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"Key points and concepts"

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Key points and concepts

- The one-year holding period return:

$$R = \frac{D_1 + P_1 - P_0}{P_0}$$

Use IRR-type calculations for multi-period returns.

- With **perfect negative correlation** the risk on a portfolio can fall to zero if an appropriate allocation of funds is made.
- With **perfect positive correlations** between the returns on investments, both the expected returns and the standard deviations of portfolios are weighted averages of the expected returns and standard deviations, respectively, of the constituent investments.
- In cases of **zero correlation** between investments risk can be reduced through diversification, but it will not be eliminated.
- The **correlation coefficient** ranges from -1 to +1. Perfect negative correlation has a correlation coefficient of -1. Perfect positive correlation has a correlation coefficient of +1.
- The **degree of risk reduction** for a portfolio depends on:
 - the extent of statistical interdependency between the returns on different investments; and
 - the number of securities in the portfolio.
- Portfolio expected returns** are a weighted average of the expected returns on the constituent investments:

$$R_p = aR_A + (1 - a)R_B$$

- Portfolio standard deviation** is less than the weighted average of the standard deviation of the constituent investments (except for perfectly positively correlated investments):
- $$S_p = \sqrt{a^2 S_A^2 + (1 - a)^2 S_B^2 + 2a(1 - a) \text{cov}(R_A, R_B)}$$
- $$S_p = \sqrt{a^2 S_A^2 + (1 - a)^2 S_B^2 + 2a(1 - a) R_{AB} S_A S_B}$$
- Covariance** means the extent to which the returns on two investments move together:

$$\text{cov}(R_A, R_B) = \frac{1}{n} \sum_{i=1}^n \{(R_A - \bar{R}_A)(R_B - \bar{R}_B)\}$$

- Covariance and the correlation coefficient** are related. Covariance can take on any positive or negative value. The correlation coefficient is confined to the range -1 to +1:

$$R_{AB} = \frac{\text{cov}(R_A, R_B)}{S_A S_B}$$

$$\text{or } \text{cov}(R_A, R_B) = R_{AB} S_A S_B$$

- Efficient portfolios** are on the **efficient frontier**. These are combinations of investments which maximise the expected returns for a given standard deviation. Such portfolios **dominate** all other possible portfolios in an **opportunity set** or **feasible set**.
- To find the proportion of the fund, a , to invest in investment C in a two-asset portfolio to achieve **minimum variance** or **standard deviation**:

$$a = \frac{S_D^2 - \text{cov}(R_C, R_D)}{S_C^2 + S_D^2 - 2 \text{cov}(R_C, R_D)}$$

- Indifference curves** for risk and return:
 - are upward sloping;
 - do not intersect;
 - are preferred if they are closer to the 'north-west';
 - are part of an infinite set of curves;
 - have a slope which depends on the risk aversion of the individual concerned.
- Optimal portfolios** are available where the highest attainable indifference curve is tangential to the efficient frontier.
- Most securities** have correlation coefficients in the range of 0 to +1.
- The feasible set for **multi-asset portfolios** is an area that resembles an umbrella.
- Diversification within a home stock market** can reduce risk to less than one-third of the risk on a typical single share. Most of this benefit is achieved with a portfolio of 10 securities.
- International diversification** can reduce risk even further than domestic diversification.
- Problems with portfolio theory**:
 - relies on past data to predict future risk and return, not taking into account the uniqueness of underlying conditions or human actions;
 - involves complicated calculations;
 - indifference curve generation is difficult;
 - few investment managers use computer programs because of the nonsense results they frequently produce.

- 3 **Evaluate alternative strategies** Business units are required to perform shareholder value calculations in order to prioritise alternatives. Even if a potential strategy has a high positive net present value, this does not necessarily mean that it will be accepted. An assessment of project risk or do-ability is overlaid across the net present value calculations.
- 4 **Agree chosen strategy with the centre** While it is perceived to be vital that the managers who best understand their business are given sufficient authority to develop strategies which they consider to be most appropriate, it is nevertheless considered equally important that there is a challenge mechanism at the centre to ensure that appropriate analyses have been performed and assumptions made are credible.
- 5 **The chosen strategy becomes a contract** Once the preferred strategy has been agreed with the centre, resource allocation and milestones are agreed. Budgetary performance targets are derived from the projections included within the strategic plan. Beyond this, however, business unit managers are free to choose whatever structures and performance indicators are considered to be relevant and appropriate.

Source: M. Davies (2000), 'Lessons from practice: VBM at Lloyds TSB', in G. Arnold and M. Davies (eds), *Value-Based Management*. Chichester: John Wiley & Sons.

Key rule: All managers should agree to both short- and long-term targets. This counters the natural tendency in all of us to focus on short-term goals that might not be optimal in the long run.

Concluding comments

The switch from management by accounting metrics to management using concepts such as value, the time value of money and opportunity cost is not widespread. Some highly successful firms have introduced value-based management systems which integrate management strategy and financial control. This has required a re-examination of all aspects of management, ranging from performance measurement systems and strategic planning to motivational schemes and training programmes. A commercial organisation that adopts value principles is one that has an important additional source of strength. The rigorous thought process involved in the robust application of these principles helps managers to understand their value drivers and having reviewed systems and product and market strategies ensure a contribution to shareholder value from all parts of the company.

The rest of this part of the book builds on the basic principles behind value-based management discussed in this chapter.

Key points and concepts

- **Value-based management** is a managerial approach in which the primacy of purpose is long-run shareholder-wealth maximisation. The objective of the firm, its systems, strategy, processes, analytical techniques, performance measurement and culture have as their guiding objective shareholder-wealth maximisation.
- **Shareholder-wealth maximisation** is the superior objective in most commercial organisations operating in a competitive market for many reasons. For example:
 - owners of the business have a right to demand this objective;
 - managers who do not satisfy shareholders may lose their roles (e.g. via a merger);
 - society's scarce resources can thereby be better allocated.
- **Non-shareholder wealth-maximising goals** may go hand in hand with shareholder value. Loyal customers, motivated employees and reliable suppliers are all important elements in value creation. But sometimes the two are contradictory and then shareholder wealth becomes paramount.
- **Earnings- (profit)-based management is flawed:**
 - profit figures are drawn up following subjective allocations and calculations relying on judgement rather than science;
 - profit figures are open to manipulation and distortion;

although Deloitte cautions “there is not a lot of detail disclosed” about them. This in turn creates a new conundrum. Most investors are calling for a wider range of factors to be fed into the calculation of executive pay, yet most investors also insist that the methodology used should be clear and transparent. Satisfying both of these demands may be less than straightforward.

The metrics used to calculate remuneration

Earnings per share (EPS) A company’s net income divided by the number of shares in issuance. Can potentially be gamed by using excess leverage (thereby increasing risk and weakening companies’ capital bases) to increase net income, or through excessive use of buybacks to reduce the number of

shares in issue. Can also act as a disincentive to long-term investment.

Total shareholder return (TSR) A combination of share price appreciation (or depreciation) and dividend pay-outs over a period of time. Can be gamed in the same manner as EPS.

Return on equity (ROE) The amount of net income returned as a percentage of shareholders’ equity. It ignores the quantum of debt deployed, and as a result its use in determining executive pay has been blamed for encouraging excessive leverage, particularly in the banking sector before the financial crisis.

Return on capital employed (ROCE) As above, except that it encompasses debt as well as equity. A potential downside is that it can deter profitable investments that may nevertheless reduce a company’s ROCE.



Financial Times, 28 September 2014.
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Concluding comments

This chapter has described several value-based metrics. The foundation for all of them is discounted cash flow allowing for a suitable return on the funds invested.

Rather than selecting one value metric, many companies, for both strategic investment discussion and performance targeting and measurement, will use both cash flow and economic profit targets. This counters some of the problems raised by using each separately and helps to alleviate short-termism; the tendency of managers to focus on short-term targets at the expense of long-term wealth. However, managers must remain aware of the drawbacks of each approach so that they do not use these metrics inappropriately. The five market-based measures should also be used in a complementary way. Relying on one indicator is unnecessarily restrictive. It is possible to use several measures simultaneously and thereby overcome many of the individual weaknesses.

