PROPERTY VALUATION

SECOND EDITION

PETER WYATT

with website

WILEY-BLACKWELL

Property Valuation

This book's companion website is at www.wiley.com/go/wyattpropertyvaluation and offers invaluable resources for each chapter:

- PowerPoint slides for lecturers
- Self-test questions and answers for students

Property Valuation

Second Edition

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To Jemma, Sam and Tom

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Preface

Welcome to the second edition of this book. I was told that writing a second edition is easy, just update the timelines on the graphs and sprinkle a few up-to-date references around and that should do it. Not so. I suspect that I am not alone in having seen the first edition in print for the first time, immediately beginning to think of ways to improve the structure and content. So that was the starting point for the second edition – to incorporate the changes that inevitably result from releasing the book for property valuation students over the past five years (is it really that long since the first edition?).

The difficulties described in the preface to the first edition remain; setting applied real estate economics in an academic context but, as the years pass and the body of real estate literature broadens and deepens, the task becomes more achievable. The book attempts to combine the academic and practical roots of valuation. This edition of the book retains its focus on property valuation and appraisal at the asset level and delves only superficially into the disciplines of law and management and I have not ventured into the world of investment portfolio analysis. The interdisciplinary nature of real estate practice means that terminology can be a problem and so all the key terms emboldened in the text are defined in a glossary at the back of the book.

The structure of the text has been substantially revised in this second edition. Part A introduces the key microeconomic principles, focusing on land as a resource, production functions, supply and demand and price determination. The locational aspect of real estate is also introduced. Macroeconomic considerations are categorised by the main market sectors (and their function); the market for land (development), for space (occupation) and for money (investment). Having set the economic context, Chapter 3 explains why property valuations are required and discusses the main determinants of value and how they might be identified. Chapter 4 introduces the mathematics required to financially quantify value determinants. Part B of the book describes the methods of valuation and Part C applies these methods to the valuation across a range of property types for a wide variety of purposes.

The companion website to this book (`www.wiley.com/go/wyattpropertyvaluation`) contains PowerPoint slides for lecturers, self-test questions and answers for students.

The primary dictionary definition of the term *property* is used in this book, namely the ownership of landed or real estate. The term property is, however, used interchangeably to describe the physical entity itself and the ownership of a legal interest in a piece of landed or real estate. The word property is also used to describe property in a singular and plural sense. As before, calculations in the book were performed using a spreadsheet but appear in the text as rounded figures.

Acknowledgements

My sincere thanks go to Danny Myers at UWE for his contribution to Chapter 1, to Pat McAllister for his help with the questions and answers available at the book's companion website, and to Wiley-Blackwell. I would also like to thank my wife, Jemma, and two sons, Sam and Tom. Just because I sat at a computer, it doesn't necessarily mean I'm playing games or searching for 'another' new bike!

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Part A
Property Value and Property Valuation

The legal ownership of land and buildings, collectively referred to as **property** throughout this book, confers legal rights on the owner that enable it to be developed, occupied or leased. The physical occupation of property is essential for social and economic activities including shelter, manufacture, commerce, recreation and movement. Typically, physical property ownership is not desired in its own right, although prestigious or landmark buildings can confer non-financial value. Rather, demand for property is a derived demand; occupiers require property as a factor of production to help deliver the social and economic activities and investors require property as an investment asset. This concept of derived demand has a direct bearing on its valuation.

This book is all about valuing *individual* properties or premises (units of occupation) within properties that are used for business purposes – what will often be referred to as commercial or business property. The interaction between the supply of and demand for property generates exchange prices and valuations are estimates of those prices. Value is thus an economic concept and valuers are primarily concerned with how market participants measure value.

In this first section of the book Chapter 1 outlines the microeconomic concepts that are relevant to property markets and estimates of exchange price. It will introduce microeconomic terms and concepts associated with the supply of and demand for land and buildings, the concept of rent as a payment for their use and

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some land use theory. It explains how property values arise using economic principles and theories that have been developed and expounded over the past century and a half. Building on the theories relating to the agricultural land market, the causes and spatial distribution of urban land and property uses and rents are described. The chapter explains the causes of price differentials between land uses and over space. In doing so it homogenises the product to a large extent, only really differentiating between the main commercial land uses of retail, office and industrial space. Chapter 2 describes the macroeconomic influences that cause the property market to be dynamic, since it is subject to constantly changing market conditions and cyclical macroeconomic pressures. As a result the value of property varies over time and space at its various scales. The chapter ends with a look at macroeconomic property market cycles. Whereas Chapter 1 is an attempt to explain property value by examining the economics of supply and demand and the establishment of equilibrium exchange price in the property market and its constituent sectors, Chapter 3 focuses on valuation, being the estimation of exchange price and describes the determinants of value. The mathematics and procedures that underpin the valuation methods described in subsequent chapters are introduced in Chapter 4.

Chapter 1
Microeconomic Concepts

Part A

Economics is conventionally divided into two types of analysis: microeconomics and macroeconomics: **microeconomics** studies how individuals and firms allocate scarce resources whereas **macroeconomics** analyses economy-wide phenomena resulting from decision-making in *all* markets. One way to understand the distinction between these two approaches is to consider some generalised examples. Microeconomics is concerned with determining how prices and rents emerge and change and how firms respond. It involves an examination of the effects of new taxes and government incentives, the characteristics of demand, determination of a firm's profit and so on. In other words it tries to understand the economic motives of market participants such as landowners, developers, occupiers and investors. This diverse set of participants is rather fragmented and at times adversarial but microeconomic analysis works on the basis that we can generalise about the behaviour of these parties. A particular branch of economics known as *urban land economics* is concerned with the microeconomic implications of scarcity and the allocation of urban property rights. This section brings together and explains the key microeconomic concepts and theories that have a bearing on urban property markets and the important work of authors like Alan Evans, Will Fraser, Jack Harvey and Danny Myers in relating classical economic concepts and theories to urban land and property markets is acknowledged.

1.1 Supply and demand, markets and equilibrium price determination

This book does not seek to present all facets of microeconomics; the focus is on price determination. The world's resources – land, labour and capital – are used to create economic goods to satisfy human desires and needs and **economics** is

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concerned with the allocation of these finite resources to humanity's infinite wants. This problem is formally referred to as **scarcity**. In an attempt to reconcile this problem, economists argue that people must make careful choices about what is made, how it is made and for whom; or in terms of property, choices about what land should be developed, how it should be used and whether it should be available for purchase or rent. In short, economics is the 'science of choice'. Because resources are scarce their use involves an **opportunity cost** – resources allocated to one use cannot be used simultaneously elsewhere so the opportunity cost of using resources in a particular way is the value of alternative uses forgone. In other words, in a world of scarcity, for every want that is satisfied, some other want remains unsatisfied. Choosing one thing inevitably requires giving up something else; an opportunity has been forgone. This fundamental economic concept helps explain how economic decisions are made; for example, how property developers might decide which projects to proceed with and how investors might select the range of assets to include in their portfolios. To avoid understanding opportunity cost in a purely mechanistic way – where one good is simply chosen instead of another, we need to clarify how decisions between competing alternatives are made. Goods and services are rarely bought to yield a one-dimensional type of utility to the purchaser; the purchase usually fulfils a range of needs. As Lancaster (1966) explained

> The good, *per se*, does not give utility to the consumer; it possesses characteristics, and these characteristics give rise to utility. In general… many characteristics will be shared by more than one good.

For example, a commercial building provides a range of services for the tenant; office space for employees, a certain image, a specific location relative to transport and supplies, an investment and so on.

An assumption must be made at this early stage; that consumers of resources seek to maximise their welfare. Our concern is with commercial property and therefore businesses are the resource consumers and welfare to them means profit. Businesses seek to maximise their profit. A budget constraint limits the choices that businesses can make when choosing between resources in a market – in effect, desire, measured by opportunity cost, is limited by a budget constraint. The existence of a budget constraint is a reflection of the distribution of resource-buying capacity throughout an economy. In some economies this distribution might be state-controlled, in others it is left to competitive forces. In a market economy the allocation of scarce commercial property resources is facilitated by means of a **market**. In economic terms a market has particular characteristics; there are lots of decision-makers (businesses in our case) and they behave competitively; any advantage some might have in terms of access to privileged information for example does not continue beyond the short-run. Each business will have particular preferences or requirements and a budget and these will influence the price that can be offered for property and consequently the quantity obtained.

Let's simplify the commercial property market for a moment to one where landowners supply properties and businesses demand or 'consume' them. Suppliers interact with consumers in a market-place where property interests are exchanged, usually indirectly by means of money. The short-run[1] demand schedule illustrated in Figure 1.1 represents consumer behaviour and is a downward-sloping curve to

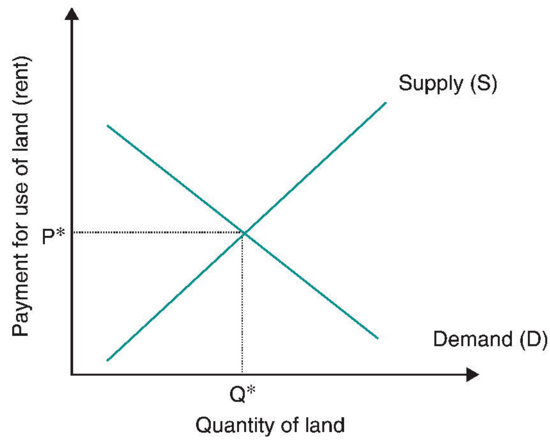

Figure 1.1 Short-run supply of and demand for property.

show that possible buyers and renters of property demand a greater quantity at low prices than at high prices (assuming population, income, future prices, consumer preferences, etc. all remain constant). The short-run supply curve maps out the quantity of property interests available for sale or lease at various prices (assuming factors of production remain constant).[2] The higher the price that can be obtained the greater the quantity of property that will be supplied. Equilibrium price P* is where demand for property equals supply at quantity Q*. Price varies directly with supply and indirectly with demand.

The result of an efficiently functioning commercial property market in the long-run should be economic efficiency, achieved when resources have been allocated optimally. Profit has been maximised and property resources could not be reallocated without making at least one consumer or business worse off, a concept known as Pareto optimality.

But what do businesses demand commercial property for? Property is demanded, and therefore leased or purchased, not for its own sake but as a means to an end; typically, as far as commercial property is concerned, for the production capabilities it offers, the services its supports or the profit it might generate. Demand of this type is known as **derived demand**. This is an important concept as it explains some of the complexity associated with valuation, especially as commercial property offers different utility opportunities for developers, occupiers and investors. This utility value is usually measured in monetary terms and might take the form of a rental value in the case of a tenant or a capital value in the case of an investor, developer or owner-occupier. So commercial property, particularly in its undeveloped state, is a resource that is combined with other resources to produce goods and services that businesses desire. Economists tend to refer to these resources as **factors of production** to emphasise that various factors need to be combined to produce goods or services. The factors of production are usually classified into three groups: land, capital and labour, and sometimes entrepreneurs are specifically identified as a fourth category. To construct a building labour is required to develop a plot of land, and plant and equipment, which may be hired or bought, is required to facilitate the process. These manufactured resources are called capital or, more precisely, **physical capital**. Each factor of production receives a specific kind of payment. Landlords, who provide the use of land over time, receive rent. Owners of physical capital receive interest, workers receive wages and the entrepreneur gains profit. It is interesting that Marxists challenge the logic of this model as they understand land to be a gift of nature – a non-produced resource – that exists regardless of payment. From a pure Marxist perspective, therefore, land has no value and all property is regarded as theft! Indeed it is too easy to forget that the state or some collective arrangement could own and allocate land.

The Appraisal Institute (2001) summarises the situation: a property or, more correctly, a legal interest in a property, cannot have economic value unless it has *utility* and is *scarce*. Its value will be determined by these factors together with *opportunity cost* and *budget constraint*. The way these four factors interact to create value is reflected in the basic economic principle of supply and demand, and valuation is the process of estimating the equilibrium price at which supply and demand might take place under 'normal' market conditions. Property, then, is required to produce goods and services and enters the economy in many ways. Capitalist market economies have developed systems of private property ownership and occupation and the trading of property rights between owners and occupiers as a means of competitive allocation. Economists try to understand the nature of payments that correspond with the trading of these property rights and this is, from an economic perspective at least, the essence of valuation.

1.2 The property market and price determination

This section introduces three inter-related economic concepts concerning the use of land for commercial activity:

a) The payment in the form of rent that is made for the use of land.
b) Different rents for different land uses; competitive bidding between different users of land means that each site is allocated to its optimal or profit-maximising use.
c) Variation in land use intensity.

1.2.1 Rent for land

Commercial property has certain economic characteristics that distinguish it from other factors of production. It actually has two components; the land itself and (usually) improvements that have been made to the land in the form of buildings and other man-made additions. This has several implications, not least the existence of a separate market in land for development, which we will discuss in more detail later. Each unit of property is unique; it is a heterogeneous product, if only because each land parcel on which a building is sited occupies a separate geographical position. This means that it will vary in quality – for urban land this is largely due to accessibility differences but will also differ in terms of physical attributes, legal restrictions (different lease terms for example) and external influences such as government intervention in the form of planning. Property tends to be available for purchase in large, indivisible and expensive units so financing plays a significant role in market activity. Also, because of its durability, there is a big market for existing property and a much smaller market for development land on which to build new property. We also know that, in the UK, about half of the total stock of commercial property is owned by investors who receive rent paid by occupiers in return for the use of property. The other half own the property that they occupy but we can assume that the price or value of each property asset is the capitalised value of rent that would be paid if the property was owned as an investment. This means that we can focus our economic analysis of price determination in the property market on rental values and assume that capital values bear a relation to these, a relationship which will be described in detail in Chapter 4.

Early classical economists regarded rent as a payment to a **landlord** by a **tenant** for the use of land in its 'unimproved' state (land with no buildings on it), typically for farming. The classical economist Ricardo (1817) set out a basic theory of agricultural land rent. The theory implied that land rent was entirely demand-determined because the supply of land as a whole was fixed and had a single use (to grow corn). The most fertile or productive land is used first and less productive land is used as the demand for the agricultural product increases. Rent on most of the productive land is based on its advantage over the least productive and competition between farmers ensures the value of the 'difference in productivity of land' is paid as rent (Alonso, 1964). Rent is therefore dependent on the demand (and hence the price paid) for the output from the land – a derived demand.

Now consider price determination in the market for new urban development land. Applying marginal productivity theory, land is a factor of production and a profit-maximising business in competitive factor and product markets will buy land up to a point at which additional revenue from using another unit of land is exactly offset by its additional cost. The additional revenue attributable to any factor is called the marginal revenue product (MRP) and it is calculated by multiplying the marginal revenue[3] (MR) obtained from selling another unit of output by the marginal product[4] (MP) of the factor. If other factors of production are fixed, as more and more land is used, its MP decreases due to the onset of **diminishing returns**. So if MR is constant and MP declines, the MRP of land will decline as additional units of land are used *ceteris paribus*. The declining MRP can represent a firm's demand schedule for the land factor as shown in Figure 1.1.[5] If the price of land falls relative to other factors of production, demand will increase; that is why the demand curve in Figure 1.1 is downward-sloping. If the productivity of land or the price of the commodity produced increases then demand for all quantities of land and hence the rent offered would rise (the demand curve would shift upwards and to the right from D to D_1, as illustrated in Figure 1.2. On the supply side the situation is a little more unusual. In a market for a conventional factor of production or end-product, the supply curve would be upward-sloping as illustrated in Figure 1.1, but the supply of all land is completely (perfectly) inelastic and cannot be increased in response to higher demand – the only response is higher price. Price therefore is solely demand-determined.

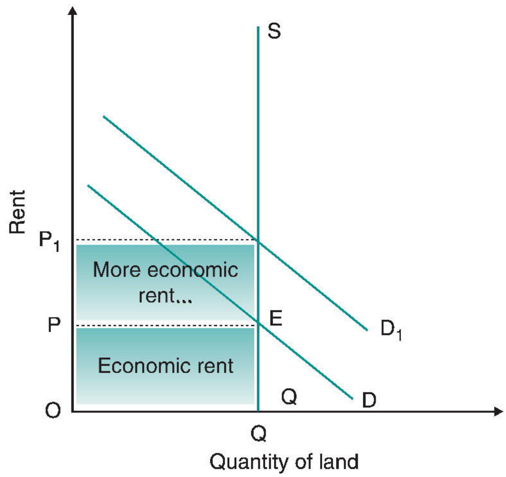

Figure 1.2 Elastic demand and inelastic supply of land for a single use using Ricardian Rent Theory.

Whatever the level of demand, supply remains fixed, the opportunity cost of using land is therefore zero and all earnings from the land (represented in Figure 1.2 by the area OPEQ) is **economic rent** – that part of earnings from a factor of production which results from it having some element of fixed or inelastic supply and there is competition to secure it (Harvey and Jowsey, 2004).

Ricardian rent theory applies to land as a whole since the ultimate supply of all land is fixed, that is why the supply curve is perfectly inelastic (vertical) and all rent is economic rent. But demand for urban development land (as for all commercial property) is a derived demand and, because each unit of land is spatially heterogeneous, different businesses will demand land in different locations for different uses. Consequently they will be able to pay a price for land that depends on the revenue they think they can generate and the costs they will incur in the process. As Harvey (1981) puts it, users compete for land and offer, in the form of rent, the difference between the revenue they think they can generate from using the land and the costs of production (including their **normal profit**). So we can adapt the above theory to take into account different businesses wishing to use land in various locations in different ways.

1.2.2 Land use rents

The supply of land for a particular use will not be fixed (perfectly inelastic) unless, of course, it can only be used in one way. This is because, in response to an increase in demand, additional supply could be bid from and surrendered by other uses if the proposed change of use has a value in excess of its existing use value. The payment to the landowner for the use of land is still made in the form of rent but, since land can be used for alternative uses, supply is no longer perfectly inelastic and has an opportunity cost. Land rent, rather than comprising economic rent only, can now be considered to consist of two elements: **transfer earnings**; a minimum sum or opportunity cost to retain land in its current use, which must be

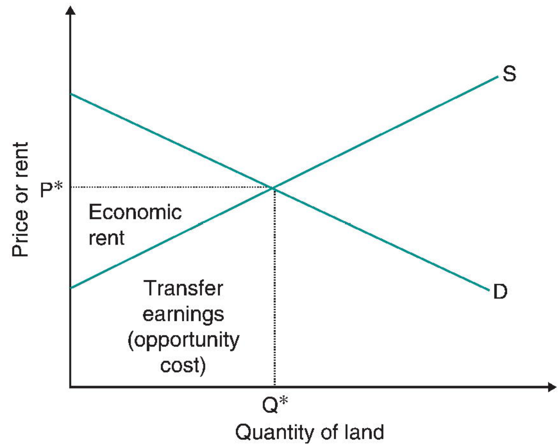

Figure 1.3 Elastic supply and elastic demand.

at least equal to the amount of rent that could be obtained from the most profitable alternative use, and economic rent; a payment in excess of transfer earnings that reflects the scarcity value of the land.

Diagrammatically, the supply curve is no longer vertical; instead it is upward-sloping. Figure 1.3 illustrates the demand for and supply of land for a particular use, warehousing perhaps. Assuming competition between users of land, interaction of supply and demand will lead to a supply of Q* land for this particular use, all of which will be demanded and for which the market equilibrium rent will be P*. Because supply is not perfectly elastic, some of this rent is transfer earnings and the rest is economic rent. If the rent falls below the transfer earnings then the landowner will transfer from this land use or at least decide to supply less of it. Q* is the marginal land and is only just supplied at price P* and all of the rent is transfer earnings. Assuming a homogeneous supply, the interaction of supply and demand leads to an equilibrium market rent for this type of land use and competition between uses ensures that this rent goes to the optimum use (Harvey, 1981).

The amount of price shift in response to a change in supply will depend on the elasticity of supply, the more inelastic the greater the change in price. Using this neoclassical land use rent theory it is possible to look at the interaction between supply and demand more closely in order to understand the nature of the rent payments for different land uses. Figure 1.4 shows that the rent for retail land use is almost entirely economic rent in the centre of an urban area. Commercial floor-space that is restricted in supply such as shops in Oxford Street in London or offices in the West End of London command a high total rent that is almost entirely made up of economic rent because of the scarcity of this type of space in these locations.

The more elastic supply of land for industrial use on the edge of an urban area means that the lower commercial rent for industrial floor-space is largely transfer earnings, see Figure 1.5. The proportion of transfer earnings and economic rent depends on the elasticity of supply of land: the more inelastic the supply, the higher the economic rent whilst the more elastic the supply, the higher the transfer earnings. Because urban land is fairly fixed in supply (inelastic) and is increasingly

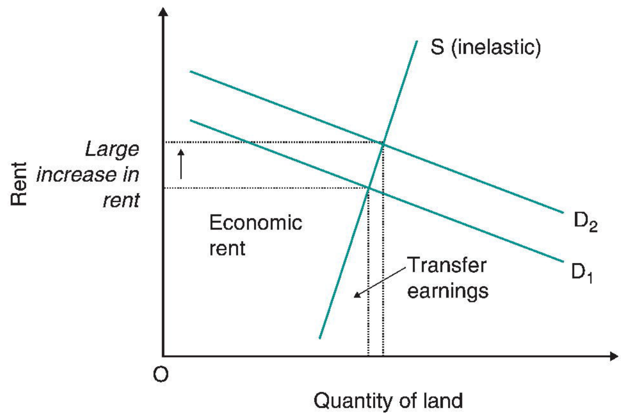

Figure 1.4 Rents for retail land in the central area under conditions of inelastic land supply.

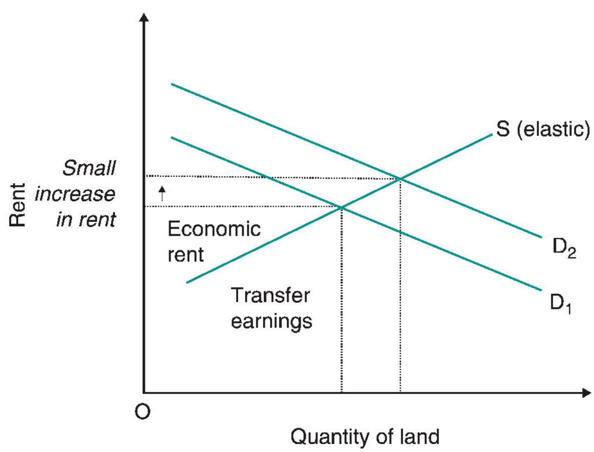

Figure 1.5 Industrial land rents on the edge of an urban area under conditions of elastic land supply.

so near the centre, economic rent forms an increasing proportion of total rent as the centre of an urban area nears. So any increase in demand (or reduction in supply) for central sites is reflected in substantial rises in commercial rent, but on the outskirts an increase in demand (or decrease in supply) for land for a specific purpose only produces a small change in economic rent (and thus total rent as a whole) because land is less scarce.

Before moving on we will consider the effect of time on the elasticity of supply of and demand for commercial land. Taking office land as an example and using conventional equilibrium analysis, in the short-run, supply will be inelastic[6] (S in Figure 1.6) and demand represented by D will be elastic, producing an equilibrium rent, r*. If demand for offices increases to D_1 (perhaps an economic upturn has meant that more employees have been recruited and there is a demand for more space), rent will rise to r_1. In the long-run, supply adjusts in response to this

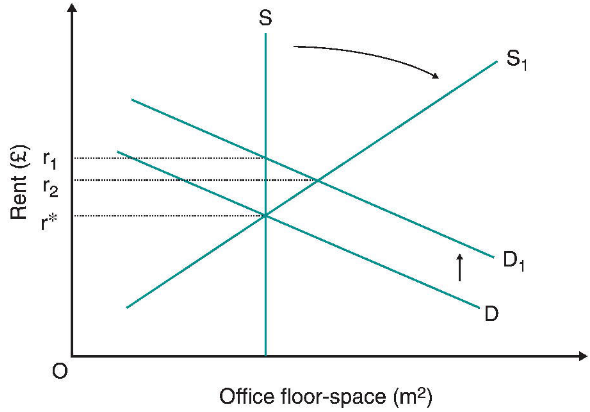

Figure 1.6 Equilibrium analysis of rent for office space (after Fraser, 1993).

increase in demand because the increase in rent improves the profitability of property development activity. The assumption of inelasticity can therefore be relaxed and the supply of office land will increase to say S_1, settling rents back to r_2, assuming no further change in demand. It should be noted that this is a very simple model of a complex market that is seldom in a state of equilibrium (Fraser, 1993).

It is now time to turn our attention to the use of land *and* buildings (property) as a collective factor of production. The first thing to point out is the dominance of the existing stock of property over new stock. Because property is so durable it accumulates over time and new developments add only a tiny amount to the existing stock. Consequently new supply has negligible influence on price. Nowadays we think of urban rent as a payment for 'improved' land – typically land that has been developed in some way so that it now includes buildings too. Economists refer to this concept of rent as **commercial rent**. If the property is leased to a tenant then the rent would include not only a payment for the use of the land but also some payment for the interest and capital in respect of the improvements that have been made to the land. But it is not easy to distinguish the rent attributable to buildings from that attributable to land. Land is permanent and although buildings ultimately depreciate, they do last a long time. It can be assumed therefore that land and buildings are a fixed factor of production in any time-frame except the very long-run which the user can combine with variable amounts of other factors (labour, capital and enterprise) to undertake business activity. We have also established that, in absolute terms, the physical supply of *all land* is *completely* inelastic and the supply of land for *all commercial uses* is *very* inelastic. The supply of land and buildings (or property) for *specific commercial uses* is *relatively* inelastic in the short-run due to the requirement for planning permission to change use and the time it takes to develop new property, but less so in the long-run as development activity reacts and changes in the intensity with which land is used are possible. Nevertheless, compared to the other factors of production, supply of property is the least flexible. So, because of the negligible influence on price of new supply, demand is the major determinant of rental value.

1.2.3 *Land use intensity*

It was stated above that the quantity of land that a user demands depends not only on its price and the price of the final product but also on its productivity. The productivity of land can usually be increased in response to increased demand (or a price rise) by using it more intensively through the addition of capital. In economic terms we can add units of other factors of production (labour but, particularly, capital) to the fixed amount of land. As we are dealing with commercial property we are typically referring to the addition of building area or floor-space to a unit of land rather than, say, the addition of fertiliser to farmland. This idea was first expounded by Alfred Marshall (1920) who argued that as demand for a piece of land increases it will be worthwhile providing more accommodation on the site, in other words using it more intensively). By providing more accommodation on a site, land area is being substituted by building area. The relative cost of land and building will determine the extent of this substitution. If land is cheap it will not take much extra building before it will pay to acquire more land to provide more accommodation. Whereas, if land is expensive, a large amount of building may take place before building costs increase to a level at which it pays to acquire more land to provide extra accommodation. It must be borne in mind though that the process of adding more and more capital to a fixed amount of land will be subject to the principle of diminishing returns. Marshall used the phrase '*the margin of building*' to describe that accommodation which it is only just worth obtaining from a given site and which would not be obtained if land were less scarce. This extra accommodation was likened to the top floor of a building which, by erecting this floor instead of spreading the building over more ground, yields a saving in the cost of land that just compensates for the extra expense. The revenue that the accommodation on this top floor provides is just enough to cover its costs without allowing anything for rent. In other words the marginal revenue from this floor equals its marginal cost.

So, for each unit of land, the land use rent theory must simultaneously allocate the optimum (profit maximising) use *and* intensity of that use. We have already examined *allocation of land use* so now let us concentrate on the *intensity of land use*. Assume that the optimum land use of a particular site has already been determined. This means that land is a factor of production which has a fixed cost. What we want to know is the optimum amount of capital (which, it is assumed, means building floor-space) to add to the land. In other words, how intensively should the land be used or how much floor-space should be added to the site to maximise profit? Assuming that perfect competition in the capital market keeps the cost per unit of capital the same regardless of the quantity required, as more capital (floor-space) is added to the fixed amount of land, initially the MRP of the land might increase because of economies of scale but the law of diminishing returns means that eventually it will fall. Profit is maximised where the MRP of a unit of capital equals the marginal cost of a unit of capital, in Figure 1.8 this is when OX units of capital are employed. If the business employs less than this amount the MR earned by an extra unit exceeds its MC and if more are employed the MC of each unit in excess of OX will be higher than its MR. OX is therefore the optimum amount of capital to combine with the land. The total revenue earned is represented by the area QYXO. Total cost (including profit) is area

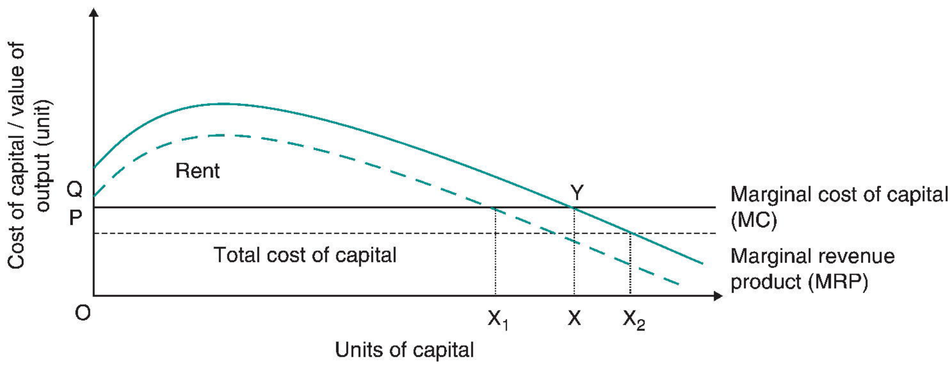

Figure 1.7 Optimum combination of land and capital (adapted from Fraser, 1993).

PYXO and surplus revenue is therefore QYP. If the current land use is the most profitable then land rent is QYP, i.e. the surplus remaining after deducting costs of optimally employed factors of production from expected revenue (Fraser, 1993). The amount of land that a business user will demand depends on its price relative to other factors of production, the price of the goods or services produced on or provided from the land and the productivity of the land. If the price obtained for goods and services produced from the land falls the MRP curve will drop from the solid line to the dashed line. Alternatively the production cost (the cost of each unit of capital) might fall, perhaps due to an improvement in construction technology or a fall in the cost of borrowing capital. This would shift the marginal cost of capital line downwards. Either case will, *ceteris paribus*, affect the margin at which it is profitable to use the land, the commercial rent that can be charged and the intensity of use of the land. Similarly a more profitable use would have a higher MRP curve and could therefore afford to bid a higher rent. Competition between different land uses ensures that the land is allocated to its most profitable use and the land rent surplus QYP is maximised.

In terms of land use intensity, Figure 1.7 and the underlying land use rent theory shows that, in order to maximise revenue from a site, capital must be added to the point where marginal revenue product equals marginal cost. This also has the effect of maximising the surplus revenue that is available to pay as rent: the highest bidder or rent payer is also the most intensive user of the land. This assumes that competition for land for various uses will ensure that the use of each site will be intensified up to a point at which it is no longer profitable to add any more capital to the same site. In a market where supply is inelastic, as demand for business space in a locality increases, its prices rise. At the same time the higher price of land means that it makes sense to intensify its use up to the point where the production costs (excluding rent) are so high that it is more cost-effective to purchase additional land than use the existing site more intensively. So a factory owner in a central location may find that, on account of the high rent for the site, the revenue generated will not cover production costs and may decide to relocate and sell the site to an office user. Harvey and Jowsey (2004) illustrate this point by comparing two sites of the same size; (a) one in the city centre and (b) one in a suburb (b). Figure 1.8 shows that it is the strength of demand (represented by the MRP curve) which determines land rent and intensity of land use. For reasons

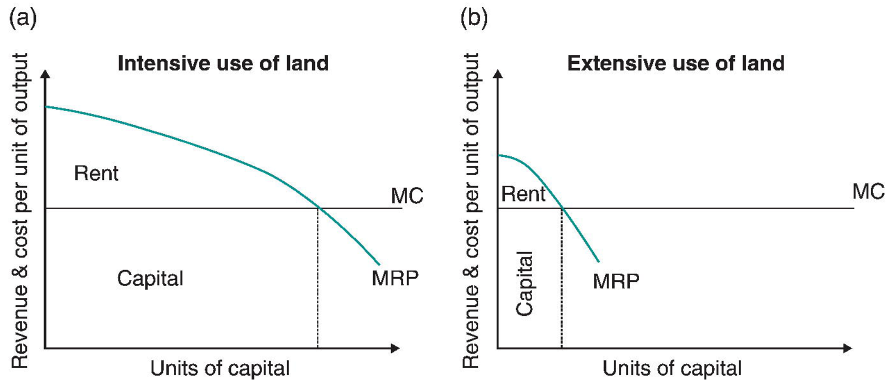

Figure 1.8 Demand and its effect on rent and intensity of land use.

that will become clear in the next section it is the city centre site from which a business user is able to extract more revenue per unit of output. From the landlord's perspective, where demand (reflected in the commercial rent obtainable) is high (high MRP curve) a more intensive use of land is possible and rents are high.

This is a very simple model which will be developed a little later in section 1.4 in the context of property development. Specifically it will be assumed that MC is not constant – as increasing amounts of capital are added to a fixed piece of land it becomes progressively more expensive to do so, as is the case when building a high-rise office building. The MC curve therefore rises.

To summarise, the rent for land is regarded as a surplus and is determined largely by demand. Different users compete for each piece of land and competitive behaviour ensures that each piece is allocated to its most profitable use and its most profitable intensity of use. We have made a number of simplifying assumptions along the way and we shall come back to these at the end of the next section.

1.3 Location and land use

Our discussion so far has suggested that different users of land might be prepared to offer different rents for a piece of land because it offers the potential to make different amounts of revenue depending on the use to which it is put. But what is this potential and why are different uses able to offer or bid different rents to use it? Land offers certain attributes that some commercial users find more beneficial than others and we have to bring these in to our discussion now. In developing our understanding of commercial rent we are not only concerned about supply of and demand for land as a whole, land for particular uses and the intensity with which those uses are employed on land, but also where the land is. We need to understand this final part of the jigsaw because land, unlike other factors of production (labour and capital), is fixed in space so the location of each site influences the way in which it is used and its profit-making potential. In short, we need to know a little about the economics of space.

As well as formulating a theory of agricultural land rent based on fertility Ricardo also recognised that land near a market bears lower transport costs and so generates more revenue with the surplus (over and above costs and normal profit) being paid as rent. Ricardo (1817) argued that

> [I]f all land has the same properties, if it were unlimited in quantity, and uniform in quality, no charge could be made for its use, unless where it possessed peculiar advantages of situation.

So land that is close to the market or a supply of labour (a 'prime' site) will yield the same output as land that is further away (a 'secondary' site) but would incur lower labour and capital costs due to its accessibility advantages. Assuming the exchange value or price of the output remains the same regardless of whether it was produced on prime or secondary land, the utility value of the prime site is greater and this value is transferred via competitive bidding from user to landlord in the form of rent.

In 1826 the German landowner von Thünen applied Ricardian rent theory in a spatial context and demonstrated the relationship between the ability to pay agricultural rent for a piece of land and its distance from the market in which the farm produce is traded. The theory assumes that farmland exists in a boundless, featureless plain over which natural resources and climate are uniformly distributed and that produce is traded at a central market which is connected to its catchment area by a uniformly distributed transport network. It was also assumed that although different agricultural produce can be produced which differs in production costs and bulk so that cost of transportation varies, revenue from each product per unit area of land is the same; in other words von Thünen's theory was a cost-based model which ignored intensity of land use and revenue differentials. Fixing all other costs Figure 1.9 shows that, for a single land use, transport costs will increase as distance from the central market increases. Assuming competition

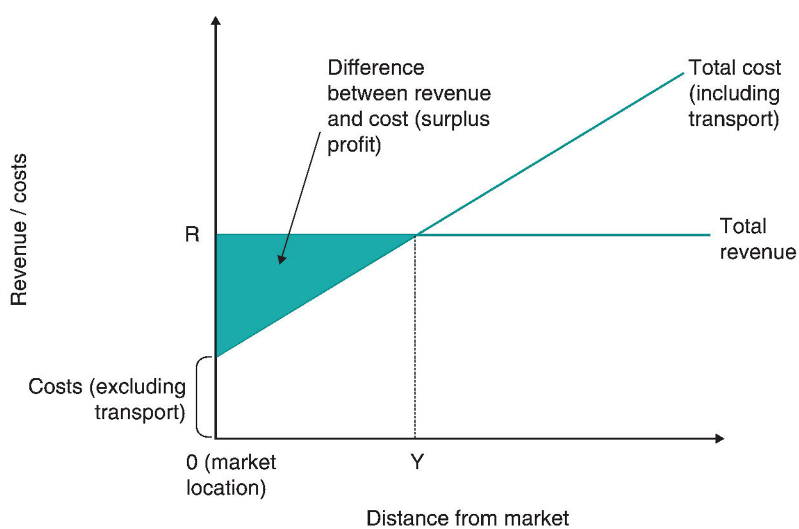

Figure 1.9 Von Thünen's single use revenue and cost model (adapted from Harvey and Jowsey, 2004).

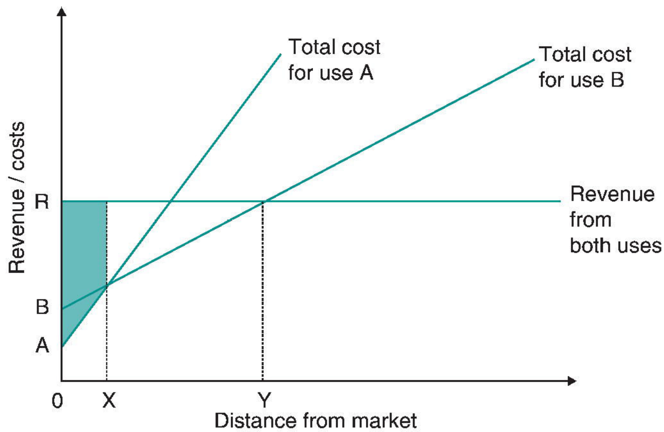

Figure 1.10 Von Thünen's two-use revenue and cost model (adapted from Harvey and Jowsey, 2004).

between uses, any surplus profit over and above costs (which include normal profit to the farmer) is paid as rent to the landowner. As the theory assumes total revenue remains constant the rent (surplus profit[7] in Figure 1.9) decreases as the distance to the market increases. Beyond distance Y this use is no longer profitable as costs exceed revenue.

Figure 1.10 introduces a second land use (A) for which fixed production costs are lower, OA, but the final product is more bulky than the original land use (B) and therefore incurs more steeply rising transport costs as distance to the market increases. Assuming revenue is the same from both products, close to the market land use A has the greatest surplus (revenue less costs) available to bid as rent (AR as opposed to BR). So land use A is able to outbid land use B but only up to distance X from the market, after which, because B's total production costs do not rise so steeply, it is able to outbid A.

As more land uses are added with different levels of fixed costs and different rates of rising transport costs an agricultural land use rent theory is obtained by rotating Figure 1.10 180 degrees and considering the rent-earning capacity (i.e. revenue less cost) of each land use on the *y* axis. In Figure 1.11, which is adapted from Harvey and Jowsey (2004), the shaded areas represent rent-earning capacity and the sizes of these are maintained for each land use. The revenue line is dropped as it is constant for all land uses. A rent curve MN is derived showing the rent for land at different distances from the market. Given a central market and a homogeneous agricultural plain, a series of concentric zones of land use is the result and the relationship between location, land use and rent should now be evident. Of course reality confounds all of the simplifying assumptions made by von Thünen's and we do not see concentric rings in the real world. Instead natural features, the vagaries of the transport network and other irregularities such as government trade policy break up this simple pattern, but the theory retains a robust logic that is hard to deny.

Building on Ricardo's observations and von Thünen's theory Mill (1909) argued that in a country where land remains to be cultivated the worst land in actual cultivation pays no rent and it is this marginal land that sets the standard for

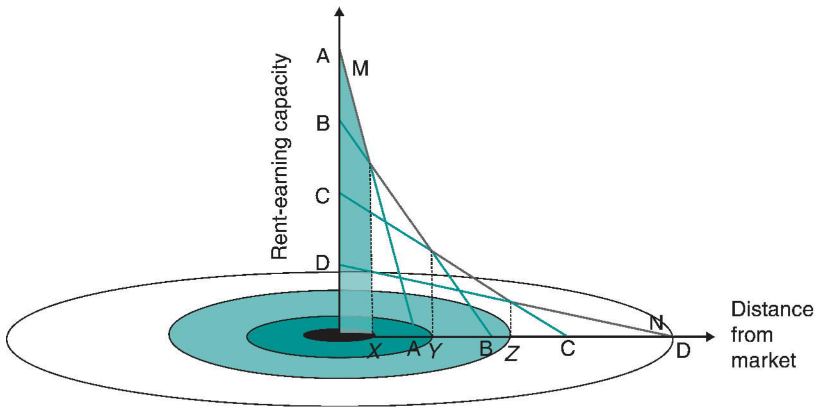

Figure 1.11 Land use bid-rent theory.

estimating the amount of rent yielded by all other land (beyond D in Figure 1.11). It does this by establishing a benchmark so that whatever revenue agricultural capital produces, beyond what is produced by the same amount of capital on the worst soil, or under the most expensive mode of cultivation, that revenue will be paid as rent to the owner of the land on which it is employed. In other words

> Rent, in short, merely equalises the profits of different farming capitals, by enabling the landlord to appropriate all extra gains occasioned by superiority of natural advantages (Mill, 1909).

Like agricultural land uses, what urban land uses desire is accessibility, not just access to the market (where the customers are) but also access to factors of production (particularly labour but capital too) and to other complementary land uses.[8] The aim is to seek a location that minimises transport costs involved with marshalling factors of production but maximises access to the market and to complementary land uses. With a radial transport network around a central market and the other simplifying assumptions, von Thünen's model can be applied to urban land uses. In explaining the cause of different land values within an urban area Hurd (1903) suggested that

> since value depends on economic rent, and rent on location and location on convenience, and convenience on nearness, we may eliminate the intermediate steps and say that value depends on nearness.