Key points and concepts

- **Discounted cash flow** is the bedrock method underlying value management metrics. It requires the calculation of future annual free cash flows attributable to both shareholders and debt holders, then discounting these cash flows at the weighted average cost of capital.
- **Corporate value (Enterprise value)** equals present value of free cash flows from operations plus the value of non-operating assets.
- **Shareholder value from operations** equals present value of free cash flows from operations minus debt.
- **Total shareholder value** equals shareholder value of free cash flows from operations plus the value of non-operating assets.
- **Investment after the planning horizon does not increase value.**
- **Shareholder value analysis** simplifies discounted cash flow analysis by employing (Rappaport’s) seven value drivers, the first five of which change in a consistent fashion from one year to the next.

Key points and concepts

- **Mergers are a form of investment** and should, theoretically at least, be evaluated on essentially the same criteria as other investment decisions, for example using NPV. However there are complicating factors:
 - the benefits from mergers are difficult to quantify;
 - acquiring companies often do not know what they are buying.
- **A merger is the combining of two business entities under common ownership.** It is difficult for many practical purposes to draw a distinction between merger, acquisition and takeover.
- A **horizontal** merger is when the two firms are engaged in similar lines of activity.
- A **vertical** merger is when the two firms are at different stages of the production chain.
- A **conglomerate** merger is when the two firms operate in unrelated business areas.
- **Merger** activity has occurred in waves. **Cash** is the most common method of payment except at the peaks of the cycle when **shares** are a more popular form of consideration.
- **Synergistic merger motives:**
 - market power;
 - economies of scale;
 - internalisation of transactions;
 - entry to new markets and industries;
 - tax advantages;
 - risk diversification.
- **Superior management merger motives:**
 - elimination of inefficient and misguided management;
 - conglomerate advantages in allocating capital and in using extraordinary resources;
 - undervalued shares.
- **Managerial merger motives:**
 - empire building;
 - status;
 - power;
 - remuneration;
 - hubris;
 - survival;
 - free cash flow.
- **Third-party merger motives:**
 - advisers;
 - at the insistence of customers or suppliers.
- **Value is created from a merger** when the gain is greater than the transaction cost.

$$PV_{AB} = PV_A + PV_B + \text{gain}$$

The gain may go to A's shareholders, or B's, or be shared between the two.
- The **winner's curse** is when the acquirer pays a price higher than the combined present value of the target and the potential gain.
- **Cash as a means of payment**

For the acquirer

<i>Advantages</i>	<i>Disadvantages</i>
— Acquirers' shareholders retain control of their firm.	— Cash flow strain.
— Greater chance of early success.	

For the target shareholders

<i>Advantages</i>	<i>Disadvantages</i>
— Certain value.	— May produce capital gain tax liability
— Able to spread investments.	
- **Shares as a means of payment**

For the acquirer

<i>Advantages</i>	<i>Disadvantages</i>
— No cash outflow.	— Dilution of existing shareholders' control
— The PER game can be played.	— Greater risk of overpaying.
	— Unquoted acquirers may not be able to do this.

For the target shareholders

<i>Advantages</i>	<i>Disadvantages</i>
— Postponement of capital gains tax liability.	— Uncertain value.
— Target shareholders maintain an interest in the combined entity.	— Not able to spread in the investment without higher transaction costs.

Concluding comments

We now have a clear guiding principle set as our objective for the myriad financial decisions discussed later in this book: maximise shareholder wealth. Whether we are considering a major investment programme, or trying to decide on the best kind of finance to use, the criterion of creating value for shareholders over the long run will be paramount. A single objective is set primarily for practical reasons to aid exposition in this text; however, many of the techniques described in later chapters will be applicable to organisations with other purposes as they stand; others will need slight modification.

There is an old joke about financial services firms: they just shovel money from one place to another, making sure that some of it sticks to the shovel. The implication is that they contribute little to the well-being of society. Extremists even go so far as to regard these firms as parasites on the 'really productive' parts of the economies. And yet very few people avoid extensive use of financial services. Most have bank and building society accounts, pay insurance premiums and contribute to pension schemes. People do not put their money into a bank account unless they get something in return. Likewise building societies, insurance companies, pension funds, unit trusts, investment banks and so on can survive only if they offer a service people find beneficial and are willing to pay for. Describing the mobilisation and employment of money in the service of productive investment as pointless or merely 'shovelling it around the system' is as logical as saying that the transport firms which bring goods to the high street do not provide a valuable service because of the absence of a tangible 'thing' created by their activities.

Key points and concepts

- Firms should clearly define the **objective** of the enterprise to provide a focus for decision making.
- **Sound financial management** is necessary for the achievement of all **stakeholder** goals.
- Some stakeholders will have their returns **satisfied** – given just enough to make their contribution. One (or more) group(s) will have their returns **maximised** – given any surplus after all others have been satisfied.
- The assumed objective of the firm for finance is to **maximise shareholder wealth**. Reasons:
 - **practical**, a single objective leads to clearer decisions;
 - the contractual theory;
 - **survival** in a competitive world;
 - it is better for **society**;
 - counters the tendency of managers to pursue goals for their own benefit;
 - they **own** the firm.
- **Maximising shareholder wealth** is **maximising purchasing power** or **maximising the flow of discounted cash flow** to shareholders over a long time horizon.
- **Profit maximisation** is not the same as shareholder wealth maximisation. Some factors a profit comparison does not allow for:
 - future prospects;
 - risk;
 - accounting problems;
 - communication;
 - additional capital.
- **Corporate governance**. Large corporations usually have a **separation of ownership and control**. This may lead to **managerialism** where the agents (the managers) take decisions primarily with their interests in mind rather than those of the principals (the shareholders). This is a **principal–agent problem**. Some solutions:
 - corporate governance regulation;
 - link managerial rewards to shareholder wealth improvement;
 - sackings;
 - selling shares and the takeover threat;
 - improve information flow.
- **Financial institutions and markets** encourage growth and progress by **mobilising savings** and encouraging investment.

Key points and concepts

- **Time value of money** has three component parts each requiring compensation for a delay in the receipt of cash:
 - the pure time value, or impatience to consume,
 - inflation,
 - risk.
- **Opportunity cost of capital** is the yield forgone on the best available investment alternative – the risk level of the alternative being the same as for the project under consideration.
- Taking account of the time value of money and opportunity cost of capital in project appraisal leads to **discounted cash flow analysis** (DCF).
- **Net present value** (NPV) is the present value of the future cash flows after netting out the initial cash flow. Present values are achieved by discounting at the opportunity cost of capital.

$$NPV = CF_0 + \frac{CF_1}{1 + k} + \frac{CF_2}{(1 + k)^2} + \dots + \frac{CF_n}{(1 + k)^n}$$
- The net present value decision rules are:
 - NPV ≥ 0 accept
 - NPV < 0 reject
- **Internal rate of return** (IRR) is the discount rate which, when applied to the cash flows of a project,

results in a zero net present value. It is an 'r' which results in the following formula being true:

$$CF_0 + \frac{CF_1}{1 + r} + \frac{CF_2}{(1 + r)^2} + \dots + \frac{CF_n}{(1 + r)^n} = 0$$

- The internal rate of return decision rule is:
 - IRR \geq opportunity cost of capital – accept
 - IRR $<$ opportunity cost of capital – reject
- IRR is poor at handling situations with unconventional cash flows.
- There are circumstances when IRR and NPV rank projects differently. This **ranking problem** becomes an important issue in situations of mutual exclusivity.
- The IRR decision rule is reversed for financing decisions.
- NPV measures in **absolute amounts of money**. IRR is a percentage measure.
- IRR assumes that intra-project cash flows can be invested at a rate of return equal to the IRR.
- If a percentage measure is required, perhaps for communication within an organisation, then the **modified internal rate of return** (MIRR) is to be preferred to the IRR.

Appendix 2.1 Mathematical tools for finance

The purpose of this appendix is to explain essential mathematical skills that will be needed for this book. The authors have no love of mathematics for its own sake and so only those techniques of direct relevance to the subject matter of this textbook will be covered in this section.

Simple and compound interest

When there are time delays between receipts and payments of financial sums we need to make use of the concepts of simple and compound interest.

Simple interest

Interest is paid only on the original principal. No interest is paid on the accumulated interest payments.

Example 1

Suppose that a sum of £10 is deposited in a bank account that pays 12% per annum. At the end of year 1 the investor has £11.20 in the account. That is:

$$F = P(1 + i)$$

$$11.20 = 10(1 + 0.12)$$

where F = Future value, P = Present value, i = Interest rate.

understanding may be more than a little annoyed at being told that the understanding of these issues is merely one of the stages leading to successful application of net present value to practical business problems. The logical, mathematical and conceptual knowledge presented above has to be married to an appreciation of real-world limitations imposed by the awkward fact that it is people who have to be persuaded to act to implement a plan. This is an issue examined in the next chapter. Further real-world complications such as the existence of risk, of inflation and taxation and of limits placed on availability of capital are covered in subsequent chapters.

Key points and concepts

- **Raw data** have to be checked for accuracy, reliability, timeliness, expense of collection, etc.
- **Depreciation** is not a cash flow and should be excluded.
- **Profit** is a poor substitute for cash flow. For example, working capital adjustments may be needed to modify the profit figures for NPV analysis.
- Analyse using **incremental cash flows**. That is the difference between the cash flows arising if the project is implemented and the cash flows if the project is not implemented:
 - **opportunity costs** associated with, say, using an asset which has an alternative employment are relevant;
 - **incidental effects**, that is, cash flow effects throughout the organisation, should be considered along with the obvious direct effects;
 - **sunk costs** – costs which will not change regardless of the decision to proceed are clearly irrelevant;
 - **allocated overhead** is a non-incremental cost and is irrelevant;
 - **interest** should not be double counted by both including interest as a cash flow and including it as an element in the discount rate.
- **The replacement decision** is an example of the application of incremental cash flow analysis.
- **Annual equivalent annuities (AEA)** can be employed to estimate the **optimal replacement cycle** for an asset under certain restrictive assumptions. The **lowest common multiple (LCM)** method is sometimes employed for short-lived assets.
- Whether to repair the old machine or sell it and buy a new machine is a very common business dilemma. Incremental cash flow analysis helps us to solve these types of problems. Other applications include the **timing of projects**, the issue of **fluctuating output** and the **make or buy decision**.

References and further reading

Bierman, H. and Smidt, S. (2006) *The Capital Budgeting Decision*, 9th edn. London: Routledge.

Contains some good chapters for the beginner.

Bierman, H. and Smidt, S. (2006) *Advanced Capital Budgeting*. London: Routledge.

Good for those wanting to pursue these topics in more depth.

Coulthurst, N.J. (1986) 'The application of the incremental principle in capital investment project evaluation', *Accounting and Business Research*, Autumn.

A discussion of the theoretical and practical application of the incremental cash flow principle.

Ismail, T. and Cline, M. (2005) 'Investment appraisal under conditions of continuous and discrete cash flows and discounting', *Managerial Auditing Journal*, 20(1), pp. 30–35.

Discusses the most effective way to calculate investment returns under continuous and discrete cash flows. Discusses limitations of the assumption that cash flows occur at the start or end of the year.

Marco-Izquierdo, J.A. (2015) 'CEOs don't care enough about Capital Allocation', *Harvard Business Review Digital Articles* 4/16/2015, pp. 2–4.

Discusses the shortage of CEOs who are skilled at capital allocation.

Mauboussin, M.J. and Callahan, D. (2014) 'Capital allocation: Evidence, Analytical Methods and Assessment Guidance', *Journal of Applied Corporate Finance*, 26(4), pp. 98–74.

Examines the main sources and uses of capital by the largest 1,500 US companies during the last 30 years. Identifies capital allocated to seven alternatives,

Exhibit 4.13 (continued)

The Sabre engine was conceived by the Three Rocketeers in tandem with a space plane, Skylon, to take an aircraft from earth to orbit and back again in a single stage, with no parts jettisoned in flight.

However, under Mark Thomas, chief executive since 2015, the company will focus on the engine and move towards its ultimate goal of single-stage-to-orbit propulsion in steps.

This means developing an intermediate solution to make the first stage of traditional two-stage launches more efficient.

Reaction has also cut the size of the engine under development by three-quarters and brought in BAE Systems, which injected £20.6m in exchange for a 20% stake. The impetus is a rising demand for lower cost re-usable satellite launch systems.

The advantage of scaling back ambitions in the near term, Mr Thomas says, is that this market can be accessed more quickly and the initial costs of development are significantly lower.

Now capable of being used in modular scaleable configurations, the technology can also be applied to

a greater range of sectors to help generate revenue earlier.

“Single stage to orbit, full re-usable systems are the ideal state, the Holy Grail,” he says from the company’s headquarters at the Culham Science Centre near Abingdon. “But there has to be something between the two. Single stage to orbit is still on the road map.

“But we have pushed the horizon out slightly further, partly to enable us to exploit these earlier opportunities that we have seen through dialogue with government and industry.”

Industry experts say Reaction’s strategy makes sense — especially for a concept as ambitious as the Sabre engine. Reaction “is the only one in town doing this type of engine”, says Phil Smith of US-based Bryce Space and Technology consultants.

“This iterative process is a very wise way to go. It demonstrates a maturity in the industry that didn’t exist before.” Rather than focusing on a goal that might fall victim to funding constraints, Reaction is seeking to demonstrate the utility of its innovation in more immediate ways, he says.



Financial Times, 5 May 2017.
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Concluding comments

The typical student of finance will spend time trying to cope with problems presented in a mathematical form. This is necessary because these are often the most difficult aspects of the subject to absorb. However, readers should not be misled into thinking that complex computations are at the centre of project investment in the practical world of business. Managers are often either ignorant of the principles behind discounted cash flow techniques or choose to stress more traditional rule-of-thumb techniques, such as payback and accounting rate of return, because of their communicatory or other perceived advantages. These managers recognise that good investment decision making and implementation require attention to be paid to the social and psychological factors at work within an organisation. They also know that formal technical appraisal takes place only after a long process of idea creation and development in a suitably nurturing environment. There is also a long period of discussion and commitment forming, and continuous re-examination and refinement. The real art of management is in the process of project creation and selection and not in the technical appraisal stage.

Key points and concepts

- **Payback and ARR** are widely used methods of project appraisal, but discounted cash flow methods are the most popular.
- Most large firms use **more than one appraisal method**.
- **Payback** is the length of time for cumulated future cash inflows to equal an initial outflow. Projects are accepted if this time is below an agreed cut-off point.

Concluding comments

This chapter deals with some of the more technical aspects of project appraisal. These are issues that are of great concern to managers and should never be neglected in an investment evaluation. Serious misunderstanding and poor decision making can result from a failure to consider all relevant information.