Theoretically, as Kivell (1993) points out, in a mono-centric urban area the centre is where transport facilities maximise labour availability, customer flow and proximate linkages and therefore attracts the highest capital and rental values. Haig (1926) suggested that

> rent appears as the charge which the owner of a relatively accessible site can impose because of the saving in transport costs which the use of the site makes possible.

His theory emphasised the correlation between rent and transport costs, the latter being the payment to overcome the 'friction of space'; the better the transport

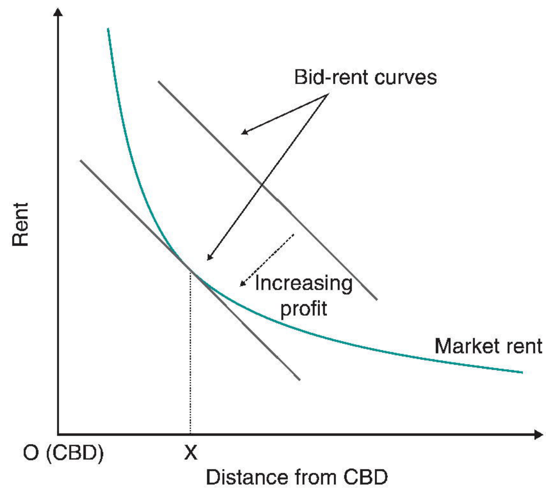

Figure 1.12 Bid-rent curves (adapted from Harvey and Jowsey, 2004).

network, the less the friction. The theoretically perfect site for an activity is that which offers the desired degree of accessibility at the lowest costs of friction. Haig's hypothesis was therefore

> …the layout of a metropolis … tends to be determined by a principle which may be termed the minimising of the costs of friction (Haig, 1926).

Haig's hypothesis concentrated on the cost-side of profit maximisation but some land uses such as retail are able to derive a revenue-generating advantage from certain sites, particularly those most accessible to customers. Therefore, the revenue-generating potential of a site must be weighed against the costs of friction for these land uses. Marshall (1920) noted that demand for the highest value land comes from retail and wholesale traders rather than manufacturers because they can fit into smaller sites (i.e. develop land more intensively) in places where there are plenty of customers. Therefore

> In a free economy, the correct location of the individual enterprise lies where the net profit is greatest (Losch, 1954).

In attempting to quantify spatial variation in rent and land use Alonso (1964) adapted von Thünen's agricultural land use model to urban land use. Alonso suggested that activities can trade off falling revenue and higher costs (including transport) against lower site rents as distance from the centre increases. This can be illustrated by defining 'bid-rent' curves (similar in nature to indifference curves) which indicate the maximum rent that can be paid at different locations and still enable the business to earn normal profit, as shown in Figure 1.12. In other words the lines join equilibrium locations where access and rent are traded off against each other. In a monocentric city market the rent curve derived in Figure 1.11 can be superimposed. Businesses will endeavour to locate on the bid-rent curve nearest the origin and the equilibrium location is at X as this is the most profitable location at current rents.

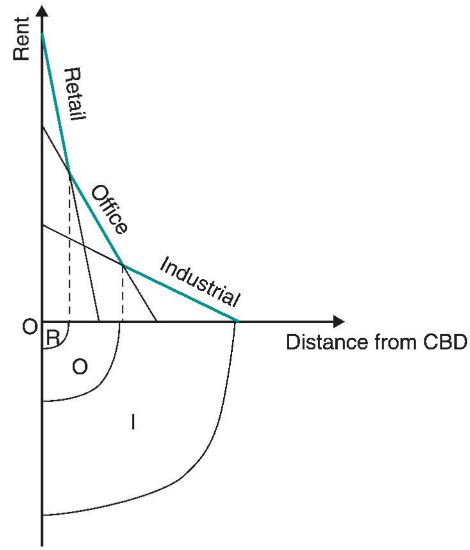

Figure 1.13 Alonso's bid-rent concept.

Some urban land uses place greater emphasis on accessibility than others and these will have steeper bid-rent curves since a considerable drop in rent will be necessary to compensate for the falling revenue as distance from CBD increases. Rent gradients emerge, illustrated in Figure 1.13, for each land use where the steepest gradient prevails. Retailers outbid office occupiers because they are particularly dependent on a central location where the market is located, accessibility is maximised and transport costs are minimised. The availability of such sites is very limited and therefore supply almost perfectly inelastic (consider the shops surrounding Oxford Circus in London as an example). Office occupiers, in turn, outbid industrial occupiers. Consequently rents generally decline as distance from the central area increases. Basically greater accessibility leads to higher demand which, in turn, causes rents to rise and land use intensity to increase. This competitive bidding between perfectly informed landlords and occupiers within a simplified market allocates sites to their optimum use.

Alonso's theory rests on simplifying assumptions: a central market in an urban area and a perfect market for urban land. Agglomerating forces, spatial interdependence, special site characteristics and topographical irregularities are all ignored. If the main determinant of differences in urban rent in a city was accessibility and if transportation were possible in all directions and the transport cost-distance functions linear, there would be a smooth land value gradient declining from the centre. In reality the gradient falls steeply near the centre and levels off further out (Richardson, 1971). Other distortions result from trip destinations to places other than the centre such as out-of-town office, retail and leisure, and a non-uniform network of transport infrastructure. Despite the simplifying assumptions this *bid-rent* theory is still regarded as an acceptable explanation of spatial variation in the demand for property. As Ball et al. (1998) argue; the rent or price paid for an owner-occupied property reflects its utility to the user.

This utility is a function of land and building characteristics and location. Rents and capital values thus vary spatially and occupiers will choose a location based on an analysis of profit they can make at different locations. Competitive pricing should ensure that, in equilibrium, land is allocated to its most profitable use, but inertia and planning controls influence this. In reality, competitive bidding between users of land often results in mixed use on sites; retail on the ground floor and offices above (Harvey and Jowsey, 2004).

As Richardson (1971) notes, the central feature of the market is that land rent is an inverse function (typically a negative exponential function) of distance from the centre. This function is primarily a reflection of external and other agglomeration economies and transport costs.

> The significance of transport costs is obvious. People and activities are drawn into cities because of the need for mutual accessibility, especially between homes and workplaces. Even within cities, the distances between interrelated activities have to be minimised, and the existence of transport costs tends *ceteris paribus* to draw activities together (Richardson, 1971).

The role of external economies and agglomeration economies is generally less obvious but probably more significant. Agglomeration economies include scale economies at the firm or industry level. External economies include access to a common labour market, benefits from personal contacts and environmental factors.

So, according to Geltner et al. (2007), equilibrium in a well-functioning land market is attained when aggregate transport costs are minimised and aggregate land value is maximised. Bid-rents represent the maximum land rent that a user would be willing to pay for a location and a bid-rent curve shows how the bid-rent from a user falls as distance from some central point increases. This central point is the point at which costs are minimised / value maximised for a given use, each of which has its own bid-rent curve (and central point). The classical economic theories of urban rent and land use have been criticised primarily due to their simplifying assumptions and the increasing influence of modern working practices and living habits on the way urban land use is organised. These criticisms are summarised as follows:

- The process of allocating a land use to a site is constrained by inertia (preventing a high proportion of urban land that is in sub-optimal use from coming on to the market) and high mobility costs (preventing users from relocating) (Richardson, 1971).
- A change in the distribution or level of income or a change in the spatial pattern of consumer demand will cause a change in urban land values and the pattern of uses.
- A change in transport costs will have a greater effect on those uses that depend more heavily on transport.
- The theories have no regard for land use interdependence, sometimes referred to as complementarity between neighbouring land uses.
- Land use changes infrequently because of the long life of buildings, lease contracts, neighbourhood effects, expectations and uncertainty. Consequently, adjustments in supply and demand towards an equilibrium are slow.

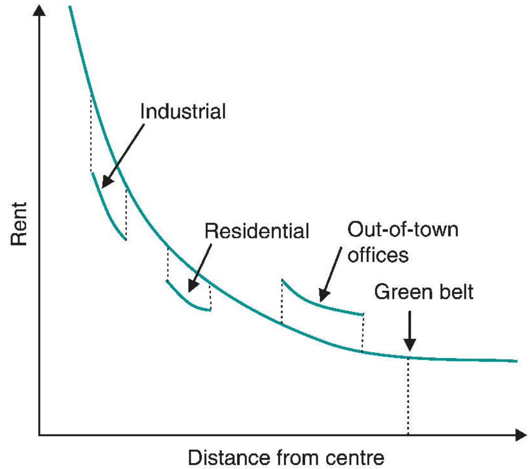

Figure 1.14 The effect of land use planning controls on bid-rent theory (Evans, 1983 and 2004).

- There is no uniform plane; geographical and economic factors, the rank and size of urban areas, proximity to other centres, history, favoured areas, cultural dispositions, existence of publicly owned land and ethnic mix all distort the perfect market assumption.
- The theories unrealistically assume a free market with no intervention and perfectly informed market players. In reality the major restriction on the competitive allocation of land uses to sites is land use planning control. This may restrict supply for some uses (leading to artificially higher rents) and over-supply other uses (leading to artificially lower rents). Diagrammatically the result is suggested in Figure 1.14.
- Owners of property have monopoly power due to heterogeneity of property.
- The theories ignore spill-over effects such as the filtering of land uses and property types and diseconomies such as traffic congestion.

The emergence of greater spatial flexibility as a result of increased car use, lower transport costs and better information and communications technology meant that, in the 1960s, the classical economic approach to explaining land use allocation, growth and pricing was challenged; see Meier (1962) for example. Indeed, ubiquitous car ownership has led to the phenomenal growth of out-of-town leisure, retailing and office activity, causing rents to rise in outer areas, and developments in information and communication technology which facilitate home-working and internet shopping may have similarly dramatic impacts on land use patterns in the future. Yet, despite these shortcomings, the classical theories retain a logical appeal that is difficult to counter. As Lean and Goodall (1966) wrote

> An urban area consists of a great variety of interdependent activities and the choice of location of any activity is normally a rational decision made after an assessment of the relative advantages of various locations for the performance

of the activity in question, given the general framework and knowledge prevailing.

In the long-term each land use will tend to the location which offers the greatest relative advantage. This will be the profit maximisation location for businesses. The spatial differentiation of land use becomes more marked and complex as the degree of specialisation increases in significance and complementarity linkages become more commonplace.

The relationship between the location of urban land uses and the rents that they attract is a complex one. Land supply in the centre is limited and competition increases rents. At a certain size and level of transport provision, diseconomies of scale set in and lead to congestion. Other influences include planning, declining importance of manufacturing, rising administrative employment and more multi-regional and multi-national organisations. These influences, together with disadvantages of city centre locations such as congestion, parking, high rents and taxes, have led to decentralisation. But despite predictions that decentralisation would continue at an increasing rate, there has not been a wholesale abandonment of the city centre. The need for face-to-face contact with clients or complementary activities remains crucial to many businesses and economies of concentration, agglomeration and complementarity can outweigh the problems associated with the city centre.

In summary, as Henneberry (1998) points out, the relationship between accessibility, property values and land use patterns preoccupied early theorists. Travel costs, it was suggested, were traded off against rents from the central area to suburbs of a mono-centric city. The centre has declined as the predominant location of employment and services in the modern city because accessibility is now heavily car-dependent and peripheral centres of activity have grown. In short, accessibility has become a more complicated phenomenon requiring more sophisticated treatment and it is important to study accessibility more rigorously in order to understand the locational advantages of individual properties rather than rely on traditional bid-rent theory that places the peak rent contour in the central area of a city.

1.4 The economics of property development

The development or supply of new commercial property resulting from activity in the development sector adds only a tiny fraction to the existing stock of commercial property each year. This helps explain why property exchange prices and their associated valuations are largely explained by demand-side factors. Supply-side factors (the supply of new developments) have little impact on overall stock availability: property is a durable good. It is price signals from the buying and selling of investments and occupational interests in the *existing* stock that influence the supply of and demand for *new* stock.

1.4.1 Type and density of property development

As demand for urban property increases it becomes worthwhile to pay more for land (land rent increases) to avoid the rising expense of building on the existing site more intensively. This increased demand (and increased land rent) will stimulate supply in the form of new construction in the development sector. Sub-marginal land might become marginal (break-even) or even super-marginal (profit-making) if demand increases sufficiently. This process is subject to the principle of diminishing returns which can be delayed by more efficient use of the land, perhaps by using technology to use the land more intensively by building upwards. If the fixed unit of land is expensive or less marginally productive in comparison with the variable units of capital then a developer will employ more capital on the fixed unit of land, use it more intensively in other words, perhaps by building at a higher plot density – a high-rise building for example. This is why land in the city centre is more intensively developed than land in more peripheral urban locations (Fraser, 1993).

Marshall (1920) was the first economist to consider how the principle of diminishing returns may be applied to the intensity of development on an urban site. If a site has no scarcity value the amount of capital employed per unit area which would yield the maximum return varies with the use to which the site is put. So the use that yields the maximum return for a given amount of capital per unit area will tend to be the use to which the site is put, all other things being equal. But when the site has scarcity value it may be worthwhile to go on applying capital beyond this maximum rather than pay the extra cost of land required for extending the site. In places of high levels of scarcity (and therefore high land value) this intensified use of land will be much greater than on sites used for similar purposes but where land is less scarce (and therefore of lower value). Marshall used the phrase 'margin of building' for that floor-space which it is only just worth adding to a site and which would not be added if the land were less scarce. The example he used was the top floor of a building; by erecting this floor instead of building on extra land a saving equivalent to the cost of that land is effected which just compensates for the expense of constructing the extra floor. In a nutshell, if land is cheap a developer will take much of it and if it is expensive he will take less and build higher. So a combination of things is going on: competition between different land uses ensures that land is used in its most efficient way (maximising return for a given amount of capital per unit area) up to the margin of building at which point it is no longer profitable to apply more capital to the same site. Referring back to Chapter 1, we are considering land use intensity from the point of view of new development activity rather than intensifying an existing use.

Fraser (1993) illustrated Marshall's ideas in a diagram similar to that shown in Figure 1.15. A characteristic that makes property development so exciting – if not risky – is that every scheme is different but, to illustrate the underlying economic principles, consider an 'average' development project as follows. The marginal cost (MC) curve shows the additional cost for each extra unit of floor-space added to a site of fixed size. At low density levels, there are economies of scale to be reaped by adding more floor-space so that the cost per unit of floor-space initially falls; consider the cost saving per unit of floor-space that might be gained by building two storeys instead of one. After a certain point, however, it becomes progressively more expensive to add more floor-space to the fixed amount of land. For example, a high-rise building will need bigger foundations, faster lifts and so on. The time taken to build it will be longer so finance costs will be higher. Moreover, the uncertainty over what the market will be like at the time of

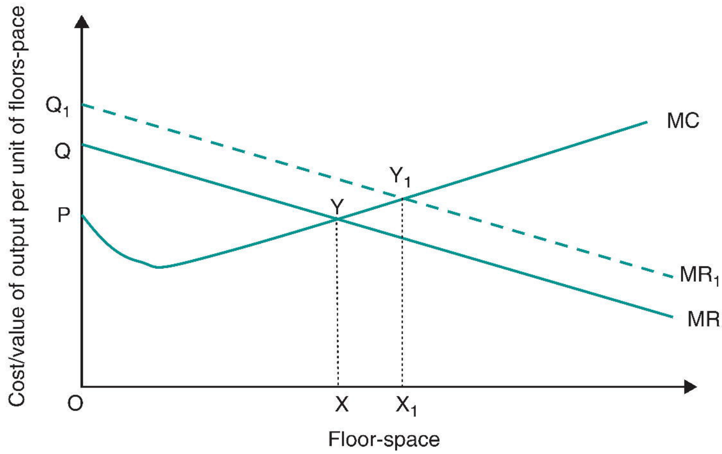

Figure 1.15 Optimum development density (Source: Fraser, 1993).

completion will be greater and this will mean that the risk and hence profit required by the developer will be higher. All of this means that the cost of adding each extra unit of floor-space increases. The marginal revenue (MR) curve is the addition to revenue or development value that is obtained from the completed development for each additional unit of floor-space. It slopes downwards because the principle of diminishing returns means that users of the property will obtain less and less utility for each additional unit of floor-space. The highest value space is usually found on the ground floor – that is why retail users outbid all other commercial users – and the rent per square metre on upper floors may well be less than on the lower floors. Fraser (1993) shows that the optimum amount of floor-space is OX units of accommodation and the area bounded by PQY represents the price the developer would pay for the site, i.e. the capital value of the site for this particular development.

Harvey and Jowsey (2004) also reiterate Marshall's ideas and note that by building higher the developer is effectively saving on land cost. Consequently a developer will only build more intensively so long as it is cheaper than acquiring extra land. So there is a margin of building in terms of the intensity of use of each piece of land (or density of development) and the extent to which additional land is used. Under free market conditions competition for land between different developers ensures that, in the long run, development everywhere will be pushed to the point where MR is equal to MC of capital.

Fraser (1993) extends his analysis of development density by demonstrating that site values and development density are affected by changes in costs and revenue. For example, an increase in property values will cause the MR to increase to MR_1, raising the optimum density to OX_1 and increasing site value to Q_1Y_1P. Fraser also argues that the diagram can be used to explain differences in site value and building density that are observed in different locations. Quite simply, if more revenue can be obtained from a particular site, perhaps because of its accessibility advantages in a city centre for example, then its marginal revenue will be higher at say MR_1. The value and development density of such a site will be high. A less accessible site on the edge of town would yield less marginal revenue at say MR and its value and density of development will be lower.

The type of development that is allowed to take place on a site and the intensity to which that site is developed is not determined solely by free market economics; they are regulated by planning policy and development control. Evans (1985) demonstrated how Government controls intervene to determine land use independently of the market. Landowners may also dictate the type, density and timing of development.

1.4.2 The timing of redevelopment

According to Fraser (1993) there are two conditions necessary for property development to be economically viable, assuming developers and landowners seek to maximise profit. First, expected development value must exceed development costs, including the price of the land and the developer's profit, and second, development site value must be at least the same as existing use value. Achievement of the first condition is measured using the residual method of valuation (see Chapter 3) which is advanced in subsequent sections of this chapter. If the second condition is not met then the developer would be unable to purchase the site at a price that would allow sufficient profit to be made. Equally the owner would be unlikely to sell to a developer at a price below existing use value.

We have seen from Chapter 1 that land use is determined by the highest bidder. The amount paid is the present capital value of the future income stream for that use. It follows that the use of an existing property will change if another user can bid a higher price than the existing occupant, subject to planning constraints, inertia of ownership and occupation and so on. But we know that buildings last for a very long time and a change of use might require redevelopment of the site. In this case, rather than comparing the present value of the existing use with the present value of the best alternative use, we need to compare the present value of the existing use with the present value of the site cleared and ready for development to its optimum use. Calculation of the latter is the role of the residual method of valuation introduced in Chapter 3. Assuming competition among developers to acquire a site, the residual site value for development purposes will be the highest price which the most efficient developer would be willing to pay (Fraser, 1993). This value can then be compared with the value of the site in its existing use and, if higher, means that development is viable.

By now you may have realised that the relationship between existing use value and development value of a specific site will vary over time. The value of a site that has just been developed for a particular use will be the highest value that could be obtained for that site; otherwise it would have been developed for another (more profitable) use. To investigate the relationship between existing use value and development value[9] of a site in more detail we need to consider the economic life of a building. Lean and Goodall (1966) stated that the economic life of a building will be the period for which the present (capital) value of the existing use is greater than the present value of the site cleared and ready for development. It is possible to illustrate the relationship over time between the capital value of a

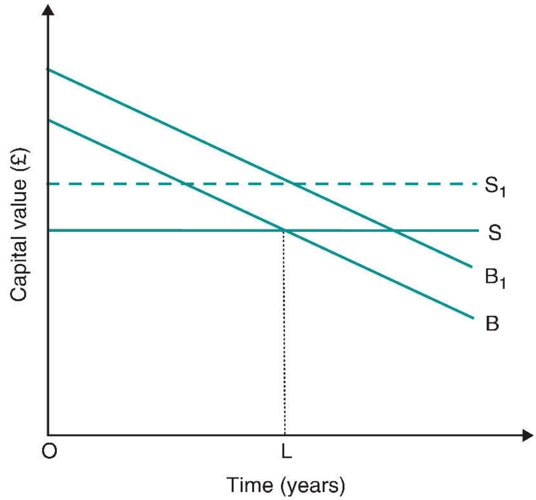

Figure 1.16 The economic life of a building (after Lean and Goodall, 1966).

cleared site and the capital value of the buildings on it (improvements made to it). Figure 1.16 shows the capital value of a site and buildings which are currently used as offices.

Lean and Goodall argue that, if we assume that office space was the most profitable use at time $t=0$, the line B shows how the capital value of the office building falls over time as depreciation takes hold, maintenance costs increase relative to rental value and a better standard of accommodation is expected. S shows the capital value of the cleared site assuming no change in supply and demand over time and that land and construction costs remain constant over time. The diagram shows that it is not economically viable (profitable) to redevelop the site until $t=L$. In reality, redevelopment is likely to occur sometime after L, perhaps when the lease ends, and the decision is subject to planning constraints and sunk investment in the existing use. The economic life of the building depends primarily on its earning power and only secondarily on its structural durability. S may increase to S_1 due to infrastructure improvements and this will reduce the economic life of the building. Similarly B may increase to B_1 due to refurbishment or conversion to a more valuable use and this will increase the economic life of the building. The model can also be used to explain urban structure. In the central area buildings fall into disrepair as owners anticipate redevelopment (B_1 to B) while, at the same time site values may increase (S to S_1). Further out from the centre the built environment is characterised by lots of conversions and refurbishments, increasing building values (B to B_1) but the infrastructure usually worsens (S_1 to S). In the suburbs buildings tend to be well maintained (B to B_1) but development forces are strong (S to S_1).

In the long-term and within the regulatory framework, land in private ownership tends to move to its most profitable use but many factors can slow the development process down (Lean and Goodall, 1966). In reality, according to Fraser, development site value will have to exceed existing or alternative use

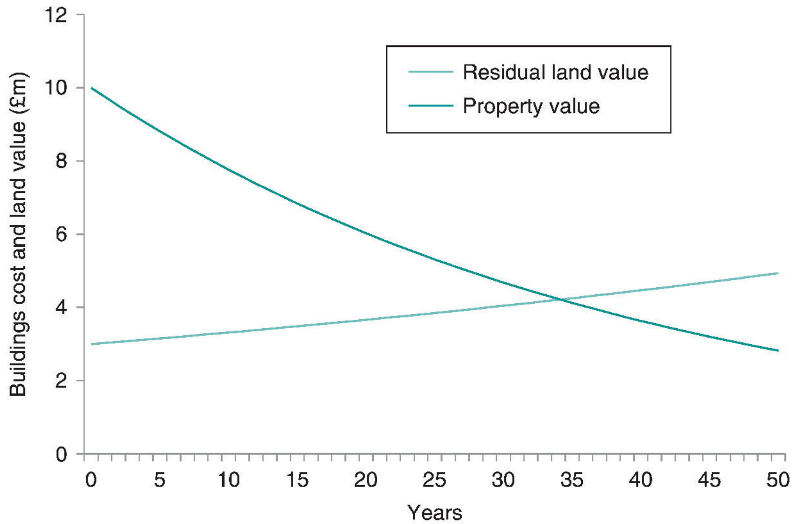

Figure 1.17 The relationship between land and property value.

value sufficiently to overcome landowner's inertia. Evans (1985) expands on this theme: expectations of landowners as to what might be the 'right' price for land may lead to a refusal of a bid that is different from expectations either now or in the future. This is known as speculation if the price expectation is higher and inertia if it is lower. Also, an owner-occupier may be unwilling to relocate without compensation sufficient to overcome the costs and possible loss of revenue, even though it may be more profitable to operate from a different location (Lean and Goodall, 1966). This means that the price paid for development land must be significantly in excess of the pure existing use value. Finally, Evans (1985) notes two landownership issues that may affect development activity. The first issue is tenure. Landlords may be more willing to sell and displace their tenants whereas owner-occupiers would have to displace themselves. Allied to this are possible statutory rights that a business tenant might have that legally secures occupation beyond the end of the current lease – the security of tenure provisions that were discussed in Chapter 4. The second issue is fragmentation of ownership. The larger the development proposal the greater this issue becomes. Trying to assemble a large development site from several smaller sites that are separately owned can be time-consuming, arduous and expensive. Sometimes developers will work with local authorities – which have powers of compulsory purchase – to ensure that these types of development can proceed.

Often, especially in the case of previously developed land (brownfield sites), it is the decline in existing use value through depreciation that brings about the redevelopment of a site well before the buildings are incapable of economic use, so the impact of depreciation (see Figure 1.17) on property is considered in Chapter 8.

Key points

- Rent is regarded as a surplus amount paid to the landowner by the user from the MRP generated after having deducted the unit costs of optimally employed factors of production involved in using land in its most profitable manner.
- The pattern of urban land use is determined by supply and demand. Classical urban location theory states that on the supply side landowners will seek to maximise value by allocating land to its optimum use, subject to planning regulation. On the demand side demand for urban land is a demand for space and occupiers or tenants of land pay occupation costs or bid rents that reflect a location's accessibility. This classical view of the relationship between land use and rent explains whether or not a site is brought into economic use, the intensity of that use and the rent that might be charged. The classical theories also posit that spatial variation in cost and revenue determines the optimum profit maximising use for a particular location.
- An extreme view of the heterogeneity of land is that the supply of each unique parcel of land is perfectly inelastic but of course there will be many plots of land that are substitutable to a greater or lesser extent. When considering urban land, sites in the centre are less substitutable than those on the outskirts simply because there are less of them. Consequently the supply of these sites is more inelastic. But these sites are the ones in greatest demand because they are the most accessible to raw materials (labour and capital) and the market (consumers) so their rents are higher and they tend to be the most intensely developed. This inelastic supply means that economic rent is high in the central area and may even represent 100% of the total rent due to the inability of supply to increase.
- The supply of new property each year represents only a tiny fraction of existing stock. This is why the property supply is regarded as inelastic in every time frame except the very long-run.
- The use to which a piece of land is put depends on competitive bidding between developers who are, in turn, interpreting the requirements of occupiers and investors. The amount of land used for a particular development and the intensity of use that is made depends on the cost of capital and revenue that can be obtained. Because these factors vary over space they also help explain why different land uses are located where they are and why they are developed to the varying densities.
- Development of a site is economically viable when the present value of the site cleared and ready for development is greater than the value of the existing use.

Notes

1. In economics the short-run is the decision-making time frame of a firm in which at least one factor of production remains fixed whilst in the long-run all factors of production may be varied and firms can respond to price changes.
2. Supply and demand schedules are referred to as curves but, for illustration purposes, these curves are normally depicted as straight lines because they are simple representations of the general form of the schedule rather than an empirically based one.

3. In a competitive product market, price is constant so MR is also constant and equal to price.
4. MP of a factor is the addition to total product (output) obtained from using another unit of that factor.
5. Technically, the MRP schedule is equal to the demand schedule only if the firm uses a single factor but it can be proven that when more than one factor is used the demand schedule for each slopes downwards.
6. Even if supply was not fixed/perfectly inelastic in the short-run, the longevity of property means that new stock is a very small proportion of total stock and therefore stock availability/supply depends much more on the availability of existing stock, either via vacant premises or the ability of uses to change easily (Ball et al., 1998).
7. The rent paid in respect of any particular use of the land is therefore a geared residual payment (unless there is monopoly ownership of land) but its volatility is reduced as the land can be transferred to the next most profitable and thus restrict drops in rent. Also, land rent is based on expectations of profitability rather than actual year-to-year profit revenue and this tends to reduce the volatility of land rent in the short-term (Fraser, 1993).
8. Complementary land uses include things like comparison shopping and symbiotic business activities.
9. The value of a site depends on the use to which it is put and a change to alternative use realises that value. Rather confusingly development control in the UK regards many changes of use as 'development'. For the purposes of this chapter though, development involves a more tangible replacement of buildings. Development value is thus regarded as a specific form of alternative use value calculated using the residual method of valuation.

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Chapter 2
Macroeconomic Considerations

Macroeconomics is concerned with the outcome of *all* decisions made in the economy as a whole. It takes account of purchases made by all consumers, total capital investments made by businesses, goods and services procured by central and local government, and the level of exports demanded overseas. In short, macroeconomics deals with aggregates and analysis of the overall level of prices, output and employment.

2.1 The commercial property market

The discussion in Chapter 1 on the theory of urban rent and land use leads to the concept of a **market** which encompasses the exchange arrangements of owners and users of property. A market is an environment in which commodities (which may be goods or services and, in our case, legal interests in property) are traded between buyers and sellers through a price mechanism, usually without undue restriction, known as 'an open market'. Buyers and sellers – market participants – interact and respond to supply and demand stimuli as well as to their own constraints (such as budget and desired risk exposure) knowledge and understanding of the relative utility of the property for its intended purpose. The level of efficiency of a market is determined to some extent by the standardisation of the product and the degree of efficiency with which it functions. The stock market in a typical developed economy, for example, provides instant information worldwide about the prices and quantities of shares being bought and sold during the current trading period. By contrast, property markets are more informal, less structured and more diverse; in many ways each property market transaction can be regarded as unique. There are fewer, more heterogeneous transactions in the property market. Consequently it is more complex; buyers and sellers rarely come

Property Valuation, Second Edition. Peter Wyatt.

together and simply strike a bargain as they usually need to appoint agents with local knowledge to act on their behalf and commission independent valuations to verify asking prices. As the Appraisal Institute (2001) points out: the property market has never been considered as strongly efficient due to decentralised trading, the heterogeneity and high cost of each unit of product, the high cost and lengthy transaction process that is common when buying and selling property (referred to as illiquidity), the relatively few buyers and sellers at a single point in time in one price range and location, paucity of market information at the individual property level, and the opportunity to exercise monopoly power.

As a way of explaining how the commercial property market functions we can define three interlinked sectors:

a) The user, or occupier market, in which each property is either owned and occupied by the user or leased from a landlord who is holding the property as an investment. The demand for property is driven by the demand for the underlying goods and services that the land helps provide; a derived demand.
b) The investment market, where properties are regarded as financial assets. This sector proceeds on the basis that rational investors seek to maximise returns on a range of assets and compare the risks of holding property against other investment opportunities. At the heart of investment theory and practice is a trade-off between risk and return with the aim of maximising return for a minimum acceptable level of risk. This market sector is driven by the opportunity cost of investment capital.
c) The new property, or development market, where land is developed to create new stock or redeveloped to replace existing stock. For ease the developer can be regarded as a separate entity but in reality is a particular type of investor or is sometimes the occupier of the developed property. The developer is responsible for conceiving the scheme, acquiring the land, negotiating the finance and organising construction. Completed projects are subsequently let to occupiers and sold to investors or retained for occupation or as an investment.

This means that the same property or site can have different values depending on the market sector in which it is being traded. For occupiers property represents a factor of production, the bid-price (rental value if let or capital value if purchased) of which will depend on the specific use to which it is put, i.e. its value to the business. This is what we have been discussing in Chapter 1. Developers and investors, on the other hand, regard property as an investment opportunity and investment value will depend on its capacity to deliver a satisfactory return. But it should be remembered that the ability of property to provide a satisfactory return to investors and developers is predicated on its value to users / occupiers, thus rental value is the key financial driver of commercial property market activity in all sectors. The three sectors are interdependent and values and market activity in each are influenced by signals from the others. Rental values are determined by the forces of supply and demand in the occupier sector and this demand is one that is derived from price signals in the market for the commodity that the property is being used to produce. In the investment sector capital values are determined by the expectations of occupier activity and its forecast effect on rental values. Capital values in the investment sector and rental values in the occupier sector provide signals to the development sector regarding the supply of new space. New supply can, in theory, affect rental and capital values in the occupier and investment sectors but the extent of this influence is determined by ratio of new to existing space in the sub-market concerned and the stage in the economic cycle at which the new space is brought to the market. These macroeconomic influences will be discussed later in this chapter.

Market sectors can be broken down into sub-sectors according to property use. Obvious examples are office buildings and business parks, retail properties such as shopping centres, shops, supermarkets and department stores; in fact high street outlets represent a significant proportion of the commercial sector. Less obvious are the industrial estates and traditional warehouses that formed an important part of the industrial age. Leisure outlets such as hotels, pubs and cinemas represent an increasing proportion of commercial property stock. Buyers and sellers of these various types of property are brought together in separate sub-markets to determine exchange details. Furthermore, because property is physically immobile, each of these sub-markets may operate differently depending on their location; office property in the West End of London is regarded as a separate market to similar space in the Mid-Town and City areas of Central London. More specialised markets may also be identified on the basis of unit size, quality, investor and tenant characteristics, such as institutionally-owned high-tech business parks let to 'blue-chip' tenants. The distinguishing characteristic of a market is the exchange of information about factors such as price, quality and quantity. In terms of property this can be interpreted as rental and capital values, location, physical (size, style, design, age, etc.) and legal (tenure, planning, etc.) attributes. The next three sections consider the principal commercial property market sectors described above in more detail.

2.2 Property occupation

From the occupier's perspective property can either be rented or owned, the latter often debt financed, via a mortgage for example. In the case of owner-occupied property, annual occupation costs are often referred to as **imputed rent** but whether real or imputed, rent acts as a price signal to market participants and, through its rise and fall, clears the market by equating supply and demand (Ball et al., 1998). For properties held as investments the owner receives a return for the capital outlay (purchase price) in the form of rent from the occupier. Typically rental income from a property is fixed for five years at a time and thus offers a degree of price stability in the occupier market. This links to stability of investment income and hence capital values in the investment market (Fraser, 1993). Indeed, Fraser argues, prices of property investments tend to be more stable than other types of investment, especially in the short term as investors often hold out for a price they expect rather than reduce their asking price when selling. So whereas occupiers are concerned with the property and its contribution to the business occurring on the premises, investors are concerned with the rate of return on the investment. This ownership / occupation split will continue as long as occupiers in the commercial market prefer to rent rather than own property and occupiers show no sign of wishing to increase the amount of property that they own. Businesses may be reluctant to own property because it can tie up a considerable amount of capital and this money could be used in core business activities. Also property ownership requires management expertise to integrate the assets into core activities. This role is often contracted out to external agents who may not be familiar with corporate objectives and strategies of the company and this can result in under-occupied space and other inefficiencies. Alternative strategies have therefore been employed by companies and these have often been variations on the theme of a **sale and leaseback** arrangement where property ownership (and sometimes management) is transferred to an owner-investor and capital is released to the occupying business tenant (previously an owner-occupier) for investment in the business.

The requirements of commercial occupiers are constantly changing in terms of physical attributes such as size of accommodation, type of structure and geographical location, and in terms of legal ownership. These changing property requirements result not only from shifts in economic activity but also from changes in the way many businesses operate; working practices, developments in information and communication technology, globalisation of resource and product markets have all had significant impacts. Increasingly big corporate organisations are trying to specify property that meets strict corporate criteria; some even want the building to be part of the branding. Hence bespoke owner-occupied commercial offices are slowly increasing in number; witness the change to the London skyline over recent years: if the existing stock cannot supply the required assets then development must occur to meet the demand.

2.3 Property investment

Economists refer to **investment** as anything that adds to productive capacity. In other words, activities that make use of resources today in order to secure greater production in the future. For example, a business may put funds into new equipment or building a new factory, either way it is making an investment to increase capacity in the future. In financial terms investment is the sacrifice of present capital for future gain, typically in the form of income and/or capital.

There are certain attributes that are desirable regardless of the type of investment: the level or amount of return on capital invested (this return may take the form of income or growth in capital value or a combination of the two); the security of capital and income (typically regarded as the risk inherent in an investment); accessibility of the invested funds (often referred to as the liquidity of an investment); and tax efficiency. Some investments will produce little or no income but will provide a return to the investor by way of capital growth, such as gold, works of art and precious gems. Other investments produce a high income but little or no capital growth. Inflation is a major factor affecting security of capital and income. High inflation quickly erodes capital and will also affect income if it is not regularly revised to ensure parity with real income levels. The fiscal implications of any investment need to be considered, especially when comparing the returns across different investment assets as their tax status may differ significantly. The importance placed on capital or income growth can also depend on the tax position of the investor. Convenience refers to the amount of management that an investment asset requires; can an investor sit back and leave the investment to look after itself or will someone else look after it for them or does the investment require constant vigilance and attention from the investor? For example building society accounts are very convenient and require virtually no attention; shares on the other hand require constant monitoring, whilst property investment returns can be enhanced through careful management.

A key attraction of owning property is its suitability as an investment, particularly over the long term. It ranks alongside equities and bonds as a major component of any investment portfolio. Property is a tangible and durable asset so investment in property is typically viewed as a relatively long-term activity in comparison to equities and bonds (Sayce et al., 2006). Investors rely on a combination of income and capital growth to generate required return and property benefits from real growth in rent and capital value; each operates in a separate sub-market and is affected by different forces, so it is possible that rental growth may be strong because of high demand by tenants while at the same time capital growth may be limited because of sluggish demand from prospective investors. Property can be invested in directly through ownership as an investor, developer or occupier. As with equities and bonds, property investments can be traded second-hand and indeed this market, rather than the market for new property, is where the vast majority investment trading activity takes place. It is also possible to invest in property indirectly by purchasing shares in property companies or companies that deal with property, property unit trusts and other securitised investment vehicles. The advantage of indirect property investment is that many of the problems associated with direct property investment such as illiquidity, high transaction costs and lengthy sale time disappear but the portfolio diversification benefits are reduced. On balance, indirect property investment is a good way of allowing small investors to pool their funds so that property can be acquired that could not be done so by these investors individually.

On the supply side property investments take the form of properties that are already in existence and occupied by one or more tenants paying rent. These 'standing investments' form the majority of assets in the property investment sector but new ones come along all the time in the form of newly developed properties and transfers from owner occupation (these are often sale and leasebacks but other financial instruments are used too). As well as standing investments and new developments, property investments can be classified in terms of their risk / return profile. Offering the greatest potential return for the least risk are 'prime' property investments which have modern amenities, a flexible design, are typically found in excellent locations and are occupied by blue chip tenants. Moving up the risk scale, secondary property can be found in viable locations and typically comprise a structurally sound property construction with improvement potential and good tenants. Then tertiary properties are usually found in poor locations, may require significant structural work, may be occupied but struggle to attract tenants and require significant proactive management. Property investments can also be classified by their ownership characteristics. Freeholds offer a pure equity interest to the owner-occupier and an equity/bond mix to an investor because of the stepped income growth pattern obtained from properties let at rents that are reviewed every five years. Leasehold investments come in two main types; long leases on ground rents where the reversion is a long way off – like long-dated or undated gilts but without the same level of liquidity and with higher management and transaction costs, causing yields to be slightly higher. The second type of leasehold investment is shorter leases but these are not very popular.

On the demand side property competes against other forms of investment, primarily bonds and equities. Perhaps as a consequence of the unique investment characteristics of commercial property, investment is dominated by large financial institutions such as pension funds, insurance companies, investment and unit trusts. These organisations traditionally invested in property as a hedge against inflation but nowadays it is the relatively favourable return that provides the incentive. Pension funds (which have long-term inflation-linked liabilities) and life assurance companies (which have long-term fixed interest liabilities) seek to match their liability profiles with suitable investment assets (Sayce et al., 2006). In addition to institutional investors, other investors include public and private property companies, overseas investors, investment and high street banks and building societies, private individuals and charitable organisations.

Property may be regarded as an equity / bond hybrid investment. Property investments are like equities because they are capable of maintaining their value in real terms (keeping pace with inflation) and hopefully growing in real terms. This is achieved through growth in capital value and income. With regard to capital growth, as standing property investments trade on a second-hand market, capital values rise and fall depending on economic activity, just as they do for shares. But, unlike equities, the capital value of a property will not fall below its inherent land value regardless of the rent-earning capacity of the business currently in occupation. Regarding income growth, this is receivable at rent reviews and lease renewals that usually take place every five years. Consequently property investments resemble a bond-type investment between rent reviews. Indeed, because rent reviews are almost always upward-only in the UK if the market rent falls below the rent currently being paid by the tenant the cash-flow has all the characteristics of a conventional fixed income bond where risk exposure depends almost entirely on the quality of the tenant. In contrast to bonds and equities (paper investments), property represents a tangible investment asset that needs to be managed and maintained in order to secure a steady income stream. Despite this property is considered to be an attractive investment for several reasons.

First, there is potential for an inflation-proof or real return on income and capital. As can be seen from Figure 2.1, total return (income and capital return combined) on **standing investments** has outperformed inflation over most of the last quarter of a century. Standing investments are properties that existed at the start and end of the period over which the return is calculated and therefore exclude new developments coming on-stream between measurement dates. The graph clearly shows the major boom and slump in the property market during the late 1980s and early 1990s respectively and, more recently, the severe drop in commercial property returns in 2007/8.

Year-on-year returns for equities, gilts and property are shown in Figure 2.2. Property investment was a very strong performer in the first five years of this millennium but the market crash of 2007 is clear to see. From Figure 2.3 the contribution of movements in capital values to movements in total return is clearly visible. Income return is much more stable.

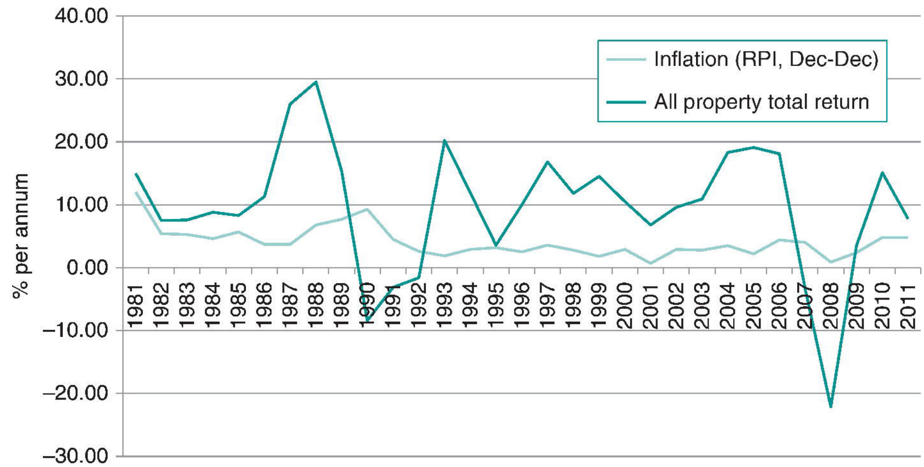

Figure 2.1 Inflation and 'All property total return'(produced using data from IPD UK Annual Index).