Key points and concepts

- **Soft capital rationing** – internal management-imposed limits on investment expenditure despite the availability of positive NPV projects.
- **Hard capital rationing** – externally imposed limits on investment expenditure in the presence of positive NPV projects.
- For **divisible one-period capital rationing problems**, focus on the returns per £ of outlay:

$$\text{Profitability index} = \frac{\text{Gross present value}}{\text{Initial outlay}}$$

$$\text{Benefit/cost ratio} = \frac{\text{Net present value}}{\text{Initial outlay}}$$
- For **indivisible one-period capital rationing problems**, examine all the feasible alternative combinations.
- Two rules for **allowing for taxation** in project appraisal:
 - include incremental tax effects of a project as a cash outflow;
 - get the timing right.
- **Taxable profits are not the same as accounting profits.** For example, depreciation is not allowed for in the taxable profit calculation, but writing-down allowances are permitted.
- **Specific inflation** – price changes of an individual good or service over a period of time.
- **General inflation** – the reduced purchasing power of money.
- General inflation affects the rate of return required on projects:
 - **real rate of return** – the return required in the absence of inflation;
 - **money rate of return** – includes a return to compensate for inflation.
- **Fisher's equation**

$$(1 + \text{money rate of return}) = (1 + \text{real rate of return}) * (1 + \text{anticipated rate of inflation})$$

$$(1 + m) = (1 + h) * (1 + i)$$
- Inflation affects future cash flows:
 - **money cash flows** – all future cash flows are expressed in the prices expected to rule when the cash flow occurs;
 - **real cash flows** – future cash flows are expressed in constant purchasing power.
- **Adjusting for inflation in project appraisal:**
 - Approach 1 – Estimate the cash flows in money terms and use a money discount rate.
 - Approach 2 – Estimate the cash flows in real terms and use a real discount rate.

References and further reading

Arnold, G.C. and Hatzopoulos, P.D. (2000) 'The theory-practice gap in capital budgeting: evidence from the United Kingdom', *Journal of Business Finance and Accounting*, 27(5) and (6), June/July, pp. 603–26.

Empirical evidence on the treatment of inflation.

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Coulthurst, N.J. (1986) 'Accounting for inflation in capital investment: state of the art and science', *Accounting and Business Research*, Winter, pp. 33–42.

A clear account of the impact of inflation on project appraisal. Also considers empirical evidence on the adjustments made in practice. Good for the beginner.

Fama, E.F. (1981) 'Stock returns, real activity, inflation and money', *American Economic Review*, 71 (Sept.), pp. 545–64.

On the complex relationship between returns on shares and inflation – high level economics.

Perhaps it is because of these difficulties that only 3.6% of large UK firms say that a real options approach to investment analysis is 'important' – none replied that it was 'very important' and 56.6% said it was 'not important' (Alkaraan and Northcott, 2006). It is a shame that over complexity has put managers off because the concept is very important.

Concluding comments

This chapter, and the previous one, have dealt with some of the more sophisticated aspects of project analysis. They have, it is hoped, encouraged the reader to consider a wider range of factors when embarking on investment appraisal. Taking into account more real-world influences such as inflation, rationing, tax and risk will enable the appraiser and the decision maker to obtain a clearer picture of the nature of the proposal being discussed. Greater realism and more information clears away some of the fog which envelops many capital investment decision-making processes.

However, this chapter has focused primarily on the technical/mathematical aspects of the appraisal stage of the investment process sequence. While these aspects should not be belittled, as we ought to improve the analysis wherever we can, it should be noted that a successful programme of investment usually rests far more on quality management of other stages in the process. Issues of human communication, enthusiasm and commitment are as vital to investment returns as, for example, assessing risk correctly.

Key points and concepts

- **Risk** – more than one possible outcome.
- **Objective probability** – likelihood of outcomes established mathematically or from historic data.
- **Subjective probability** – personal judgement of the likely range of outcomes along with the likelihood of their occurrence.
- **Risk can be allowed for by raising or lowering the discount rate:**

Advantages:

- easy to adopt and understand;
- theoretical support.

Drawbacks: susceptible to subjectivity in risk premium and risk class allocation.

- **Sensitivity analysis** views a project's NPV under alternative assumed values of variables, changed one at a time. It permits a broader picture to be presented, enables scarce resources to be more efficiently directed and allows contingency plans to be made.

Drawbacks of sensitivity analysis:

- does not assign probabilities and these may need to be added for a fuller picture;
- each variable is changed in isolation.

- **Scenario analysis** permits a number of factors to be changed simultaneously. Allows best- and worst-case scenarios.

- **Probability analysis** allows for more precision in judging project viability.
- **Expected return** – the mean or average outcome is calculated by weighting each of the possible outcomes by the probability of occurrence and then summing the result:

$$\bar{X} = \sum_{i=1}^{i=n} (x_i p_i)$$

- **Standard deviation** – a measure of dispersion around the expected value:

$$S_x = \sqrt{\sum_{i=1}^{i=n} (x_i - \bar{x})^2 p_i}$$

- It is assumed that most people are **risk averters** who demonstrate **diminishing marginal utility**, preferring less risk to more risk.

- **Mean-variance rule:**

Project X will be preferred to Project Y if at least one of the following conditions applies:

- 1 The expected return of X is at least equal to the expected return of Y, and the variance is less than that of Y.
- 2 The expected return of X exceeds that of Y and the variance is equal to or less than that of Y.

- If a normal, bell-shaped distribution of possible outcomes can be assumed, the probabilities of

The road is long and winding but the vistas revealed along the way provide enlightenment, if only of the kind captured in the following phrase: 'The fool says he is knowledgeable and has the answers, the wise man says he has much to learn.'

Key points and concepts

- Risky securities, such as shares quoted on the London Stock Exchange, have produced a much higher average annual return than relatively risk-free securities. However, the annual swings in returns are much greater for shares than for Treasury bills or bonds. **Risk and return** are positively related.
- **Total risk** consists of two elements:
 - **systematic risk** (or market risk, or non-diversifiable risk) – risk factors common to all firms;
 - **unsystematic risk** (or specific risk, diversifiable risk, or idiosyncratic risk).
- **Unsystematic risk can be eliminated by diversification.** An efficient market will not reward unsystematic risk.
- **Beta** measures the covariance between the returns on a particular share with the returns on the market as a whole.
- The **security market line (SML)** shows the relationship between risk as measured by CAPM-beta and expected returns.
- The equation for the **Capital Asset Pricing Model** is:

$$r_j = r_f + b_j(r_m - r_f)$$
- The slope of the characteristic line represents beta

$$r_j = a + b_j r_m + e$$
- **Some examples of the CAPM's application:**
 - portfolio selection;
 - identifying mispriced shares;
 - measuring portfolio performance;
 - rate of return on firm's projects.
- **Technical problems with the CAPM:**
 - measuring beta;
 - *ex ante* theory but *ex post* testing and analysis;
 - unobtainability of the market portfolio;
 - one-period model;
 - few government securities are risk free;
 - unrealistic assumptions.
- **Early research** seemed to confirm the **validity of beta** as *the* measure of risk influencing returns. **Later work** cast serious doubt on this. Some researchers say beta has no influence on returns.
- **Beta is not the only determinant of return.**
- **Multi-factor models** allow for a variety of influences on share returns.
- Factor models refer to diversifiable risk as **non-factor risk** and non-diversifiable risk as **factor risk**.
- **Major problems with multi-factor models** include:
 - the difficulty of finding the influencing factors;
 - once found, the influencing factors only explain past returns.
- The **arbitrage pricing theory (APT)** is one possible multi-factor model:

$$\text{Expected returns} = \text{risk-free return} + b_1(r_1 - r_f) + b_2(r_2 - r_f) + b_3(r_3 - r_f) + b_4(r_4 - r_f) + \dots + b_n(r_n - r_f) + e$$
- Fama and French have developed a **three-factor model**:

$$\text{Expected return} = \text{risk-free rate} + b_1(r_m - r_f) + b_2(\text{SMB}) + b_3(\text{HML})$$
- **Traditional commonsense based measures of risk** seem to have more explanatory power over returns than beta or standard deviation.
- Projects of differing risks should be appraised using different discount rates.

Appendix 8.1: Note on arithmetic and geometric means

To understand the difference between arithmetic and geometric means, consider the case of an investment that only has capital gains and losses (there are no dividends).

At Time 0 the investment is worth £100. One year later (Time 1) it has risen to £200, an annual rate of return of 100%. In the next year the investment falls back to £100, a loss of 50% for the year. In the third year the value rises to £130, a 30% gain.