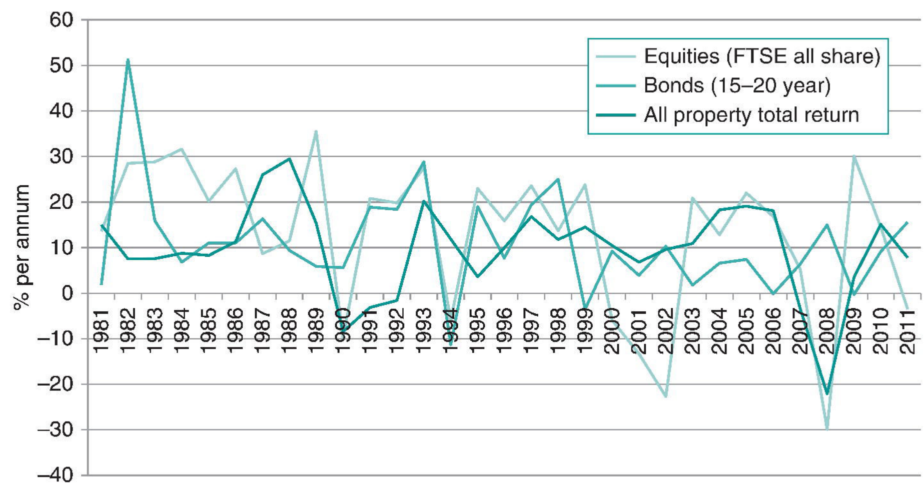

Figure 2.2 Returns from IPD Standing Investments, equities and medium-dated bonds (produced using data from IPD UK Annual Index).

Box 2.1 lists the main variables affecting property returns. As a consequence, different types of commercial property display different investment characteristics. There are many types of shops and they are typically regarded as a secure investment because of the **goodwill** and capital invested by the tenant. Retail developments, such as a new shopping centre, can be more risky and so rent linked to turnover can provide a solution. There is also a wide range of office accommodation let on different lease terms. From an investor's perspective there are two main methods of leasing offices; the whole building may be leased to a single tenant and this is usually regarded as the best option. Alternatively the building can be split into

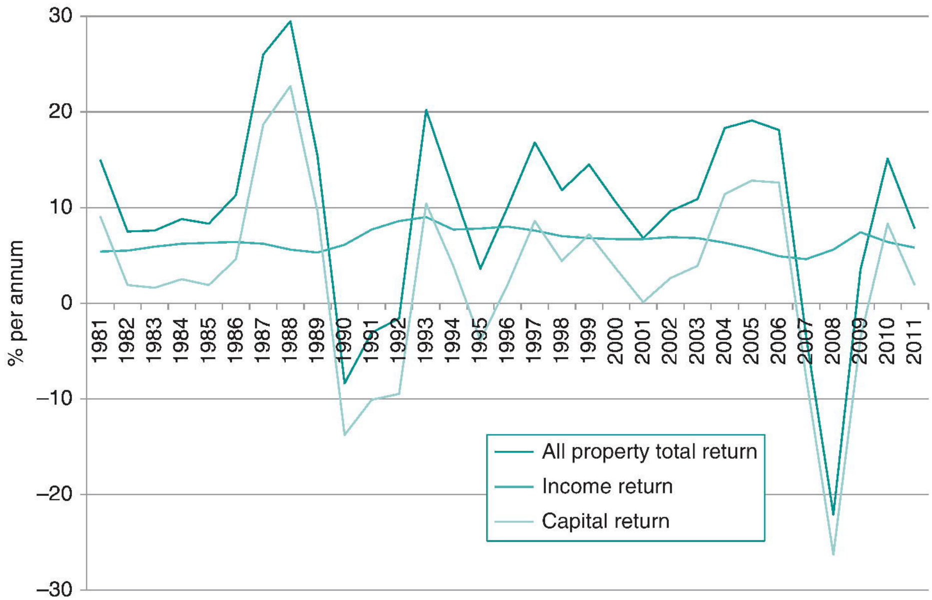

Figure 2.3 Total return split into its income and capital components (produced using data from IPD UK Annual Index).

suites which are leased to separate tenants and the cost of maintenance of the building as a whole is recovered via a service charge to each tenant in addition to their rent. Historically, industrial property was not a popular form of investment due to intense physical use, inflexibility of premises and the close relationship between risk/return profile and the declining manufacturing base since the 1970s. Attitudes have changed due to the introduction of new types of premises which are typically of a modern, simple construction with a large, uninterrupted and well-lit floor-space, with ancillary offices, yard space and parking. 'High-tech' industrial units offer good communications, campus style accommodation, high specification space, proximity to skilled labour, and the flexibility to cope with changes in information, communication, production and distribution technologies. Nevertheless investment in industrial property is subject to 'voids' due to economic conditions and changes in technology and manufacturing practice. Warehousing can be either purpose-built or conversions of existing properties but both are prone to voids as demand for warehousing varies significantly with economic activity. IPD measures total return by property sector and Figure 2.4 shows the investment performance of these three main property types over the past quarter of a century. Retail is the least volatile, industrial has performed surprisingly well and offices have shown the biggest downside due, in part, to major problems in the London office market in the early 1990s when there were lots of **over-rented property** investments. As with the whole property market most of the shifts in total return can be explained by shifts in capital rather than income return. The boundaries between these very simplistic classifications of retail, office and industrial investment property are changing; increasingly retail coexists with leisure activities and the distinction between office and industrial land use is sometimes rather blurred.

Box 2.1 Influences on property investment returns

Main variables affecting all property returns:

- Supply of floor-space in relevant sector
- Inflation
- Exchange rate
- Interest rates

Main variables affecting retail property returns:

- Consumer expenditure
- Sales
- Employment
- Savings ratio
- Personal sector liquidity
- Company profitability
- House prices
- Housing starts
- Average earnings
- Personal disposable income
- Personal sector retail credit
- Car sales

Main variables affecting office property returns:

- GDP
- Service sector employment
- Gilt yields
- Exports / imports of services
- Stock market indices
- Company sector liquidity
- Fixed investment
- Company productivity
- Corporation tax

Main variables affecting industrial property returns:

- GDP
- Manufacturing output
- Capacity utilization
- Gilt yields
- Manufacturing earnings
- Manufacturing productivity
- Exports (goods)
- Company productivity
- Imports (goods)
- Fixed investment

Main variables affecting property yields:

- Rents
- Inflation
- Base rates
- Gilt yields
- Institutional investment in property
- Company productivity

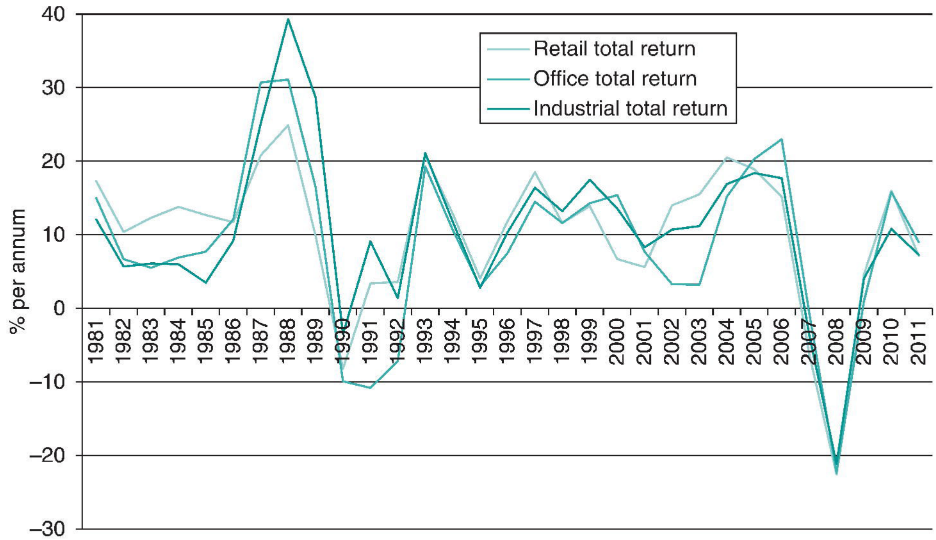

Figure 2.4 IPD All Property Total Returns by sector (produced using data from IPD UK Annual Index).

Table 2.1 Annualised returns (produced using data from IPD UK Annual Index).

Last...	Inflation (RPI, Dec–Dec)	Equities	Bonds (15–20 year)	All Property Total Return	Retail Total Return	Office Total Return	Industrial Total Return
3 years	2.70	1.40	7.70	–2.50	–2.00	–3.2	–3.1
5 years	3.30	5.10	5.90	1.10	0.30	2.1	0.6
10 years	2.90	3.70	5.90	6.80	7.30	5.9	6.7

Most investors hold direct property investments for several years so it is important to monitor returns that have been annualised over periods that correspond to typical holding periods. Table 2.1 reveals the extent of the property market crash over the last three years. Extending the time period to a longer period of ten years shows that property has performed relatively well compared to equities and, to a lesser extent, bonds.

As well as providing performance measures and details of investment activity by main sector, market segment and region, IPD also categorises these data by floor area and date of construction. The usefulness of these data will become apparent in later chapters so they will not be presented here.

The second reason property is an attractive investment proposition is to do with risk. Risk is the uncertainty surrounding expected investment return, both capital and income. Investors seek to minimise risk for an expected level of return and property is regarded as a relatively secure or low-risk investment. Risk to capital refers to the possibility of losing some or all of the investment capital. For property investments, capital risk is low because property is a tangible asset where proof of

Table 2.2 Standard deviation of the base rate and annual returns from the main investment classes (produced using data from IPD UK Annual Index).

	Retail Bank Base Rate (year-end)	Equities	Bonds (15–20 year)	All Property Total Return
SD 1981–2010	3.89	16.41	11.42	10.30
SD last 10 yrs	1.79	20.49	4.84	12.69
SD last 5 yrs	2.30	22.64	6.47	16.15

ownership is usually registered by law and its usefulness ensures a high opportunity cost (transfer earnings). Income risk is reduced by rent reviews helping to keep rent in line with inflation. Security of income is affected by factors such as the quality of the tenant and the nature of the lease terms, for example, how likely is the tenant to default on the rent and thus undermine the investment value or is there a break clause in the lease that may lead to a void or gap in rental income? Property income risk is similar to dividend risk in the case of equities although income from property investments is normally fixed for periods of five years rather than changing each year. But rent is a prior charge above dividend payments should a tenant go into receivership. Consider again the returns from equities, gilts and property but this time focusing on the standard deviation of the annual returns over the last five, ten and 30 years. These are shown in Table 2.2. Using standard deviation as a measure of risk, we can see that the return on property is less volatile than equities over all time periods according to this very basic statistic. Also, the return from direct property investment has been much greater per unit of risk than the other principal asset classes (IPF, 2007).

As well as providing a real return and offering a relatively secure investment opportunity, property can provide corporate identity, there may be tax advantages and it is a useful portfolio diversifier. This means that levels of property risk can be hedged against non-correlated levels in other investment asset classes such as equities and bonds. An influence that causes a change in gilt yields may lead to an opposite change in property yields. For example a rise in inflation can lead to higher gilt yields and therefore higher property yields (as the risk-free component of the latter is often based on the former). But the higher rate of inflation may also lead to a higher rental growth expectation and thus reduce property yields as property investment becomes more attractive and investors bid up prices. This reduction might cancel the increase and might explain why property yields are relatively stable when compared to yields from gilts and only follow significant trends (Fraser, 1993). Many of the larger, institutional portfolios contain a mix of investment types as a means of hedging against adverse market conditions in any single sector or location and portfolio managers rebalance their assets from time to time as a response to market conditions. It is important to note that whereas all shares in a company are the same, property investments are heterogeneous and vary by size, location, use, age, construction and tenant (Sayce et al., 2006). So investing in property as part of a mixed portfolio of investments can help reduce the amount of risk that the portfolio as a whole is exposed to. Look at Figure 2.2 and see how total return from property investment moves in relation to the return on equities and gilts. Even within a property portfolio it is useful to hold a mix of property types because the returns may not always move in same way. A final but important feature of property as an investment vehicle is the ability to borrow money to help purchase property investments. This allows investors to combine their equity with debt finance and thus invest in either bigger properties or in a larger number of properties than they would otherwise be able to do. This debt financing represents an advantage over the equity and bond investment markets.

However, property has a number of disadvantages too. First, it comes in large indivisible heterogeneous units that suffer from deterioration and obsolescence. Its lumpiness makes it difficult for smaller investors to acquire big, prime investments and almost impossible to acquire landmark developments such as shopping centres or prestigious office buildings. It also means that only the larger investors can afford to assemble balanced and sufficiently diversified portfolios (Sayce et al., 2006). Ways round this are to syndicate investment acquisitions or use debt finance. Second, property is an illiquid investment asset. This means transactions take time and money to complete. A sale of an investment property usually takes weeks or months rather than days – the norm in equity and bond markets. The purchase of a property investment sometimes involves the acquisition of complex legal interests and the arrangement of complicated finance structures. Transfer costs are usually higher for property investments than they are for other investment assets. **Stamp Duty Land Tax** must be paid, surveyors are employed to survey the property and negotiate price and general lease terms, legal advisors are required to draft the lease and oversee the conveyance. Tax, legal and agents fees on sale and purchase have been estimated to be in the region of 7% in every five year holding period and perhaps should be amortised over this period (Sayce et al., 2006). However, lot size and holding period are higher and longer respectively than for bonds and equities, so the annual equivalent of costs is lower but probably still higher than for shares and bonds (Fraser, 1993). Third, there are high management costs to cover rent collection, ensure compliance with lease terms, negotiate rent reviews and lease renewals, revaluations, performance analysis and so on (Fraser, 1993) and this means that net income might be significantly below gross income. But, on the plus side, pro-active management, which might include refurbishment and renewal, can enhance income and capital value (Sayce et al., 2006). An investor will seek to minimise these costs and transfer liability wherever possible to the tenant. For example, a typical lease requires the tenant to be responsible for internal and external repairs and insurance of the premises.

Property is characterised by a decentralised and cyclical market with a paucity of market information in which a high degree of market knowledge is required. It is susceptible to external influences and government intervention in the form of planning, environmental controls, buildings regulations, rent control, security of tenure add to management obligations and affect value (Sayce et al., 2006). All aspects of property dealings, whether occupation, investment or development take time to respond to changes in economic activity and this leads to periods of over and under supply and hence greater volatility and risk (Ball et al., 1998). Consequently property is typically a long-term investment because a long holding period reduces the problems associated with illiquidity and the emphasis is on security of income and capital especially in real terms.

Around half of all commercial and industrial properties in the UK are held as investments, where the ownership interest is separate from the occupation interest.

The landlord leases the property to an occupying tenant or tenants. Investors in UK commercial property include large financial institutions such as pension funds and insurance companies, overseas investors, UK listed property companies, UK private property companies, limited partnerships, landed estates, charities, trusts, unitised and pooled funds and private investors. The majority of commercial property investments can be placed in one of three principal sectors; retail (shopping centres, retail warehouses, standard shops, supermarkets and department stores); offices (standard offices and business parks); and industrial (standard industrial estates and distribution warehousing). Investment market sub-sectors are often defined using a combination of this sector classification and their location, 'City of London offices' or 'south west high street retail' for example. There are also several smaller sectors of the property market which attract investment interest such as leisure parks, restaurants, pubs and hotels.

2.4 Property development

Property development may be defined as a process by which buildings are constructed either for owner occupation or for retention or sale as an investment. In financial terms development becomes viable when the value of the completed scheme is at least equal to the development costs, which include the acquisition and preparation of the site, construction materials and labour costs, finance and a suitable profit element. In common with all other economic activity the process of development requires the integration of land, capital, labour and enterprise and the process takes time; a site needs to be acquired, existing property demolished if necessary, planning permission has to be negotiated, construction activity has to be contracted, complex financial arrangements may need to be arranged, especially in the commercial sector where property is often developed as a speculative venture. Consequently it can take several years for a building or more complex scheme to progress from its development phase to completion, and there is inevitably a time lag before supply catches up with demand.

It is important to identify the optimum use that can be envisaged for a site and choices about design, planning, funding, construction, renting or selling need to be made. These are difficult decisions especially since, in most instances, commercial property development companies tend to be dominated by entrepreneurial talent and few other resources. In fact, apart from the really big institutional players in the market, developers of commercial property rarely own land in their own right. The success of any kind of development depends upon drawing together the other factors at the right time and at the best price. The importance, therefore, of the entrepreneur should not be overlooked. In a small development firm the manager-proprietor would be the entrepreneur; in a joint stock company the shareholders would take on that responsibility. In all market-driven organisations the entrepreneur organises the factors of production.

A characteristic of the development sector of the property market is the paucity of transaction information. Not only do development land transactions occur very infrequently (especially when compared to the volume of transactions that takes place in other financial markets or, indeed, the occupation and investment sectors of the property market) but also the market players – the buyers and sellers – are not inclined to share this information. Development success depends to a large extent on piecing together the various factors; the right site with relevant permission to develop, access to sufficient finance, labour and construction materials, a market for the completed development and so on. Only if these ingredients lead to a successful development can a developer extract a profit as payment for the enterprise. The profit is a residual sum and is therefore very risky. As a way of reducing competition risk, secrecy surrounds the assembly of development sites, the securing of planning permission and finance.

Short-term finance is typically used to pay for the costs incurred throughout the development period and so money markets that deal in short-term loans are especially important to the property development sector. Development loans are usually short-term with variable interest rates. If the rate increases then construction becomes expensive and reduces the number of viable projects. Also the longer the development period the more uncertain developers are about future costs and the more risky it is to predict them. If the developer is looking to retain the scheme as an investment, an arrangement can be made with a lender on completion to repay the short-term finance that was taken out to fund the development. This long-term finance is typically obtained from the capital markets in the form of a **mortgage**. Traditional mortgage loans are for 20–30 years and the interest rate is lower than for short-term finance. If the developer sells the scheme on completion then long-term finance is not required.

2.5 Property and the wider economy

Decisions on the development and occupation of and investment in property require an assessment of the current and future macroeconomic conditions and an understanding of the related markets. For example, if interest rates rise sharply, consumer spending tends to decline and the demand for retail and manufacturing property reduces and in some instances may even become surplus to requirements. When the UK Government increased interest rates in the late 1980s this precipitated a major downturn in investment returns from property. Property market activity responds to short and long-term macroeconomic stimuli; the former are largely a function of availability of debt finance and the latter a function of changes in employment, population, income and shifts in consumer preferences. Consequently, the property market does not operate in isolation; it is influenced by, but tends to lag, movements in the economy as a whole and in the financial markets in particular.

It is important therefore that valuers monitor key macroeconomic indicators and understand how their movements may influence the supply and demand of different types of property in different locations. Knowing this will facilitate more informed judgements about rental and capital values, rental growth, investment and occupier demand and development activity. Key macroeconomic indicators include gross domestic product, trade deficit, tax-to-GDP ratio, inflation, employment and unemployment figures, oil prices, house prices, household debt and debt as a percentage of income. A key money market indicator is the price of money or interest rate which is influenced by supply and demand and set by the Bank of England. The interest rate is very important to the property market as most investment and development activity is a combination of debt and equity finance, typically a large amount of the former and a small amount of the latter. The cost and availability of equity and debt finance influence demand for and supply of property. The interest rate is also a component of yields and discount rate used in valuation and so directly affects property values (Appraisal Institute, 2001). The UK economy has been characterised by a low interest rate since the early 1990s and the property market has benefited as rental yields have exceeded bond yields and the average cost of borrowing. It is also important to monitor government policy not just in relation to planning and development control but also legislation and other statutory controls regarding the environment, workplace, landlord and tenant relationship, licensing and so on.

The property market, like the economy as a whole, is prone to cyclical fluctuations. Property cycles are identified by monitoring changes in key indicators of property market activity such as investment returns. What makes the property market interesting is the way in which the sectors of the market interact during these fluctuations – the varying leads and lags. Over the short term the supply of property is relatively inelastic, so disequilibrium can characterise the market in the short term when demand increases or decreases (Appraisal Institute, 2001). For there to be equilibrium in the overall property market all sub-markets must be in equilibrium simultaneously but markets are continually adjusting to new supply and demand conditions and therefore are unlikely to be in equilibrium at any one time. Also, because of longevity and fixed location of property, its high unit price and the terms of lease contracts, property markets take time to adjust (Ball et al., 1998). By that time the market would have probably moved on so that market prices tend to lag changes in buying and selling pressure – a feature of an imperfect market. Consequently the property market has been cyclical, displaying successive periods of expansion, decline, recession and recovery. Figure 2.5 illustrates how this cycle operates.

The position of property in its cycle is determined by supply and demand in the occupier market (measured by stock availability, rental value and rental growth) and supply and demand in the investor market (measured by yields and capital values). So, according to the Appraisal Institute (2001), trends in the property market as a whole can be observed by measuring vacancy rates, rental growth rates, yields and

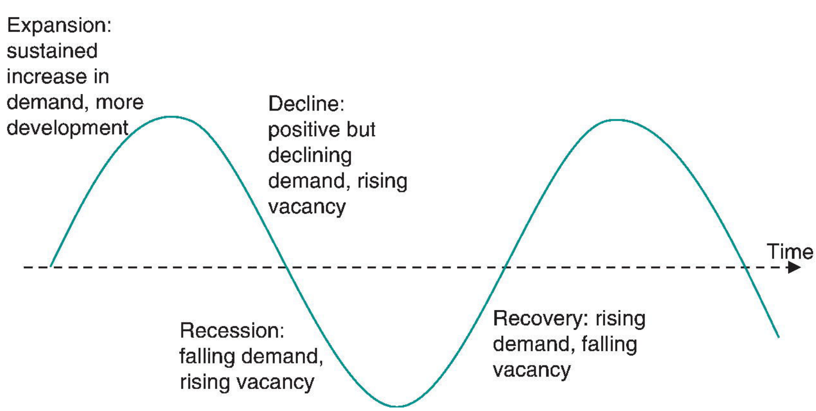

Figure 2.5 Property market cycle (after Appraisal Institute, 2001).

changes in supply but remembering that the property market is slow to react to new information. For example, the vacancy rate may begin to rise and rental growth to stagnate but new buildings will still be constructed in the short to medium term and landlords tend to be very reluctant to reduce rents unless they absolutely have to. Fuerst and Grandy (2012) found that, for the central London office market, developer decisions are explained largely by current and historic local market conditions and suggested that this is due to the long lead-in period associated with new development. The lag in construction activity can lead to over-supply and raise vacancy rates in times of reduced market activity. This, in turn, causes a drop in rents and an increase in yields until such time as demand increases to remove any surplus. However, development activity introduces only a small amount of new property each year in comparison to the size of the total stock and so tends not to significantly influence the property market as a whole. At the start of a market upturn supply lags the increase in demand, which causes the vacancy rate to drop and rents to rise and yields to fall. In the medium term, developers increase supply in response to rising demand. Building costs tend to follow general price levels over the long term but may vary in the short-term and geographically. High building costs lead to increased demand for existing buildings and more refurbishment of existing buildings.

It is important for valuers to understand the position of the economy in its cycle because different types of valuation work might predominate at certain stages. For example, valuations in relation to foreclosures, bankruptcies and tax appeals

Box 2.2 Macroeconomic indicators

National economic activity

- Output (GDP)
- Unemployment
- Money supply
- Public sector borrowing
- Inflation
- Interest rate
- Net trade
- Number of businesses, employment, turnover, profits and investment (by sector)
- Business and individual bankruptcies, business insolvencies

Property market activity (typically classified by land use and location)

- Capital value and capital growth of property investment assets (the ratio between capital values and construction costs can be a broad indicator of profitability of development)
- Rental value, rental growth and depreciation rates for occupier sector and yields for investment sector (note, these indicators usually lag changes in general economic activity)
- Number of planning applications and value of construction output
- Number of (and level of employment in) construction and real estate firms
- Number of sale and rental transactions, market prices and rents
- Vacancy rate (allow for 'churn' or natural vacancy rate; higher in volatile, fast-growing market, lower in supply restricted market)

might be more prevalent during a declining market or recession, valuations for lending purposes and in connection with investment and occupation market transactions would tend to dominate during a recovery or expansion phase, and at the peak of the market valuers may lead with consulting on investments as investors may want to know when to buy and sell or redevelop their assets.

According to the Appraisal Institute (2001), although the general economic cycle influences the property cycle, it is typically not synchronised with it. The property cycle is the compounded result of cyclical influences from the wider economy, which are coupled with cyclical tendencies inherent to property markets. The critical linkage between property and economic cycles can be, in the main, captured in simple models which are intuitively plausible and statistically sound (RICS, 1999) and more sophisticated commercial rent determination models are also possible (see McCartney, 2012 for an example). Macroeconomic indicators are listed in Box 2.2.

Key points

- Microeconomics involves the study of individual decision-making agents, whereas macroeconomics involves a broader study of aggregate activity. The concepts of scarcity, choice, opportunity cost and rent form the basis of property economics. A definition may describe it as: a social science that studies how individuals choose to allocate scarce resources to satisfy the competing needs of society for various goods and services.
- The exchange of information between buyers and sellers about factors such as price, quality and quantity takes place in a market. Property is made up of a diverse range of market sectors and, relative to all other markets, they have distinguishing characteristics: the market is decentralised and restricted to fewer transactions than consumer goods or services, the product is heterogeneous, physically immobile, durable and of finite supply.
- Commercial property exists to serve the needs of occupying businesses. It is a derived demand that can be classified by property type. A lot of this stock is not actually owned by business occupiers themselves but is owned by investors instead.
- Commercial property investments tend to be of interest to a wide range of institutional investors seeking real income and capital growth. There is a broad range of opportunities to choose from, each comprising a different set of attributes. Property, as an investment medium, exhibits some of the characteristics of equities and bonds. The risks and returns associated with property and other investment assets continually shift in absolute and relative terms as economic conditions change, driven by the level of the interest rate and the opportunity cost of capital invested elsewhere (Ball et al., 1998).
- Developers play a key role in assembling sites and procuring the services of a professional team to bring forward property for investment and occupation.
- As in the general economic cycle, the property cycle consists of recurrent upswings and downswings which vary in length, scale and composition.

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Chapter 3
What is Property Valuation

3.1 Introduction

Chapter 1 explained that, under normal market conditions, the economic outcome of interaction between the supply of and demand for property is an **exchange price**. The more generic term **price** is used to describe the amount requested, offered or paid for a property whereas **cost** refers to the expense of producing it (constructing a building on a piece of land for example). In a single conveyance or transaction of a property there might be an asking price advertised by the seller, a bid price offered by the potential buyer and finally, usually after some period of negotiation, an agreed exchange or sale price at which the property is conveyed or transacted.

The concept of **value** is more difficult to pin down. Adam Smith[1] first noted the ambiguity surrounding the word 'value', which can mean usefulness in one sense and purchasing power in another, referring to them as value-in-use and value-in-exchange respectively (Mill, 1909). Given the definition of exchange price above, we are interested here in value-in-exchange and can say that it is an estimate of price, typically an estimate of the most likely price to be concluded at a specific point in time by buyers and sellers of a property that is assumed to be available for purchase. Consequently sale prices are by and large useful indicators of the value of properties. As we saw in Chapter 1 scarcity and **utility** of property gives rise to its value: scarcity of all land in terms of its limited supply relative to other factors of production and the unique spatial characteristics of each site; and utility of all property in terms of durability and the specific physical and legal attributes of each site. Individual properties will, of course, have different utility values to different people but in a market you would expect individuals to converge on a consensus exchange price.

Property **valuation** is the process of forming an opinion of value-in-exchange under certain assumptions. Supply and demand within the property market as a

Property Valuation, Second Edition. Peter Wyatt.

whole and in specific sub-markets will be changing all the time and therefore a valuation is a snapshot estimate of exchange price at a particular moment. Because people tend to buy and use commercial property for a variety of utility and investment reasons, most decisions are made after an assessment of their financial implications. Similarly, while a property is held as a business resource or as an investment asset, its financial contribution will be monitored. If a property no longer provides the return that an investor requires or if a property is no longer suited to a particular mode of occupation, then the financial impact of these effects will be estimated and a decision made. Part of the information set needed to make this decision will be a property valuation. Property valuations are financial estimates of the future net benefit of purchasing an interest in property, suitably discounted over time to reflect opportunity cost and risk. Consequently, the economic concepts of exchange price and opportunity cost are fundamental to property valuation.

A **market** valuation[2] is an economic concept that attempts to quantify the aspirations of buyers and sellers of a property in an 'open market' situation. It has a formal basis and a methodology which is firmly grounded in the analysis of market transactions. In Chapter 1 it was noted that property can be distinguished from many other commodities and, particularly as far as property investment is concerned, from bonds and equities, because relatively speaking it takes a long time to transact. Also, property is traded less frequently than other types of investment asset because companies tend to hold on to property assets for long periods of time. Individual units of property are quite large and expensive – in Chapter 1 they were described as lumpy and illiquid. All of this, coupled with the perennial fact that each unit of property is unique, thus giving rise to separate sub-markets for different types of property, means that there is a demand for professional **valuers** to help determine the market value of individual properties. Valuers are employed to analyse and make informed judgements about market value based on their analysis of market transaction information. Market value is an important concept because vast sums of debt and equity capital are committed annually to property investments and loans which are based on opinions of market value. Property taxation and legislation also refer to market values as we shall see later.

3.2 The need for valuations

Valuers are requested to provide advice about the capital and rental value of properties and the service is often closely associated with agency work where the client seeks advice on the appropriate asking price (in the case of a vendor) or the accuracy of an asking price (in the case of a prospective purchaser) and the terms of the transaction are negotiated. This close association allows valuers to have a strong link to current market activity and helps them spot the price signals. The term **appraisal** is often used in conjunction with valuation and refers to a wider consideration of client-specific issues as well as market signals.

Valuations are required for many purposes relating to the development and subsequent occupation and ownership of property. The purpose for which the valuation is required and the type of property that is to be valued will determine the nature of the valuation instruction, including the techniques employed and the

Table 3.1 Reasons for valuing commercial property.

Development appraisal
Transfer of ownership
Monitoring of property investment performance
Reporting the value of property assets held by companies
Loan security
For taxation purposes
Insurance risk assessment
Compensation claims

basis on which value is to be estimated. Table 3.1 lists the chief reasons for commissioning a valuation of commercial property.

Developers need to know how much they should bid for a piece of development land or a building that is in need of redevelopment. Ever since the construction of the canals and railways during the Industrial Revolution valuers have been employed to assess the amount of compensation that should be paid to land-owners whose land has been compulsorily acquired to make way for these transport routes. In fact a professional body, the Institution of Surveyors (now known as the **Royal Institution of Chartered Surveyors or RICS**), was founded in 1868 to represent the collective interests of the valuation profession and regulate its activity. Land continues to be compulsorily acquired for many public sector and utility network projects including major transport infrastructure projects, urban public transport networks and airport construction, for regeneration projects where sites in fragmented ownership need to be assembled, and for minor works such as the realignment of a road junction to improve sight lines. Compensation may also be paid to land-owners where none of their land has been acquired but there has been a reduction in the value because of nearby public works, such as noise from a new road.

A property owner who wishes to sell would need to advertise an asking price that will attract potential purchasers and the level is clearly dependent on market conditions. If the owner wishes to lease the property then advice will be sought regarding the level of rent that could be obtained, the lease terms that should be sought and the type of tenant that can be expected. **Rent reviews** ensure that the rent paid by the tenant is periodically reviewed to market value and it is necessary (usually as a condition of the rent review clause in the lease) to employ a valuer to estimate the revised rent. If the property is already leased and the tenant wishes to dispose of the lease then the lease must be assigned to a new tenant and a **premium** or reverse premium might be paid.

When an investor purchases a property and leases it to a tenant the expectation is that it will generate sufficient income in the form of rent payments and capital appreciation to provide an adequate rate of return in comparison to other investment opportunities such as equities and bonds. After a period of time the investor may sell the property to another investor at a value that has risen over the holding period. Properties held as investments are valued on a regular basis as a means of monitoring investment performance. Indeed many property investors are legally required to revalue their property investment assets regularly and annual, often monthly, valuations of properties in the portfolios of these investors are undertaken. Many of these investment valuations are recorded in the IPD databank (see Chapter 1) and this enables investors to benchmark the performance of their property investment portfolios.

Historically companies reported the original cost of property assets in their balance sheets. This led to considerable under-valuation of company assets. Entrepreneurs could buy these businesses for a price that reflected their historic asset value and then release real value by disposing of valuable assets, including property, at current prices (a process known as 'asset stripping'). Companies may now elect to report the current value of their property assets in their annual accounts and valuers are required to perform these valuations for corporate disclosure purposes. As businesses are acquired or merged valuers are often asked to value the property assets of the companies concerned.

A lender who is offering a loan facility which is to be secured by a property will invariably require a valuation of the property to ensure that it represents sufficient collateral. If a borrower defaults then the lender may wish to take possession of the property and sell it in order to realise its value and thus recover the debt. A lender who is lending money for property development will clearly wish to be suitably reassured (with adequate allowance for the risk taken) as to the expected value of the completed development.

Valuations are also required for capital and revenue taxation purposes. Occupiers of commercial premises in England and Wales must pay a property tax, known as **business rates**, to the Government. The tax liability is calculated by assessing the **rateable value** of the premises and multiplying this amount by a rate known as the Uniform Business Rate. The rateable value of a property is very similar to its annual rental value but with some simplifying assumptions. Valuers are employed by the Valuation Office Agency (an executive agency of the Government's Revenue and Customs Department) to assess the rateable value of every business property in the country. Valuers are also employed by occupiers who wish to ensure the rateable value has been correctly assessed. Also valuations are required for property on which Capital Gains Tax and Inheritance Tax is due.

Finally, most properties are insured against damage and destruction and valuers are required to estimate their replacement cost for insurance purposes. Strictly speaking this is less of an estimate of market value in the sense of an exchange price and more an assessment of the cost of a replacement building. Also, insurance companies must regularly revalue property investment assets that they own to ensure that they are complying with statutory solvency requirements and to encourage them to maintain a prudent spread of investments in relation to their liabilities (RICS, 2003).

3.2.1 Types of property to be valued

Until this point the terminology surrounding the concept of property has been rather confusing and it is probably a good time to try and pin down some of the key terms that are used. A good place to start is the International Valuation Standards in which a parcel of **real estate** is defined as a physical entity comprising land and buildings. Incidentally, buildings on land are often referred to as improvements and therefore a piece of developed land might be called improved land. This term is not favoured in this book because 'improvements' is a rather generic term and in any case it is used later to refer to improvements that a tenant might carry out and which carry special meaning in law (see Chapter 4). The property market actually deals in property rights rather than the physical land and buildings themselves. So real estate is the physical entity whereas **real property** is a legal interest in real estate which entitles its owner to various rights, including the right to develop, lease, sell, donate, farm, mine, physically alter, subdivide or assemble into larger units. These real property rights are typically restricted and regulated by limitations imposed by national government such as taxation, compulsory acquisition, and land use planning regulation or appropriation in cases of intestacy. Many statutes also affect the way in which property may be owned and occupied; under certain conditions tenants can obtain legal rights that protect their occupational interest and investment that they may have made to improve the premises. Other restrictions may be imposed by: **deed** or **covenant**, which run with the land and may affect the use, development and transfer of ownership; or by **easement** (non-possessory and **incorporeal**) interests conveying use but not ownership of real estate, such as a right of way. The term real property is, then, used to describe ownership of real estate. From now on the prefix 'real' will be omitted and we will simply use the term 'property' to refer to the ownership of a legal interest in real estate.

But what about this term **legal interest**? Common law, as it relates to property, is derived from the system of feudal land tenure by which the monarch and his or her lords ruled the land. In the UK only the Crown can own land and historically lords merely 'held' their land under a system of **tenure**. The lords, in turn, granted lesser rights to hold property to others in return for loyalty, services or **rent**. The monarch or superior *land*lords could withdraw their patronage and reclaim their land at any time. This holding of land was categorised according to its duration and because of its derivation in the doctrine of legal estates it is more accurate to speak of someone holding an 'estate' (or bundle of rights) rather than owning physical land (Card et al., 2003). The two most important estates are **freehold** and **leasehold**. A freeholder holds land in perpetuity from the Crown and is at liberty to use it for any purpose subject to statutory regulation and the legal protection afforded to third parties. The freeholder may be an occupier using the property for business purposes or the freeholder may be an investor (usually referred to as a **landlord** but sometimes as a **lessor**) deriving a rental income from a lease granted to an occupier. A leaseholder (usually referred to as a **tenant** but sometimes as a **lessee**) holds a property for a term of years, the duration of which is usually specified in or implied by the terms of the **lease** granted by the landlord.

There are two principal types of lease. Long *ground leases* are typically for a term of more than one hundred years where the landlord grants a lease of, say, a vacant site to a tenant who in turn may construct a building on it and enjoy the economic benefits of doing so during the term of the ground lease. Historically these ground leases required a rent to be paid that typically remained the same during the entire term. As time passed, the real value of this rent diminished. Nowadays it is common to find rent reviews or some other arrangement inserted into ground leases that enable the landlord to participate in rental value growth. Shorter leases of say five to 25 years duration are granted in respect of existing land and buildings for occupation. Subject to the provisions of these *occupation leases* tenants can sub-divide and sub-let a property but only for durations of less than the length of any head-lease. During the lease the rent is usually reviewed upwards every five years and at the end of the lease term the business tenant may have a legal right to renew the lease. So a single unit of property may comprise more than one legal interest, each of which will have a market value providing it is capable of being freely exchanged (IVSC, 2005). Fraser (1993) notes that it is the longevity of property as a physical asset that enables its use to be separated from ownership and for a number of interests to exist in the same property at the same time. Figure 3.1 provides an example of the way in which legal interests in a single physical property might be structured but there is no limit to the number of leasehold interests that may be created in this way.

Leases can be for a fixed term or they can be periodic. Leases for a fixed term are the most common form of commercial tenancy. Periodic tenancies have no fixed duration and continue from period to period (weekly, monthly, quarterly or yearly) until determined at the end of any period by a 'notice to quit' issued by either party. Other important ownership and financial interests include: trusts where the interest of a beneficiary under a trust is an equitable interest as opposed to the legal interest of a trustee, and financial interests which are created by a legal charge if the property is used as collateral to secure finance (the owner's equity position is considered a separate financial interest). There are other, more minor, legal interests in land such as easements, covenants and licences which allow or restrict the use of land under specific conditions.

So far we have distinguished physical real estate from legal interests in real property and stated that the property market is concerned with exchanges of the latter. As valuation is concerned with the estimation of exchange price this distinction between physical real estate and legal real property interests is critical – it is the real property interest that is valued rather than the real estate as a physical entity. For example a lease might specify that the tenant has no right to sell or transfer the leasehold interest, making the interest unmarketable during the lease term and causing the exchange value to be zero. Instead, its value exists solely in

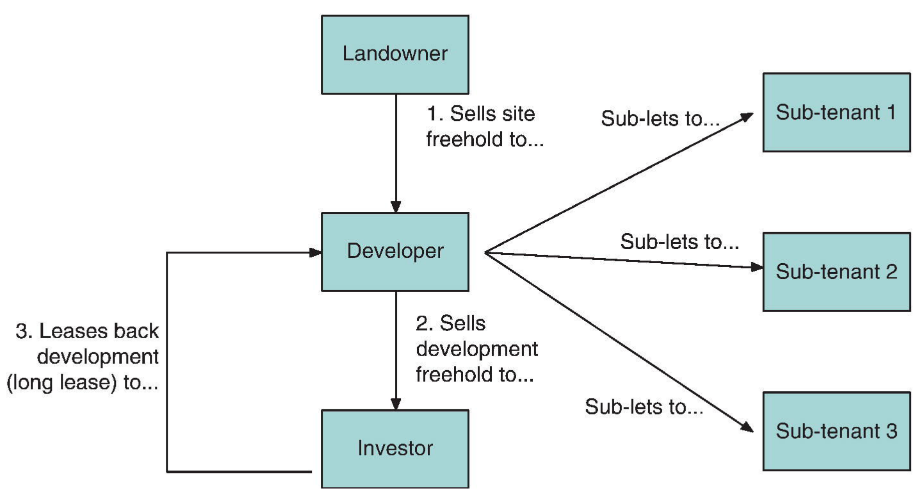

Figure 3.1 Legal estates in a property.

terms of its use and occupancy rights, in other words it has a value-in-use but not a value-in-exchange. Similarly, onerous lease covenants, such as restrictions on the way that occupation of the property may be transferred, may adversely affect the market value of a leasehold interest (IVSC, 2005).

A property is usually valued as a distinct physical and legal entity designed for a specific use or range of uses, such as a factory, shop or office building, to which particular ownership rights apply. Having said this, the value of some properties is estimated by considering the profitability of the business that is operating therein and the property is a specialised asset of that business. As a result, property is often classified by legal interest (primarily freehold or leasehold) as well as by property type (retail, office, industrial for example) and then more specifically by such descriptions as high-tech industrial, warehousing and factory space, by specific geographical locations such as South West, London West End or Central Leeds and by geographic abstractions such as in-town or out-of-town. These classifications are important to the analysis of market transactions because the values of similar types of properties in the same locality tend to correlate. The classifications are also important to valuation because methods vary depending on the type of property being valued. Table 3.2 illustrates the diversity of commercial property and attempts to classify them into recognisable sub-markets. Overlaying this use classification will be the sort of geographical divisions mentioned above.

Ownership of a legal interest in an item other than real estate is known as personal property. Items of personal property can be tangible such as a chattel or intangible such as a licence. In a property context tangible personal property includes items not permanently attached to real estate (IVSC, 2005) such as plant and machinery or fixtures and fittings. According to UK valuation guidance (RICS, 2012) plant and machinery that are usually valued with a property include service installations, utility equipment (such as heating, hot water and air-conditioning) and structures and fixtures (such as chimneys, plant housings or railway track) that are not an integral part of a process. Fixtures and fittings attached to a building by a tenant and used in conjunction with the business are removable upon lease expiry. The RICS International valuation guidance is slightly more generic in its approach to the valuation of plant and equipment. According to the International Valuation Standards Council (IVSC), under 'IVS220: Plant & Equipment', plant and equipment is a general class of tangible personal property that is typically moveable and depreciates more quickly than real property. Value can differ markedly depending on whether it is valued in combination with other assets in an operational unit or whether it is valued as an individual item for exchange and where it may be considered as either *in situ* or for removal.

Personal property may need to be valued in conjunction with real property when valuing **specialised trading properties**. These are properties that usually change hands while remaining operational. The conveyance frequently includes not only real property (land and buildings) but also personal property (plant, machinery, fixtures, fittings furniture, equipment) together with a business component comprising the transferable elements of the business itself and including intangible assets such as goodwill. As such, a specialised trading property is valued as an operational business entity or **going concern**. When valuing such property the valuer must decide whether personal property is valued as part of the transferable

Table 3.2 Commercial property descriptions.

Standard Property Types

Offices	*Shops*	*Factories & Warehouses*
Standard office	Kiosk	Factory
Business park	Standard unit	Works (e.g. quarry, pit, mine, tip)
	Post Office, bank	Workshop
	Showroom	Light industrial business unit
	Supermarket / Superstore	Warehouse
	Retail Warehouse	Builders yard
	Retail Park (collection of retail warehouses)	Store
	Shopping centre (collection of standard units)	Storage land
	Department / Variety store	Storage depot
	Market stall	

Non-Standard Property Types

Accommodation	*Licensed*	*Education*	*Leisure*	*Transport*
Camping park	Pubs and clubs	Day nursery	Golf course	Petrol station
Hotel	Market	School	Sports hall / ground	Car park
Self-catering unit	Restaurant	College	Leisure centre	Dock / wharf
Guest house	Café	University	Cinema	Marina / mooring
Student	Food court		Garden centre	Bus station
	Betting shop	*Medical*	Health club	Railway
Miscellaneous	Casino	Surgery	Theatre	Airport
Advertising right	Bingo hall	Health centre	Amusement park	Vehicle dealership
Utility works	Amusement arcade	Hospital	Place of worship	
		Nursing home		
Public service				
Library	Club-house	Sports centre	Swimming pool	Hostel
Museum / gallery	Hall	Stadium	Cemetery / crematorium	Home
Community centre	Playing field	Sports ground	Police / fire station	Toilets
Prison	Allotments	Sporting right	Law court	Park

business or as separate assets and we will look at this decision process in more detail in Chapter 3. In addition to the case of specialised trading property, personal property must be distinguished from real property for other types of valuation including valuations for compulsory purchase and taxation. Finally it may also be necessary to consider the impact of depreciation on personal property.

Finally, an important question arises when valuing a group of properties such as the estate of a business or the portfolio of an investor; should the properties be valued individually or collectively? The market values may be different in each case. The RICS (2012) gives two examples of why this might be so: one is where physically adjacent land parcels are worth a certain amount individually but might be worth a great deal more when assembled as part of a development programme; another is where various properties are used in a functionally dependent way, such as an office with a car park down the road, a chain of retail outlets or a utility network. If the group of properties were to be sold at the same time this could 'flood' the market and the increase in supply might lead to a decrease in the prices obtained for each property. Conversely, an opportunity to purchase the group of properties might persuade a bidder to pay a premium and therefore increase the collective price paid. UK valuation guidance in the form of 'GN 3 – Valuations of Portfolios and Groups of Properties' (RICS, 2012) advises that the properties should be valued as though they were part of a group and in the way that they would most likely be offered for sale. If the purpose of the valuation is one that would ordinarily assume that a group of properties will remain in existing ownership and occupation (the valuation is for a set of company accounts for example) then it is not appropriate to reduce the value as a result of all properties flooding the market at the same time. But if the group of properties is being valued for, say, loan security then the flooding effect should not be ignored. In such a case the assumption would normally be that the properties are marketed in an orderly way. Hayward (2009) adds that purchasing a group of functionally or geographically related properties can mean reduced acquisition fees and a shorter transaction time on the part of the purchaser and this may lead to the payment of a 'lotting premium'. It may also allow the purchaser to obtain valuable personal property such as a brand name or design right. Whatever approach is adopted all assumptions should be reported with the valuation and both group and individual valuations should be stated if they are different.

3.2.2 Bases of value

It was mentioned above that a property can have a value-in-use or a value-in-exchange with estimates of the latter being the most commonly sought. To help clarify matters valuers talk about bases of value – descriptions or definitions of a value of a property interest within a given set of parameters. Before a valuation can be undertaken the valuer must identify a particular basis of value. **Market Value**, being a basis that corresponds to the concept of value in exchange, is the most common but others exist. The UK has adopted the international basis of market value, which is

> the estimated amount for which a property should exchange on the date of valuation between a willing buyer and a willing seller in an arm's length

> transaction after property marketing wherein the parties had each acted knowledgeably, prudently and without compulsion (RICS, 2012: 27)

The Red Book (RICS, 2012) provides explanatory notes on the conceptual framework for this definition. In essence, Market Value is measured as the most probable price reasonably obtainable in the market. The estimate must not include any element of **special value**, defined in the IVS as value to a particular purchaser or group of purchasers over and above value to the market in general. This might include, for example, price inflated or deflated by special circumstances such as unusual financing arrangements, **synergistic value** (which arises from the merger of two or more physical properties or two or more legal interests within the same property) or a relationship between the parties. Special Value might be reported but it must be separate from the Market Value estimate. Market Value can include **hope value** though, which might arise from expectations of changing circumstances surrounding the property such as development potential (even if there is no planning permission at the time of the valuation) or the prospect of synergistic value.

Assumptions may need to be added to the basis when estimating the market value of certain types of property. Specialised trading properties, for example, are designed or adapted for specific uses and they often transfer as part of an operational business. Consequently such properties tend not to be valued separately from the business as a whole and include the value of personal property. Often a separate valuation of plant and machinery is required, particularly for industrial premises where such assets represent a significant component of the tangible assets of a company. Plant and machinery may be valued as a whole in its working place or for removal from the premises at the expense of the purchaser (RICS, 2012). If a property includes land which is mineral-bearing or is suitable for use as a waste management facility, an assumption may be necessary to reflect the potential for such uses in the valuation.

An opinion of market value can also be expressed with **special assumptions**. These may include: planning consent for development, a physical change to the property, a new letting on given terms, or a known constraint which could prevent the property either being brought to, or adequately exposed to the market. Also, where a property has been damaged, special assumptions may include treating the property as reinstated, as a cleared site with planning permission assumed for the existing use or refurbished / redeveloped for a use for which there is a prospect of obtaining planning permission. The valuation of trade-related properties may also require special assumptions and these will be considered later. Special assumptions must be clearly stated together with a note of the effect on value.

Because property valuations can be capital and rental, a definition of **market rent** is also published. It is

> the estimated amount for which a property, or space within a property, should lease on the date of valuation between a willing lessor and a willing lessee on appropriate lease terms, in an arm's-length transaction, after proper marketing wherein the parties had each acted knowledgeably, prudently and without compulsion. (RICS, 2012: 31)

'Appropriate lease terms' should be stated in the valuation and usually cover repair liability, lease duration, rent review pattern and incentives.

There are two further internationally recognised bases of value. The first is **Worth**, or **Investment Value**, which will be discussed in detail in Chapter 19. The definition is

> The value of property to a particular owner, investor, or class of investors for identified investment or operational objectives (RICS, 2012: 32)

The second is **Fair Value**, discussed in Chapter 13. Fair value is defined as

> The amount for which an asset could be exchanged, between knowledgeable, willing parties, in an arm's-length transaction (RICS, 2012: 32)

This definition seems remarkably similar to the definition of market value but two important distinctions are (a) that although the parties may be unconnected and negotiating at arm's length, the asset is not necessarily exposed to the wider market, and (b) the price agreed may be one that reflects the specific advantages (or disadvantages) of ownership to the parties involved rather than the market at large. An example would be the price agreed between a landlord and a tenant for the surrender or extension of a lease.

Valuations for Capital Gains Tax, Inheritance Tax and Stamp Duty Land Tax purposes are based on statutory definitions of market value similar to the Red Book definition of market value. A definition for the basis of valuation for Capital Gains Tax can be found in Section 272 of the Taxation of Chargeable Gains Act 1992, for Inheritance Tax it is in Section 160 of the Inheritance Act 1984 and for Stamp Duty Land Tax it is in Section 118 of the Finance Act 2003. These current statutory definitions are similar to those used in earlier tax legislation and, over the years, case law has established that, in arriving at market value, the following assumptions must be made:

- the sale is hypothetical
- the vendor and purchaser are hypothetical, prudent and willing parties to the transaction (unless the latter is considered a 'special purchaser')
- for the purposes of the hypothetical sale the vendor would divide the property to be valued into whatever natural lots would achieve the best overall price, known as 'prudent lotting'
- all preliminary arrangements necessary for the sale to take place have been carried out prior to the valuation date
- the property is offered for sale on the open market by whichever method of sale will achieve the best price
- adequate marketing has taken place before the sale
- the valuation reflects the bid of any 'special purchaser' in the market (provided they are willing and able to purchase).

Further clarification on detailed aspects of the statutory definitions of market value, as established by case law can be found in the UK Guidance Notes section of the RICS Valuation Standards (RICS, 2012: UKGN3 – Valuations for capital gains tax, inheritance tax and stamp duty land tax).

There are other bases of value that are used in specific circumstances. These include **going concern value** which is the value of the business as a whole and can only apply to a property that is a constituent part of a business and **net realisable value** which is an accounting concept used in relation to the value of fixed assets, which include property. It is probably best, though, to discuss these when describing the particular situations in which they might be used, in later chapters.

3.3 Determinants of value

The value-influencing characteristics of a property must be identified to enable a valuation to be undertaken. Chapter 1 set out the theoretical background to the concept of rent and its capitalised equivalent, capital value. The focus of that chapter was to consider the economic implications of changes in supply and demand and their effect on the rental value of land and buildings. To be able to place the concepts and the mechanisms described in Chapter 1 into a practical valuation context it is necessary to identify those demand factors that underpin the rental bid for commercial property. Remembering that the demand for property is a derived demand and that property is a factor of production, the attributes that make a property attractive to an occupier are central to the understanding of the rental bid level and hence an estimate of value. This demand for occupation is fundamental to the supply decisions of developers with regard to new stock and is of paramount importance to investors as it provides the income return. This section therefore considers those attributes regarded as desirable in a commercial property and therefore likely to influence its rental and capital value. Influences on value can be classified as property-specific or market-related. Valuation methods have developed over the years to help the valuer quantify the effect of geographical / spatial, legal and physical influences on value. The wider market factors are less to do with the valuation itself and more to do with context, and form part of the cognitive background that valuers bring to a valuation including market knowledge and an awareness of the current legislative framework, environmental policy and economic activity.

3.3.1 Property-specific factors

The principal **physical qualities** of the building are size, age, condition, external appearance (including aspect and visibility), internal specification and configuration. These qualities affect the performance of the building to varying degrees depending on the use to which it is put. For commercial properties the handling of materials, products and maintenance arrangements are important whereas the impact on the volume of business is important for retail property. Retail property value can be influenced by what would appear to be minor physical considerations such as aspect, lighting, internal configuration (including frontage length, depth, ground floor area, capacity for display, sale and storage space) and delivery facilities. Office occupiers often look for a prestigious address and good design features whilst occupiers of industrial property favour an uninterrupted ground floor area with good load-bearing capacity, generous eaves height, easy loading and access. Generous car parking, good ventilation and canteen facilities might also be desirable.

Running costs such as repairs and maintenance of common parts are important considerations and it is in the interest of the occupier to keep these to a minimum. Other financial considerations may be site development potential and adaptability of the premises in the face of changing production methods, technological advances or a rapidly expanding or contracting market. The ability to dispose of the property and the flexibility for possible changes of use are also value-significant considerations as they will enhance the marketability of the property should the current occupier wish to move. As well as flexibility for change of use, office occupiers increasingly demand adaptable internal space so that it is capable of meeting their changing business requirements without having to move premises. Design considerations and corporate image are important to occupiers who may be using the premises as a headquarters or a use that requires regular client contact. These characteristics help the property combat obsolescence – an issue to which we will return later.

Legal factors can have a significant impact on value. If the legal interest is a freehold then it is important to consider any easements or other statutory rights and obligations (such as restrictive covenants) over the land, the nature and extent of permitted use(s), potential for change of use and proposed development plans. If the freehold is held as an investment and let to an occupying tenant then the quality of that tenant is a primary concern, not only in terms of an ability to keep paying rent but also in complying with other lease terms such as repair and maintenance. Other key lease terms are length, break clause, user clause, alienation clauses, and repair, service charge and insurance obligations. If the property is let to more than one tenant then the mix of tenants is important. Consequently, user restrictions are sometimes inserted into each lease contract in order to protect the landlord's balance of lettings. For example, if the landlord owns a large shopping mall then it would be wise to ensure that there is a wide variety of shops. To do this the landlord and each tenant must agree what limitations are to be placed on the trade that can occur in a particular shop unit. The landlord will need to ensure that potential tenants are financially able to meet the terms of the lease and that they are of a sufficient standing so as not to harm the investment value of the shopping mall as a whole; references and guarantees are often taken up.

There is a growing body of opinion that energy-saving measures and other environmentally beneficial features may have a positive influence on rental and capital values. These measures include:

- wind power
- photovoltaic cells
- thermal and radiant heating for water and climate control
- turnstile door powered engines
- elevator counterweights that capture and store potential energy
- recycled and sustainably harvested materials
- daylight sensing and timers
- sunshades and programmable louvers
- healthier paints, finishes and adhesives
- carpets with recycled fibres and eco-friendly dyes
- LED lights and CFLs
- solar panels

- fans, opening windows, timed vents
- dark, south-facing surfaces
- low water fixtures, rainwater collection and re-use
- daylight orientated design.

The evidence for any 'green' rental or capital premium is thin, primarily due to difficulties in obtaining sufficient breadth and depth of data that would allow other influences on value to be controlled in a mathematical model. Nevertheless, it would seem logical to assume that, as energy costs rise, environmental awareness grows and legislation is enacted that requires carbon reduction measures to be implemented, that green property attributes will have an increasing influence on value. Due to the paucity of quantitative evidence, it is not yet clear how valuers should reflect these attributes in their valuations. The RICS has produced some guidance (RICS, 2009) and there are several papers that make the case for valuers to take a lead in this area and suggest approaches that might be considered (Bordass, 2000; Lutzkendorf and Lorenz, 2005, 2007 and 2011; Reed and Wilkinson, 2005; Ellison et al., 2006; Sayce et al., 2007; Lorenz and Lutzkendorf, 2008; Mansfield, 2009; Meins et al., 2010; Hill and Lorenz, 2011; and van de Wetering and Wyatt, 2011). But it should be remembered that valuers are market interpreters not market makers. The distinction does of course become rather blurred when valuers are asked to provide advice and consultancy. The affect may be fairly small. Axcell et al. (2001) provide some figures for total office costs based on information obtained from suppliers of various occupancy cost elements relating to a hypothetical 'grade A' (new, 4 storey, 5,000 m^2 NIA, a/c, self-contained, B1 use) building in prime business locations throughout the UK. Making various assumptions about VAT, depreciation, lease length, Table 3.3 provides cost percentages for prime office space in Bristol. Energy costs are included in the 'hard facilities management' category. Whereas rent and rates account for approximately half of the total office occupancy costs, energy costs are a fraction of the 20% or so spent on hard FM.

Yates (2001) reports average annual expenditure for a typical US office building. Salaries and rent account for 83% and 13% respectively, energy accounts for 2%. Indeed, a 1% increase in productivity can nearly offset a company's entire annual energy cost (Browning and Romm, 1994: 3). According to EiBI (2004)

Table 3.3 Total office costs for prime office space in Bristol.

Rent	37.72%
Rates	11.69%
Annualised fit-outs & furniture	12.66%
Hard facilities management[1]	21.52%
Soft facilities management[2]	15.06%
Management	1.35%

Source: Axcell et al., 2001

[1] Includes repair and maintenance (internal, external and M&E), insurance, improvements, internal moves, reinstatement, security, cleaning, waste disposal, plant operation (internal and external), water & sewerage, energy and compliance

[2] Includes telephones, catering, reception, post/courier, reprographics and disaster recovery

total energy use in a central London office is €8/m^2 compared to rental costs of €484–645/m^2 per annum, i.e. 1–2%. Consequently energy-saving measures have a small financial impact on a company balance sheet. At a market level, where sentiment and perception play a much larger role, green credentials are encapsulated in the form of ratings and awards, there is evidence to suggest that environmental labelling is having an impact on value (Dermisi, 2009; Fuerst and McAllister, 2009, 2010 and 2011; Pivo and Fisher, 2009; Chegut, et al., 2010; Eichholtz et al., 2010; Wiley et al., 2010). Most of the studies have been on US offices. The vast majority have found a positive (albeit variable and inconsistent) effect of environmental or energy certification on rents and sale prices. Usually due to incomplete information, the studies differ in sample size and composition, econometric model specification, outcome variables (appraisals, prices), handling of data errors and control for location effects. Finally, all the studies are snapshots in time. If market penetration of environmentally certified or highly energy efficient buildings (supply) continues to increase and the attitudes of investors and occupiers continue to change (demand), the price effects of environmental certification on buildings will also continue to evolve.

It is important to consider how much rent is left after all expenditure has been accounted for. This **net rent** is usually calculated by deducting the cost of insurance, management and maintenance from the **gross rent**. Usually the precise amounts of expenditure are not known and percentage deductions from the gross rent are estimated instead (a 2.5% deduction to cover the cost of insurance, 10% for management costs for example). Ideally investors want leases that oblige the tenant to be responsible for repairs and insurance. This (partly) explains why leasehold investments are less attractive; the additional repair and management responsibilities, the wasting nature of the asset and a lack of reversionary value (redevelopment potential perhaps) are not attractive characteristics to an investor. A primary concern of the landlord is the security of rent in real terms so the negotiation of a new rent at rent review or lease renewal is of great importance. If rent reviews were not inserted into the lease contract then the rent that the landlord receives would be eroded by inflation over the duration of the lease. Rent reviews ensure that the landlord receives an inflation-proof income.

From an occupying tenant's perspective legal obligations contained in the lease can have a substantial impact on value. Of overriding concern is the amount of rent, length of the lease, repair and insurance liability and any other regular expenditure such as a **service charge**. But there are many other issues and lease provisions that the tenant must be mindful of; any restrictions on use and the ability to make changes to the premises, sub-letting or **assignment**, the nature and frequency of any rent reviews and options to renew or terminate the lease, known as **break options**, the nature of any incentives offered by the landlord (such as a rent-free period) or by the tenant (such as a premium) and the remedies for breach of lease terms.

In Chapter 1 the influence of location on property value was considered at the scale of the urban area and it was argued that accessibility was the key determinant of the location for a business. In short the importance of accessibility is dependent upon the use to which the property is put and the various needs for accessibility result in a process of competitive bidding between different land uses and a property rent pattern emerges that is positively correlated with the pattern of accessibility. This usually means that the highest rents are paid in the centre of an urban area but there are an increasing number of exceptions to this simple assertion. Nevertheless the theory is sound and empirical evidence supports it. It is worth spending a few moments considering the accessibility advantages to specific land uses in a little more detail.

3.3.1.1 Offices

The prime location factor revolves around linkages to people and other uses measured in terms of accessibility to market(s) and factors of production (capital and labour). Accessibility refers to the ease with which contacts can be made considering the number, frequency and urgency of those contacts. If there is more reliance on access to customers there is more need to locate at the position of maximum accessibility to the market. The layout of transport routes and the cost of traversing them influence the pattern of accessibility. Retail property is highly dependent on market accessibility and it is a key objective to locate a shop where it has vehicular or pedestrian access to the greatest number of relevant customers. Differences can be observed at the individual property level and are caused by the type of district, street, position in the street, and whether there are department stores, car parks or public transport nodes nearby. Certain types of office premises such as building societies, employment agencies and estate agents also require particularly accessible locations in order to attract customers. They try to locate at ground level in those locations where they are not outbid by retailers. Other, more general office property, insurance companies and other financial institutions for example, requires access to a pool of usually skilled labour and will locate in the centre of urban areas where commuter transport hubs are located. Within the urban area itself, headquarters and large branches of international firms regard accessibility and a prestigious address as very important, professional institutions require similar attributes but often fail to outbid the first category and therefore locate near parks, squares or buildings of interest. Small professional firms and branch offices require access to a resident population and usually locate in a high street, suburb or near a public transport node. Local government and civil service offices used to be centrally located but now tend to occupy cheaper sites on the edge of the central area.

Demand for office space is derived from the activity of the business but generic attributes that occupiers seek are listed in Table 3.4. Occupiers will select offices according to their preferences and these will be reflected in the weight they assign to each attribute. Prestigious and accessible locations might be sought for headquarters, accessible locations for uses that require public access and low cost, accessible locations (such as business parks and overseas locations) for 'back office' functions. The fixed supply of office space at any one time will limit choice and occupancy costs will vary depending on the mix of attributes that can be supplied and on the demand for them. For example, business park space might be regarded as less aesthetically appealing than a refurbished listed building in the city centre.

Business space is classified according to its perceived investment quality. **Prime** space includes investment-grade buildings, generally the most desirable in their markets, offering an excellent location and first-rate design, building systems,

Table 3.4 Desirable attributes of office space.

Quality of accommodation	Fitness for purpose	Comfortable and predictable temperature & ventilation Lift(s) where appropriate Daylight (less than 15 m from window to wall)
	Design	Longevity, durability and life-cycle cost Aesthetic, corporate identity
Flexibility	Space	Open plan Raised floors & suspended ceilings
	Future contractual (lease) liability	Lease length that fits with business plan Option(s) to break lease Wide user clause Standard assignment provision
Location	Access: – by staff and suppliers – to clients and complementary businesses	Private transport: parking, motorway network, congestion, cycle routes Public transport: air, rail, buses
	Quality of surroundings	Low incidence of crime, attractive appearance Access to: open space, retail, leisure, amenities (post office, doctors, schools, opticians, dentists, pharmacists, etc.)

amenities and management (at least at the time they were built). These buildings command the market's highest rent and attract creditworthy tenants. While some older buildings can be renovated and repositioned as prime, prime space is usually limited to new, highly competitive buildings. Secondary space includes buildings in good locations, sound management and construction, and little functional obsolescence or deterioration. Such space is found generally in well-located buildings of an earlier generation that have been maintained to a high standard. Tertiary buildings are often substantially older than prime and secondary buildings and have not been modernized. They may be functionally obsolete and contain asbestos or other environmentally hazardous materials. Their low values make many tertiary buildings potential candidates for demolition or conversion to other uses. While data for prime and secondary space are available in most markets, tertiary space is seldom tracked with any accuracy. Indeed, definitions of prime, secondary and tertiary, even within a single market, are not standard, they are difficult concepts to pin down. As Adams et al. (2008) state '…the notion of what should be regarded as "prime property" … is transmitted and refined from one generation of surveyor to the next'. It involves breaking prime down into legal (lease), physical and locational attributes and considering them from the point of view of the owner (investor landlord) and occupier (tenant). When does prime space cease to be prime?

3.3.1.2 Industrial premises

Compared to other land uses industrial relocation is uncommon due to inertia and sunk costs, generally the more space extensive the industry the less demand for central sites. Heavy industry requires access to raw material and heavy freight, whilst light industries are often located in, or on the periphery of, an urban area. If the firm's market is outside the urban area then intra-urban location is irrelevant with regard to sales but will differ on costs due to land value variation, access to the labour market and the transport network. Other considerations include access to materials, parts and components, skilled labour, ancillary activities, owner's preferences, utilities and services. High-tech industrial units require a high quality 'green' environment with generous car parking, and close proximity to residential areas and amenities. Business and science parks require motorway access and close proximity to academia. Warehouses also need easy motorway access.

3.3.1.3 Retail property

Other important location considerations are agglomeration economies and complementarity, collectively known as neighbourhood effects. These are the benefits that can accrue when properties of a similar nature cluster together. The amount of benefit depends on the need for contacts. Once sites in an area have been developed for a particular use, this will largely determine the best use for remaining sites due to advantages of concentration. Large multiple retailers and chain stores tend to cluster to provide comparison shopping and complementary shops cluster to offer a wider range of goods and services. As an example of retail agglomeration, big 'anchor' stores in shopping centres are usually able to capture a share of external economies through negotiated lower rents or incentive packages (Ball et al. 1998). Offices cluster near shopping facilities and desirable residential neighbourhoods. Industry benefits from clustering the production sequence which in turn lowers costs due to external economies of scale. This explains the success of industrial estates. Smaller firms locate near the centre but larger firms have less dependency on agglomeration economies and complementarity because they are able to internalise their production processes. Incompatibility is the inverse of complementarity where properties locate apart to prevent higher costs or loss of revenue, for example an obnoxious industry and food production. With regard to retail property 'dead frontage' such as a civic building or a church can have a detrimental impact on value due to different opening hours and a lack of display frontage.

3.3.2 Market-related factors

The principal macroeconomic influences on property values include national output (measured using the Gross Domestic Product), inflation, household disposable income, consumer spending and retail sales, employment, construction activity, net household formation, production costs (including wage levels) and the cost and availability of finance. Changes in the size and demographic profile of the population can affect demand for goods and services as well as the availability and cost of the workforce used to produce them. Economic factors that affect the value of retail property in particular centre on the propensity to attract custom; for example purchasing power (credit restrictions), consumer behaviour (spending habits, changes in tastes or fashion) and population density. Office property value may be influenced by the period of establishment in a region. But, regardless of the property type, the valuer tries to ascertain market strengths and weaknesses, assess the likely supply of and demand for properties comparable to the one being valued and determine the factors likely to influence value. Important local market characteristics include stock availability, rental growth rates, yields, rents, capital values, take-up rate, vacancy rate and the development pipeline. As a way of obtaining a mixture of macroeconomic information and market information valuers are able to obtain summary statistics relating to the urban and regional location in which the property is located. The extent to which a valuer is concerned with national and regional economy depends on the size and type of property being valued; a large regional shopping centre or car assembly plant would require a great deal of market analysis at the national level whereas the valuation of a doctor's surgery or suburban shop would require analysis primarily at the local level.

Social factors include tastes of consumers and clients and changes in those tastes. For example, a wholesale shift towards the purchase of organic produce, to working at home or internet-based retailing will clearly impact on various sectors of the property market including shops, warehousing, offices and transport logistics. Important data includes demographic, household and employment data, economic data and estimates of floor-space for the main commercial property market sectors (offices, shops and restaurants, and industrial and warehousing). Data are readily available at the national, regional and town/city level as well as market-defined sub-locations such as the West End, Mid-Town and City of London. Location-specific market reports from the main property agents typically consist of some headlines and then report the availability (in terms of floor-space) of new, refurbished and second-hand business space and space under construction, the level of take-up (also measured in terms of floor-space), asking prices and quoted rents for new and second-hand space and the amount of vacant floor-space. Box 3.1 summarises market data typically available from CoStar at the town/city level.

The changing preferences and attitudes of market participants and new environmental regulation are having an increasing impact on the operation of property markets. Among property occupiers, investors and professionals, there has been a growing awareness of the potential impact of environmental certification on value. A range of acronyms has appeared for property eco-certification schemes, e.g. BREEAM (UK), NABERS (Australia), CASBEE (Japan), HQE (France), LEED (USA) and DGNB (Germany). In addition to these voluntary eco-labels, Energy Performance Certificates (EPCs) and Display Energy Certificates (DECs) are examples of mandatory energy labels that have been introduced across the European Union. These instruments aim to provide information to occupiers and investors about the environmental or energy performance of the property. The RICS has produced some guidance for valuers when considering the impact that sustainability and environmental performance of real estate might have on value (RICS, 2009).

Box 3.1 City/town level data available from CoStar

Infrastructure

- Details of road, rail and air communications
- Name and population of nearest five centres

Demography

- Population and number of households in the town/city
- Population with five and ten kilometer radii
- Resident population classified by:
  - Gender
  - Age
  - CACI lifestyle groups, e.g. 'from wealthy executives' and 'inner city adversity'
  - Census class groupings, e.g.
    AB. Higher and intermediate managerial/administrative/professional
    C1. Supervisory clerical junior managerial/administrative/professional
    C2. Skilled manual workers
    D. Semi-skilled and unskilled manual workers
    E. On state benefit unemployed lowest grade workers
- Car ownership
- Household tenure

Economy

- Employment profile (% employed full-time and part-time work, self-employed, unemployed, retired, studying, looking after the home, permanently disabled)
- Proportions of the main sectors in which the working population is employed (Manufacturing Industries, Primary Industries, Construction, Hotels & Catering, Transport & Communication, Banking, Finance & Business Services, Other Services, Utilities, Public Admin & Defence, Retail)
- Name, activity and number of staff of the largest employers.

Commercial property

- Prime rents for offices and shops
- Number of requirements for retail space, monthly
- Top 20 comparison goods multiple retailers ranked by average town centre sales
- % of national top 20 retailers present in the town/city and the names of those not present
- The names of the top three shopping streets
- Annual spend on comparison and core convenience goods within the catchment area of the town/city
- Details of the main retail developments including the name, size, developer, date of opening, managing agent, landlord, details of anchor and other tenant(s)

Finally, the property market is a market for a tangible product that has influences and implications beyond its straightforward economic use as a factor of production or as an investment asset. The aesthetic and architectural qualities of individual properties are there for all to see. Similarly the layout and design of property in its collective sense – across an urban area – imposes a skyline that influences not only how we feel about a place but also how we work, reside, interact with others and spend our leisure time. The 'invisible hand' of free trade is not always able to optimise these 'public' benefits and can sometimes impose unacceptable public or social costs on society. It is therefore the role of government to intervene. The main way that government intervention affects property values is through development control and land use regulation or planning, but other activities can also have a significant impact including compulsory purchase of real estate, legislation that may protect certain rights of occupiers (security of tenure for example) and regulations that may affect revenue such as Sunday trading and gambling laws.

3.4 Valuation procedures

Valuation methods and techniques are broadly similar throughout the world. In the UK valuation procedures are regulated to a large extent by the Royal Institution of Chartered Surveyors (RICS). The key set of standards are contained within the RICS Valuation Standards (RICS, 2012), commonly referred to as the 'Red Book'. The Standards regulate valuation process rather than the methods employed and they do this by promoting the use of consistent definitions, bases of valuation and reporting standards.

Valuations for certain purposes are subject to additional, specific standards. In the UK the bases for valuations that are to be included in financial statements are set out in the Red Book and these are discussed in Chapter 12. Valuations may also be required for other regulated purposes such as incorporation or reference in stock market listing particulars and for takeovers and mergers, collective investment schemes, unregulated property unit trusts, financial statements of pension schemes and assets of insurance companies for purposes of calculating their margin of solvency. In the overwhelming majority of cases market value is the basis of valuation that should be employed but the Red Book also contains information on the relevant codes and requirements which must be adhered to when undertaking valuations for these purposes. In particular, where a valuer's firm has received an introductory fee or negotiated the acquisition of one or more properties for which the same client now requires a regulated purpose valuation within one year the valuer must decline unless another firm has provided a valuation in between. Valuations for commercial secured lending are undertaken in accordance with the protocol agreed between the RICS and the British Bankers Association, which requires detailed commentary on market trends and risks and extends the general rule on disclosing conflicts to disclosure of past involvement too.

Most valuations undertaken in the UK are subject to Red Book regulations. Those that are not include: advice in preparation for, or during the course of, negotiations or possible litigation; functions dictated by statutory or legal procedures; valuations for internal purposes or in connection with certain agency work; and replacement cost estimates for insurance purposes. The Red book stipulates that valuers must act with independence, integrity and objectivity, and

> …must have sufficient current local, national and international (as appropriate) knowledge of the particular market, and the skills and understanding necessary to undertake the valuation competently (RICS, 2012: 17)

Procedural tasks associated with a typical valuation are listed in Box 3.2 and include: confirming the valuation instruction, agreeing terms of engagement (the assumptions under which the valuation is conducted), inspecting the property,

Box 3.2 Procedural tasks associated with a typical valuation

Preliminary questions

- Determine purpose of valuation
- Ensure valuer is suitably qualified and there is no conflict of interest which cannot be managed
- Determine whether the valuation is exempt from standards, whether there are any specific UK Valuation Standards that apply and whether it is a Regulated Purpose Valuation (valuation for financial statements, listing particulars, take overs, collective investment schemes, unregulated trusts, pension schemes and insurance companies)

Agreement of terms of engagement, which should identify

- The client
- The subject of the valuation; type of property, physical extent and legal nature of the interest to be valued
- The purpose, basis, date and currency of valuation, including details of any anticipated or actual marketing constraint
- The affiliation, experience and qualifications of the valuer, and status (internal, external, independent, any managed conflicts of interest)
- Source and nature of information relied upon, scope of information supplied by the client, extent of inspections, investigations, assumptions, reservations, etc.
- Any consent to or restrictions on publication
- Any limits or exclusions of liability to parties other than client
- Confirmation that valuation will be undertaken in accordance with standards
- Fee basis
- Availability of complaints handling procedure

Valuation preparation

- Full or limited inspection
- Inspections
- Verification of information
- Discussions with client before draft report
- Resolution of any reservations in initial terms of engagement
- Prepare and finalise valuation

Reporting

- Identify client
- Purpose and subject of valuation and interest to be valued, type of property, etc.
- Basis, date and currency of valuation
- Status of valuer
- Source and nature of information relied upon, extent of investigations and assumptions, reservations, etc.
- Consent to or restrictions on publication
- Limits or exclusions of liability
- Statement of valuation approach
- Confirmation that valuation accords with standards
- Valuation (figures and words)
- Signature and date

gathering and analysing comparable evidence, performing the valuation itself and producing the report.

3.4.1 Terms of engagement

The terms of engagement must be confirmed before the valuation report is issued. If the valuation is one in which the public has an interest or upon which third parties may rely, the terms should disclose any previous involvement that the valuer may have had with either the property to be valued or the client commissioning the valuation. This is required to reduce the potential for conflicts of interest. The Red Book sets out specific disclosures that must be made (RICS, 2011: 17). Cherry (2006) lists some of the more likely conflicts of interest that may arise:

- The valuer acts for both buyer and seller of a property in the same transaction.
- Valuing for a lender where advice is being provided to the borrower.
- Valuing a property previously valued for another client.
- Valuing both parties' interests in a leasehold transaction.

Should such a conflict arise the valuer must decide whether to accept the instruction depending on the specific circumstances. If the instruction is accepted the valuer must:

- Disclose to the client(s) the possibility and nature of the conflict, the circumstances surrounding it and any other relevant facts.
- Advise the client(s) in writing to seek independent advice on the conflict.
- Inform client(s) in writing that the valuer or valuer's firm is not prepared to accept the instruction unless either the client(s) request(s) the valuer to do so unconditionally or it is subject to specified conditions that the valuer has put in place as well as arrangements for handling the conflict, which the client has in writing approved as acceptable, i.e. Chinese Walls (Cherry, 2006).

In addition, any assumptions, special assumptions, reservations, special instructions or departures, consent to or restrictions on publication and any limits or exclusion of liability to parties other than client should be noted. The fee basis and complaints handling procedure or reference thereto will also be set out.

3.4.2 Inspections and investigations

The extent of inspections and investigations would have been agreed in the terms of engagement.

The inspection draws attention to the characteristics of the locality (including the availability of infrastructure communications and other facilities that affect value) and the physical nature of the property (including dimensions and areas of land and buildings, age and construction of buildings, use(s) of land and buildings, description of accommodation, installations, amenities, services, fixtures, fittings, improvements, any plant and machinery which would normally form an integral part of the building). Floor areas are calculated in accordance with the RICS Code of Measuring Practice but if drawings are supplied they must be sample-checked on site. Plant and machinery items that would normally be passed with the property are included in the valuation. Trade fixtures and fittings are normally excluded from a valuation unless the property is being valued as part of an operational entity. When valuing a standing property, particularly leasehold interests, it is essential that running costs and liability for them are identified. When valuing a development property the valuation should reflect the stage of construction that has been reached. It is acceptable to revalue a property without inspection so long as the client has confirmed that no material changes to the property or area have occurred, and subject to this assumption. Market practice suggests an inspection every three years for investment properties but this will vary (Cherry, 2006).

The assessment of physical factors does not involve a structural survey but a record of the repair and condition of the premises including the decorative order, whether the property has been adequately maintained and any basic defects. The nature of the legal interest must also be ascertained including details of any leases or sub-leases, easements and other legal rights, restrictions on, say, use or further development and any improvements that may have been made to the premises by a tenant. Planning and environmental issues such as abnormal ground conditions, historic mining or quarrying, coastal erosion, flood risks, proximity of high voltage electrical equipment, contamination (potentially hazardous or harmful substances in the land or buildings), hazardous materials (potentially harmful material which has not yet contaminated land or buildings) and deleterious materials (building materials that degrade with age, causing structural problems) must also be raised and are of paramount importance if the property is to be (re)developed, as are potential alternative uses. Because of the complexity and diversity of property interests, apparently minor legal or physical details can have a significant effect on value, such as an overly restrictive user clause in the lease or non-compliance with a fire regulation. Refer to the appendix for a typical inspection check-list.

The valuer must take reasonable steps to verify any information relied upon and client information that is not in the public domain and which is obtained whilst valuing a property must be treated confidentially. It is important to identify any potential comparable evidence, noting rents and prices achieved together with physical, legal and spatial attributes of the properties. Useful information can be obtained from online databases such as Estates Gazette Interactive (www.egi.co.uk) and CoStar (www.costar.co.uk) but there is no substitute for market knowledge obtained either directly through previous valuations, through colleagues working in other departments or from contacts in other firms.

It is entirely appropriate to make certain assumptions when valuing a property so long as they are agreed with the client beforehand. Assumptions are defined in the Red Book as suppositions taken to be true without the need for verification. Typical valuation assumptions are: that the property is in good condition, services are operational, there are no deleterious materials, structural defects or hazardous materials present and statutory requirements relating to construction have been met. With regard to the site it is usually assumed that it is capable of development or redevelopment with no unusual costs, that there are no archaeological remains and there is no pollution, contamination or risk of flooding. Searches of the Land Register (www.landreg.gov.uk) to verify ownership and the Local Land Charges register at the local authority to check any legal rights over the land are not normally undertaken and the valuer relies on information provided by the client, nor are detailed enquiries about the financial status of any tenant made. Informal enquiries are usually made to the local planning authority on publicly available information but it is normally assumed that no compulsory purchase powers are proposed.

The Red Book also defines ‘special assumptions’ as facts that differ from those that actually exist at the valuation date. Examples include: that a development or refurbishment is finished when in fact it is still under way, that a property has been let on specified terms when it is actually vacant (and vice versa), that planning consent has been, or will be, granted for development, that there is a restricted period in which to sell the property, or that the exchange takes place between parties where one or more has a special interest and that additional value, or *synergistic value*, is created as a result of the merger of the interests.

The valuation itself should take account of the age, type, size, aspect, amenities, fixtures and features of the property, the tenure of the legal interest, and other significant environmental factors within the locality, the apparent general state of and liability for repair, the construction and apparent major defects, liability to subsidence, flooding, and/or other risks. Particular care is needed when valuing buildings of non-traditional construction.

3.4.3 Valuation report

As a minimum the valuation report should identify the client, the purpose and subject of the valuation, the type and use of the property, the legal interest that has been valued and the basis on which the valuation was conducted. The dates of the inspection, valuation and report should be recorded together with any assumptions (relating to title, condition of buildings, planning, contamination and hazardous substances, environmental matters and sustainability for example), conditions (such as the handling of taxation, expenses, transaction costs, goodwill, fixtures and fittings), reservations, special instructions and departures. The status of the valuer and disclosure of any previous involvement, extent of investigations and nature and source of information relied upon should also be included. The valuation amount (and the currency in which it is expressed) should be reported together with a statement of the approach used, consent to or restrictions on publication, any limits or exclusion of liability to parties other than client, confirmation that valuation was undertaken in accordance with the Red Book, the basis on which the fee will be calculated, complaints handling procedure or reference thereto and the signature of valuer. When reporting the value of a portfolio of properties, if it is suspected that the value of the portfolio as a whole is different from the sum of individual property values then this should be mentioned in the report. Also, negative values[3] must be reported separately.

3.5 Measurement

Given that property size is a key determinant of value, any variation in the way measurements are taken will clearly lead to valuation variance. Consistent measurement techniques are therefore required. This is achieved by making use of the

RICS Code of Measuring Practice (RICS, 2007) which sets out recommended practice for the measurement of land and property.

Gross External Area (GEA) is the area of a building measured externally at each floor level and includes outbuildings (which share at least one wall with the main building), loading bays and pavement vaults but excludes external open-sided balconies, covered ways and fire escapes, canopies, open vehicle parking areas, roof terraces and similar appendages. GEA is the basis of measurement for planning applications and approvals, i.e. site coverage and plot ratio (the ratio between GEA and site area).

Gross Internal Area (GIA) is the area of a building measured to the internal face of the perimeter walls at each floor level and includes loading bays and pavement vaults but excludes perimeter wall thicknesses and external projections, external open-sided balconies, covered ways and fire escapes, canopies, voids over or under structural, raked or stepped floors. GIA is a recognised method of measurement for calculating building costs and is a basis of measurement for the marketing and valuation of industrial buildings (including ancillary offices), warehouses, retail warehouses, department stores, variety stores and food superstores.