Key points and concepts

- **Stock exchanges** are markets where government and industry can raise long-term capital and investors can buy and sell securities.
- **Two breakthroughs in the rise of capitalism:**
 - thriving secondary markets for securities;
 - limited liability.
- **Over 140 countries now have stock markets.** They have grown in significance due to:
 - disillusionment with planned economies;
 - recognition of the key role of stock markets in a liberal pro-market economic system in mobilising saving and allocating resources.
- The **largest** domestic stock markets are in the USA, Japan and China.
- **Electronic communication networks (ECNs) or multilateral trading facilities (MTFs)** are alternative trading venues for shares quoted on the major national stock exchanges of the USA and Europe.
- The **globalisation** of equity markets has been driven by:
 - deregulation;
 - technology;
 - institutionalisation.
- Companies **list on more than one exchange** for the following reasons:
 - to broaden the shareholder base and lower the cost of equity capital;
 - the domestic market is too small or the firm's growth is otherwise constrained;
 - to reward employees;
 - investors in particular markets may understand the firm better;
 - to raise awareness of the company;
 - to discipline the firm and learn to improve performance;
 - to understand better the economic, social and industrial changes occurring in major product markets.
- **A well-run stock exchange:**
 - allows a 'fair game' to take place;
 - is regulated to avoid negligence, fraud and other abuses;
 - allows transactions to take place cheaply;
 - has enough participants for efficient price setting and liquidity.
- **Benefits of a well-run stock exchange:**
 - firms can find funds and grow;
 - society can allocate capital better;
 - shareholders can sell speedily and cheaply. They can value their financial assets and diversify;
 - increase in status and publicity for firms;
 - mergers can be facilitated by having a quotation. The market in managerial control is assisted;
 - corporate behaviour can be improved.
- The **London Stock Exchange** regulates the trading of **equities** (domestic and international) and **debt instruments** (e.g. gilts, corporate bonds and Eurobonds, etc.) and **other financial instruments** (e.g. covered warrants, depositary receipts and preference shares).
- The **primary market** is where firms can raise finance by selling shares (or other securities) to investors.
- The **secondary market** is where existing securities are sold by one investor to another.
- **Internal funds** are generally the most important source of long-term capital for firms. **Bank borrowing** varies greatly and **new share or bond issues** account for a minority of the funds needed for corporate growth.
- LSE's **Main Market** is the most heavily regulated UK exchange.
- The **Alternative Investment Market (AIM)** is the lightly regulated exchange designed for small, young companies.
- NEX Exchange provides a share trading facility for companies, less costly than the LSE.
- Stock exchanges undertake most or all of the following **tasks** to play their role in a modern society:
 - supervise trading;
 - authorise market participants (e.g. brokers, market makers);
 - assist price formation;
 - clear and settle transactions;
 - regulate the admission of companies to and companies on the exchange;
 - disseminate information.
- A **quote-driven** share trading system is one in which **market makers** quote a bid and an offer price for shares. An **order-driven system** is one in which investors' buy and sell orders are matched without the intermediation of market makers.

Key points and concepts

- **Ordinary shareholders** own the company. They have the rights of control, voting, receiving annual reports, etc. They have no rights to income or capital but receive a residual after other claimants have been satisfied. This residual can be very attractive.
- **Debt capital holders** have no formal control but they do have a right to receive interest and capital.
- **Equity** as a way of financing the firm:

<i>Advantages</i>	<i>Disadvantages</i>
1 No obligation to pay dividends – ‘shock absorber’.	1 High cost: <ul style="list-style-type: none"> a issue costs; b required rate of return.
2 Capital does not have to be repaid – ‘shock absorber’.	2 Loss of control.
	3 Dividends not tax deductible.
- **Authorised share capital** is the maximum amount permitted by shareholders to be issued.
- **Issued share capital** is the amount issued (sold) expressed at par value.
- **Share premium** The difference between the sale price and par value of shares.
- **Private companies** Companies termed ‘Ltd’ are the most common form of limited liability company.
- **Public limited companies (plcs)** can offer their shares to a wider range of investors, but are required to have £50,000 of share capital.
- **Preference shares** offer a fixed rate of return, but without a guarantee. They are part of shareholders’ funds but not part of the equity capital.

<i>Advantages to the firm</i>	<i>Disadvantages to the firm</i>
1 Dividend ‘optional’.	1 High cost of capital relative to debt.
2 Usually no influence over management.	2 Dividends are not tax deductible.
3 Extraordinary profits go to ordinary shareholders.	
4 Financial gearing considerations.	
- **Types of preference share:** cumulative, participating, redeemable, convertible, variable rate.
- **Ordinary shares** rank higher than **deferred ordinary shares** for dividends, but in a good year the deferred holders (often founders) may receive a large share of the profit. Preferred ordinary shares rank higher than ordinary shares.
- **Golden shares** have extraordinary special powers.
- **To float on London Stock Exchange’s Official List with a premium listing** the following are required:
 - a prospectus;
 - an acceptance of new responsibilities (e.g. dividend policy may be influenced by exchange investors; directors’ freedom to buy and sell may be restricted);
 - 25% of share capital in public hands;
 - that the company is suitable;
 - usually three years of accounts;
 - competent and broadly based management team;
 - appropriate timing for flotation;
 - a sponsor;
 - a corporate broker;
 - underwriters (usually);
 - accountants’ reports;
 - lawyers;
 - registrar.
- **Following flotation on the Main Market:**
 - greater disclosure of information;
 - restrictions on director share dealings;
 - annual fees to LSE;
 - high standards of behaviour.
- **Methods of flotation:**
 - placing;
 - offer for sale;
 - introduction;
 - intermediaries’ offer;
 - reverse takeover.
- **Book-building** Investors make bids for shares. Issuers decide price and allocation in light of bids.
- **Stages in a flotation:**
 - pre-launch publicity;
 - decide technicalities, e.g. method, price, underwriting;
 - pathfinder prospectus;
 - launch of public offer – prospectus and price;
 - close of offer;
 - allotment of shares;
 - first trading.
- **The Alternative Investment Market (AIM)** differs from the Main Market in:
 - nominated advisers, not sponsors;
 - lower costs;
 - no minimum capitalisation, trading history or percentage of shares in public hands needed;
 - lower ongoing costs.

funds to be buyers in the long-dated segment. If banks need to borrow large quantities quickly they will sell some of their short-term instruments, increasing the supply on the market and pushing down the price and raising the yield. On the other hand pension funds may be flush with cash and may buy large quantities of 20-year bonds, helping to temporarily move yields downward at the long end of the market. At other times banks, pension funds and the buying and selling pressures of a multitude of other financial institutions will influence the supply and demand position in the opposite direction. The point is that the players in the different parts of the yield curve tend to be different. This hypothesis helps to explain the often lumpy or humped yield curve.

A final thought on the term structure of interest rates

It is sometimes thought that in circumstances of a steeply rising yield curve it would be advantageous to borrow short term rather than long term. However, this can be a dangerous strategy because long-term debt may be trading at a higher rate of interest because of the expected rise in short-term rates and so when the borrower comes to refinance in, say, a year's time, the short-term interest rate is much higher than the long-term rate and this high rate has to be paid out of the second year's cash flows, which may not be convenient.

Concluding comments

So far this book has taken a fairly detailed look at a variety of ways of raising money by selling shares and has examined the main methods of raising funds through long-term debt. The decision to raise equity or debt finance is neither simple nor straightforward. In the next chapter we consider a wider array of financial sources and types, from leasing to factoring. Knowledge of these will enable the finance manager or other executives to select and structure the different forms of finance to maximise the firm's potential. Topics covered later in the book draw on the knowledge gained in Chapters 10, 11 and 12 to permit informed discussion of such crucial questions as: What is the appropriate mixture of debt and equity? How is the cost of various forms of finance calculated? How can the risk of certain forms of finance (for example a floating-interest-rate term loan) be reduced?