Net Internal Area (NIA) is the usable area within a building measured to the internal face of the perimeter walls at each floor level and includes pavement vaults and areas severed by internal non-structural walls and demountable partitions provided the area beyond is not used in common, but excludes:

- Parts of entrance halls, atria, landings and balconies used in common.
- Toilets, toilet lobbies, bathrooms, cleaners' rooms.
- Lift rooms, plant rooms, tank rooms (other than those of a trade process nature), fuel stores.
- Stairwells, lift-wells and permanent lift lobbies.
- Corridors and other circulation areas where used in common with other occupiers or of a permanent essential nature (e.g. fire corridors, smoke lobbies, etc.).
- Areas under the control of service or other external authorities including meter cupboards and statutory service supply points.
- Internal structural walls, walls enclosing excluded areas, columns, piers, chimney breasts, other projections, vertical ducts.
- The space occupied by permanent and continuous air-conditioning heating or cooling apparatus, and ducting in so far as the space it occupies is rendered substantially unusable.
- Areas with headroom of less than 1.5 metres.
- Areas rendered substantially unusable by virtue of having a dimension between opposite faces of less than 0.25 metres.
- Vehicle parking areas (the number and type of spaces should be noted though).

NIA is the basis of measurement for the valuation of business uses, offices and shops. Other technical definitions used in the measurement of buildings for valuation purposes include:

- Clear Internal Height; The height between the structural floor surface and the underside of the lowest point of the structural ceiling or roof. This dimension is used in the measurement of industrial and warehouse buildings.

- Cubic Content; The product of the Gross Internal Area and the Clear Internal Height, used in the measurement of warehouses.
- Eaves Height; internal eaves height is the height between the floor surface and the underside of the roof covering, supporting purlins or underlining (whichever is lower) at the eaves on the internal wall face. External eaves height is the height between the ground surface and the exterior of the roof covering at the eaves on the external wall face, ignoring any parapet.

Shops present particular measurement issues. The retail area of a shop is its NIA and includes ancillary accommodation formed by non-structural partitions and recessed and arcaded areas of shops created by the location and design of the window display frontage. The gross frontage of a shop is the overall external measurement in a straight line across the front of the building, from the outside of external walls or from the centre line of party walls. The net frontage is the overall external frontage on the shop line measured between the internal face of the external walls, or the internal face of support columns including the display window frame and shop entrance but excluding recesses, doorways or access to other accommodation.

We know from Ricardian rent theory that the rent that a tenant can afford to pay depends upon the level of trade and hence profit that can be produced. The level of trade in a shop is influenced by the ability to display items in the window to attract passing trade. The more that can be displayed, the more trade will be generated, the more the profit, the higher the rent. Consider two shops of identical size but different shapes, shown in Figure 3.2.

Even though they are the same size shop 2 would be regarded as more valuable because its longer frontage will allow more goods to be displayed. A technique known as **zoning** is used to divide up the sales area of standard shop units. It is a means of reflecting the fact that the trading area nearest front of shop is most valuable. The ground floor sales area is divided into zones parallel to the frontage and to a depth of six metres (approximately 20 feet). Zone A is always at the front and a maximum of three zones is usual with a 'remainder' area encompassing all that is left over. In Scotland and in parts of Oxford Street and Regent Street the zones are 12 metres (30 feet) deep. Figure 3.3 illustrates how the shops in Figure 3.3 would be zoned.

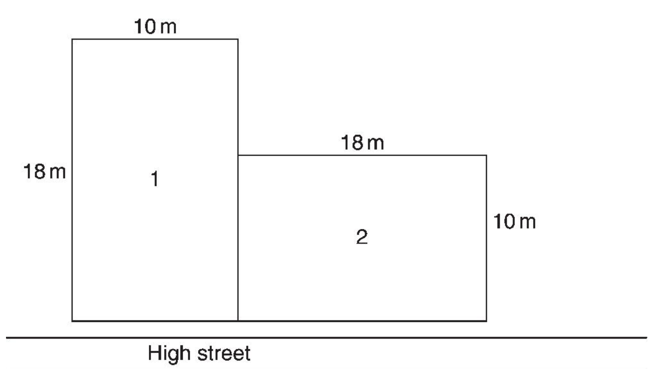

Figure 3.2 Shop shapes.

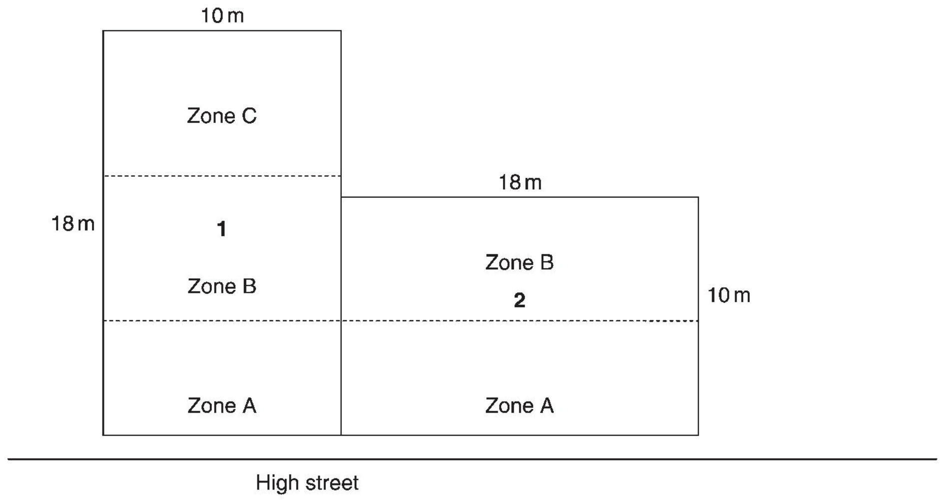

Figure 3.3 Zoning shops.

The areas of the zones are as follows:

Shop 1
Zone A = 6 m x 10 m = 60 m^2
Zone B = 6 m x 10 m = 60 m^2
Zone C = 6 m x 10 m = 60 m^2

Shop 2
Zone A = 6 m × 18 m = 108 m^2
Zone B = 4 m × 18 m = 72 m^2

We shall see in Chapter 5 how these zones are used to place more value on space at the front of the shop.

Many properties used for leisure are valued having regard to trading potential. In these circumstances the area of the premises may not be a factor used directly in the assessment of value. There are, however, occasions where the value is assessed or the price paid is analysed by reference to area and it is recommended that the GIA is used for these types of properties (RICS, 2007). In practice, most measuring up is undertaken using metric units but areas and rents per unit of area are often quoted and advertised in imperial units.

Appendix – Inspection checklist

All types of property

Desk-top Information:
Report on title if available
Tenure, details of any leases, sub-leases, licences and any other legal documents
Service and other charge details
Floor plans and site plans (cross-check with inspection to identify any differences that may be due to tenant improvements)
Obtain a GOAD plan if the property is a shop (www.experian.co.uk)
Agents' details of subject property and comparables if on market

Previous valuation(s) if available
Property address including postcode, map, directions
Contact details and access arrangements
Planning/highways information (listed status, conservation area, planning use; by consent (date) or established use, local plan allocation, outstanding planning consents or applications, local authority proposals that might affect the site)
Property tax; Rateable Value and Uniform Business Rate
Buildings insurance details
Land Registry details

Inspection Equipment:
Dictaphone
Note paper
Measuring devices (tape and laser)
Camera
Plans, scale rule, maps and coloured pens

Initial information:
Date of inspection
Occupier if met at the subject property
Weather
Arrival and departure times
Limitations on inspection
Occupied/unoccupied

Site:
Size and topography
Stability
Flood risk, drainage
Abnormal ground conditions (coastal erosion, mines, quarries or other underground works, services, cables
Contamination, filled land, hazardous or deleterious materials, radon risk
Boundaries (definition, responsibility, stability of adjacent buildings, light and support)
Car parking provision (covered, uncovered) – count number of spaces
Building works
Trees

Exterior of building(s):
Age, use and any previous use of building(s)
Type of construction, inc. whether converted or purpose built, floor loading for industrial / warehousing
Condition (décor, rot, structural movement)
Evidence of extension(s), refurbishment
Services (water, gas, electricity, heating and drainage)
Standard of maintenance

Interior of building(s):
Number of floors, configuration, levels, mezzanine, use, condition, fit-out specification

Lift (goods, passenger), escalator
Ventilation
Fire and security systems
Disability Discrimination Act issues
Gross external/internal floor areas and net internal area, frontage length and depth for shops, eaves height, yard area, site area for industrial/warehousing

Communications:
Roads; made / unmade, adopted / not adopted by the local authority / Highways Agency
Rights of way or easements
Public transport
Loading / rear access, including any weight / height restrictions on access
Parking facilities
Broadband availability

Locality:
Adjacent land uses, whether prime pitch if retail use
Character of locality
Comparable properties (look for agents' boards and check those identified in desk-top study)
High voltage cables or substations
Telecommunications masts

Lease details (if applicable):
Lease length
Repair and insurance obligations
Break options
Rent review terms
Alienation, sub-letting and assignment terms
Obligations to refurbish
Use clause

Miscellaneous:
Potential for alternative uses(s)

Certain property types will require the collection of specific information

Licensed premises:
Bar length / room size
Sales area / drinking space
Display fittings
Surveillance of bar by landlord
Temperature of cellar
Internal or external toilets
Catering facilities
Car parking

Location: passing trade, catchment, demographics, competition
'Tied' to a brewery or free-house

Healthcare facilities:
Most recent registration documents
Facility's statement of purpose
List of current service users, fees paid and funding sources
Occupancy record over at least one year
Staffing details including costs
Accounts for at least two years

Golf courses:
Course details including history, construction, quality, safety, length, difficulty, versatility, designer
Irrigation and drainage
Practice facilities
Clubhouse facilities
Green-keeping compound facilities
Details of any public rights of way including number, route and effect on golf
Details of any entertainment and gaming licenses, franchises or concessions

Petrol filling stations:
Fuel sales over past three to five years
Price details over past year and those of competitors
Shop sales over past three to five years plus stock details
Details of any lottery sales and receipts
Valeting sales
Trading hours
Details of equipment: tanks, fuel losses, ownership

Student accommodation:
Details of room types and sizes
Occupancy
Other revenue sources such as vending machines and laundry facilities
Revenue from holiday lets
Details of institutions in the vicinity
Details of competitor accommodation

Telecommunications:
Line of sight
Extendibility
Site-sharing rights
Equipment rights
Decommissioning responsibilities
Power situation
Rates responsibilities
Wayleave rights

Key points

- 'Property' is a term used to describe a legal real property interest in real estate. In economic terms a property can have a value-in-use and a value-in exchange, the latter is an estimate of exchange price.
- A property valuation is the process of forming an opinion of value-in-exchange under certain assumptions and a market valuation requires those assumptions to establish an open market scenario.
- Valuations are required in connection with many activities, chiefly development appraisal, transfer of ownership, monitoring of property investment performance, reporting the value of property assets held by companies, loan security, tax matters and insurance risk assessment.
- The diversity of property makes valuation a difficult task, no two properties are ever the same yet valuation relies on the comparison of properties to give an indication of value. To do this the valuer must be aware of, and be able to quantify, differences in type, location, legal interest, quality and the state of the market. These determinants of value are considered in more detail in section 2.3.
- Value influencing property characteristics can be property-specific or market-wide: the former refers to the spatial, physical and legal attributes of the property itself and the latter refers to the characteristics of the market as a whole or the market sector in which the property operates. Fundamentally, the market value of a property reflects its capacity to fulfil a function. If the property is a shop for example then its value will be determined by factors such as trading position, length of frontage, accessibility, planning restrictions and tenure. We shall see later how it is important to be able to quantify financially these value factors as part of the valuation process (comparison adjustment). This is not an easy task and provides substance to the argument that valuation is as much an art as it is a science.
- There are two levels of property value analysis: property-specific and market overview. The value of a property is largely determined by its competitive position in the market in which it operates. Therefore, both property-specific and market-wide factors must be considered to delineate the market by investigating property type, features such as (single or multiple) occupancy, use, construction types, design, amenities, geographical extent, available substitutes and complementary land uses.
- The built environment cannot be treated like a clinical laboratory and in practice variations in valuations will occur. Rates of inflation will alter, market conditions will change the expected rates of return and unforeseen events will happen. The calculations performed in valuations assume a static view of a dynamic market.
- Valuation procedures are regulated in the UK at the national and international level by a long-established set of standards. These standards are continuously monitored by professional bodies and are revised on a regular basis. It is essential therefore for valuers to keep themselves up to date.
- The valuation standards do not concern themselves with method but regulate the procedures surrounding the initial instruction, terms of engagement, valuation preparation and reporting. Specific valuations standards regulate certain types of valuations.
- Accurate measurement of a property is fundamental to valuation and the RICS Code of Measuring Practice (RICS, 2007) provides detailed guidance on accepted *de facto* practice for measuring commercial premises.

Notes

1. (1723–1790) In 1776 Smith published 'Inquiry into the Nature and Causes of the Wealth of Nations' which helped create the academic discipline of economics.
2. To avoid confusion, adjectives are often added to describe value (market value, existing use value, investment value, rateable value and so on) but market value is the focus of most valuations.
3. Negative values might arise where expenditure exceeds income – a leasehold interest where the head-rent is higher than the sub-rent, for example.

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Chapter 4
Valuation Mathematics

4.1 Introduction

If properties are to be exchanged then buyers and sellers must agree prices for the property or 'basket' of property attributes that they are acquiring. In a competitive market suppliers to, users of and investors in property must agree on exchange prices and valuation is all about estimating these. The best way of doing so, assuming you are not trying to measure and explain the relative contribution of the individual property attributes, is by comparison. We can, in the main, group properties into relatively homogeneous market sectors defined by land use and location. Comparison only then becomes a problem in markets where the uniqueness of each property precludes attempts at meaningful comparison. In these cases it is necessary to look more closely at the financial decisions that underpin the prices agreed. As an example some specialised types of property are valued by quantifying the contribution of the property to business profit. So now it is necessary to introduce the financial mathematics that underpins valuation methods. For many years valuers have tended to adopt fairly simple ratios between rental income and capital value and, in the presence of heterogeneity, make rudimentary adjustments to these ratios. This can be sufficient but increasingly it is not acceptable; a more fundamental understanding of the way in which property attributes influence value is required.

We know that property is usually demanded not as an end in itself but as a means to an end – as a factor of production or as an investment asset – it is a derived demand and the opportunity cost of capital invested in property must be measured against other factors of production for occupiers and other investment asset types for investors. Valuers rely on this feature of property demand when attempting to quantify financially the opportunity cost of owning or leasing property. Economists (and valuers) use financial mathematics when measuring

Property Valuation, Second Edition. Peter Wyatt.

the opportunity cost of capital spent on property and this is necessary because property usually requires large amounts of money to be invested over periods lasting several years, so the 'time value of money' must be factored into calculations. This time value of money is an expression used to refer to the fact that, although in nominal terms £1,000 tucked under the mattress today will be £1,000 in say ten years' time, in real terms it will be worth less because inflation will have partially eroded its value. Similarly, and more importantly as far as property investment is concerned, the further into the future an amount of money (rent for example) is received the less it is worth in today's terms.

Occupation and ownership are separate for approximately half of the stock of commercial property in the UK, as we discovered in Chapter 1, and this feature provides a very good evidence base from which to derive financial measures of the opportunity cost of money invested in property and of the cost of occupying property; the prices and rents paid for investment (landlord) and occupation (tenant) interests respectively. But in the absence of perfectly comparable evidence (sadly a luxury that only valuation textbooks can invent) valuation involves adjustment of comparable evidence using mathematical formulae that enable the time value of money to be expressed in financial terms. This process requires a mathematical framework within which to operate and this is provided by financial investment theory. This section begins by illustrating some of the frequently used formulae for calculating investment value that take into account the time value of money before describing simple ratios between the price paid and the financial return expected from a property acquisition. The focus is on acquisition as a standing investment but the theory is equally applicable to acquisitions for owner-occupation and development but the investor's required rate of return is replaced by measures like the 'weighted average cost of capital' (which we will come to later) and developer's profit margin.

4.2 The time value of money

In order to be able to value properties it is necessary to understand how future economic benefits, usually in the form of a cash-flow, can be expressed in terms of present value. As far as property is concerned, after an initial expenditure on acquisition, cash-flow revenue typically takes the form of rental income and would be a real rent to an investor and an imputed rent to an owner-occupier. Property-based cash-flows can take other forms though; capital profit from a completed development or capital payments such as premiums for example, but let's keep things simple at this stage and just think about rental income. Mathematical formulae are used to measure the time value of regular income cash-flows such as rent. These formulae are founded on the premise that rational purchasers of property, whether for ownership, investment or development, would prefer to have money now rather than later because, in an inflationary economy, money has a time-value. In other words its real value is eroded by the general rise in the cost of all goods and services (inflation) over time. This time-value is a function of property investment characteristics described in Chapter 1, namely loss of liquidity and costs associated with the management of the investment, inflation and risk. The principles of compounding and discounting measure

Table 4.1 Frequently used notation.

Variable	Description
A	Amount invested as a single sum
PMT	constant periodic cash-flow investment
n	Number of periods over which the cash-flow is estimated
r	Rate of return or discount rate per period
y	Market yield
t	Tax rate

the value of money over time and form the basis of the financial economics of cash-flows. By compounding it is possible to calculate the **future value** of any income or expenditure and by discounting it is possible to calculate the **present value** of any future income or expenditure.

Before the various formulae are described we need to introduce some mathematical notation so they can be presented in a succinct and consistent form. The basic notation that will be used is shown in Table 4.1 and it is also worth noting that the formulae assume, unless otherwise stated, that investment deposits are made at the start of each period and interest is payable at the end of each period (in arrears).

4.2.1 Single period investments

The **Future Value of a single sum** investment is the amount to which it will accumulate at r rate of return after n periods. For example, if £1 is invested at the beginning of year one at r rate of return, the capital accrued at the end of the year will be $1+r$. If £1 is invested for two years the future value will be $(1+r)+r(1+r)$ or $(1+r)^2$ and if it is to be invested for n periods:

$$(1+r)^n \qquad [4.1]$$

If PV is the sum originally invested, rather than £1, the formula to calculate the amount accumulated is:

$$FV = PV(1+r)^n \qquad [4.2]$$

For example, the roof of a factory will need replacing in four years' time as part of a rolling programme of maintenance. The current cost of the work is estimated to be £25,000. Building costs are forecast to increase at an average annual rate of 3.5% per annum over this period of time. The cost of the repair in four years' time will be:

$$FV = PV(1+r)^n = £25,000(1+0.035)^4 = £28,688$$

The **Present Value of a single sum** investment is the sum that needs to be invested at the present time in order to accumulate to FV by the end of n periods at r rate of return. If an amount of money FV is invested for n periods and earns an annual rate of return, *r*, so that at the end of period *n* the investor receives £1 (equal to the original amount plus the required return) we can solve for *FV* using Equation 4.2 as follows:

$$1 = PV(1+r)^n \quad [4.3]$$

So

$$PV = \frac{1}{(1+r)^n} = (1+r)^{-n} \quad [4.4]$$

For any *FV* other than £1:

$$PV = FV(1+r)^{-n} \quad [4.5]$$

If money can be invested in a secure investment and receive an annual return of 4% per annum, how much capital should be invested now to meet the estimated future expenditure calculated in the roof repair example above?

$$PV = FV(1+r)^{-n} = £28,688(1+0.04)^{-4} = £24,523$$

4.2.2 *Multi-period investments*

The *FV £1* and the *PV £1* are concerned with single sum investments. Property investment typically provides a regular or multiple-period return and therefore the following formulae are concerned with regular flows of money.

4.2.2.1 Level annuities

The **Future Value of a Level Annuity** is the amount to which a series of payments of money invested at the end of each period will accumulate at *r* rate of interest after *n* periods. It is based on multiple deposits rather than a single deposit. Remembering that the last payment accrues no interest because interest is invested in arrears, the formula is derived by adding the single sum *FVs* for each successive period. Take a regular series of *n* £1 payments:

$$FV = (1+r)^{n-1} + (1+r)^{n-2} + \ldots + (1+r)^2 + (1+r) + 1 \quad [4.6]$$

This is an example of a geometric progression and we can use some of the recurring terms to simplify matters when calculating its sum. This is achieved by applying the general form of a geometric progression; a, ar, ar^2, ar^3, ar^4, … ar^{n-1} where there are n terms, a is the first term and scale factor and r ($\neq 0$) is the common ratio. The sum of a geometric progression in its general form looks like this:

$$\sum_{i=0}^{n} ar^i = a + ar + ar^2 + ar^3 + ar^4 + \ldots + ar^{n-1} \quad [4.7]$$

If both sides of the above equation are multiplied by *r*

$$r\sum_{i=0}^{n} ar^i = ar + ar^2 + ar^3 + ar^4 + ar^5 + \ldots + ar^n \qquad [4.8]$$

and Equation 4.8 is deducted from 4.7 we are left with the following since all the other terms cancel.

$$\sum_{i=0}^{n} ar^i - r\sum_{i=0}^{n} ar^i = a - ar^n \qquad [4.9]$$

Rearranging Equation 4.9 we get the following formula for the sum of a geometric progression:

$$\sum_{i=0}^{n} ar^i (1-r) = a\left(1-r^n\right) \qquad [4.10]$$

which simplifies to:

$$\sum_{i=0}^{n} ar^i = \frac{a\left(r^n - 1\right)}{r-1} \qquad [4.11]$$

This equation for calculating the sum of a geometric progression can now be used to construct a formula for the FV of a level £1 annuity by inserting 1 as the first term and $(1+r)$ as the common ratio:

$$FV = \frac{1(1+r)^n - 1}{(1+r)-1} = \frac{(1+r)^n - 1}{r} \qquad [4.12]$$

So for any series of payments other than £1, *PMT*, the *FV* for *n* periods is:

$$FV = PMT\left[\frac{(1+r)^n - 1}{r}\right] \qquad [4.13]$$

There are major repair works planned in eight years' time for the entire industrial estate that you hold in your investment portfolio. Assuming that you can invest money at an average rate of return of 6.5% per annum, how much will accrue if you invest £50,000 at the end of each year for the next eight years?

$$FV = PMT\left[\frac{(1+r)^n - 1}{r}\right] = £50{,}000\left[\frac{(1+0.065)^8 - 1}{0.065}\right]$$
$$= £50{,}000 \times 10.0769 = £503{,}845$$

If we know the future amount the **FV of a Level Annuity** formula above can be rearranged to calculate the *PMT*. When rearranged like this the series of payments is known as a **Sinking Fund** (**SF**), being the *PMT* which must be invested at the end of each period, accumulating at *r* rate of return, to provide a known amount after *n* periods. So if *PMT* must accumulate to £1, Equation 4.13 is rearranged, substituting £1 as the amount to which the annuity must accrue:

$$1 = PMT\left[\frac{(1+r)^n - 1}{r}\right] \qquad [4.14]$$

Rearranging this equation to isolate *PMT*:

$$PMT = \frac{r}{(1+r)^n - 1} \tag{4.15}$$

The formula for a Sinking Fund is the reciprocal of the Future Value of a Level Annuity formula.

Rather than set aside a single capital amount now for the roof repair as we did in the *PV £1* example above you decide to set aside equal annual instalments. What should these instalments be, assuming that the repair will still cost £28,688 in four years' time and you can invest money at a rate of return of 4% per annum?

$$PMT = FV\left[\frac{r}{(1+r)^n - 1}\right] = £28{,}688\left[\frac{0.04}{(1+0.04)^4 - 1}\right]$$
$$= £28{,}688 \times 0.2355 = £6{,}756$$

In other words £6,756 should be invested at the start of each of the next four years to accrue £28,688 assuming an interest rate of 4% per annum paid annually in arrears. This can be checked using the *FV of £1 pa* formula to calculate the future value of £6,756 invested in each of the next four years at 4% per annum. The answer should be £28,688.

The **Present Value of a Level Annuity** is the present value of the right to receive a series of payments at the end of each period for *n* periods at *r* rate of return. It is the sum of the present values (single sum *PVs*) over *n* periods. So the PV of £1 per annum is:

$$PV = (1+r)^{-1} + (1+r)^{-2} + (1+r)^{-3} + \ldots + (1+r)^{-n} \tag{4.16}$$

This is another geometric progression where the first term is $(1+r)^{-1}$ and the common ratio is also $(1+r)^{-1}$. So, substituting these terms into Equation 4.11 we get:

$$PV = \frac{(1+r)^{-1}\left[1-\left((1+r)^{-1}\right)^n\right]}{1-(1+r)^{-1}} = \frac{(1+r)^{-1} - \left((1+r)^{-1}\right)^{n+1}}{1-(1+r)^{-1}} = \frac{(1+r)^{-1} - \dfrac{1}{(1+r)^{n+1}}}{1-(1+r)^{-1}}$$

$$PV = \frac{(1+r)^{-1} - \dfrac{1}{(1+r)^{n+1}}}{1-(1+r)^{-1}} \tag{4.17}$$

If we multiply both sides of this equation by $(1+r)$ it simplifies to:

$$PV = \frac{1-(1+r)^{-n}}{r} \tag{4.18}$$

And for any series of payments, or cash-flow (*CF*) other than £1:

$$PV = CF\left[\frac{1-(1+r)^{-n}}{r}\right] \tag{4.19}$$

For example, how much would you pay for the right to receive £50,000 per annum over the next 15 years assuming average investment returns of 8% per annum?

$$PV = CF\left[\frac{1-(1+r)^{-n}}{r}\right] = £50,000\left[\frac{1-(1+0.08)^{-15}}{0.08}\right] = £50,000 \times 8.5595 = £427,975$$

The *PV* of a level annuity formula is used to calculate the present capital value of regular cash-flows which, of course, includes rent payments. If we replace the word 'calculate' with 'value' in the preceding sentence, the mathematical essence of valuation should now be apparent. The valuation of a finite (terminable) cash-flow involves capitalising the net income at a suitable discount rate r for the duration n that the income A is received. In other words the formula is used to convert a series of regular rent payments into a capital value. Conventionally the *PV* of a level annuity formula is referred to as the **Years Purchase** by valuers, being the multiplier applied to the annual rent A to calculate the capital value of a property. It is called the 'years purchase', or *YP* for short, because the multiplier is the number of years that will pass before the income equals the capital value – like a payback period but taking the time value of money into account as well. So, in the example above, it will take approximately 8.56 years of receiving £50,000 per annum to recoup the original outlay of £427,975 at the prevailing interest rate of 8% per annum.

Now consider an investment which provides a constant annual income of £1 in arrears *in perpetuity*. If we assume a discount rate of 10% per annum, as the time period n over which income received goes beyond about 50 or 60 years the value of this investment levels out to a fraction under £10. Mathematically, as n gets bigger the $(1+r)^{-n}$ term in Equation 4.19 gets smaller and the equation simplifies to:

$$PV = \frac{1}{r} \qquad [4.20]$$

So, in terms of the mathematical accuracy typically required for property valuation, any stream of income receivable for 60 years or more may be regarded as receivable in perpetuity. This means that freehold and long leasehold property interests can be valued to an acceptable degree of accuracy by dividing the income by the rate of return, r. For example, a freehold shop investment which currently produces an annual rent of £80,000 per annum is for sale. If investors generally require a 5% return on investments of this sort what is the capital value of this investment?

$$PV = 80,000\left(\frac{1}{0.05}\right) = \frac{80,000}{0.05} = £1,600,000$$

When looking at property investment transactions that have recently taken place in the market it is possible to substitute r in Equation 4.20 to identify the market rate of return, known as the yield y (more of which later) given a current price P (i.e. PV £1 pa). Thus Equation 4.20 remains the same mathematically but the variables change:

$$P = \frac{1}{y} \qquad [4.21]$$

And for any market rent MR other than £1 per annum:

$$P = \frac{MR}{y} \qquad [4.22]$$

By rearranging Equation 4.22 to isolate y

$$y = \frac{MR}{P} \qquad [4.23]$$

it is possible to use this formula to derive market yields from property investments that have recently transacted. These yields can be used to derive a suitable yield (known as an **all-risks yield**) with which to value a property. For example, when valuing (i.e. calculating the present value or PV of) freehold properties where the annual rental income is assumed to be received in perpetuity, the market rent (MR) is divided by the yield y, as in Equation 4.23, but substituting P for V (value).

$$V = \frac{MR}{y} \qquad [4.24]$$

Finally, the PV of a level annuity can be rearranged to calculate the payments that the annuity will provide at the end of each period for n periods at r rate of return for a given investment. The return on an annuity is in the form of a constant income either for a fixed term or in perpetuity. Rearranging Equation 4.19 we get:

$$CF = PV \frac{r}{1-(1+r)^{-n}} \qquad [4.25]$$

The formula is the reciprocal of the PV of a level annuity. As n gets bigger the denominator in Equation 4.25 gets smaller and the equation simplifies to:

$$CF = PV.r \qquad [4.26]$$

Which is the inverse of $\frac{CF}{r}$ that results when the present value of a level annuity receivable in perpetuity is calculated.

Unlike a building society account or bond investment – where the capital invested remains, the capital invested in an annuity is not paid back. Instead the return from an annuity is partly a return *on* capital (at r) and partly a return *of* capital in the form of a sinking fund which must recoup the capital originally invested by the end of n periods. The formula therefore comprises these two parts, r and SF:

$$PV = CF.\frac{1}{r + SF} = CF.\frac{1}{r + \left[\frac{r}{(1+r)^n - 1}\right]} \qquad [4.27]$$

Similarly

$$CF = PV.r + SF = PV.r + \left[\frac{r}{(1+r)^n - 1}\right] \qquad [4.28]$$

So there are two formulae for calculating *PV* (Equations 4.19 and 4.27) and *CF* of an annuity (4.25 and 4.28). The reason for this concerns the way in which an investment provides a return *on* and a return *of* capital. To correctly calculate the present value of a cash-flow the *PV* formula must include a sinking fund so that capital is recovered by the end of the investment period (the return of capital) while, at the same time, a return on capital is maintained at *r*. For example, what is the present value of an investment that offers an annual income of £10,000 over the next four years at a return of 5% per annum? Using Equation 4.19:

$$PV = £10{,}000 \times \frac{1-(1+0.05)^{-4}}{0.05} = £10{,}000 \times 3.5460 = £35{,}460$$

And using Equation 4.27

$$PV = £10{,}000 \times \frac{1}{0.05 + \left[\dfrac{0.05}{(1+0.05)^4 - 1}\right]} = £35{,}460$$

Table 4.2 shows the returns on and of capital broken down year-by-year:

The income provides for a return on capital at the remunerative rate (5% per annum) and a return of capital at the accumulative rate (also at 5% per annum). The sinking fund invests income at the accumulative rate to recover the original capital outlay of £35,460. Because the sinking fund is returning some of the capital at the end of each year the amount of capital outstanding reduces, causing the return on capital to reduce too, leading to more of the fixed income being available for return of capital, and so on. Because the accumulative and remunerative rates are the same the annuity and present value formulae in Equations 4.19 and 4.25 are known as 'single rate' – the sinking fund is, in effect, a hypothetical one. The other versions (4.27 and 4.28) are known as 'dual rate' and are used when the remunerative rate *r* and the accumulative rate *SF* (or *s* for short) are different. Note that $r+s$ becomes *r* when the period over which income is received is really long because the annual amount that needs to be invested in a sinking fund becomes negligible as *n* gets bigger, so *s* tends to 0 and the formula simplifies.

All of the formulae presented so far assume that the return on the investment is received annually in arrears. If the payments from a level annuity are receivable in

Table 4.2 Return on and of capital.

Year	Capital outstanding	Income	Return on capital	Return of capital (sinking fund)
1	35,460	10,000	1,773	8,227
2	27,233	10,000	1,362	8,638
3	18,595	10,000	930	9,070
4	9,525	10,000	476	9,524
				35,460

advance (at the start of each period) for *n* periods, the first payment is received immediately so there is one less time period over which a payment is discounted, and the last payment is received after *n*-1 periods. Therefore, the series of present values that comprise the *PV of a level annuity w*ith payments received at the beginning of each period becomes:

$$PV_{advance} = CF + \frac{CF}{(1+r)} + \frac{CF}{(1+r)^2} + \frac{CF}{(1+r)^3} + \ldots + \frac{CF}{(1+r)^{n-1}}$$

This simplifies to:

$$PV_{advance} = CF\left[\frac{1-\dfrac{1}{(1+r)^{n-1}}}{r}+1\right] \equiv CF(1+r)\cdot\left[\frac{1-(1+r)^{-n}}{r}\right] \qquad [4.29]$$

Most leases on commercial property in the UK require the tenant to pay rent in quarterly instalments at the beginning of each quarter, usually on 'quarter days' at the end of December, March, June and September. Because the income is received sooner than if it was paid annually in arrears, these arrangements have a small but beneficial impact on the value of the investment. So, although rents are quoted as annual figures and used in valuations in this way, the actual return that an investor receives is enhanced by this payment method but not quite to the same extent as having all of the annual rent at the start of each year. To illustrate this compare the present value of two investments that both yield a 6% annual return on an income of £10,000 for the next five years but one pays this income annually in advance and the other annually in arrears:

$$PV£10{,}000pa_{arrears} = £10{,}000 \times \frac{1-(1+0.06)^{-5}}{0.06} = £10{,}000 \times 4.2124 = £42{,}124$$

$$PV£10{,}000pa_{advance} = £10{,}000 \times \frac{1-\dfrac{1}{(1+0.06)^{(5-1)}}}{0.06} + 1 = £10{,}000 \times 4.4651 = £44{,}651$$

Now assume that the income is paid in four instalments of £2,500 at the beginning of each quarter:

$$PV£1pa_{quarterlyadvance} = \frac{1-(1+r)^{-n}}{4\left(1-(1+r)^{-0.25}\right)} \qquad [4.30]$$

$$PV£10{,}000pa_{quarterlyadvance} = £10{,}000 \times \frac{1-(1+0.06)^{-5}}{4\left(1-(1+0.06)^{-0.25}\right)}$$
$$= £10{,}000 \times 4.3692 = £43{,}692$$

The yield from a completed investment transaction is usually reported as a simple annual income to capital value ratio which assumes that the income is received annually in arrears. Given the above, we now know this to be slightly inaccurate and for property investments it is often desirable to adjust this yield so that it reflects the fact that income is received quarterly in advance. Assuming the property investment is a freehold or long leasehold interest and the income is receivable in perpetuity the simple annually in arrears yield y_a that was derived in Equation 4.23 may be converted to a quarterly in advance yield y_q using the following formula:

$$y_q = \frac{1}{\left(1 - \frac{y_a}{4}\right)^4} - 1 \qquad [4.31]$$

For example, if the £10,000 income in the example above was receivable in perpetuity rather than just five years and an investor paid £120,000 for the investment the initial yield (y_a) is 8.3333%. But this assumes the income is paid annually in arrears. If the rent is paid quarterly in advance the yield (y_q) is 8.7861%. This is often referred to as the **true equivalent yield.**

4.2.2.2 Growth annuities

Property, along with many other types of investment, might be expected to grow over time and this growth can be built into the PV of an annuity formulae as follows.

$$PV = \frac{CF}{(1+r)} + \frac{(1+g)CF}{(1+r)^2} + \frac{(1+g)^2 CF}{(1+r)^3} + \ldots + \frac{(1+g)^{n-1} CF}{(1+r)^n} = CF\left[\frac{1-((1+g)(1+r))^n}{r-g}\right]$$

Where g is an annual growth rate. If the cash-flow is receivable in perpetuity the above formula simplifies to

$$PV = \frac{CF}{r-g}$$

4.2.3 Tax

Finally, let's consider the impact on valuation of income tax. When income is receivable in perpetuity income tax makes no difference to the valuation because income is perpetual and all return is on capital. Consider an investment where the net income is £10,000 per annum in perpetuity and the yield is 10%. Gross of tax the valuation (present value of £10,000 in perpetuity) would be:

$$£10{,}000 \times \frac{1}{r} = £10{,}000 \times \frac{1}{0.10} = £100{,}000$$

Net of income tax t at a rate of say 40% the valuation would be:

$$£10{,}000(1-t) \times \frac{1}{r(1-t)} = £6{,}000 \times \frac{1}{0.06} = £100{,}000$$

If the income is terminable, a leasehold property investment for example, then there is an impact on value. Consider profit rent of £10,000 receivable for 15

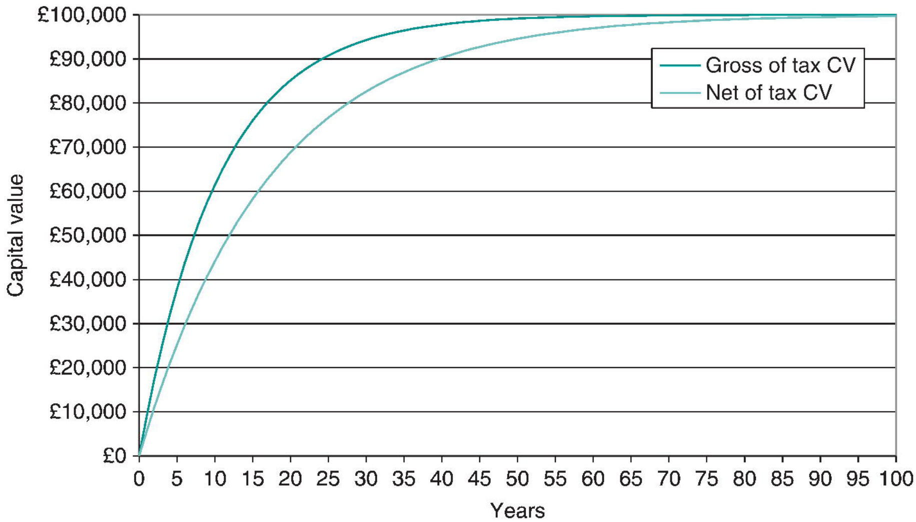

Figure 4.1 The effect of tax on perpetual and terminable income streams.

years on a 10% gross yield with tax at 40%. Gross of tax the valuation (present value of £10,000 per annum for 15 years) would be:

$$\pounds 10{,}000 \times \frac{1-(1+10)^{-15}}{0.10} = \pounds 10{,}000 \times 7.6061 = \pounds 76{,}061$$

But net of tax at 40% the valuation would be:

$$\pounds 10{,}000(1-t) \times \frac{1-\left[1+r(1-t)\right]^{-15}}{r(1-t)} = \pounds 6{,}000 \times \frac{1-\left[1+0.06\right]^{-15}}{0.06} = \pounds 58{,}273$$

Figure 4.1 illustrates what is happening to the present (capital) value of this income stream over the first 100 years, both gross and net of income tax at 40%.

4.3 Yields and rates of return

As a simple rule of thumb, the term 'yield' is generally used to describe the return that an investment provides or yields; it is the ratio of annual income to value or price, whereas as the rate of 'return' refers to the desired return (on capital) that an investor would like. Using this terminology simple investment decision rules can be devised that compare the yield from an investment with the investor's required return; if the yield is below the required return then an investment looks bad. Bond yields are regarded as fundamental benchmarks for the various financial markets and their movements set rate levels throughout money and capital markets. Perhaps the most widely known rate of return is the one that the Bank of England Monetary Policy Committee reviews each month; the bank base rate or, as it is more generally known, the interest rate. Having made this simple distinction between yields and rates of return we now need to complicate matters by explaining some of the other terms that are commonly used. As a way of imposing some sort of logic these terms will be described under the headings of 'yields' and 'rates of return' although in reality life is not quite so straightforward.

4.3.1 *Yields*

The purchaser of a property investment is acquiring the right to receive income in the form of rent from an occupying tenant or tenants. The price is usually paid at the time of acquisition and, as stated above, the yield describes the ratio of annual income to price paid. For example, consider the freehold interest in a shop purchased for £375,000 and subsequently let at a rent of £30,000 per annum. Given that this is a freehold interest we can assume that this income is receivable in perpetuity, thus, using Equation 1.23, the property produces a yield of 8%, i.e. £30,000 ÷ £375,000 = 8%. The more precise term for this yield is the **income yield** as it measures the current income return. The income yield can be calculated at any time during the life on an investment and maybe be referred to as a **running yield**. The **initial yield** is a particular type of income yield and is the net income received in the first year divided by purchase price, and is a common market measure of investment performance because it represents the yield accepted by an investor at acquisition. The fact that initial yields from similar types of property investment are similar demonstrates that they typically sell for a certain multiplier of income. For example if a shop recently let at market rent of £100,000 per annum and the investment was purchased for £1,667,000 the initial yield is £100,000 divided by £1,667,000, i.e. 6%.

A good quality investment (a new building let to a large business perhaps) has a low yield as investors bid up the price in relation to income level. But supply of and demand for a particular investment (and hence the price paid) is affected by many other characteristics of the investment in addition to current income level. These were discussed in Chapter 1 and include expectations of income and capital growth and perceived risk which are, in turn, determined by the range of factors that we have already encountered in this chapter such as location, age, use, condition of the property, the financial standing of the tenant and so on. Attention would also be paid to the returns obtainable from other investments and, of these, government bonds often form an important reference point. We consider how these factors might be expressed mathematically when we discuss how a rate of return might be derived below. As far as property investments are concerned the initial yield is usually lower than the rate of return that will actually be obtained over the life of the investment because the purchaser is paying a price that assumes the rent paid by a tenant and the capital value of the property will grow over time. If income and capital value are expected to increase sufficiently, investors may be willing to accept an initial yield below what they could achieve from a risk-free, non-growth investment. If this should be the case the difference between an initial yield of say 6% from a property investment and say 7% from a risk-free investment such as government bonds is known as the **reverse yield gap** and is counter-intuitive to the notion that investors require a higher return for higher risk. The gap must be made good through growth.

In the absence of directly comparable exchange prices valuers use the initial yield as a unit of comparison for investment valuation. It is the rate at which rent (derived in the occupier market) is capitalised in the investor market (Ball et al., 1998). Baum and Crosby (1995) argue that, because the market for a particular type of investment usually generates comparable price and income information, this leads to widespread use of initial yield as a market comparison metric. In doing so the term **all-risks yield** (**ARY**) is given to the unit of comparison used to value property investments. The ARY is usually derived by analysing the initial yields from recent comparable property investment transactions. When using the ARY to value a property, adjustments are made to initial yields in recent comparable transactions to reflect any differences between them and the property being valued. For example the higher the expectation of future income and/or capital growth the more an investor is prepared to pay for the investment *ceteris paribus* and, as a consequence, the initial yield that an investor is prepared to accept will be lower. Yields tend to be comparable for similar property investments in similar locations because their income growth prospects and risk to capital and income will tend to be similar.

For property investments where the rent passing is below the market rent but is likely to revert to market rent in the future the **reversionary yield** refers to the ratio between the reversionary market rent and the capital value. The **equivalent yield** is an overall yield that can be used to capitalise both the current and reversionary incomes. Nowadays reversions to a higher rent usually take place within a five-year period due to the frequency with which rent reviews occur and, unless the reversion is many years away or the term income is very low compared to the reversionary income, the equivalent yield will be very close to the ARY. It is important to note that the equivalent yield, as with the ARY, is a growth-implicit yield and therefore any future growth in the income stream is implied by the choice of the yield.

Figure 4.2 shows IPD data on yield levels across market sectors between 1981 and 2005. Focusing on the equivalent yields for the main sectors, it can be seen that yields on industrial property investments are higher than on retail and office investments. What this shows is that investors pay a lower price for each unit of rent from industrial property than for shops and offices. They do this because they perceive industrial property to be more risky. It is also possible to see how the initial yield from all property is lower than the equivalent yield, revealing an expectation of reversionary growth.

4.3.2 Rates of return

The rate of return that is expected from a property investment is often referred to as the **target rate of return** (**TRR**) and also as the **discount rate** because it is the rate used in the *PV £1 pa* formula to discount future income to a present capital value. The target rate of return depends on a range of factors and these, along with supply-side factors, determine the price that will be paid and the resultant initial yield that will be obtained. We have already listed some of these factors in the section above and in Chapter 1 but we need to consolidate them if we are going to model them mathematically in a rate of return. Fisher (1930) argued that the total

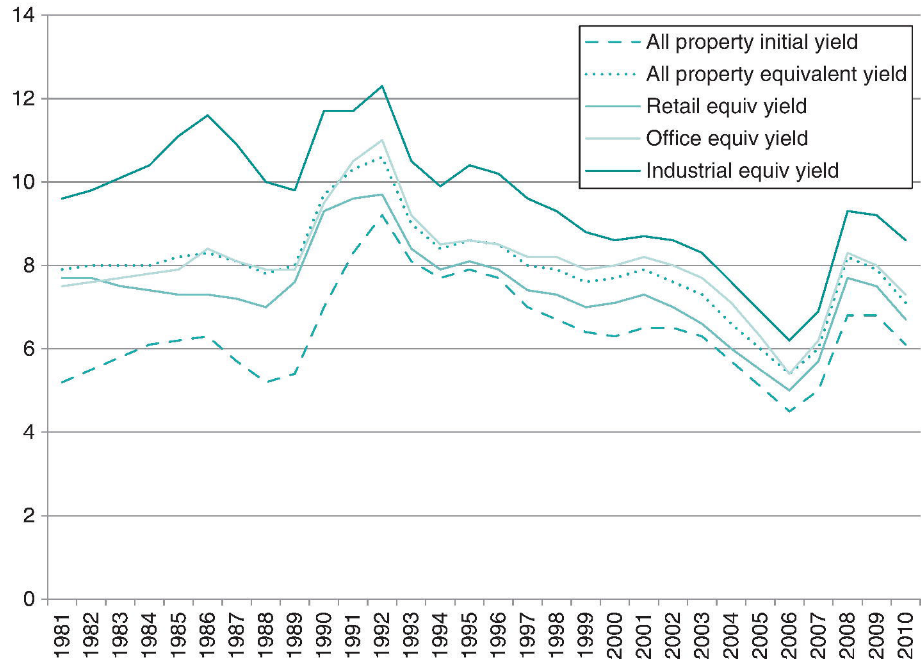

Figure 4.2 Yields from the main property market sectors (produced using data from IPD UK Digest).

return expected from an investment may be made up of three economic variables. First, the prevailing market rate of interest, as this determines the cost of acquiring the capital to invest and sets a minimum level of return that could be obtained if we simply put the funds into a savings account – a measure of opportunity cost or loss of **liquidity**. Second, the anticipated rate of inflation; if inflation is expected to rise then the target rate should increase to compensate. Third, a risk premium could be added to compensate for the chance of incurring a financial loss and the uncertainty surrounding expected future benefits. Investors expect a reward for taking risk; the greater the perceived risk the greater the return necessary to attract investment. Risk may be categorised as market risk or as property risk. Market risk refers to events that might affect the return on all property investments such as shifts in supply and demand, unexpected inflation, availability and cost of equity and debt finance, liquidity problems and returns available from other types of investment. Property risk might be added to reflect specific risks associated with the type of tenant (breaches of lease terms for example), the sector (industrial more risky than retail for example), the location and physical condition of the property and how this might impact on depreciation of capital and rental value and management costs. The amount added to the discount rate as **risk premium** will vary for each investor and investment and each type of risk can influence separately or in combination so things can get pretty complicated. It is important to keep sight of the fact that a *market* value is being estimated so factors considered to be more investor-orientated than market-orientated should be considered in an appraisal context rather than a market valuation (see Chapter 19).

Obtaining rates to reflect these three components of total return allowed Fisher (1930) to construct an equation so that the nominal target rate of return *r* required by an investor may be expressed as:

$$r = (1+i)(1+\Delta)(1+RP) - 1 \quad [4.32]$$

Where *i* is the prevailing interest rate, Δ is the rate of inflation and *RP* is the risk premium.

Government bonds are regarded as a risk-free investment (except for the risk of *un*expected inflation) so investors expect a return that adequately compensates them in terms of opportunity cost of capital and expected inflation. The rate of return that investors expect from government bonds provides a useful combined measure of *i* and Δ. The rate of return (or gross redemption yield) on short and medium-dated government bonds is used as a benchmark risk-free rate on which to build target rates of return for other types of investment. Property investments tend to be held for periods of five to seven years so it may be more appropriate to consider using medium-term gilt yields. Mathematically the risk-free rate, *RFR*, required from government bonds may be expressed as:

$$RFR = (1+i)(1+\Delta) - 1 \quad [4.33]$$

So the *RFR* can now be inserted into Equation 4.32 as follows:

$$r = (1+RFR)(1+RP) - 1 \quad [4.34]$$

And, as Baum and Crosby (1995) note, an approximation of this is given by:

$$r = RFR + RP \quad [4.35]$$

Often an investor's choice of target rate of return will be affected by the actual returns that have been achieved within the sector or as revealed in indices such as the Investment Property Databank (IPD) index. The important point to remember is that if the target rate is set too high good investments will be rejected, if it is set too low uneconomic investments will be accepted.

4.3.3 Yields and rates of return

Gordon (1958) argued that the initial yield *y* from an investment can be related to the target rate of return *r* in terms of the growth in net income which is anticipated:

$$y = r - g \quad [4.36]$$

So, combining Fisher and Gordon, i.e. Equations 4.35 and 4.36:

$$y = RFR + RP - g \quad [4.37]$$

Ball et al. (1998) extend this model to include an annual rate of property depreciation *d*:

$$y = RFR + RP - g + d \quad [4.38]$$

Where *g* is the expected average annual income growth in perpetuity and *d* is the expected average annual depreciation rate in perpetuity. So, for example, if:

RFR	=4% (conventional fixed interest i.e. nominal gilts)
RP	=3%
g	=2%
d	=1%
y	=6%

So *y* can be determined using valuation rules to adjust market-derived initial yields to an ARY as described in the 'yields' section above or by applying financial economic principles to derive a TRR based on bond rates plus a risk premium less growth. Although the construction of a target rate can be helpful in understanding these components it should not be considered as a replacement means of developing a market discount rate for use in valuation. Analysis of yields obtained from comparable investments is the best way to estimate a market discount rate for a particular property investment but deriving a target rate of return from financial economic principles as an aid to valuation has many merits in certain situations.

Key points

- Commercial property ownership and occupation are often separate interests and the capital amount paid for a property is therefore a function of its income-producing potential.
- Even when occupiers buy property for their own occupation they must consider the opportunity cost of the capital and the financial return the asset may produce.
- The inverse of the yield is known as the years purchase; a multiplier used to compare different investments by stating how many years need to pass until the income received equals the capital value.
- Valuation is the estimation of the future financial benefits derived from the ownership expressed in terms of their present value.

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Part B
Valuation Methods

Part B

There are three internationally recognised methods of property valuation and they are all based on the principle of comparison. The methods are sales comparison, income capitalisation and replacement cost. Using the sales comparison method the valuer examines the sales of comparable properties and uses this market intelligence to help estimate a value. Income capitalisation considers the net income that a property might generate, typically in the form of rent, and this income is capitalised using an appropriate yield or by discounting the projected cash-flow at a suitable target rate of return. Both the rent and yield will be estimated using comparable evidence. The replacement cost method considers the possibility that, as a substitute for the purchase of a given property, one could construct another property that is either a replica of the original or could offer comparable utility. In practice the approach also involves an estimate of depreciation for older or less functional properties where the estimated cost of a new replacement is likely to exceed the price that would (hypothetically) be paid for the subject property (IVSC, 2005). Building costs, depreciation rates and land values are all estimated by referring to comparable evidence.

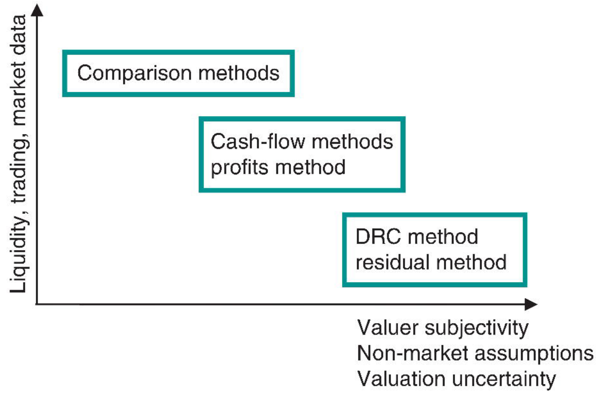

Figure B1 A classification of valuation methods.

In the UK these three internationally recognised methods are supplemented by two further methods; the profits method and the residual method but, again, in applying all these methods the principle of comparison is fundamental. The profits method is used to value specialised properties that are usually sold as operational entities such as pubs, clubs, hotels and petrol stations. With non-specialised property (shops, offices, factories, warehouses, etc.) there is normally sufficient trading activity and homogeneity of asset within each market sector to observe price levels without having to interpret underlying economic fundamentals of the business – price is determined by comparison. Specialised properties on the other hand are more heterogeneous and there are fewer transactions to call upon for comparison, so use of the comparison method is more difficult. Consequently the valuer needs to employ a method that addresses the underlying fundamentals of that property so that its value can be determined by reference to its revenue and costs. In the absence of sufficient trading activity and in circumstances where it is not possible to determine the financial contribution that the property makes to the business, the replacement cost will become the principal form of valuation for specialised properties. The residual method is used to value land for development purposes and usually takes the form of a valuation of the completed development using the income capitalisation method from which all costs of the development are then deducted, leaving a residual land value. The method is a bit like an investment valuation and replacement (development in this case) cost valuation rolled into one.

The choice of method depends on the purpose of the valuation and the type of property that is to be valued. McAllister and Loizou (2007) suggest a two-way classification of these valuation methods based on the level of trading activity in the market for the property being valued and the amount of assumptions that need to be made by the valuer when estimating value. This is shown in Figure B1 below.

Chapter 5
Comparison Method

5.1 Introduction

The principle of comparison is based on the economic concept of substitution, that a knowledgeable and prudent person would not pay more for a property than the cost of acquiring an equally satisfactory substitute. This implies that, within a suitable time-frame, the values of properties that are considered to be close substitutes in terms of location, utility and desirability will tend to be similar and the lowest price of the best alternative tends to establish market value. The principle of comparison underpins all valuation methods but it is also a valuation method in its own right. A property may be valued by comparing it to similar properties for which recent price information is available. Comparable properties are selected on the basis of their **elements of comparison** which include the key transaction information such as the date, price paid, market rent and yield, as well as the determinants of value that were described in Chapter 3 such as size, location, use, age, condition and tenure. Value-significant differences between each comparable and the subject property must be reconciled before price information from the former provide reliable evidence of the value of the latter. This reconciliation can be undertaken qualitatively by the valuer, who would have experience and knowledge of the local market, or a quantitative technique can be used to weight comparable properties, isolate differences in the elements, quantify these differences and adjust the values accordingly. Typically, a combination of qualitative and quantitative approaches would be employed. Procedurally, the comparison method involves the following steps:

- Collect evidence of transactions and eliminate those not conducted at **arm's length** (between parent and subsidiary companies for example).
- Determine which transactions are suitable for adjustment having regard to their comparability with the subject property. The geographic extent from

Property Valuation, Second Edition. Peter Wyatt.

which comparables can be selected depends on the type of property and the state of the market. Comparables yet to transact or beyond a suitable time-frame should be given less weight.
- Select the elements of comparison.
- Compare the transactions on the basis of these elements and make adjustments where necessary.
- Reconcile comparison elements to provide an indication of value for the subject property (taking care to ensure that any adjustments made to the comparable evidence reflect the likely reactions of market participants).

The comparison method is predicated on comprehensive and up-to-date records of transactions and is therefore a reliable method in an active market where recent evidence is available. The method's reliability is limited when market conditions are volatile or when valuing specialised properties with less market evidence. The prices paid by owner-occupiers of commercial property will provide evidence of the capital value of freehold or long-leasehold interests and, if a sufficient quantity of such capital transactions can be obtained, this would be good comparable evidence of capital values. Purchasers of property investments usually concentrate on the property's income-producing characteristics. Therefore, rental value and yield comparisons are essential for valuing commercial property investments. The comparison method is also used to help value specialised trading property and is useful for valuing auxiliary facilities such as car parking spaces and land uses that are ancillary to the main business accommodation such as storage land.

5.2 Sources of data

Sources of data include databases of surveying firms, data publishers and the government. Surveying firms or property consultants in the UK typically offer consultancy and agency services and the latter can provide an up-to-date and readily available source of transaction information for valuers working in the same firm. Moreover, valuers and their agency colleagues tend to share transaction information on an informal basis and this provides a great deal of market knowledge on which to base valuation assumptions. Much of this information is not released into the public domain at the transaction level by the surveying firms themselves: instead they prefer to release aggregate information, usually on a quarterly, biannual or annual basis. Typically the sort of information that is published includes supply, demand and resultant take-up figures, yields and rents across the main urban areas. There is no single definitive source and firms often publish information relating to specific sectors of the markets such as big warehouse space or out-of-town retailing. Some of the larger surveying firms with offices in many countries publish international data. Table 5.1 summarises the main sources of UK commercial property market information.

Although surveying firms do not publish individual transaction details, publishers and specialist data providers such as *Estates Gazette* (a weekly property magazine) and CoStar (an online information provider) do compile details of individual market transactions. Unfortunately some of the detail required for valuation purposes is missing and it is nearly always necessary to contact the

Table 5.1 Key real estate data sources.

Source	Title	Update frequency
Indices and time series		
Investment Property	Index	Annual, quarterly, monthly
Databank (IPD)	Property Investors Digest	Annual
	Local Markets	Annual
CBRE	Rent & Yield Monitor	Quarterly
Jones Lang Lasalle	UK Property Index	Quarterly
Market brokerage and transactions		
CoStar (Focus)	Deals	Continuous
	Availability	Continuous
Estates Gazette Interactive	Deals	Continuous
(EGi)	Availability	Continuous
Useful Reports		
Strutt & Parker / IPD	Lease Events Review	Annual
Valuation Office Agency	Property Market Report	Annual
De Montfort University	UK Commercial Property Lending Market	Annual
DTZ	Money Into Property	Annual
Cushman & Wakefield	Marketbeat	Quarterly
Gerald Eve	Invbrief	Quarterly
British Property Education / IPD	Annual lease Review	Annual
Forecasts		
Investment Property Form	UK Consensus Forecasts: Summary Report	Quarterly

agent(s) involved in the transaction to request more detailed information. Some surveyors specialise in auctioning commercial property and transaction results from auctions can provide very useful information on, typically, secondary property, as it is this type of property that tends to be sold at auction.

So far transaction information has been discussed in a rather general way but commercial property transactions can take several forms; they can be freehold sales (which reveal evidence of capital values and yields) or new lettings (which reveal evidence of rental values). And there are other types of transaction that can be used to provide evidence of market rents. These include renewals of existing leases, rent review settlements, assignments, arbitration awards, sale and leasebacks. Sayce et al. (2006) provide a useful ranking of the usefulness of these sources of comparable evidence for valuation purposes: the best evidence is obtained from open market lettings that are conducted at arm's length, then lease renewals (from which the tenant can walk away although the significant costs in doing so should be borne in mind), and then rent reviews (where both parties have contractual obligations under the lease). If the comparable is a lease renewal this is usually negotiated by professionals and agreed on similar terms to the previous lease but it is important to note whether the value of any improvements that the tenant may have made to the property was disregarded when setting the level of rent under the new lease. Under legislation which we will discuss in more detail later, the value of a tenant's improvements may be disregarded for certain valuations. The rent agreed at review will reflect the terms of the rent review clause in the lease and it is important to consider these terms in detail. Chief concerns are:

- The timescale for operation of the rent review and the precise terms on which it should take place, including the interval between each review (the rent review period).
- Whether the review of the rent is upward-only.
- Whether there is an assumption that the property is vacant and to let for the purposes of determining the rent.
- Assumptions regarding the user clause (a lease term that may restrict the use of the premises).
- Assignment and sub-letting (**alienation**) provisions.
- Whether the value of tenant's improvements should be disregarded.

The rent review clause in the lease will also state how disputes over the amount of reviewed rent should be resolved. Sub-lettings are secondary evidence as they are usually contracted out and affected by amount of head rent and other terms in the head-lease. Assignments, where the current tenant sells (assigns) the lease to a new tenant, do not involve a reassessment of the rent passing (contract rent) but may involve a premium if there is a profit rent or a reverse premium if the property is over-rented. As a consequence they are regarded as secondary evidence of market rents. If a rent at lease renewal or at a rent review cannot be agreed by the two parties and is determined by a third party then this provides relatively weak evidence of market rent. At arbitration the arbitrator must weigh up the evidence supplied by expert advisors who are appointed by the parties to the dispute. Contrastingly if an independent expert is called in to resolve the dispute more reliance may be placed on the judgement. Disputes that end up in a law court often do so in order to resolve a legal matter or require an interpretation of a point of law and are far removed from the open market.

5.3 Comparison metrics

Suitable comparison metrics are required to assist the comparison process by eliminating the need to make adjustments for size differences, although only comparable properties within a similar size range should be selected. For commercial properties that are let, rents are expressed as an annual figure per square metre (except for standard shop units where a measurement unit based on the zoning procedure described earlier is used). Consider the following example; an industrial property with a gross internal area of 325 square metres needs to be valued. A comparable property (arm's length transaction, similar age, condition, location, lease structure and design) has a gross internal area of 350 square metres and was recently purchased by an investor for £135,000. It was subject to a new 15 year lease with five-yearly, upward-only rent reviews at a rent of £12,200 per annum. Analysis of the comparable property reveals that the rent paid was equivalent to £34.86 per square metre and the initial yield on the investment purchase was 9%. This information can be used to estimate the rental value of the subject property as follows:

Area (m^2)	325	
x Rent (£/m^2)	34.86	
Estimated Rental Value (£)		11,330

Car-parking spaces may either be separately valued on a unit rent per space basis or, more usually, their value will be implied in the overall rent per square metre that is applied to the main floor-space.

Another example of how the comparison method can be applied to more unusual property is taken from Hayward (2009). In estimating the rental value of a car showroom and ancillary accommodation Hayward suggests that there is a relationship between showroom rents and rents in off-centre retail areas; typically the rent on ancillary office space is a half to two thirds of the rent for showroom space. The rental value of workshop space would be comparable to rents for workshops in the area and the annual rental value of one car stance should approximately relate to the average retained profit on one vehicle. The rental valuation might be set out as follows:

	Area (m^2)	Rent (£/m^2)	Annual rent (£)
Showroom	300	120	36,000
Sales office	30	60	1,800
General office	100	60	6,000
Reception area	20	40	800
Workshops	600	30	18,000
Parts store	20	30	600
Mezzanine floor	50	15	+ 750
Rental value of buildings			63,950
Uncovered car stances	No. 25	400	10,000
Car-parking spaces	No. 40	100	+ 4,000
Estimated rental value (£)			77,950

5.3.1 *Relative value of retail ground floor 'zones'*

In Chapter 3 it was shown how the area of a standard shop unit is divided into zones. This is a means of placing extra weight on the rental value of space at the front of the premises. In Figure 5.1 the shop has a frontage length of seven metres and a depth of 16 metres.

The ground floor would be divided into zones as follows:

Zone	Frontage length (m)	Depth (m)	Actual Area (m^2)	Area ITZA (m^2)
A	7.00	6.10	42.7	42.70
B	7.00	6.10	42.7	42.7 ÷ 2=21.35
C	7.00	4.00	28.0	28.0 ÷ 4= 7.00
			113.4	71.05

To weight the space at the front of the shop more highly, the area of zone A is kept the same but the area of each subsequent zone is 'halved back'. This process derives an area 'in terms of zone A space' or **ITZA** for short. Looking at the

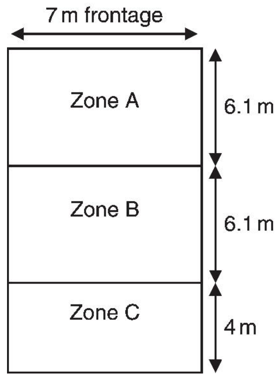

Figure 5.1 Zoning a shop.

example above the area ITZA for zone A is the actual area, the area of zone B is halved and the area of zone C is halved again (i.e. quartered). Any remaining space beyond zone C might be halved again (i.e. divided by eight) but the magnitude of this fraction may vary depending on any special features of the remaining area. The calculation of an area ITZA allows a 'zone A' rent per square metre to be a standard metric for comparison purposes that can be multiplied by the area ITZA to calculate the annual rent for a shop. If we consider the example above to be a useful comparable and we discover that the market rent is £40,000 per annum, this equates to £563 for each square metre of shop space when it is expressed ITZA. If we zone the property that is being valued this zone A rent per square metre can be used to estimate a market rent. Sales space on floors other than the ground floor is considered to be less valuable and is expressed as a small fraction of the area ITZA, perhaps a sixth or a tenth. There is not much demand for sales space above first floor level in a standard shop unit but the value applied will depend upon the ease with which the other floors can be reached by customers (facilitated, perhaps, by escalators and lifts or stairs at the front of the shop) and the ease with which goods can be transported to these floors. Ancillary space such as storage is even less valuable and may be expressed as a smaller fraction of the area ITZA or as a nominal rent per square metre. Office space that is ancillary to the sales area may also be expressed as a fraction of the area ITZA or may be related to rents for similar office space in the locality.

Looking back to the example in Figure 3.3, using the halving back technique the area ITZA of shop 1 is 105 m^2 and shop 2 is 144 m^2. Whatever zone A rent is applied the zoning method values shop 2 more highly due to its wider frontage and consequent larger Zone A. Of course, not all shops are 'standard'. A typical frontage-to-depth ratio is 1:2.5 or 1:3; shop 1 in Figure 5.2. Shops with a much higher ratio, shop 2 for instance, may warrant a reduction to the valuation because, although the zone A space gives display prominence, there is relatively limited space for the retailer to stock goods for sale. Similar adjustments may be made if the shop is an unusual shape such as shop 3 which has a masked area towards the rear of the premises (a masked area is an area made less prominent by, say, an L-shaped layout or features such as split levels or pillars getting in the way of displays). If the shop has a return frontage (where a shop is positioned on a corner and fronts two roads or pedestrian flows, shop 3) it is usual to either zone from both frontages if both

Figure 5.2 Shop shapes.

provide good pedestrian flow, or zone from the prominent frontage and make an end allowance (say a 5% to 15% addition to the zone A rent) if warranted, bearing in mind that an excessive return can adversely affect the layout of sales space. The size of the end allowance will depend on the nature of the return frontage; is it a back street, can the property be accessed from it, what is the security like? Some shops, in a shopping centre for example, may have frontages on two floors. The valuation below is an example of a shop with complex floor areas and illustrates how this might be handled when estimating a rental value. The valuation may be subject to end allowances including deductions for abnormal size.

Floor	Description	NIA (m^2)	Area ITZA (A) (halving back NIA) (m^2)	Zone A rent (£/m^2)	Rent (Area ITZA * Zone A rent/m^2) (£)
Ground floor	Zone A	30	30 (A)		
	Zone B	30	15 (A/2)		
	Zone C	30	7.5 (A/4)		
	Remainder	20	2.5 (A/8)		
	Masked area	4	0.5 (A/8)		
	Total area ITZA		55.5	400	= 22,200
End adjustment	Rear access	Add 5% of ground floor rent			1,110
First floor	Sales	100	10 (A/10)		
Second floor	Office	90	6 (A/15)		
Third floor	Store	80	4 (A/20)		
Basement	Sales	80	8 (A/10)		
	Store	10	0.5 (A/20)		
	Total area ITZA		28.5	400	= 11,400
					34,710
End adjustment	No lift	Deduct 10% of total rent			(3,471)
Estimated rental value					**31,239**

Because shoppers appreciate the convenience of a well laid out and easily accessible shopping area, the rents that retailers are prepared to pay decline quite rapidly with increasing distance from the prime (most accessible) shopping location in an urban area. In valuation terms the prime location is often referred to as the 100% prime position and zone A rents of neighbouring shops may be related to this position by expressing them as a percentage of 'retail prime'.

Finally, with regard to shops, many are let as 'shells'. In other words their internal fittings are excluded and the landlord often grants a short (say, three-month) rent-free period to enable the incoming tenant to fit out the shop. Care must be taken to ensure that any measurements taken when the property was a shell are suitably adjusted or re-measured when calculating the net internal area for valuation purposes. Furthermore, when selecting comparables it is important to ensure these fit-out periods are not confused with longer rent-free periods that may be granted as an incentive to take occupation.

Certain types of leisure property, which are normally valued with regard to their trading potential, may be compared using specific units of comparison too. For example, if sufficient comparable evidence is available, a capital or rental value per hotel room (inclusive of dining and conference facilities), per cinema seat, per tent or caravan pitch might be determined. Similarly, it might be possible to estimate a price per square metre or hectare for development land if a sufficient quantity of land sales has taken place.

5.4 Comparison adjustment

Because each property is unique adjustments need to be made to allow comparison to take place. Chapter 3 set out the determinants of property value; location, physical attributes such as size, layout and configuration, quality and condition of accommodation and legal factors such as ownership type and lease terms. These elements of comparison need to be quantified, adjusted and reconciled in the comparison method of valuation. Crosby et al. (1992) is the seminal UK paper that examined in detail how this adjustment and reconciliation process was conducted for retail property, and a more recent analysis of the drivers of shopping centre rents can be found in Yuo et al. (2011).

A quantitative approach would be to compare two or more transactions in order to derive the size of the adjustment for a single value factor. Ideally, two sales will be identical apart from the characteristic being measured but this is rare and usually a series of 'paired' comparisons are made to isolate the effect of a single factor. Each comparable may be weighted depending on the number of adjustments applied, the total adjustment in absolute terms, the difference between positive and negative adjustments, any large adjustments made or any other factors that suggest more or less weight should be applied. Mathematically, the adjustment process is presented in Table 5.2 for establishing market rent but the process would be the same for estimating a capital value or an all-risks yield.

When analysing rents that have been agreed on comparable properties it is important to consider the contractual terms contained in the lease. These might include: payment of a premium, grant of a financial incentive to sign the lease, nature of the user clause, how the contractual rent might be periodically

Table 5.2 Adjustments to elements using the comparison method of valuation.

	Comparable A	Comparable B	Comparable C	Comparable N
Rent / m2:	£R_a	£R_b	£R_c	£R_n
Elements:				
– Location	£(+/–)	£(+/–)	£(+/–)	£(+/–)
– Physical description	£(+/–)	£(+/–)	£(+/–)	£(+/–)
– Sale date	£(+/–)	£(+/–)	£(+/–)	£(+/–)
– Sale conditions	£(+/–)	£(+/–)	£(+/–)	£(+/–)
– Lease terms	£(+/–)	£(+/–)	£(+/–)	£(+/–)
– etc.	£(+/–)	£(+/–)	£(+/–)	£(+/–)
Net adjustment:	£$(+/-)_a$	£$(+/-)_b$	£$(+/-)_c$	£$(+/-)_c$
Adjusted rent / m²	**£R_a+£$(+/-)_a$**	**£R_b+£$(+/-)_b$**	**£R_c+£$(+/-)_c$**	**£R_n+£$(+/-)_n$**

reassessed, and provision for renewal of the lease. The details of these terms will be expanded upon in later; for the time being it is important to note that the comparison method is a means of reflecting the value implications of these terms in a valuation.

In a landlord / tenant relationship it is usually the tenant who is responsible for all repairs (internal and external) and insurance costs and a lease that places financial responsibility for these costs on the tenant is known as a **full repairing and insuring** (FRI) lease. This reflects the relatively strong bargaining position that landlords have had in the past. Recently, the bargaining positions of both parties have become more balanced but there is no evidence to suggest that tenants have been able to pass on repair liabilities to landlords in great numbers. If the tenant occupies part of a property, perhaps sharing common parts (such as the reception, car park, lifts and corridor space) with other tenants, the cost of repairs and insurance is usually apportioned between the tenants in the form of a service charge. The apportionment may be calculated in various ways but is typically related to the floor-space occupied or rent paid by each tenant.

The aim of the comparison adjustment process is to derive an **effective net rent** for each comparable after all these adjustments have been made. The effective rent is the contract rent plus the annual equivalent of capital expenditure on alterations or improvements, less the annual equivalent value of any rent-free period or other contributions to expenditure by the landlord. The way in which some of these elements of comparison are translated to an annual equivalent sum is described later. For now, consider an example of how differences in repair and insurance lease terms might be reflected. As stated above most leases require the tenant to take responsibility for internal and external repairs and insurance of the property for the duration of the lease. However, if the lease requires the landlord to take financial responsibility for these costs then adjustments should be made to the gross rent to arrive at an effective net rent as follows:

- Repairs: reduction of typically 15% of the gross rent (10% for external repairs, 5% for internal repairs).
- Insurance: reduction of say 2.5% of the gross rent.
- Management: reduction of say 10% of the gross rent.

For example, a first floor office suite of 1,000 square metres has just been let at £150,000 per annum. The landlord is liable for maintaining the structure and common parts and for insuring the building. A service charge covers the cost of heating and lighting. The net rent to the landlord might be calculated as follows.

Annual rent (£)	150,000	
Area (m^2)	÷ 1,000	
Rent per square metre (£/m^2)		150.00
Less adjustments for:		
▪ External repairs at, say, 10% of the gross rent	– 15.00	
▪ Internal repairs of common parts, say 2.5%	– 3.75	
▪ Insurance at 2.5%	– 3.75	
▪ Management at 5%	– 7.50	
Making a total deduction of 20% of gross rent		– 30.00
Effective net rent per square metre (£/m^2)		120.00

The deductions in the example above were estimated as a percentage of the gross rent but could equally be estimated annual amounts.

In case of properties subject to ground leases, the ground rent should be deducted when valuing the head-lease. For example, a property is subject to a head-lease at a fixed base ground rent of £10,000 per annum plus 2% of any sub-rent. The property is sublet at a rent of £400,000 per annum. The head-lessee must pay the freeholder non-recoverable costs of £500 per annum plus 5% of the sub-rent. The head-rent that the freeholder receives is:

$$\pounds 10{,}000 + (\pounds 400{,}000 \times 2\%) = \pounds 18{,}000 \text{ per annum}$$

The net rent that the head-lessee receives is calculated as follows:

$$\pounds 400{,}000 - \pounds 18{,}000 - (\pounds 500 + \pounds 20{,}000) = \pounds 361{,}500 \text{ per annum}$$

In the absence of sufficient data to allow a quantitative approach comparison elements may be expressed in qualitative terms such as ‘inferior’ or ‘superior’. Reconciliation involves consideration of the strengths and weaknesses of each element. The valuer uses judgement to determine the direction and magnitude of the effect that each element has on value and assesses its relative importance. When this has been done for each factor and for every comparable the net adjustment for each is resolved. A qualitative approach is popular because it reflects the imperfect nature of the property market but it is usual to combine quantitative and qualitative approaches when using the comparison method. Table 5.3 provides an example of how this might be done when estimating a market rent. The inclusion of net internal area (NIA) helps determine comparability in terms of size so it is best not to calculate market rent per square metre straight away. Comparables A and D appear to be very strong and should probably attract the greatest weight when reconciling these comparables to derive an estimate of market rent for the subject property.

Wiltshaw (1991) argues that the comparison method is statistically flawed, primarily because of the small number of comparable transactions used in many

Table 5.3 Comparison valuation using quantitative and qualitative approaches.

	Comp A	Comp B	Comp C	Comp D	Comp E	Subject Property
Market Rent (£)	£67,000	£75,000	£66,000	£80,000	£83,200	–
Elements:						
• NIA (m^2)	100	90	95	115	130	125
• MR/m^2	£670	£830	£694	£609	£640	
• Management costs	–	–5%	–5%	–	–5%	
• Repair liability	–	–5%	–10%	–	–5%	
• Insurance liability	–	–2.5%	–	–	–2.5%	
• Age allowance	+5%	–5%	–	–	–5%	
Net quantitative adjustment to market rent (MR)/m^2	+5%	–17.5%	–15%	–	–17.5%	
Adjusted MR/m^2	£704	£685	£590	£696	£528	
• Condition	Ave	Ave	Ave	Ave	Ave	Ave
• Ratio of parking space to NIA	Ave	Ave	Ave	Poor	Good	Good
• Location	Superior	Inferior	Ave	Superior	Inferior	Superior
Net qualitative adjustment	**–ve**	**+ve**	**–ve**	**–ve**	**+ve**	**–**

valuations and, as the number of comparables decreases relative to the number of comparison elements to be adjusted, it increases the likelihood of statistical insignificance. Nevertheless, the principle of comparison is central to property valuation. If sufficient transaction data were available it would be possible to use multiple regression analysis but this is rare in practice, although automated valuation techniques using such techniques are increasingly being used for mass appraisal of residential property.

In addition to rent, it is quite normal for tenants to pay a service charge to the landlord, particularly if the premises are part of a multi-let building, in a managed shopping centre or situated on an industrial estate for example. The service charge typically covers expenditure on repair and maintenance of the building, maintenance of the estate, plant and machinery and the provision of services such as security, reception facilities and so on. The extent of landlord's obligations for provision of works and services is dependent upon the wording of the lease and it should be noted that the charge is a reimbursement, not a profit stream. The service charge should cover:

- Running costs: temperature, ventilation, lighting, lifts, cleaning, security, reception, etc.
- Maintenance, repair and replacement: boilers and lifts, car park, etc.
- Management and professional fees.

If these costs are to be apportioned between tenants this may be done as fixed amounts or percentages, weighted by rent or floor area. Payment, like rent, is quarterly in advance and increases in the charge are negotiated and stated in the lease, typically linked to inflation or pre-determined percentage increases.

Key points

- The comparison method utilises transaction data generated by the market and is based on a rational approach that compares characteristics and adjusts for any differences. The approach is less reliable when data are scarce.
- Complex income producing properties are harder to analyse due to the possible existence of special circumstances. For example, a landlord may accept a lower rent from a tenant who renews a lease and incentives offered by the landlord such as a rent-free period and incentives offered by tenants such as a premium must be handled carefully to ensure a rational and defensible adjustment is made. Other dangers include transactions that are not at arm's length.
- The principle of comparison is fundamental to all methods used to value commercial properties: estimates of market rents, yields, expenses, land values, construction costs and depreciation may be derived using comparison techniques.

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Part B

Chapter 6
Investment Method

6.1 Introduction

The investment method is used to value properties held as investments. The owner of an investment property passes occupation rights to a tenant by way of a lease. The tenant pays rent to the owner (landlord) and the level of rent is determined by the supply of and demand for that type of property in the occupier market. To the landlord the rent represents the income return on the investment so its ability to keep pace with or exceed the rate of inflation is critical to its investment value. Mathematically the rent is simply a cash-flow and therefore the investment value of the property may be determined by calculating its capitalised present value. Alfred Marshall was the first to expound methods of capitalizing urban rental income as a means of pricing property investments. He focused on the scenario whereby landowners let sites on long ground leases, for 99 years say, and stated that the

> capitalized value of any plot of land is the actuarial 'discounted' value of all the net incomes which it is likely to afford, allowance being made on the one hand for all incidental expenses, including those of collecting the rents, and on the other for its mineral wealth, its capabilities of development for any kind of business, and its advantages, material, social and æsthetic, for the purposes of residence (Marshall, 1920: Book Five, Chapter 11).

Property investments may be freehold or leasehold but the overwhelming majority are freehold because of their greater potential for income and capital growth and their lower risk profile. Lean and Goodall (1966) and Fraser (1993) both provide excellent summaries of the investment characteristics of the main types of freehold property investment. A freehold in possession (the interest of an owner-occupier where there are no sub-interests) is a pure equity interest which affords the owner a perpetual right to the full benefits of the property. For a business this is the right

Property Valuation, Second Edition. Peter Wyatt.

to the profit obtainable from undertaking business activity on the premises without the liability to pay rent. The notional annual return from this interest, known as the **imputed rent**, is the market rent of the property. For a freehold acquired as an investment (where the property is let) the equity extent of the freehold depends on the lease terms and, in particular, the frequency with which the rent is reviewed to market rent. For example, a long lease without review is a fixed income investment whereas an annually reviewed turnover rent is an equity investment. The market norm is a review of rent every five years, usually upward-only. This offers a significant degree of income security which is being eroded as leases become shorter and break options more frequent. A fixed income freehold property investment (where the property is let on a long lease at a fixed rent) is often referred to as **freehold ground rent** and is less common nowadays. They were common until the 1960s and typically took the form of a lease of a development site for a term ranging from 99 to 999 years at a very low rent with no provision to revise the rent during the lease. Such investments tend to have higher yields than equity investments due to their lack of growth potential. Their yields are similar to yields on undated bonds but somewhat above to reflect their comparative illiquidity. As the end of a freehold ground lease approaches the yield falls in anticipation of reversionary value. When the value of the freehold ground rent for the remaining term plus the value of the reversion exceed the value of the freehold ground rent in perpetuity, the reversion is affecting value. From this point the investment will exhibit equity investment characteristics because the reversionary market rent can be affected by rental growth prospects and the like. In more recent years rent review clauses have been introduced into freehold ground rents and these introduce a further equity element. Most business properties are let on leases with five-year reviews and are effectively equity investments whose investment characteristics are broadly similar to shares albeit with a stepped (five-yearly) income growth pattern. Both are growth investments which are influenced by the profitability of underlying business, although property investment return is more dependent upon the use to which the property is put rather than the specific trade of the occupier.

The actual rent specified in the lease and currently paid is known as the rent passing or **contract rent** and the rent that a property would normally command in the open market as indicated by rents paid for comparable space near to the valuation date is known as the **market rent**. Whether a contract rent or estimated market rent, the valuer must determine the net income (receivable after deductions for any repairs, insurance, services, rates, head rents and other rent charges) and the period for which it will be received. The investment cash-flow is usually in the form of rental income for freehold and leasehold interests plus a reversionary capital value in the case of freeholds.

The calculation of the present value of the cash-flow is often referred to as capitalisation and, because rent is a regular income return, it involves the use of *Present Value of £1* pa formula described in Chapter 4. There are two approaches to estimating the present value of a property investment: income capitalisation using an all-risks yield (ARY) and discounted cash-flow (DCF) using a **target rate of return** or **discount rate**. Both calculate the present value of future economic benefits; the former is merely a simplification of the latter.

Income capitalisation simply involves capitalising the net income at an appropriate all-risks yield derived from comparable evidence of similar investment transactions. Any future growth in economic benefits (either rental income or capital value) is accounted for in (implied by) the choice of yield. The approach is therefore 'growth-implicit' in that it does not explicitly project the cash-flow beyond current contract rent or estimate of market rent. This approach contrasts with techniques used in other investment markets where discount rates and income growth expectations are estimated separately and links to other financial markets and to the wider economy were more explicitly considered.

DCF, on the other hand, requires an explicit forecast of the cash-flow over a pre-defined time horizon. The cash-flow may consist of a rental income plus a reversion or resale value and is discounted at a target rate of return or discount rate. It is important to note that, despite criticism that income capitalisation tends to be backward-looking because of its reliance on historical comparable evidence (see Ball et al., 1998 for example), the approach still involves forecasting – it is just that future expectations are encapsulated in the yield choice. Indeed, it can be argued that, since the choice of ARY is based on information obtained directly from the market, it is a more reliable investment valuation method – a market valuation should be based on market-derived data. Consequently income capitalisation is widely used to value properties with stable, fairly predictable income flows and with ample comparable evidence to hand. Difficulties arise when properties differ markedly from one another particularly in terms of lease structures.

6.2 All-risks yield (ARY) methods

In income capitalisation the relationship between the price and rent paid on a comparable property is expressed as a yield. Valuers analyse the current and anticipated supply and demand for properties similar to the one being valued, analyse rents and prices of comparable investment transactions, calculate their yields, derive a suitable all-risks yield (ARY) for the subject property and use it to capitalise its actual or estimated rent. Income capitalisation therefore has comparison at its heart and does not attempt to analyse the worth of a property investment from first principles. An investor may be willing to pay more than market value if the property satisfies requirements specific to that investor (a gap in an investment portfolio for example) but if this sort of decision-making is not reflected in the market then it should not influence an opinion of market value. Instead this is a quantification of worth to an investor, known as appraisal, and is discussed later.