Key points and concepts

- **Debt finance has a number of advantages for the company:**
 - it has a lower cost than equity finance:
 - a lower transaction costs;
 - b lower rate of return;
 - debt holders generally do not have votes;
 - interest is tax deductible.
- **Drawbacks of debt:**
 - Committing to repayments and interest can be risky for a firm, ultimately the debt-holders can force liquidation to retrieve payment;
 - the use of secured assets for borrowing may be an onerous constraint on managerial action;
 - covenants may further restrict managerial action.
- **A corporate bond** is a long-term contract in which the bondholders lend money to a company. A straight 'vanilla' bond pays regular interest plus the capital on the redemption date.
- Debentures are generally more secure than **loan stock** (in the UK).
- A **trust deed** has **affirmative covenants** outlining the nature of the bond contract and **negative (restrictive) covenants** imposing constraints on managerial action to reduce risk for the lenders.
- A **floating rate note (FRN)** is a bond with an interest rate which varies as a benchmark interest rate changes (e.g. LIBOR).
- **Attractive features of bank borrowing:**
 - administrative and legal costs are low;
 - quick;
 - flexibility in troubled times;
 - available to small firms.

12 million transactions worth over USD1 trillion in value. They use 2 primary banks and 150 non-primary banks with 2,300 accounts in total. The operating companies that make up Shell are able to use the central treasury for foreign exchange and money market deals. In this way the best rates can be achieved on the market due to economies of scale and netting (combining subsidiary balances and simply dealing with the net amounts), control over risk levels can be exercised, skills can be concentrated and advantage can be taken of the sophisticated computerised treasury management systems. The argument against centralisation is that this can be bureaucratic, inflexible and slow to respond to the immediate needs of the operating managers in far-flung places.

Another fundamental question is whether the treasury should act as a risk minimiser or a profit maximiser. Many companies make use of the derivative markets both to hedge (reduce risk) foreign exchange and interest rates, and for 'trading' purposes to try to make gains. Most firms are adamant that their treasury should not speculate. The danger with instructing the treasury to act as a profit centre is that the managers may be tempted to take excessive risks. There have been some spectacular and well-publicised losses made by members of treasury teams. The embarrassment to ostensibly staid and low-risk firms such as Procter & Gamble (US\$100m + lost) can be considerable.

Key points and concepts

- **Overdraft** A permit to overdraw on an account up to a stated limit.
Advantages: (a) flexibility; (b) cheap.
Drawbacks: (a) bank has right to withdraw facility quickly; (b) security is usually required.
- **A bank usually considers the following before lending:**
 - the projected cash flows;
 - creditworthiness;
 - the amount contributed by borrower;
 - security.
- **Term loan** A loan of a fixed amount for an agreed time and on specified terms, usually one to seven years.
- **Trade credit** Goods delivered by suppliers are not paid for immediately.
- The **early settlement discount** means that taking a long time to pay is not cost free.
- **Advantages of trade credit:**
 - convenient, informal and cheap;
 - available to companies of any size.
- **Factors determining the terms of trade credit:**
 - tradition within the industry;
 - bargaining strength of the two parties;
 - product type;
 - credit standing of individual customers.
- **Factoring companies** provide at least three services:
 - providing finance on the security of trade debts;
 - sales ledger administration;
 - credit insurance.
- **Invoice discounting** is the obtaining of money on the security of book debts. Usually confidential and with recourse to the supplying firm. The supplying firm manages the sales ledger.
- **Hire purchase** is an agreement to hire goods for a specified period, with an option or an automatic right to purchase the goods at the end for a nominal or zero final payment.
The main advantages:
 - small initial outlay;
 - certainty;
 - available when other sources of finance are not;
 - fixed-rate finance;
 - tax relief available.
- **Leasing** The legal owner of an asset gives another person or firm (the lessee) the possession of that asset to use in return for specified rental payments. Note that ownership is not transferred to the lessee.
- **An operating lease** commits the lessee to only a short-term contract, less than the useful life of the asset.
- **A finance lease** commits the lessee to a contract for the substantial part of the useful life of the asset.
Advantages of leasing:
 - small initial outlay;
 - certainty;
 - available when other finance sources are not;
 - fixed rate of finance;
 - tax relief (operating lease: rental payments are a tax-deductible expense; finance lease: capital value can be written off over a number of years; interest is tax deductible);
 - avoid danger of obsolescence with operating lease.

To conclude: the equity markets are generally efficient, but the person with superior analytical ability, knowledge, dedication and creativity can be rewarded with abnormally high returns. However, for people who do not have these four qualities directed effectively at security analysis – the vast majority – it is dangerous to invest or make corporate decisions on the assumption that the share (currency and commodity) markets are inefficient, because most of the time they are efficient. Markets are inefficient in spots. Those spots are first of all difficult to identify, and then, once you think you have identified an area of inefficient pricing it has a tendency to fade away, or additional analysis shows it was not really there in the first place. Playing the game of trying to land yourself in an area of inefficiency is to be played only by the very skilful and knowledgeable. Most corporate managers and fund managers do not qualify.

Key points and concepts

- **In an efficient market security prices rationally reflect available information** New information is a rapidly and b rationally incorporated into share prices.
- **Types of efficiency:**
 - operational efficiency;
 - allocational efficiency;
 - pricing efficiency.
- **The benefits of an efficient market are:**
 - it encourages share buying;
 - it gives correct signals to company managers;
 - it helps to allocate resources.
- Shares, other financial assets and commodities generally move with a **random walk** – one day's price change cannot be predicted by looking at previous price changes. Security prices respond to news which is random.
- **Weak-form efficiency** Share prices fully reflect all information contained in past price movements.
Evidence: mostly in support, but there are some important exceptions.
- **Semi-strong form efficiency** Share prices fully reflect all the relevant, publicly available information.
Evidence: substantially in support but there are some exceptions.
- **Strong-form efficiency** All relevant information, including that which is privately held, is reflected in the share price.
Evidence: stock markets are strong-form inefficient.
- **Insider dealing** is trading on privileged information. It is profitable and illegal.
- **Behavioural finance studies** offer insight into anomalous share pricing.
- **Implications of the EMH for investors:**
 - for the vast majority of people public information cannot be used to earn abnormal returns;
 - investors need to press for a greater volume of timely information;
 - the perception of a fair game market could be improved by more constraints and deterrents placed on insider dealers.
- **Implications of the EMH for companies:**
 - focus on substance, not on short-term appearances;
 - the timing of security issues does not have to be fine-tuned;
 - large quantities of new shares can be sold without moving the price;
 - signals from price movements should be taken seriously.

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Shares held by more overconfident fund managers experience greater momentum profits and stronger return reversals than shares held by less overconfident managers.

with. Returns falling below the acceptable range can be easily rejected, those with a good margin above are simple to make a decision about. Management at these extremes is survivable even for the humdrum executive. It is those projects that give returns lying in the middle that require insightful judgement that is the art of management: they call for leaders.

Key points and concepts

- The **cost of capital** is the rate of return that a company has to offer finance providers to induce them to buy and hold a financial security.
- The **weighted average cost of capital (WACC)** is calculated by weighting the cost of debt and equity in proportion to their contribution to the total capital of the firm:
- The **cost of retained earnings** is equal to the expected returns required by shareholders buying new shares in a firm.
- The **cost of debt capital**, k_D , is the current market rate of return for a risk class of debt. The cost to the firm is reduced to the extent that interest can be deducted from taxable profits:

$$WACC = k_E W_E + k_{DAT} W_D$$

$$k_{DAT} = k_{DBT} (1 - T)$$

- The **WACC can be lowered** (or raised) by altering the proportion of debt in the capital structure.
- **Investors in shares** require a return, k_E , which provides for two elements:
 - a return equal to the risk-free rate; plus
 - a risk premium.
- The **cost of irredeemable constant dividend preference share capital** is:

$$k_p = \frac{d_1}{P_p}$$

The most popular method for calculating the risk premium has two stages:

- estimate the average risk premium for shares ($r_m - r_f$); and
- adjust the average premium to suit the risk on a particular share.

The CAPM using a beta based on the relative co-movement of a share with the market has been used for the second stage but other risk factors appear to be relevant.