Depending on the timing of the investment acquisition a freehold property investment might be **rack-rented** or **reversionary**. A rack-rented property is one which is let at the current market rent while a reversionary freehold property investment is one where the property is let below market rent but with a reversion (usually at a rent review or lease renewal) to market rent in the future. The next two sections consider the valuation of these freehold property investments in turn.

6.2.1 Valuation of rack-rented freehold property investments

For a property to be rack-rented at the valuation date it must have either been let or been subject to a lease renewal or rent review so recently that the contract rent is assumed to be the market rent. If the property is vacant at the valuation date it is common practice to assume a market rent possibly subject to a letting period or an adjustment to the yield to reflect the fact that the property is vacant. For example, value the freehold interest in a shop that was recently let at a net rent of £100,000 per annum. Analysis of recent transactions for similar premises reveals that initial yields average 8%. The net annual rent of £100,000 is receivable in perpetuity[1] and, if we assume that we need make no adjustment to the yield obtained from comparable evidence to derive an all-risks yield (ARY), we can capitalise the market rent at the ARY using Equation 4.24 from Chapter 4 (in which the ARY is represented by *y*) :

$$V = \frac{MR}{y} = \frac{£100{,}000}{0.08} = £1{,}250{,}000$$

The inverse of the ARY is a multiplier known as the years purchase (YP), so called because it represents the number of years over which the net income must be received in order to recoup the present value. Mathematically the YP is the equivalent of the *Present Value of £1 pa* and, conventionally, is multiplied by the net rent (from now on we will dispense with the word 'net') to determine the total present value or, simply, the value of the property. The valuation would therefore be set out as follows:

MR (£)	100,000	
YP in perpetuity @ 8%	12.5	
Valuation (£)		1,250,000

In practice purchase costs should be deducted from the valuation. These would comprise stamp duty at 4% for any agreed sale price over £500,000, agent's fee of around 1% of sale price, legal fees amounting to approximately 0.5% of sale price and VAT on these fees. However, because these are fairly standard deductions they are not presented in this valuation or in subsequent valuations throughout the book.

As we know from Equation 4.23 in Chapter 4 the formula above can be rearranged to derive initial yields from comparable evidence where the market rent (MR) and price paid (P) are known:

$$y = \frac{MR}{P}$$

For example, a modern factory was recently let at a rent of £150,000 per annum and the freehold has just been sold for £2,250,000, what is the initial yield from this investment?

$$y = \frac{MR}{P} = \frac{£150{,}000}{£2{,}250{,}000} = 6.67\%$$

In fact the **Initial Yield Method** is the name often given to income capitalisation for rack-rented properties. Although current market practice is to assume that the rent is received annually in arrears, as the above formula does, because rent from commercial property is usually received quarterly in advance in the UK, the true

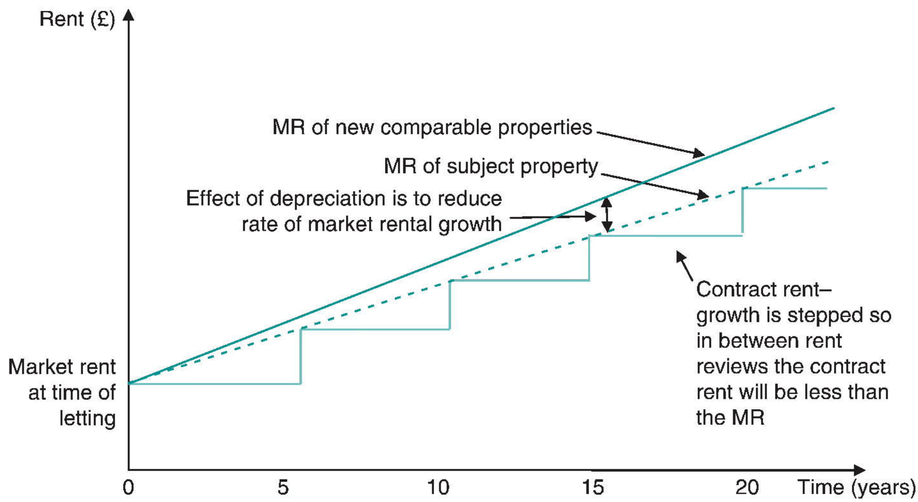

Figure 6.1 Income profile of a rack-rented property investment.

initial yield, y_q, in this example can be obtained by adjusting the yield obtained in the above equation using Equation 4.31 in Chapter 4:

$$y_q = \frac{1}{\left(1 - \frac{y_a}{4}\right)^4} - 1 = \frac{1}{\left(1 - \frac{0.0667}{4}\right)^4} - 1 = 6.96\%$$

The income profile of a typical rack-rented property investment is illustrated in Figure 6.1. At the beginning of a new lease the property is let at the market rent or, if the property is empty, an estimate of market rent is derived from comparable evidence and it is assumed that this rack rent is receivable in perpetuity. Over time the market rent of equivalent new properties will increase (the solid line) but the market rent of the subject property – which is getting older – will not keep pace (the dashed line). The actual rent received by the investor rises in steps under a typical UK lease arrangement to the market rent of the subject property every five years (the stepped solid line).

6.2.2 Valuation of reversionary freehold property investments

Often the contract rent is not the current market rent because it was agreed some time ago, usually when the lease began or at the last rent review, but sometimes because a premium was paid and the rent was reduced to reflect this. The income from a reversionary freehold comprises a contract rent secured by the lease contract and a potential uplift or reversion to a higher market rent at the next rent review or lease renewal. The value of this potential reversion should be reflected in the price the investor pays. Theoretically, according to Baum & Crosby (1995), the growth potential of reversionary investments where the term is less than the normal rent review period of five years is greater than for a rack-rented property because the first rent review will be in less than five years' time. However it is rare for reversions to be valued at a yield lower than the ARY for equivalent but rack-rented freeholds – the market tends to regard reversionary investments less favourably because the reversionary market rent is merely an estimate and so more risky. Fraser (1993) argues that, for a reversionary investment, the value impact of the reversion becomes greater as it draws nearer – immediately after a rent review the capital value growth rate tends to be less than the rental growth rate but as the reversion draws nearer it tends to exceed it. Thus investors purchasing reversionary investments anticipate three elements of return: current income, capital gain deriving from rental growth and capital gain deriving from the passage of time to reversion uplift. The latter is in effect rental growth from earlier years (not yet received because of five-year rent reviews) being stored up and released as capital gain as the reversion approaches. The arbitrage method of valuation, described later, builds on this concept.

In practice three approaches are used to value reversionary investments and they are: term and reversion, core and top-slice and equivalent yield. The first two split the rental income into two components and capitalise them at different yields and the last one capitalises the current and reversionary income components at a unified 'equivalent' yield.

a) Term and reversion

The contract rent (also known as the term rent or rent passing) is capitalised until the point at which it reverts to market rent. Then the market rent (known as the reversionary rent in this case) is capitalised in perpetuity but this capital value is deferred from now until the point at which it is received. These two capital values are then added together. This is shown diagrammatically in Figure 6.2.

Mathematically, the income streams are valued as follows:

$$V = (t \times \text{YP for term}) + (m \times \text{YP in perpetuity} \times \text{PV for term})$$

$$= \left[t \times \left(\frac{1-(1+y_t)^{-n}}{y_t}\right)\right] + \left[m \times \frac{1}{y_r} \times \frac{1}{(1+y_r)^n}\right] \quad [6.1]$$

where V = value
t = contract rent for term
YP = years purchase (*PV £1 pa*)
m = market rent
n = period to rent revision
y_t = term all-risks yield
y_r = reversion all-risks yield

For example, a factory is currently let at £250,000 per annum on a lease with four years unexpired. The market rent is £300,000 per annum and the ARY is estimated to be 9%. A valuation of the property is set out below.

Term rent (£)	250,000	
YP 4 yrs @ 8%	× 3.3121	
		828,025
Reversion to MR (£)	300,000	
YP perpetuity @ 9%	11.1111	
Deferred 4 yrs (PV £1 for 4 yrs @ 9%)	× 0.7084	
		2,361,331
Valuation (£)		3,189,356

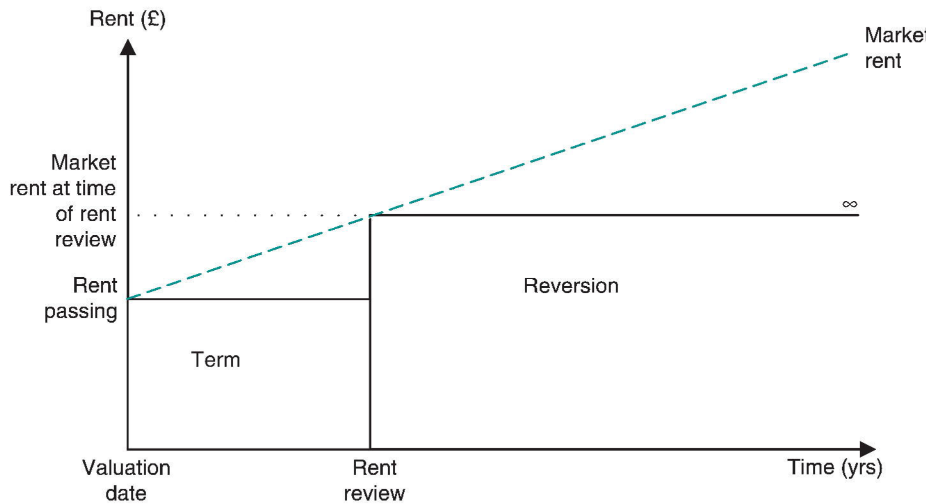

Figure 6.2 Term and reversion valuation.

The valuation figure would usually be rounded. The future reversionary rent is usually capitalised at an ARY based on evidence from rack-rented comparable properties while the term rent may be capitalised at a slightly lower yield. The conventional rationale for this adjustment is that the term rent is regarded as more secure and is normally in the region of 0.5 to 2% below the reversion yield. This logic might have been appropriate in an economy with negligible inflation and rental growth (the UK before the 1960s for example) but in a growth economy, if the rent is fixed significantly below the market rent for the length of the term, the loss in real terms can be significant. The yield used to capitalise this term income should, therefore, be more in line with yields on fixed income investments suitably adjusted for risk. In fact the fixed term income is overvalued by capitalising it at a yield that implies growth – an error that is countered by an under-valuation of the reversion because the market rent receivable on reversion is not inflated at any sort of growth rate. Greaves (1972) argued that, because the rent on reversion has growth potential it could be capitalised at a yield below that applied to the term.

A word of caution regarding the term and reversion approach: the use of variable rates can sometimes mean that a higher value is placed on the longer reversion, something that is clearly counter-intuitive. Bowcock (1983) demonstrated this by valuing two reversionary investments let at £100 per annum but one with a review to £105 in five years and the other in ten:

Property 1

Term rent (£)	100	
YP 5 years @ 9%	x 3.8897	
		388.97
Reversion to MR (£)	105	
YP perpetuity @ 10%	10	
PV £1 5 years @ 10%	x 0.6209	
		+ 651.97
Valuation (£)		1,040.93

Property 2

Term rent (£)	100	
YP 10 years @ 9%	x 6.4177	
		641.77
Reversion to MR (£)	105	
YP perpetuity @ 10%	10	
PV £1 10 years @ 10%	x 0.3855	
		+ 404.82
Valuation (£)		1046.59

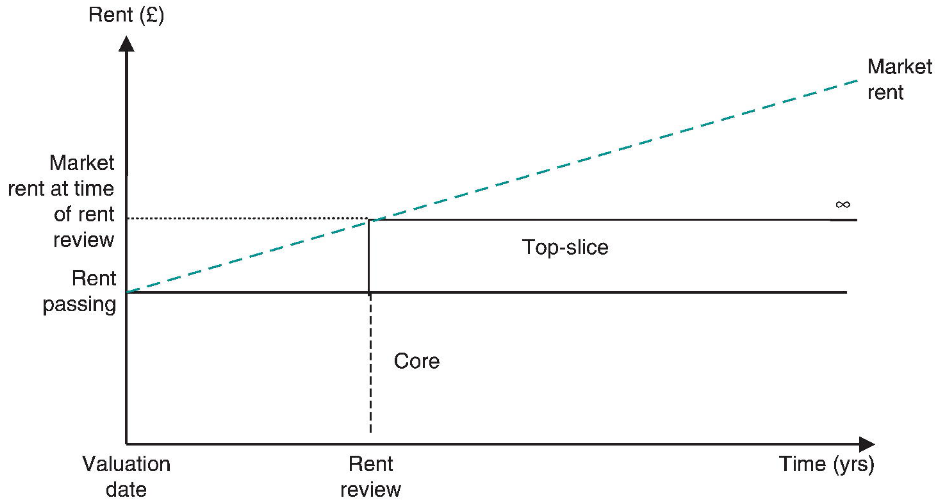

Figure 6.3 Core and top-slice valuation.

In practice valuers would adjust the yields to reflect their views of income security (quantified in terms of the difference between contract rent and market rent) and the risk associated with the period until reversion. Baum and Crosby (1995) suggest that the term and reversion approach is good for valuing properties let on long fixed terms without rent reviews prior to the final reversion, adopting a high yield on the term to reflect the fixed income, based on bond yields but adjusted to reflect additional property risk, the prospect of future reversion (with growth) and the quality of the tenant.

b) Core and top-slice

The core and top-slice or layer approach capitalises the contract rent (core or bottom slice) in perpetuity and the top-slice rent (also known as the incremental rent or uplift), which is the difference between the market rent and the contract rent, is also capitalised in perpetuity but deferred until the rent review or lease renewal. These capital values are then added together. This is shown diagrammatically in Figure 6.3.

Usually the lower risk contracted element of the rent is capitalised at an ARY based on yield evidence from comparable rack-rented property investments and the riskier, top-slice element receivable at the next rent review or lease renewal is capitalised at a higher yield. Mathematically, the valuation would be as follows:

$$V = (c \times \text{YP into perpetuity}) + ((m - c) \times \text{YP in perpetuity} \times \text{PV for term})$$

$$= \left[c \times \frac{1}{y_c}\right] + \left[(m - c) \times \frac{1}{y_t} \times \frac{1}{(1 + y_t)^n}\right] \qquad [6.2]$$

$$= \frac{c}{y_c} + \frac{m - c}{y_t (1 + y_t)^n} \qquad [6.3]$$

where c = contract (core) rent in perpetuity
y_c = core yield
y_t = top-slice yield
and the other variables are as defined for Equation [6.1] above

Using the same example:

Core: contract rent (£)	250,000	
YP in perpetuity @ 9%	× 11.11	
		2,777,500
Top-slice: uplift to MR (£)	50,000	
YP perpetuity @ 9.5%	10.0000	
Deferred 4 yrs (PV £1 for 4 yrs @ 10%)	× 0.6380	
		+ 335,789
Valuation (£)		3,113,289

As with the term rent in the term and reversion approach, the yield used to capitalise the core rent implies growth where there is none, thus overvaluing this component and the top-slice is undervalued by capitalising the current rather than projected estimate of the reversionary market rent (Greaves, 1972).

The rationale for dividing the income into these two layers is that the core rent is assumed to extend into perpetuity on the basis that there is little likelihood of the rent falling below the rent passing because of upward-only rent reviews and rental growth prospects. Whereas the top slice is more risky since it is based on an estimate of market rent and, because it is the top slice, an error in this estimate would propagate as an increased error in top slice value (Baum and Crosby, 1995). In other words the top-slice is highly geared. For example, assume a market rent estimate of £500,000 per annum was 10% over the actual market rent of £450,000 per annum. If the rent passing was £400,000 per annum the top slice would be £100,000 per annum in our original estimate but £50,000 per annum actually – an error of 50%. So the geared nature of the top-slice means that it is sensitive to error in market rent estimates but it does give valuers the opportunity to raise the top-slice yield if they believe the market rent estimate is very suspect (Baum and Crosby, 1995). The approach is rather lopsided because, not only does the top-slice have to deal with gearing, it also contains all the rental growth because the core element of the rent is fixed in perpetuity. So the valuer might feel justified in applying a lower yield if it is felt that the rate of rental growth will be particularly high.

The core and top-slice approach is not very good at valuing property investments let on short leases and with break clauses (Baum and Crosby, 1995) but can be adapted to value an over-rented property (where the contract rent is higher than the current estimate of market rent) so that a higher yield can be used for the **overage** (until it ceases) as it is considered to be at a higher risk. There is still a risk of double-counting growth because the core income is fixed but capitalised using a growth-implicit yield. We shall return to the valuation of over-rented property investments later.

Despite the fact that both the term and reversion and core and top-slice approaches may produce acceptable market valuations, there are two significant drawbacks to both methods. First, valuers must make subjective adjustments to yields obtained from comparable evidence and, second, different yields are used to capitalise different components of income. This makes it difficult for investors to compare yields from other investments and brings us to the third approach to valuing reversionary property investments.

c) Equivalent Yield

The equivalent yield is a single ARY reflecting the growth potential and risks associated with the investment as a whole rather than as separate components of income: the mathematical problems associated with adjustments to yields in the above methods are eliminated (Baum and Crosby, 1995). Essentially the equivalent yield is an **internal rate of return** or **IRR** (see later) which will discount the term and reversion (or core and top slice) income components in terms of their current rental values. In other words, no attempt is made to explicitly incorporate estimates of future rental growth in the calculation beyond the reversion. The main advantage of an equivalent yield is that it enables comparison with yields on rack-rented property investments and, indeed, the equivalent yield is usually selected in practice after analysing comparable evidence of similar rack-rented investments (Sykes, 1981). In most circumstances the equivalent yield of a reversionary investment is slightly higher than the initial yield of a comparable rack-rented investment. It is also possible to calculate the equivalent yield of a reversionary property investment that has recently been sold.

Using the core and top-slice example from above, if this property was acquired at the valuation figure the initial yield would be 8.03% (£250,000 / £3,113,289) and the reversion yield would be 9.64% (£300,000 / £3,113,289). In terms of cash-flow this investment generates four annual payments of £250,000 and then (ignoring growth in the cash-flow because it is handled in the yield) £300,000 per annum in perpetuity. The equivalent yield is the rate at which this cash-flow must be discounted so that it equates to the purchase price of £3,113,289. It is a growth-implicit internal rate of return (IRR). The calculation can be performed using the 'goal-seek' function on a spreadsheet to set the NPV to zero by altering the equivalent yield as follows:

Year	Cash-flow description	Cash-flow	PV @ equivalent yield	DCF
0	Purchase price	–3,113,289	1.0000	–3,113,289
1	Rental income	250,000	0.9161	229,019
2	Rental income	250,000	0.8392	209,799
3	Rental income	250,000	0.7688	192,192
4	Rental income	250,000	0.7043	176,063
5 – perpetuity	Reversionary rent of £300,000	300,000	7.6874	2,306,215
NPV:				0
Equivalent Yield (found using goal seek):		9.16%		

As a check, if this equivalent yield is input into the core and top-slice valuation above the resultant valuation is:

Term rent (£)	250,000	
YP 4 yrs @ 9.16%	3.2284	
		807,094
Reversion to MR (£)	300,000	
YP in perpetuity @ 9.16%	10.9170	
PV £1 for 4 yrs @ 9.16%	0.7043	
		2,306,597
Valuation (£) (small discrepancy due to rounding)		3,113,690

Alternatively it is possible to use the goal-seek function to find the equivalent yield by setting the equivalent yield valuation figure to same figure obtained using either the term and reversion or core and top-slice approach by changing the equivalent yield used.

When the period to reversion is short (less than five years) most of the value of a reversionary property investment is contained in either the reversion component of a term and reversion approach or the core of the core and top-slice approach, so the equivalent yield will be very close to the yield used to capitalise these income components. Over time the initial yield and the equivalent yield revealed by the analysis of transactions will grow together and apart as lease lengths vary and market rental growth produces and destroys reversionary potential.

To help value reversionary investments, equivalent yields can be derived from comparable reversionary investment transactions, a process referred to as **equivalent yield analysis**. For example, assume a comparable reversionary investment recently sold for £3.2 m. The rent passing is £225,000 per annum with three years until the next rent review and the estimated market rent is £290,000 per annum. The initial yield is therefore 7.03% (£225,000/£3,200,000) and the reversionary yield is 9.06% (£290,000 / £3,200,000) but if we want to use this transaction as comparable evidence it is useful to calculate its equivalent yield. We have seen how to do this using goal-seek but it is possible to use a more rudimentary approach that avoids the need for a spreadsheet. The aim is to calculate a positive and a negative **net present value** at two ‘trial’ equivalent yields and then, using the properties of similar triangles, to linearly interpolate the equivalent yield where the net present value (NPV) is zero (i.e. an approximation of the IRR).[2] The net present value is calculated by valuing the property at a trial equivalent yield and then deducting the price paid.

8% trial equivalent yield

Term rent (£)	225,000	
YP 3 yrs @ 8%	2.5771	
		579,848
Reversion to MR	290,000	
YP perpetuity @ 8%	12.5000	
Deferred 3 yrs (PV £1 for 3 yrs @ 8%)	0.7938	
		2,877,525
Valuation (£)		3,457,373
Less: purchase price (£)		–3,200,000
Net present value (£)		257,373

9% trial equivalent yield

Term rent (£)	225,000	
YP 4 yrs @ 9%	2.5313	
		569,543
Reversion to MR	290,000	
YP perpetuity @ 9%	11.1111	
Deferred 4 yrs (PV £1 for 4 yrs @ 9%)	0.7722	
		2,488,198
Valuation (£)		3,057,741
Less: Term & reversion valuation (£)		–3,200,000
Net present value (£)		–142,259

The geometric properties of similar triangles mean that there is a ratio between triangle ABC and triangle ADE in Figure 6.4.

Examining the lengths of the sides of these triangles we can state:

$$\frac{x}{NPV_1} = \frac{IRR_2 - IRR_1}{NPV_2 + NPV_1}$$

Therefore:

$$x = NPV_1 \times \left[\frac{IRR_2 - IRR_1}{NPV_2 + NPV_1}\right] = 257{,}373 \times \left[\frac{1\%}{257{,}373 + 142{,}259}\right] = 0.6441$$

The IRR estimate is obtained by adding this increment to the 8% trial yield, i.e. 8.64%. As a check, value the property using a term and reversion approach with an equivalent yield:

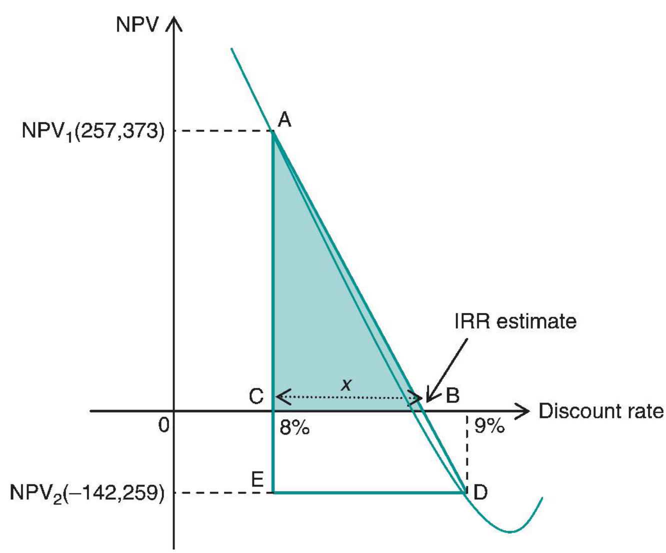

Figure 6.4 Linear interpolation between two trial IRRs.

Term rent (£)	225,000	
YP 4 yrs @ 8.64%	2.5476	
		573,210
Reversion to MR (£)	290,000	
YP perpetuity @ 8.64%	11.5741	
Deferred 4 yrs (PV £1 for 3 yrs @ 8.64%)	0.7799	
		2,617,703
Valuation (£) (small discrepancy due to rounding and linear interpolation of a quadratic function)		3,190,913

And if this equivalent yield is input into a core and top-slice valuation of the same property, an identical valuation should result:

Core: Contract rent (£)	225,000	
YP in perpetuity @ 8.64%	11.5741	
		2,604,167
Top-slice: Uplift to MR	65,000	
YP perpetuity @ 8.64%	11.5741	
Deferred 3 yrs (PV £1 for 3 yrs @ 8.64%)	0.7799	
		586,732
Valuation (£) (small discrepancy due to rounding and linear interpolation)		3,190,899

6.2.3 *Valuation of leasehold property investments*

The freehold investments that were described above are capable of producing an income return for as long as the land is capable of economic use and the capital value may be realised at any time at least equivalent to the value of the site but usually enhanced by whatever buildings have been constructed. Leaseholds, on the other hand, are a much more diverse group of investment assets. There must be at least two legal interests in a property to create a leasehold investment; perhaps a head-tenant leases the property from the freeholder via a head-lease, paying a head-rent, and sublets to a sub-tenant by a sub-lease and receives a sub-rent. Assuming the rent received from the sub-tenant is greater than the rent paid to the landlord, the head-tenant receives a **profit rent** and if the head-lease is assignable this profit rent may have a market capital value.

Generally speaking leaseholds are a less popular form of property investment than freeholds. A leasehold investment is terminable and therefore the original capital outlay is lost and the investment return is in the form of income only. The income is more sensitive to the level of and changes in the market rent of the property than is the case for an equivalent freehold – the profit rent is a geared top-slice form of income (Baum and Crosby, 1995 and Sayce et al., 2006). Indeed, if the sub-tenant stops paying rent the head-tenant (i.e. the leasehold investor) will still have to pay the head-rent to the landlord – a situation that would not occur if the investment interest was a freehold. As the head-lease nears the end of its term it will be harder to sub-let the property. Also, complex patterns of profit rent can occur if revisions to the rent received and rent paid are at different times and this complexity cannot be handled by making adjustments to the ARY. It is even possible for the profit rent to become negative when the contract rent exceeds the market rent and, particularly in these situations but in general also, the quality of the tenant, and especially the ability to pay rent, is critical in determining risk. Being a head-leasehold interest the investor may have repair, insurance and other liabilities under the terms of the lease as well as restrictions over the way that the interest may be transferred. These constraints can be inconvenient and costly, and consequently they affect value. Some or all of these liabilities can be passed on to the sub-tenant under the terms of the sub-lease but this is still a management cost and the constraints remain nonetheless. All of this adds to the costs and risk of a leasehold investment interest.

Due to the relative unattractiveness of leasehold investments, valuations are less frequently undertaken but where they are required they are more difficult than freeholds. Lease terms and termination dates, the gearing characteristics caused by the size of the profit rent compared to the head rent, and repair, insurance and other liabilities under the terms of the lease will all vary. This means that the range of yields and capital values revealed by analysis of comparable evidence will be very diverse. Because valid leasehold yield comparisons can only be made between leasehold investments where the remaining terms and other income characteristics are similar, this severely restricts the amount of comparable information that might be available to support a yield choice. To get around this problem, the conventional method of valuing leasehold investments was to capitalise the profit rent at a yield derived from freehold investments, which tend to be more commonplace and homogeneous than leasehold investments. To justify the use of freehold yields as a basis for the valuation of leasehold investments, valuers used to capitalise the profit rent at a **dual rate**. This comprised a remunerative rate (ARY) derived from freehold transactions of comparable properties (but increased to reflect the greater risk associated with a profit rent[3]) which was used capitalise the profit rent; and an accumulative rate or sinking fund designed to recoup the original capital outlay at the end of the lease term so a similar leasehold investment could be purchased *ad infinitum* – thus creating, in theory at least, the equivalent of a freehold interest. The approach ensures that a leasehold investor receives a return *on* the capital outlay throughout the lease term at the remunerative rate and a return *of* the capital by the end of the term. To ensure there is very little risk attached to the recovery of the original capital outlay, it is assumed that some of the annual income from the leasehold investment is reinvested in a sinking fund that offers a low, safe accumulative rate. Although this will almost certainly recoup the original outlay (return of capital) it reduces the amount of income actually received (return of capital).

In Chapter 4, Equation 4.27 presented a version of the *PV £1 pa* formula that contained both a remunerative rate and an accumulative or sinking fund rate. This formula is repeated here:

$$PV\ £1\ pa = \frac{1-(1+r)^{-n}}{r} = \frac{1}{r+SF} = \frac{1}{r+\left[\dfrac{s}{(1+s)^{n}-1}\right]}$$

Where r is the leasehold rate (the remunerative rate) derived from yields obtained on comparable freehold investments and s is the sinking fund or the accumulative rate. This is the formula for a dual rate *PV £1 pa* (YP) separating, as it does, the remunerative and accumulative rates. Incidentally the dual rate YP is compatible with the single rate YP when the remunerative rate r and accumulative rate s are the same, i.e.

$$\frac{1}{r+\dfrac{s}{(1+s)^n-1}}=\frac{1-(1+r)^{-n}}{r}$$
$$\text{when } r=s$$

Conventionally, if the investor is a taxpayer then tax is also payable on the return received from the sinking fund, so the dual rate YP must be adjusted to allow the sinking fund to accumulate at a net-of-tax rate. For example, where an annual sinking fund is £5,000 per annum and the gross of tax accumulative rate is 6% per annum the interest earned after one year is: £5,000×6%=£300. With tax deducted at 40% this is reduced to 60% of £300, i.e. £180. £180 is only 3.6% of £5,000. The gross accumulative rate of 6% has been reduced to a net rate of 3.6%. The solution is to apply a tax adjustment factor of (1−t) to the gross rate, where t is the tax rate. Tax is also payable on the profit rent received so the sinking fund has to be set up using income remaining after tax has been paid. To ensure the net of tax sinking fund still replaces the initial outlay it needs to be grossed up. The effect of tax on a sinking fund is thus twofold: tax is levied on the interest accumulated in the sinking fund – to allow for this a net accumulative rate must be used, and tax is levied on the income from which the sinking fund is drawn – a grossing up factor must be applied to the sinking fund. The formula for a dual rate YP which incorporates these tax adjustments to the sinking fund is therefore:

$$YP=\frac{1}{r+\left(SF\times\dfrac{1}{1-t}\right)}=\frac{1}{r+\left(\left[\dfrac{s}{(1+s)^n-1}\right]\times\dfrac{1}{1-t}\right)} \qquad [6.4]$$

Where income is received quarterly in advance the formula is:

$$YP_{quarterly\ advance}=\frac{1}{4\left[1-\dfrac{1}{\sqrt[4]{1+r}}\right]+\dfrac{4\left[1-\dfrac{1}{\sqrt[4]{1+s}}\right]}{\left[(1+s)^n-1\right]\left[1-t\right]}} \qquad [6.5]$$

For valuation purposes it is useful to divide leasehold property investments into two types: those with fixed profit rents and those with variable profit rents.

a) Valuation of fixed profit rents
These tend to take the form of short periods of profit rent between rent reviews or where the lease is short. As with freehold investment valuations, before the profit rent is capitalised all irrecoverable expenses must be deducted to arrive at a net profit rent. If the profit rent is fixed during the term Equation 6.4 can be applied directly, assuming that rent is paid annually in arrears. For example, value the net profit rent of £25,000 per annum from a head-lease that has a remaining term of four years. The leasehold yield

(remunerative rate) is assumed to be 9% and the sinking fund (accumulative rate) is 4%. Income tax is payable at 40%. Inputting these figures into Equation 6.4 the profit rent is valued as follows:

$$PV = £25{,}000 \times YP = £25{,}000 \times \frac{1}{0.09 + \left(\frac{0.04}{(1+0.04)^4 - 1} \times \frac{1}{1-0.4}\right)} = £25{,}000 \times 2.0726 = £51{,}815$$

The valuation may be set out in the conventional format thus:

Profit rent (£)	25,000	
YP for 4 years @ 9% & 4% (40% tax)	2.0726	
Valuation (£)		51,815

This valuation provides a return on capital at 9% and a return of capital at 4% (adjusted for tax) and this can be checked as follows:

The annual sinking fund to replace £12,000 in 4 years @ 4% per annum:

$$SF = £51{,}815 \times \frac{r}{(1+r)^n - 1} = £51{,}815 \times \frac{0.04}{(1+0.04)^4 - 1} = £51{,}815 \times 0.2355 = £12{,}202$$

Grossed up to allow for tax on original income of £25,000:

$$£12{,}202 \times \frac{1}{(1-t)} = £12{,}202 \times \frac{1}{(1-0.4)} = £20{,}337$$

The grossed up annual sinking fund of £20,337 deducted from the annual profit rent of £25,000 leaves £4,663 per annum, a 9% return on £51,815.

Another way of looking at this is that a 9% annual return *on* £51,815 is £4,663 (*r* in the formula). £25,000 less £4,663 is £20,337 and this represents the annual investment into the tax-adjusted sinking fund to ensure the return *of* capital. From Equation 4.13 in Chapter 4 we know that the future value of £1 per annum is:

$$FV\,£1\,pa = \frac{(1+r)^n - 1}{r}$$

Substituting *r* for the net-of-tax sinking fund rate of 4% and multiplying this formula by the annual sinking fund amount we get back to the capital outlay as follows:

$$£20{,}337 \times \left[\frac{(1+0.04)^4 - 1}{0.04} \times (1-t)\right] = £20{,}337 \times [4.2465 \times 0.6] = £51{,}816$$

One danger with the dual rate YP approach is to imply an effective gross return on the sinking fund that is greater than the remunerative rate. For example a 7% leasehold yield and a 4% sinking fund with tax at 50% would imply that the investor would be better off (initially at any rate) putting the money in the sinking fund rather than purchasing the leasehold investment. The profit rent must grow at a rate sufficient to compensate for investing at

7% *gross* of tax rather than 4% *net* of tax. Notwithstanding this word of caution, there are many criticisms of the dual rate YP approach. Perhaps the most fundamental criticism is the use of freehold yields to derive leasehold yields. Can leasehold investments really be compared to freehold investments, even for similar properties in similar locations? The initial yield derived from a recently transacted freehold investment reflects its perpetual nature and its income and capital growth prospects. Adjusting such a yield to arrive at a suitable yield to capitalise a terminable, possibly fixed profit rent would seem irrational to many. Greaves (1972) points out that when using the dual rate YP approach the sinking fund only recoups original capital outlay and ignores inflation and capital growth – both of which are inherent in the property investment market. Incorporating tax adjustments is not normally undertaken with other valuation methods. Indeed, tax is not paid by some investors such as pension funds and charities so the tax deductions will significantly under-value leasehold investments in the eyes of these investors (Lean and Goodall, 1966; Baum, 1982). It is difficult to justify the dual rate YP approach when most investors do not take out sinking funds and certainly not on a property-by-property basis. Instead, investors provide for reinvestment in a general, portfolio sense. Also, where a leasehold investment is made with borrowed funds, sinking funds at low rates may be lower than the interest rate charged by lenders. So investors would be better off paying back the debt rather than investing in a sinking fund.

An alternative to the YP (dual rate) approach is the YP (single rate) approach, with or without tax adjustment; see Chan and Harker (2012) for a recent exposition. In this case it is assumed, implicitly, that the sinking fund accumulates at the remunerative rate. In other words, the sinking fund earns as much as the investment itself. When a single rate is used a smaller sum is put aside into the sinking fund than when a dual rate is used because it will accumulate at a higher rate of return. Consequently the net income after the sinking fund deduction will be higher when a single rate is used (Lean and Goodall, 1966). However, risk to capital is lower when dual rate is used as its replacement is via a lower risk sinking fund and income is more secure because there is less possibility that more money will be needed to shore up the sinking fund as it is so low risk. So, with lower income and capital risk, the investor may be willing to accept a lower dual rate leasehold yield (remunerative rate) than when single rate is used. In practice, whatever approach is adopted, the valuations should be the same and this occurs when the YPs are the same. For example, ignoring tax for a moment, the dual rate YP for four years at 9% leasehold yield and 4% sinking fund is 3.0723. To obtain the same YP using a single rate requires a leasehold yield of 11.46%. But, as Baum and Crosby (1995) note, even the YP (single rate) relies on comparison and good leasehold comparisons will always be difficult to find. The practical solution has been to base the YP (single rate) on yield evidence derived from freehold comparables with an additional risk margin but, bearing in mind the rather different investment characteristics of freehold and leasehold property investments, this is not an ideal solution. An alternative is to use the YP (single rate) based on yields derived from non-property investments such as bonds (Baum and Crosby, 1995). Fraser (1993) argues that if the market rent and head rent (and hence the profit rent) are fixed for the whole term, the yield would be similar to long-dated gilts plus a risk premium to reflect default risk and terminable nature of the interest – remember that gilts return the capital invested. A final alternative is to use a cash-flow technique and this will be examined later.

b) Valuation of variable profit rents
A variable profit rent would arise if the head-rent and sub-rent do not move in perfect unison, perhaps because the sub-lease contains rent reviews and the head-rent is fixed (essentially the head rent is a fixed deduction from a growth income) or both head-lease and sub-lease contain reviews but at different times. Variable profit rents tend to be for longer periods of say ten or more years and can be for very long periods. Referring back to the freehold ground rents described at the beginning of this chapter, the head-leasehold interest in such an arrangement would take the form of a variable profit rent. The head-tenant could develop the site and let the property at an occupation rent (containing rent reviews) far in excess of the fixed ground rent. A long ground lease (more than 50 years remaining) can be very similar in its income growth characteristics to a freehold investment over its early life. Figure 6.5 illustrates this. The lines track the capital values of two investments over a period of 50 years; the upper line is a freehold with a current market rent of £100,000 per annum and a rental income growth rate of 5% per annum. The rent is projected every five years and capitalised at an ARY of 8%. So in year 0 the current market rent of £100,000 per annum is capitalised at 8% giving a capital value of £1,250,000 and in year 25 it is £100,000 compounded at 5% per annum for 25 years capitalised at 8% giving £4,232,944. Because this investment is a freehold the capital value will keep rising exponentially in perpetuity as long as the growth rate and yield assumptions hold. The leasehold investment takes the form of a long (50 year) head-lease where the

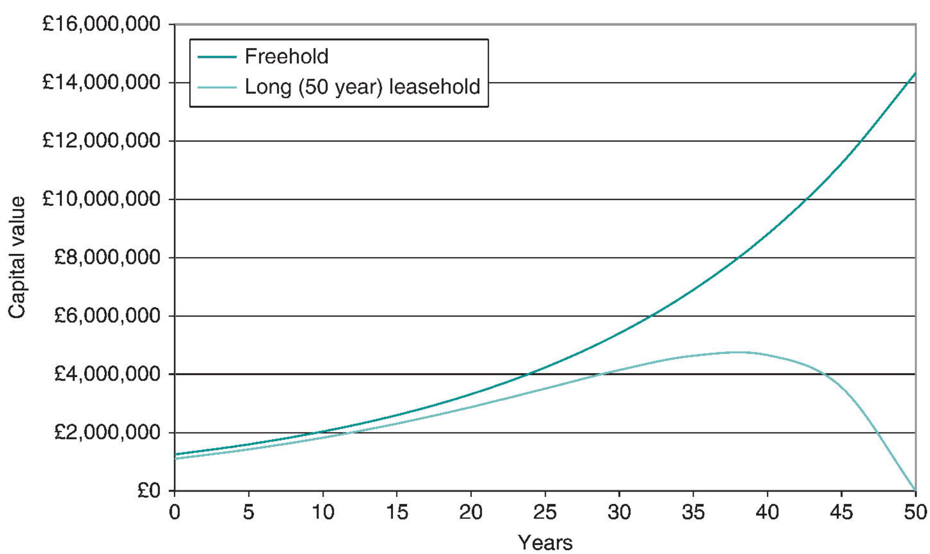

Figure 6.5 Freehold and leasehold capital values over time.

head-rent is fixed at £10,000 per annum of the whole term and is sub-let at the market rent of £100,000 and, like the freehold, this sub-rent is predicted to grow at an average of 5% per annum. So the value of the long leasehold now is £100,000 less £10,000 giving a profit rent of £90,000 per annum capitalised at 8% (assume same as freehold yield for simplicity) for a fixed term of 50 years giving a capital value of £1,101,014. In year 25 the profit rent would have grown to £328,635 (£100,000 compounded at 5% per annum over 25 years less fixed ground rent of £10,000) and this is capitalised at 8% over the remaining 25 years of the lease giving a capital value of £3,508,110. However, towards the end of the lease term the capital value of the long lease drops dramatically.

But how do we value variable profit rents? The most popular way is to deduct the ground rent from the income to arrive at a net figure for capitalisation. In a multi-tenanted property a proportion of ground rent may be deducted from each tenant's gross income and the apportionment of ground rent may be calculated as a percentage of each tenant's rental value, as a percentage of each tenant's floor area, shared equally between tenants or as a percentage of the rent paid by each tenant. The YP (single rate) approach, with or without tax adjustment, can be used to capitalise the net profit rent subject to the same caveats as mentioned above. Using this approach growth in the profit rent is implicitly handled in the ARY. For example, a leasehold shop is held on a head-lease with 12 years unexpired at a fixed rent of £10,000 per annum with no further rent reviews. The property is sublet for the remainder of the head-lease term (less one day) at a current rent of £30,000 per annum with five-year rent reviews. The market rent is £35,000 per annum. Rack-rented freehold shops sell at initial yields averaging 6%.

Rent received (£)	30,000	
less rent paid (£)	10,000	
Profit rent (£)	20,000	
YP for 2 years @ 8%	1.7833	
Term value (£)		35,666
Reversion to MR (£)	35,000	
less rent paid (£)	10,000	
Profit rent (£)	25,000	
YP for 10 years 8%	6.7101	
PV for 2 years @ 8%	0.8573	
Reversion value (£)		143,814
Valuation (£)		179,480

An alternative approach is to calculate the capital value of the ground rent separately and then deduct this amount from the capital value of the tenant's profit rent (from which the ground rent had not been deducted).