- An alternative method for calculating the required rate of return on equity is to use the **Gordon growth model**:

$$k_E = \frac{d_1}{P} + g$$

- The **weights in the WACC are based on market values**, not balance sheet values.
- For projects, etc. with similar risk to that of the existing set, use the WACC, which is based on the target debt to equity ratio. **Do not use the cost of the latest capital raised.**
- For projects, SBUs, etc. of a **different systematic risk level from that of the firm**, raise or lower the discount rate in proportion to the risk.
- Companies use a mixture of theoretically correct techniques with rules of thumb to calculate hurdle rates of return.
- Calculating a cost of capital relies a great deal on judgement rather than scientific precision. But there is a theoretical framework to guide that judgement.

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Evidence on what UK companies do.

Exhibit 17.16 (continued)

'The answer is to stick to businesses which are relatively simple and stable in character.'

Mr Buffett explicitly rules out businesses or industries that are new, unstable or subject to rapid change, such as investment banking or technology.

Without wishing to put words into the great man's mouth, this seems to include most of the market.

Taken as a simple syllogism, this is rather daunting. It says that 1) the only rational valuation method is DCF; 2) DCF is not applicable to most businesses, and therefore 3) most businesses cannot be rationally valued.

And yet business people go on making valuation decisions every day. How come?

Part of the answer, I suspect, is that executives proceed much more cautiously than analysts. Their cash-flow projections are lower, their discount rates higher. This makes sense.

If a fund manager buys a stock on false assumptions, he can dump it. If an executive builds a plant on the same basis, he is stuck.

The other part of the answer is that the market works as a kind of blundering average. The point is not that it is setting the right price, but that it is setting a price at all.

This is what Mr Buffett means when he says 'Mr Market' is there to serve you, not to guide you. It is also why he rejects the use of beta. Suppose a stock that normally tracks the market suddenly collapses for no good reason. Should you not buy it, just because its beta has gone up?

Alas, for the average fund manager the answer is normally yes. If the market says a stock is risky, so it is. And if DCF says a stock is cheap but its market price is falling, end of story.

FT

Financial Times, 15 September 2008, p. 24.
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Concluding comments

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 which give insight, not a single number at the end. It is the recognition of the qualitative, and even subjective, nature of key variables in a superficially 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. As the sage of finance, Warren Buffett, says, 'Valuing a business is part art and part science'.⁸

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

Key points and concepts

- Knowledge of the influences on share value is needed by:
 - a managers seeking actions to increase that value;
 - b investors interested in allocating savings.
- Share valuation requires a combination of two skills:
 - a analytical ability using mathematical models;
 - b good judgement.
- The net asset value (NAV) approach to valuation focuses on balance sheet values. These may be adjusted to reflect current market or replacement values.
 - Advantage: 'objectivity'.
 - Disadvantages: – excludes many non-quantifiable assets;
 - less objective than is often supposed.

⁸ Quoted by Adam Smith, 'The modest billionaire', *Esquire*, October 1988, p. 103. Reprinted in Janet Lowe (1997), p. 100.

However, as gearing rises the risk of financial distress causes shareholders (and eventually debt holders) to demand a greater return. This eventually rises to such an extent that it outweighs the benefit of the lower cost of debt, and the WACC starts to rise. This risk factor is difficult, if not impossible, to quantify and therefore the exact position and shape of the WACC curve for each firm remain largely unknown. Nevertheless, it seems reasonable to postulate there is a U-shaped relationship like that shown in **Exhibit 18.33**.

We cannot establish with precision an optimal gearing ratio. There are many complicating factors which determine the actual capital structure adopted by firms, so that, while we accept that the WACC is probably U-shaped for firms generally, we cannot calculate, with any certainty, an optimal gearing level. This explains why there is such a variation in gearing levels.

Variations derive from both internal and external factors. Internal factors include the profitability and stability of the company's cash flow, the company's borrowing capacity which may be restricted by availability of assets as security. Emotions and opinions also influence behaviour including the personalities involved, management self-belief, shareholder attitude. External factors include the economic environment, the norms in the industry, the volatility of the market or the availability of credit.

So, to the question of whether a firm can obtain a level of gearing which will maximise shareholder wealth the answer is 'yes'. The problem is finding this level in such a multifaceted analysis.

Key points and concepts

- **Financial gearing** concerns the proportion of debt in the capital structure.
- **Operating gearing** refers to the extent to which the firm's total costs are fixed.
- **Capital gearing** can be measured in a number of ways. For example:
 - 1
$$\frac{\text{Long-term debt}}{\text{Shareholders' funds}}$$
 - 2
$$\frac{\text{Long-term debt}}{\text{Long-term debt} + \text{Shareholders' funds}}$$
 - 3
$$\frac{\text{All borrowing}}{\text{All borrowing} + \text{Shareholders' funds}}$$
 - 4
$$\frac{\text{Long-term debt}}{\text{Total market capitalisation}}$$
- **Income gearing** is concerned with the proportion of the annual income stream which is devoted to the prior claims of debt holders.
- The **effect of financial gearing** is to magnify the volatility of a firm's profit available to ordinary shareholders.
- **Business risk** is the variability of the firm's operating income (before interest).
- **Financial risk** is the additional variability in returns to shareholders due to debt in the financial structure.
- In **Modigliani and Miller's perfect no-tax world** three propositions hold true:
 - 1 The total market value of any company is independent of its capital structure.
 - 2 The expected rate of return on equity increases proportionately with the gearing ratio.
 - 3 The cut-off rate of return for new projects is equal to the weighted average cost of capital – which is constant regardless of gearing.
- In an **MM world with tax** the optimal gearing level is the highest possible.
- The **risk of financial distress** is one factor which causes firms to moderate their gearing levels. Financial distress is where obligations to creditors are not met, or are met with difficulty.
- The **indirect costs of financial distress**, such as deterioration in relationships with suppliers, customers and employees, can be more significant than the direct costs, such as legal fees.
- **Financial distress risk is influenced by the following:**
 - the sensitivity of the company's revenues to the general level of economic activity;
 - the proportion of fixed to variable costs;
 - the liquidity and marketability of the firm's assets;
 - the cash-generative ability of the business.
- **Agency costs** are the direct and indirect costs of ensuring that agents (e.g. managers) act in the best interests of principals (e.g. shareholders, lenders), for example monitoring costs, restrictive

These companies can then determine a sustainable dividend level that will leave sufficient retained earnings to meet the financing needs of their investment projects without having to resort to selling shares. (Not only does issuing shares involve costs of issue but, as described in Chapter 18, investors sometimes view share issues as a negative signal.) Thus, a maintainable regular dividend on a growth path is generally established, providing some certainty to a particular clientele group and reducing the likelihood of sending misleading signals. At the same time the residual theory conclusions have been recognised, and (over, say, a five-year period) dividends are intended to be roughly the same as surplus cash flows after financing all investment in projects with a positive NPV. Agency costs are alleviated to the extent that managers do not, over the long run, store up (and misapply) cash flows greater than those necessary to finance high-return projects.

The future is uncertain and so companies may consider their financial projections under various scenarios. They may focus particularly on the negative possibilities. Dividends may be set at a level low enough that, if poorer trading conditions do occur, the firm is not forced to cut the dividend. Thus, a margin for error is introduced by lowering the pay-out rate.

Companies that are especially vulnerable to macroeconomic volatility, such as those in cyclical industries, are likely to be tempted to set a relatively low maintainable regular dividend to avoid the dreaded consequences of a reduced dividend in a particularly bad year. In years of plenty directors can pay out surplus cash in the form of special dividends or share repurchases. This policy of low regular pay-outs supplemented with irregular bonuses allows shareholders to recognise that the pay-outs in good years might not be maintained at the extraordinary level. Therefore, they do not interpret them as a signal that profits growth will persist at this high level.

If a change in dividend policy becomes necessary, then firms are advised to make a gradual adjustment, as a sudden break with a trend can send an erroneous signal about the firms' prospects. And, of course, the more information shareholders are given concerning the reasons behind a change in policy, the less likelihood there is of a serious misinterpretation.

Firms in different circumstances are likely to exhibit different pay-out ratios. Those with plentiful investment opportunities will, in general, opt for a relatively low dividend rate as compared with that exhibited by companies with few such opportunities. Each type of firm is likely to attract a clientele favouring its dividend policy. For example, investors in fast-growth, high-investment firms are prepared to accept low (no) near-term dividends in return for the prospect of higher capital gains.

A suggested action plan

A suggested action plan for a dividend policy is as follows.

- 1 Forecast the 'surplus' cash flow resulting from the subtraction of the cash needed for investment projects from that generated by the firm's operations over the medium to long term.
- 2 Pay a sustainable regular dividend based on this forecast. This may be biased on the conservative side to allow for uncertainty about future cash flows.
- 3 If cash flows are greater than projected for a particular year, keep the maintainable regular dividend constant (hopefully with stable growth), but pay a special dividend or initiate a share repurchase programme. If the change in cash flows is permanent, gradually shift the maintainable regular dividend while providing as much information to investors as possible about the reasons for the change in policy.

Key points and concepts

- **Dividend policy** concerns the pattern of dividends over time and the extent to which they fluctuate from year to year.
- UK-quoted companies generally pay dividends every six months – an **interim** and a **final**. They may only be paid out of distributable profits.
- **Miller and Modigliani** proposed that, in a perfect world, the policy on dividends is irrelevant to shareholder wealth. Firms can **finance investments** from retained earnings or new share sales at the same cost (with no transaction costs). Investors are able to manufacture '**homemade dividends**' by selling a portion of their shareholding.
- In a world with **no external finance** dividend policy should be residual.

- **Strong form** Public and private (that is, available to insiders, for example those working for a central bank) information is reflected in prices.

Much empirical research has been conducted into currency market efficiency and the overall conclusion is that the question remains open. Some strategies, on some occasions, have produced handsome profits. On the other hand, many studies show a high degree of efficiency with little opportunity for abnormal reward. Most of the studies examine the major trading currencies of the world – perhaps there is more potential for the discovery of inefficiency in the more exotic currencies. Central bank intervention in foreign exchange markets also seems to be a cause of inefficiency.

As far as ordinary humble corporate treasurers are concerned, trying to outwit the market can be exciting, but it can also be dangerous. Alan Greenspan, former chairman of the US Federal Reserve, said, 'To my knowledge no model projecting movements in exchange rates is superior to tossing a coin.'⁸

Concluding comments

Managers need to be aware of, and to assess, the risk to which their firms are exposed. The risk that arises because exchange rates move over time is one of the most important for managers to consider. Once the extent of the exposure is known managers then need to judge what, if anything, is to be done about it. Sometimes the threat to the firm and to the returns to shareholders are so great as to call for robust risk-reducing action. In other circumstances the cost of hedging outweighs the benefit. Analysing and appraising the extent of the problem and weighing up alternative responses are where managerial judgement comes to the fore. Knowledge of derivatives markets and money markets, and of the need for flexible manufacturing, marketing and financing structures, is useful background, but the key managerial skill required is discernment in positioning the company to cope with forex risk. The ability sometimes to stand back from the fray, objectively assess the cost of each risk-reducing option and say, 'No, this risk is to be taken on the chin because in my judgement the costs of managing the risk reduce shareholder wealth with little to show for it,' is sometimes required.

Key points and concepts

- An **exchange rate** is the price of one currency expressed in terms of another.
- **Exchange rates are quoted** with a bid rate (the rate at which you can buy) and an offer rate (the rate at which you can sell).
- **Forex shifts can affect:**
 - income received from abroad;
 - amounts paid for imports;
 - the valuation of foreign assets and liabilities;
 - the long-term viability of foreign operations;
 - the acceptability of an overseas project.
- The **foreign exchange market** grew dramatically over the last quarter of the twentieth century. Over US\$5,100bn is now traded on an average day. Most of this trading is between banks rather than for underlying (for example, import/export) reasons.
- **Spot market** transactions take place which are to be settled quickly (usually one or two days later). In the **forward market** a deal is arranged to exchange currencies at some future date at a price agreed now.
- **Transaction risk** is the risk that transactions already entered into, or for which the firm is likely to have a commitment in a foreign currency, will have a variable value.
- **Translation risk** arises because financial data denominated in one currency then expressed in terms of another are affected by exchange-rate movements.
- **Economic risk** Forex movements cause a decline in economic value because of a loss of competitive strength.

⁸ Quoted in Samuel Brittan, 'The dollar needs benign neglect', *Financial Times*, 30 January 2004, p. 21.

Key points and concepts

- A **derivative instrument** is an asset whose performance is based on the behaviour of an underlying asset (the underlying).
- An **option** is a contract giving one party the right, but not the obligation, to buy (call option) or sell (put option) a financial instrument, commodity or some other underlying asset, at a given price, at or before a specified date.
- The **writer of a call option** is obligated to sell the agreed quantity of the underlying at some time in the future at the insistence of the option purchaser (holder). A **writer of a put** is obligated to purchase.
- **American-style options** can be exercised at any time up to the expiry date whereas **European-style options** can only be exercised on a predetermined future date.
- **Intrinsic value** on an option: the pay-off that would be received if the underlying is at its current level when the option expires. For a call option this is determined by how much the current market price is above the exercise price. For a put it is the extent to which the current price of the underlying is below the exercise price.
- An **out-of-the-money option** is one that has no intrinsic value.
- An **in-the-money option** has intrinsic value.
- **Time value** arises because of the potential for the market price of the underlying, over the time to expiry of the option, to change in a way that creates intrinsic value.
- **Share options** can be used for hedging or speculating on shares.
- **Corporate uses of options include:**
 - share options schemes;
 - warrants;
 - convertible bonds;
 - rights issues;
 - share underwriting;
 - commodity options;
 - taking control of a company;
 - protecting the company from foreign exchange losses;
 - real options.
- A **forward contract** is an agreement between two parties to undertake an exchange at an agreed future date at a price agreed now. Forwards are tailor-made, allowing flexibility.
- **Futures** are agreements between two parties to undertake a transaction at an agreed price on a specified future date. They are exchange-traded instruments with a clearing house acting as counterparty to every transaction standardised as to:
 - quality of underlying;
 - quantity of underlying;
 - legal agreement details;
 - delivery dates;
 - trading times;
 - margins.
- For futures, **initial margin** (0.1% to 15%) is required from each buyer or seller. Each day profit or losses are established through **marking to market**, and **variation margin** is payable by the holder of the future who makes a loss (to avoid going below the maintenance margin).
- The majority of futures contracts are **closed** (by undertaking an equal and opposite transaction) **before expiry** and so **cash losses or profits** are made rather than settlement by delivery of the underlying. Some futures are **settled by cash only** – there is no physical delivery.
- **Short-term interest-rate futures** can be used to hedge against rises and falls in interest rates at some point in the future. The price for a £500,000 notional three-month contract is expressed as an index:

$$P = 100 - i$$

As interest rates rise the value of the index falls.
- **Forward rate agreements (FRAs)** are arrangements whereby one party pays the other should interest rates at some point in the future differ from an agreed rate.
- An interest rate **cap** is a contract that gives the purchaser the right effectively to set a maximum interest rate payable through the entitlement to receive compensation from the cap seller should market interest rates rise above an agreed level. The cap seller and the lender are not necessarily the same.
- A **floor** entitles the purchaser to payments from the floor seller should interest rates fall below an agreed level. A **collar** is a combination of a cap and a floor.
- A **swap** is an exchange of cash payment obligations. An interest rate swap is where interest obligations are exchanged. In a currency swap the two sets of interest payments are in different currencies.
- Some **motives for swaps:**
 - to reduce or eliminate exposure to rising interest rates;
 - to match interest rate liabilities with assets;