Fraser (1977) argued that it is wrong to compare yields from freehold investments with those from leaseholds with geared terminable profit rents because the income growth patterns will be different. For the profit rent from a long leasehold to be comparable to the market rent from a freehold investment it needs to be for a long term and the head-rent should be fixed and significantly below market rent. Alternatively the head-lease should contain reviews to a small fraction of the market rent payable under the sub-lease which should contain regular, five year rent reviews to market levels. The yield that could be used to capitalise this type of investment might then be comparable to freehold yields but higher to reflect terminable nature of the investment and increased management and possible maintenance liability that the landlord might face. As the lease nears termination increasing capital depreciation (see the rapid decline in capital value of the long leasehold interest in Figure 6.5) means a leasehold investment bears little comparison to other types of investment and any supposed relationship between freehold and leasehold yields becomes tenuous. Valuing variable profits at a single growth-implicit rate is too simplistic. It becomes more rational to forecast profit rent over the lease term using a discounted cash-flow approach.

6.2.4 *Example: ARY Investment method*

A pension fund requires a valuation for accounting purposes. The property is located on a business park five miles north of the city of Bristol. It is one mile from a junction on the national motorway network, one and a half miles from Bristol Parkway station – from which London is one and a half hours by train. The business park comprises 38 acres of landscaped grounds. The property consists of two storeys of open plan office space with the following net internal areas: ground floor 721 square metres, first floor 717 square metres, giving a total net internal area of 1,438 square metres. The accommodation includes a spacious reception area with first floor balcony, suspended ceilings with recessed lighting, raised floors with a 150 millimetres clear void, double glazed opening windows and gas-fired central heating. There is parking for 83 cars. The property was let two years ago to the regional property division of a large national bank on a 15 year lease that requires the landlord to be responsible for all repairs and insurance and is subject to upward only rent reviews every five years on standard terms. There is also a service charge to cover the landlord's costs of landscaping, estate lighting and associated services. The current rent is £27,000 per annum. You are aware of a recent letting on the business park of a similar property in all respects except that it has air conditioning. The rent was £26,450 per annum and the lease was on full repairing and insuring (FRI) terms. Analysis of this recent letting suggests a rent of £18.50 per square metre. You decide to reduce this to £17.50 per square metre to reflect the fact the subject property does not have air-conditioning. Therefore 1,438 square metres at £17.50 per square metre gives a market rent for the subject property of £25,165 per annum on FRI terms. The comparable property was sold by the developer to an investor for £330,625 providing an initial yield of 8%. The valuation of the pension fund's property is set out as follows:

Gross term rent [a]	27,000	
Less external repairs @ 10% gross rent (£)	2,700	
Less insurance @ 5% gross rent (£)	1,350	
Less management @ 5% gross rent (£)	1,350	
Net rent (£)	21,600	
YP 3 years @ 7.75% [b]	2.5888	
		55,918

Reversion to MR (£)	25,165	
YP perpetuity @ 7.75% [c]	12.9032	
Deferred 3 years [d] (PV £1 for 3 yrs @ 7.75%)	0.7994	
		259,972
Valuation (£)		315,890

Notes:
[a] This is the rent receivable until the next rent review.
[b] The rent is capitalised at a yield that reflects the security of this income (the tenant is paying a rent less than market value and is therefore less likely to default). To reflect this, the yield obtained from the comparable evidence is reduced to 7% for the capitalisation of this income stream.
[c] Evidence of the 'growth implicit' yield is obtained from the comparable property, using an equivalent yield approach.
[d] This capitalised income stream is receivable in three years' time.

6.3 Discounted cash-flow (DCF) methods

The ARY is simply a ratio between income and capital value. Because income and capital value are expected to change (usually grow) over the holding period of an investment, investors are often prepared to accept a lower return (initial yield) at the start of the investment in expectation of higher returns later on. Rather than attempt to predict how income and value might change in the future, ARY investment valuation techniques capitalise the current rent at an all-risks yield (derived from comparable evidence) which is lower than the rate of return that an investor expects to receive because it implies future rental income and capital growth expectations. The gap between the ARY and expected rate of return represents the expected or implied rental growth hidden in the valuation. Consequently, the assumed static cash-flow is not the expected cash-flow, the yield is not the target rate and is not comparable to target or discount rates used to capitalise or value income from other investments.

We know that ARY investment valuation techniques rely on comparison to justify adjustments to initial yields obtained from comparable investment transactions. These adjustments account for all factors that influence investment value except those that can be handled by altering the rent such as regular/annual management and maintenance expenditure. The most important investment characteristics that need to be reflected in the ARY are income and capital risk and growth potential but influencing these characteristics are a multitude of economic and property-specific factors including macro-economic conditions, property market and sub-sector activity, the financial standing of individual tenants, property depreciation and changes in planning, taxation, landlord and tenant legislation. The ARY has to implicitly quantify these factors and the all-encompassing nature of the ARY means that capital value is very sensitive to small adjustments. In essence, a single divisor (ARY) or multiplier (YP) conceals many of the assumptions regarding choice of target rate of return (which includes risk) and income and capital growth expectations.

Nevertheless, the ARY approach is practical and appropriate where there is a plentiful supply of comparable market transactions providing evidence of yields, rents and capital values. But there are circumstances when it is particularly difficult to use the ARY technique to value a property investment. Problems arise when, first, comparable evidence is scarce either because market activity is slow or the property is infrequently traded and, second, where there is greater variability in investments, meaning more variables must be accounted for in the ARY. Regarding this latter point, shorter, more flexible leases are creating greater diversity in property investment cash-flows, often with gaps in rental income. But, in addition to that, secondary properties are generally more variable in terms of location, physical quality, condition or covenant and are therefore more risky. Further problems arise when the property is more complicated than a simple rack-rented investment: the ARY technique is inappropriate for valuing property that is over-rented, let on short leases or producing varying rental income streams from multiple tenants. It can be difficult to quantify all of these factors in an ARY when comparable evidence is scarce. Havard (2000) notes that increasing diversity in the property investment market has undermined the ARY valuation technique because it relies heavily on comparison between relatively homogeneous investment assets and simple adjustments to comparable evidence. As a result property investment valuation techniques have emerged that focus more explicitly on the target rate of return that an investor requires, the expected flow of income, expenditure and capital growth that might be expected from an investment. The appendix at the end of this chapter lists research papers spanning four decades that chart the history of the development of contemporary valuation techniques. The discounted cash-flow (DCF) technique uses an established financial modelling technique which allows comparison between property and other forms of investment. Where information is scarce or when an unusual property is being valued the DCF technique assists in the consideration of income and capital growth, depreciation, timing of income receipts and expenditure payments and the target rate of return. Indeed the RICS Red Book included guidance on the use of DCF analysis for valuation in its 2011 edition (RICS, 2011: GN 7).

6.3.1 A discounted cash-flow valuation model

The ARY technique relies on analysis of prices and rents achieved on recent comparable transactions to estimate an ARY for the subject property. This growth-implicit ARY is then used to capitalise an initial estimate of the cash-flow. The DCF technique discounts the actual or estimated cash-flow at the investor's target rate of return. It requires explicit assumptions, based on evidence, to be made regarding several factors but most importantly the target rate of return (which should cover the opportunity cost of investment capital plus perceived risk) and expected rental income growth. It can be difficult to find market-supported estimates for the key variables in the cash-flow. The selection of the target rate of return (the discount rate) is subjective, for example. It might be necessary to estimate current market rent and expected changes over the next few years. It might also be necessary to try and predict what will happen when the tenant has an option to break or when the lease needs renewing. The variation in possible lease incentives that might be offered, length of possible voids and expenditure that might be incurred is considerable. Moreover, because the DCF technique separates the value significant factors as distinct inputs into the cash-flow and even separates the discount rate into a target rate of return and an exit yield, the risk of double-counting the effect on value of these factors is high.

6.3.1.1 Constructing a DCF valuation model

The relationship between the growth-implicit ARY and the growth explicit DCF techniques can be represented by a simple equation;

$$y = r - g \qquad [6.6]$$

Where y is the ARY, r is the investor's target return and g is the annual rental growth rate.

The left side of the equation represents the growth-implicit ARY technique and the right side represents a growth-explicit DCF technique. The DCF technique separates the ARY into two elements; a rental income growth rate and a target rate of return; in other words the ARY implies the rental growth that the investor expects in order to achieve the target rate of return. An investor accepting a relatively low initial yield from a property investment when higher yields might be available from fixed interest investments implies an expectation of future income growth. For example, an investor with a target rate of 15% who purchases a property investment for a price that reflects an initial yield of 10% would require a 5% annual growth to achieve the target rate. This simple relationship is made more complex in the UK property market because income from property investments (in the form of rent) is normally reviewed every five years. This means that a slightly higher annual growth rate will be required to meet the investor's annual target rate of return. Provided the growth rate, target return and rent review period in the DCF approach are mathematically consistent with the yield adopted in the ARY approach, the valuation will be the same. The following explains why.

Starting with the ARY approach, the present (capital) value, V, of an income stream from a rack-rented freehold property investment is the PV £1 pa or YP (see Equation 4.19 in Chapter 4) multiplied by the annual income or market rent (MR):

$$V = MR \cdot \frac{1-(1+y)^{-n}}{y} \qquad [6.7]$$

Where y is the growth-implicit ARY and n is the number of years for which the rent is received. If the rent is receivable in perpetuity, i.e. a freehold property investment, the above formula simplifies to Equation 4.24 from Chapter 4:

$$V = \frac{MR}{y}$$

In other words, the present value is equivalent to a constant annual income capitalised at (divided by) the ARY. In the case of the DCF technique, the income stream is discounted at the investor's target rate of return, r, rather than the ARY. So the present value of a rack-rented freehold property investment which consists of a constant (i.e. non-growth) annual market rent receivable in perpetuity annually in arrears can be expressed as follows:

$$V = \frac{MR}{r} \qquad [6.8]$$

But because the DCF technique is explicit about income growth we now need to introduce rental income growth, g, into this valuation model. Assume rent is receivable in perpetuity and there are annual rent reviews at which the rent is increased at the estimated long-term average annual rental growth rate, g. Assuming $r > g$, rental growth can be incorporated as follows:

$$V = \frac{MR}{r - g} \quad [6.9]$$

But for most property investments rent does not grow each year. If non-annual rental growth is now introduced, the following equation represents a freehold property recently let at market rent in perpetuity with three-year reviews:

$$V = \frac{MR}{(1+r)} + \frac{MR(1+g)}{(1+r)^2} + \frac{MR(1+g)}{(1+r)^3} + \frac{MR(1+g)^3}{(1+r)^4} + \frac{MR(1+g)^3}{(1+r)^5} + \frac{MR(1+g)^3}{(1+r)^6} + \frac{MR(1+g)^6}{(1+r)^7} + \ldots \infty$$

The above expression (which is a geometric progression) simplifies to:

$$V = \frac{MR}{r - r\left(\frac{(1+g)^3 - 1}{(1+r)^3 - 1}\right)} \quad [6.10]$$

Rearranging Equation 6.8 we can show that $\frac{MR}{V} = y$ and, substituting these variables into Equation 6.10, the relationship between the ARY and DCF techniques can be shown by:

$$y = r - r\left(\frac{(1+g)^p - 1}{(1+r)^p - 1}\right) \quad [6.11]$$

This is the property yield equation derived by Fraser (1993) and based on a rack-rented freehold property investment. It shows that y is determined by the investor's target rate of return, r, the annual rental growth rate, g, and the number of years between each rent review (the rent review period), p. This equation is the same as Equation 7.6 except that the annual rental growth rate g has been increased to compensate for the fact that rental growth is not actually received until each non-annual rent review.

If the property to be valued is rack-rented and the rent and review period are known, applying the ARY technique, the valuer only has one variable, the ARY, to predict in order to value the property. If sufficient evidence is available this is straightforward. With the DCF technique there are two unknowns; the investor's target rate of return and the growth rate. To predict the growth rate, yields on recently let comparable freehold properties can be compared with an estimate of the investor's target return for those properties. Armed with this information and rearranging Equation 6.11 an average annual growth rate can be implied as follows:

$$g = \left(\frac{(r-y)(1+r)^p + y}{r}\right)^{\frac{1}{p}} - 1 \quad [6.12]$$

If reviews were annual the growth rate would be the target rate minus the initial yield on a rack-rented freehold property ($g = r - y$). For example, if an investor accepts an initial yield of 8% but requires an overall return of 12%, then the income must grow by 4% over the year. But with five year rent reviews

$$g = \left(\frac{(0.12 - 0.08)(1 + 012)^5 + 0.08}{0.12}\right)^{\frac{1}{5}} - 1 = 4.63\%$$

So an investor accepting an initial yield of 8% would require 4.63% per annum growth in the income, on average, (compounded at each review) to achieve the target return. Figure 6.6 illustrates this.

Equation 6.12 is often referred to as the implied rental growth rate formula. The higher the client's target rate relative to the market-derived ARY, the higher the rental growth rate must be to achieve the desired level of return. The implied growth rate formula is constructed assuming that the property is rack-rented. g represents the market's expectations of future growth and is an average growth rate. In fact it is a discounted growth rate into perpetuity so g is influenced by expectations in the near future more than ones further away (Fraser, 1993). As an alternative it is possible to derive an explicit growth rate from direct analysis of rental growth rates prevalent in various market sectors, regions and towns. Some argue that the assumption of a stable and constant growth rate is simplistic but it can be taken to be an adequate reflection of the decision-making process of most investors. Before looking at the practical application of the DCF technique the next section will look at the input variables in more detail.

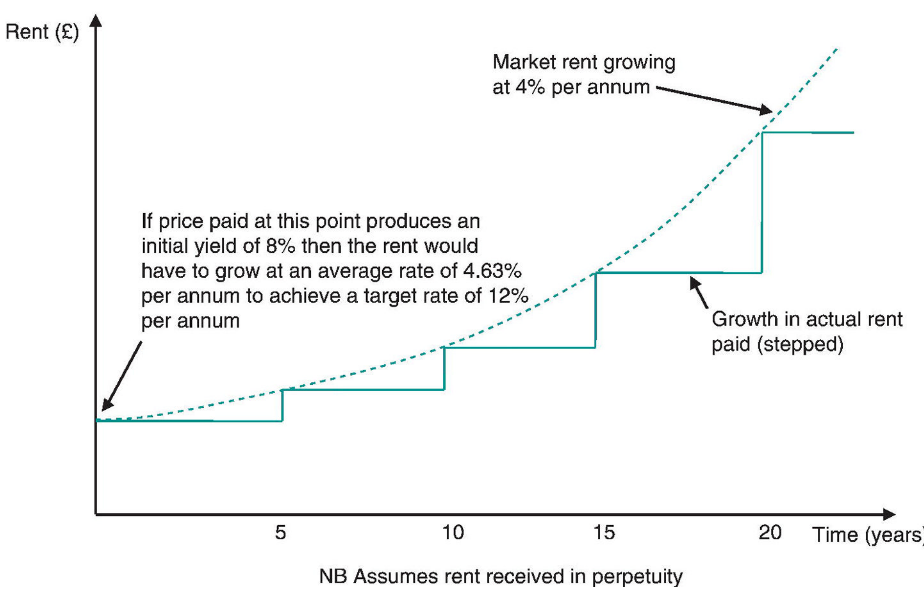

Figure 6.6 Rental growth.

6.3.1.2 Key variables in the DCF valuation model

The key, value significant, variables in the DCF technique are the rent, rental growth rate, the target rate of return and the exit yield. Other variables include regular and periodic expenses, transaction fees and taxes, but these are determined in relation to the key variables and their estimation is relatively straightforward.

The *rent* must be net of any regular or periodic expenditure and the estimation of market rent is undertaken in the same way as for the ARY technique described in section 6.2. Rental growth can be separated into two components; growth in line with inflation and real growth in excess of inflation. Depreciation is the rate at which the market rent of an existing property falls away from the market rent of a property that is comparable in all respects except that it is (hypothetically) permanently new. So, assuming constant rental growth, an annual rate of rental growth must be net of an average annual rate of depreciation. As these two components are interacting growth rates their mathematical relationship with g is (Fraser, 1993):

$$g = g_m - d - dg_m \qquad [6.13]$$

Where g is the average annual rental growth rate of actual property, g_m is the average annual rental growth rate of permanently new property and d is the average annual rate of depreciation. As dg_m is usually very small the equation can be simplified to:

$$g = g_m - d \qquad [6.14]$$

It is possible to conduct or commission forecasts of rental values and rental growth rates and the models that underpin these forecasts are usually based on analysis of past performance. It is important to determine whether the forecast is based on actual properties (and therefore include depreciation) or hypothetical – new, prime – properties (and therefore ignore effect of depreciation). Simple models might take the form of an historic time series of rents and capital values from which a moving average or exponentially smoothed set of values for future years might be predicted. More complex regression-based models will produce equations which identify independent variables such as GDP or other output measures, expenditure, employment, stock, vacancy, absorption and development pipeline and measure their effect on a dependent variable such as rental growth or yield (Baum, 2000). Forecasts, although not at the individual property level, provide useful information on rental growth performance across the main investment sectors and locations in the UK and allow an implied rental growth rate to be verified against growth rates achieved in the market. It must be remembered, though, that rents can be volatile in the short-term and very little is known about depreciation rates and their effect on rental growth prospects in the long-term.

The **target rate of return** (or **discount rate** because it is the rate at which cash-flows are discounted to present value) should adequately compensate an investor for the opportunity cost of capital plus the risk that the investor expects to be exposed to. It is therefore a function of **a risk-free rate of return** and a **risk premium**: a higher risk premium (and thus higher target rate) would be used to discount the future cash-flow of a more risky property investment and cause its present value to reduce accordingly. It is difficult to obtain evidence of the target rate from the market but the base-line is the return from a risk-free investment. The closest available proxy for the risk-free rate is the gross redemption yield on medium-dated fixed interest gilts. A risk premium is then added to this risk-free rate which should cover (Baum and Crosby, 1995):

- Tenant risk: risk of default on lease terms, particularly payment of rent but also repair and other obligations), risk of tenant exercising a break option or not renewing lease (higher risk if the lease is short). The level of tenant risk will depend to an extent on the type of tenant; a public sector organisation may be considered less likely to default than a fledgling private sector company.
- Physical property risk: management costs (e.g. rent collection, rent reviews and lease renewal) and depreciation. This type of risk is less acute in the case of prime retail premises because land value is a high proportion of total value, but the reverse is true for, say, small industrial units. A certain amount of physical property risk can be passed on to the tenant via lease terms.
- Property market risk: illiquidity caused by high transaction costs, complexity of arranging finance and accentuated by the large lot size of property investments.
- Macroeconomic risk: fluctuating interest rate, inflation, GDP, etc. all affect occupier and investment markets in terms of rental and capital values and potential for letting voids.
- Legal risk: in the main, this refers to planning policy and development control. For example, presumption against out-of-town retailing, promotion of mixed-use, developments on previously developed land.

Baum and Crosby (1995) point out that, for valuation, it is not feasible to quantify all of these components of risk as this would need to be done for each comparable. Instead, the valuer might subjectively choose and adjust a target rate not at the individual property level but by grouping various property investments and examining the risk characteristics of each. By far the most frequently encountered investment type is a rack-rented freehold. Regular rent reviews mean that this is an equity-type investment that benefits from income and capital growth just as equities do, albeit with less frequent income growth participation. Whereas the return from an investment in company shares relies on the continued existence and profitability of that company, a property investment will remain even if the occupying company fails. Unlike share dividends, rent is a contractual obligation paid quarterly in advance and is a priority payment in the event of bankruptcy. After a likely rent void the premises can be re-let and perhaps used for a different purpose, subject to location, design and planning considerations. This reduces the reliance of the investment on a single business occupier, helps underpin the value of the investment and reduces risk. A freehold let on fixed ground rent has a risk profile similar to undated gilts as it generates a fixed income from a head-tenant who is very unlikely to default on what will probably be a significant profit rent. Consequently this type of property investment is very secure and risk will derive from changes in the level of long-term interest rate and inflation rather than property or tenant-specific factors (Fraser, 1993).

Some of the more general 'market' risks, such as illiquidity, tenant covenant and yield movement are best incorporated by adjusting the target rate of return. Other, property-specific risks such as regular deductions from gross rent, a depreciation rate slowing rental growth, voids and management costs can be reflected in adjustments to the cash-flow. In this way properties of the same type can be grouped together to help estimate a risk premium for a particular sector or sub-sector of the market such as high street shops or secondary industrials on the basis that properties within each sector have similar tenant risks or lease structures. Any remaining costs (fees, management, dilapidations, etc.) can be incorporated by making adjustments to the cash-flow.

It is worth noting that, because the rental growth rate is not part of the target rate of return (as it is with the ARY), the valuation is less sensitive to the choice of target rate than is the case for ARY.

A property is a durable, long-term investment asset and in order to avoid trying to estimate cash-flows far off into the future, a **holding period** of between five and ten years is normally specified, after which a notional sale may be assumed. The length of the holding period can be influenced by lease terms such as the length of the lease or incidence of break clauses or by the physical nature of the property, perhaps timed to coincide with a redevelopment towards the end of the period. But the longer the period the more chance of estimation error when selecting variables.

The notional sale value or **exit value** is usually calculated by capitalising the estimated rent at the end of the holding period at an ARY. When an ARY is used to estimate an exit value it is called an **exit yield** and is usually higher than initial yields on comparable but new and recently let property investments because it must reflect the reduction in remaining economic life of the property and the higher risk of estimating cash-flow at the end of the holding period. The exit yield may reflect land values if demolition is anticipated. Prime yields tend to be fairly stable but care should be taken when choosing an exit yield if the holding period is less than 20 years as it can have a significant impact on the valuation figure. Where an allowance has been made for refurbishment in the cash-flow during the holding period the exit yield should reflect the anticipated state of the property.

6.3.2 Applying the DCF valuation model

6.3.2.1 Rack-rented freehold property investments

A freehold property investment was let recently at £10,000 per annum (receivable annually in arrears) on a 15-year FRI lease with five-year rent reviews. Assuming an initial yield of 8% (from comparable evidence), a target return of 12% (risk-free rate 9%, market risk 2%, property risk 1%), an implied annual growth rate (calculated above) of 4.63% and a holding period of ten years after which a sale is assumed at an exit yield equivalent to today's ARY, the valuation of this property is shown below.

Period (years)	Rent (£)	Growth @ 4.63% p.a.	Projected rent (£)	PV £1 @ 12%	YP in perpetuity @ 8%	PV (£)
1	10,000	1.0000	10,000	0.8929		8,930
2	10,000	1.0000	10,000	0.7972		7,970
3	10,000	1.0000	10,000	0.7118		7,120
4	10,000	1.0000	10,000	0.6355		6,360
5	10,000	1.0000	10,000	0.5674		5,670
6	10,000	1.2539	12,539	0.5066		6,357
7	10,000	1.2539	12,539	0.4523		5,668
8	10,000	1.2539	12,539	0.4039		5,066
9	10,000	1.2539	12,539	0.3606		4,527
10	10,000	1.2539	12,539	0.3220		4,038
10+	10,000	1.5724	15,724	0.3220	12.5	63,289
Valuation						124,986

The net income in each period is discounted at the target rate of return to a present value and these are totalled to obtain a total present value or valuation of the subject property. Because no growth is implied in the target rate the rental income must be inflated at the appropriate times (rent reviews) over the term of the investment to account for growth. At the end of the holding period a notional sale is assumed so the projected rent of £15,724 is capitalised at an exit yield based on the current initial yield of 8% (a YP of 12.5). Figure 6.7 illustrates the way in which the elements of the cash-flow are valued.

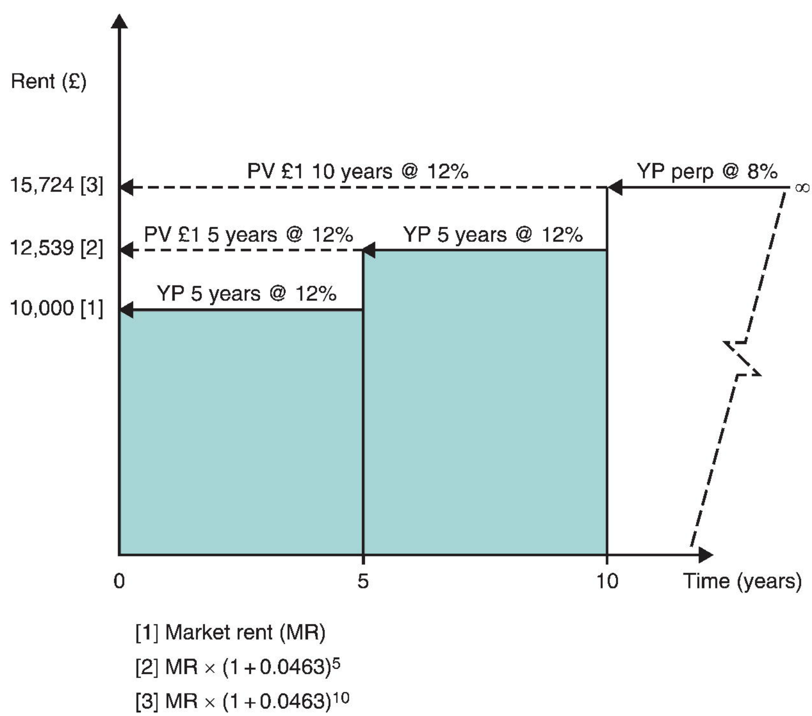

Figure 6.7 Ways in which the elements of cash-flow are valued.

Checking this answer against an ARY valuation, because the rental growth rate has been implied from the relationship between the target rate and the ARY, the answers will be the same.

Market rent (£)	10,000	
YP in perpetuity @ 8%	12.5	
Valuation (£)		£125,000

A rack-rented freehold is least prone to inaccurate valuation using the ARY technique. The advantage of the DCF technique is that more information is presented, use of a target rate enables cross-investment comparisons and specific cash-flow problems such as voids and refurbishment expenditure can be incorporated. DCF valuations are frequently used for complex investment properties where there may be many tenants, all with different covenant strengths, rents, lease terms and rent review dates.

6.3.2.2 Reversionary freehold property investments

As we know from section 6.2 a reversionary property is one where the rent passing is below the market rent. The valuation of a freehold reversionary interest in a retail property let at £10,000 per annum on a lease with three years until the next rent review and a five-year rent review pattern is shown below. A comparable property recently let on a similar review pattern at £15,000 per annum sold for a price that generated an initial yield of 6%. It is assumed that the investor's target rate of return is 13% and the holding period is until the second rent review in 13 years' time.

ARY term and reversion valuation:

Term (contract rent) (£)	10,000	
YP 3 yrs @ 5%	2.7232	
		27,232
Reversion to MR (£)	15,000	
YP in perpetuity @ 6%	16.6667	
PV £1 in 3 years @ 6%	0.8396	
		209,900
Valuation (£)		237,132

DCF valuation:

Using the implied growth rate formula (Equation 6.12 above), the annual growth rate implied by a target rate of 13% and an initial yield of 6% assuming five-year rent reviews is 7.76% per annum.

Years	Rent (£)	Growth @ 7.76% pa	Projected rent (£)	PV £1 @ 13%	YP in perpetuity @ 6%	PV (£)
1	10,000	1.0000	10,000	0.8850		8,850
2	10,000	1.0000	10,000	0.7831		7,831
3	10,000	1.0000	10,000	0.6931		6,931

4	15,000	1.2512	18,772	0.6133		11,513
5	15,000	1.2512	18,772	0.5428		10,189
6	15,000	1.2512	18,772	0.4803		9,016
7	15,000	1.2512	18,772	0.4251		7,980
8	15,000	1.2512	18,772	0.3762		7,062
9	15,000	1.8189	27,284	0.3329		9,083
10	15,000	1.8189	27,284	0.2946		8,038
11	15,000	1.8189	27,284	0.2607		7,113
12	15,000	1.8189	27,284	0.2307		6,294
13	15,000	1.8189	27,284	0.2042		5,571
13+	15,000	2.6436	39,653	0.2042	16.6667	134,954
Valuation						240,425

Baum and Crosby (1995) argue that, in a valuation, it is not really necessary to show cash-flow growth explicitly beyond the point at which the market rent is obtained; that is more appropriate for appraisal, which we will look at in Chapter 7. Instead, a 'short-cut' DCF technique, developed by Sykes (1981) can be used. The technique discounts the term rent (which is fixed and contains no prospect of growth until the next rent review or lease renewal) at the target rate of return and then capitalises the rent receivable on reversion (which has been adjusted to account for any rental growth over the term period) at a growth-implicit ARY but discounted for the period until review or lease renewal at the target rate. If an implied growth rate has been used then the projected rent at the reversion can be capitalised at the market yield for a rack-rented freehold. Mathematically:

$$V = (c \times \text{YP for term at } r) + (\text{inflated } m \times \text{YP in perpetuity at } y \times \text{PV for term at } r)$$

$$= \frac{c\left(1-(1+r)^{-n}\right)}{r} + \frac{m(1+g)^n}{y(1+r)^n} \qquad [6.15]$$

Where c is contract rent for term, m is the market rent, r is the target rate of return, y is the all risks yield and n is the period to next rent revision (next rent review or lease renewal). The valuation would look like this:

Term (contract rent) (£)		10,000	
YP for 3 years @ 13%		2.3612	
			23,612
Reversion to MR (£)	15,000		
growth @ 7.76% pa for 3 yrs	1.2515		
		18,772	
YP in perpetuity @ 6%		16.6667	
PV £1 in 3 years @ 13%		0.6931	
			216,854
Valuation (£)			240,466

Unlike the ARY-based term and reversion technique the short-cut DCF technique shows the correct capital values of the term and reversionary incomes

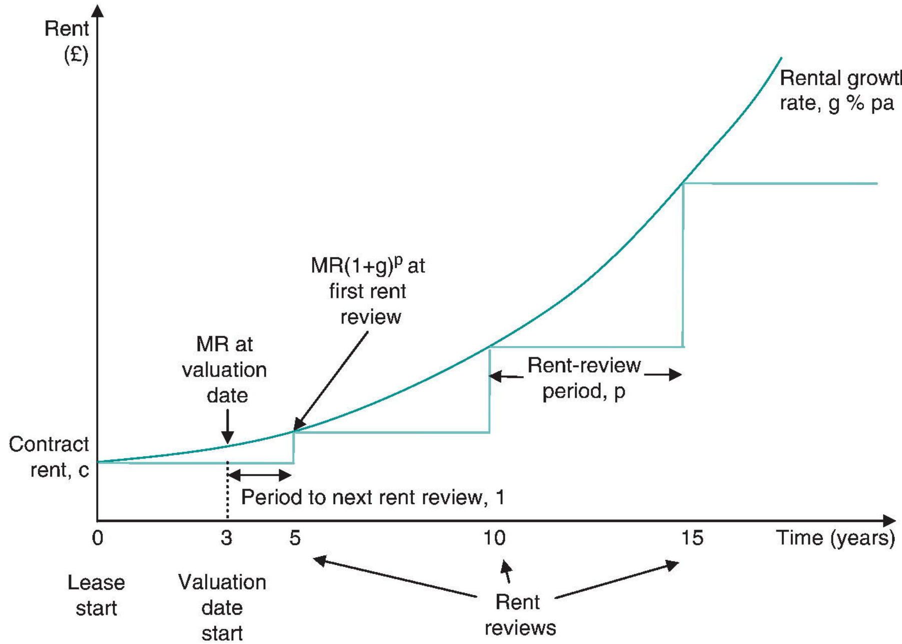

Figure 6.8 Rental growth between rent reviews.

and reveals the growth assumption over the term. It is explicit about the target rate and growth rate up to the first rent review, at which point the market rent (which has been projected at the long-term implied growth rate) is capitalised at the ARY. For properties where the cash-flow is more complex and comparable evidence more scarce a full DCF is perhaps more appropriate but can lead to greater variability between valuers regarding values of key input variables (Harvard, 2000).

It is possible to use the implied rental growth rate formula to derive a growth rate that is implied from the ARY, target rate of return and rent-review period of a reversionary freehold property investment. The mathematics is a little more complex but Brown and Matysiak (2000) provide a clear explanation. Diagrammatically the situation is illustrated in Figure 6.8.

The core and top-slice ARY model (with equivalent yields) for calculating the present value of this investment is adapted from Equation 6.3 in section 6.2:

$$V = (c \times \text{YP into perpetuity}) + ((m - c) \times \text{YP in perpetuity} \times \text{PV for term})$$

$$v = \frac{c}{y} + \frac{m - c}{y(1+y)^n} \qquad [6.16]$$

Where y is the equivalent ARY and the other variables are as defined for Equation 6.15. The ARY implies growth and therefore the rent is not explicitly projected at the growth rate *g*. The DCF model does project rent at the growth rate but, unlike a rack-rented property, there are two periods to incorporate into the calculation; one that lasts until the first rent review and then the normal rent review period thereafter:

$$V = \frac{c\left(1-(1+r)^{-n}\right)}{r} + \frac{m(1+g)^n}{r(1+r)^n}\left[\frac{(1+r)^p - 1}{(1+r)^p - (1+g)^p}\right] \qquad [6.17]$$

Where n is the period to the next rent revision and p is the rent review period. If we assume that the present values from each model produce the same answer we can calculate the implied growth rate for a reversionary property investment. To see how this works, take an example where the ARY is 8%, the TRR is 12%, the rent review period is five years (for a rack-rented property investment the growth rate implied by these figures would be 4.63% per annum) but the period to next review is two years. The contract rent is £8,000 per annum and the current market rent is £10,000 per annum. An ARY core and top-slice technique assuming an equivalent yield of 8%, produces the following valuation:

$$V = \frac{8{,}000}{0.08} + \frac{10{,}000 - 8{,}000}{0.08(1+0.08)^2} = 100{,}000 + 21{,}433 = £121{,}433$$

If we assume that a DCF valuation produces the same valuation, using spreadsheet iteration in the final stage, g can be calculated as follows:

$$121{,}433 = \frac{c\left(1-(1+r)^{-n}\right)}{r} + \frac{m(1+g)^n}{r(1+r)^n}\left[\frac{(1+r)^p - 1}{(1+r)^p - (1+g)^p}\right]$$

$$121{,}433 = 13{,}520 + \frac{10{,}000(1+g)^2}{0.1505}\left[\frac{0.7623}{1.7623 - (1+g)^5}\right]$$

$$\therefore g = 0.0455 = 4.55\%$$

Therefore the implied growth rate from this reversionary property is slightly lower than from the rack-rented equivalent because the rental growth will arrive sooner due to the rent review in two years' time rather than in five years.

6.3.2.3 Leasehold property investments

Baum and Crosby (1995) argue that a leasehold property investment producing a fixed profit rent over its entire term produces a risk that is almost entirely dependent upon the quality of the sub-tenant: a cash-flow from a good quality tenant is similar to the return from a fixed income bond plus a suitable risk premium. The target rate used to discount a fixed profit rent is therefore likely to be derived from comparison to other fixed income investments such as gilts with similar maturity dates. This approach is more logical and is not based on questionable comparisons with the freehold investment market (see section 7.2).

If the profit rent is variable then there is a gearing effect. Basically if a fixed head-rent is deducted from a sub-rent which includes rent reviews the resultant profit rent must vary by an amount greater than the variation in the sub-rent itself. The magnitude of this variability depends on the size of the fixed deduction of head-rent from the variable sub-rent and can be expressed as the income-gearing ratio. To illustrate this consider three property investments: a freehold, a leasehold where the head-rent is very similar to the sub-rent and another leasehold where the sub-rent is very much larger than the head-rent. All three investments generate an initial income of £100,000 per annum subject to annual rent reviews and rental growth is estimated to be 5% per annum. As can be seen from Table 6.1 the income from the freehold investment grows at the rental growth rate of 5% per annum. The first leasehold investment receives a £900,000 per annum sub-rent and pays a £800,000 per annum head rent, leaving £100,000 per annum profit rent. The second leasehold receives a £110,000 per annum sub-rent and pays a £10,000 per annum head rent, leaving £100,000 per annum profit rent.

Except where the head rent is a peppercorn (very low) rent, rental growth for a leasehold profit rent is greater than the rental growth on an equivalent freehold. The growth rate diminishes at each subsequent rent review and tends towards the market rental growth rate in perpetuity (Baum and Crosby, 1995). The income-gearing ratio for the first leasehold is 89% and for second it is 9% and the way that a profit rent might be expected to grow depends on this ratio. Use of an ARY technique (even the single rate approach described in section 6.2) is hard to justify because of heterogeneity of interests and potential complexity profit rent cash-flows. Similarly, identifying a market target rate of return for leaseholds with variable and geared profit rents is difficult as each investment opportunity will have unique ratios between head-rent and sub-rent leading to individual profit rent cash-flows and gearing circumstances. Furthermore, there will also be differences in terms of tenant quality and remaining lease term. The leasehold target rate must relate to the lease structure and any profit rent gearing and Baum and Crosby (1995) suggest that attention should focus on the choice of risk premium when moving from a freehold to a leasehold target rate. Other cash-flow variables such as the head-rent, rent reviews and so on can be incorporated in the cash-flow.

Freehold investment transactions can be analysed to derive a suitable rental growth rate which can be applied to the leasehold investment cash-flow and this should be done in preference to estimating a growth rate that is implied by the relationship between target rate and ARY on a leasehold investment because of the heterogeneity of cash-flows from leasehold investments (Baum and Crosby, 1995). If the leasehold includes a head rent and sub-rent both with rent reviews at the same time and both rents are assumed to grow at the same rate then the profit rent would grow at the same rate as the growth in market rent for a freehold. But in cases where the rent reviews in the sub-lease (say every five years) are different to those in the head-lease (say every 15 years) the complexities are best handled by a full DCF rather than a short-cut. As an example the leasehold investment described in section 6.2 will be valued again but this time using a DCF technique. Assuming a target rate of 10% and an ARY of 6% for freehold property this implies rental growth of 4.47% per annum. But the target rate at which the cash-flow from a leasehold investment is discounted must be adjusted to reflect additional risk. Here the adjustment is from 10% to 15%.

Table 6.1 Geared leasehold profit rents.

Year	Freehold initial net income	Freehold income growth (%)	Leasehold 1 initial net income	Leasehold 1 income growth (%)	Leasehold 2 initial net income	Leasehold 2 income growth (%)
0	£100,000	–	£100,000	–	£100,000	–
1	£105,000	5.00%	£145,000	45.00%	£105,500	5.50%
2	£110,250	5.00%	£192,250	32.59%	£111,275	5.47%
3	£115,763	5.00%	£241,863	25.81%	£117,339	5.45%
4	£121,551	5.00%	£293,956	21.54%	£123,706	5.43%
5	£127,628	5.00%	£348,653	18.61%	£130,391	5.40%
6	£134,010	5.00%	£406,086	16.47%	£137,411	5.38%
7	£140,710	5.00%	£466,390	14.85%	£144,781	5.36%
8	£147,746	5.00%	£529,710	13.58%	£152,520	5.35%
9	£155,133	5.00%	£596,195	12.55%	£160,646	5.33%
10	£162,889	5.00%	£666,005	11.71%	£169,178	5.31%
…						
40	£703,999	5.00%	£5,535,990	5.76%	£764,399	5.07%
41	£739,199	5.00%	£5,852,789	5.72%	£803,119	5.07%
42	£776,159	5.00%	£6,185,429	5.68%	£843,775	5.06%
43	£814,967	5.00%	£6,534,700	5.65%	£886,463	5.06%
44	£855,715	5.00%	£6,901,435	5.61%	£931,287	5.06%
45	£898,501	5.00%	£7,286,507	5.58%	£978,351	5.05%
46	£943,426	5.00%	£7,690,832	5.55%	£1,027,768	5.05%
47	£990,597	5.00%	£8,115,374	5.52%	£1,079,657	5.05%
48	£1,040,127	5.00%	£8,561,143	5.49%	£1,134,140	5.05%
49	£1,092,133	5.00%	£9,029,200	5.47%	£1,191,347	5.04%
50	£1,146,740	5.00%	£9,520,660	5.44%	£1,251,414	5.04%

Years	Rent received (£)	Growth @ 4.47% pa	Inflated rent (£)	*Less* rent paid (£)	Profit rent (£)	PV @ 15%	PV (£)
1	30,000	1.0000	30,000	–10,000	20,000	0.8696	17,392
2	30,000	1.0000	30,000	–10,000	20,000	0.7561	15,122
3	35,000	1.0913	38,196	–10,000	28,196	0.6575	18,539
4	35,000	1.0913	38,196	–10,000	28,196	0.5718	16,122
5	35,000	1.0913	38,196	–10,000	28,196	0.4972	14,019
6	35,000	1.0913	38,196	–10,000	28,196	0.4323	12,189
7	35,000	1.0913	38,196	–10,000	28,196	0.3759	10,599
8	35,000	1.3578	47,523	–10,000	37,523	0.3269	12,266
9	35,000	1.3578	47,523	–10,000	37,523	0.2843	10,668
10	35,000	1.3578	47,523	–10,000	37,523	0.2472	9,276
11	35,000	1.3578	47,523	–10,000	37,523	0.2149	8,064
12	35,000	1.3578	47,523	–10,000	37,523	0.1869	7,013
Valuation							151,269

Two important criticisms of the DCF approach are that growth is unlikely to be constant over the life of the investment and the target rate of return is subjectively estimated and possibly different for lease term and reversion part of cash-flow.

6.3.2.4 Example: Valuation of a city centre office block

You have been asked to value, for sale purposes, the freehold and head-leasehold interests in the property described below. The valuation date is 1 April 2012. The property was constructed in 1980 and is located in the central business district of Bristol. It comprises a basement (used for storage) with five floors above (including the ground floor). Externally, notable features include glazed exterior cladding, a high quality entrance and reception area on the ground floor and a secure barrier to the car park at the rear. The office accommodation is open plan and finished to a reasonable specification (suspended ceilings and perimeter-trunking but no air-conditioning or raised floors). There are two lifts serving all floors. Car parking is rather restricted due to the location of the property in the centre of the city but access to the railway station and main bus routes is good. The property is also close to the main retail area of the city. Occupying tenants can internally partition the floor-space under the terms of the leases. With regard to maintenance of the building, each occupying tenant pays a portion of the annual service charge to the landlord. The floor area that each tenant occupies is used to apportion the service charge between tenants. The service charge pays for the cleaning of common parts, general repairs, services, lighting to common parts, lifts, insurance and management. The tenants pay for their own cleaning and lighting.

6.3.2.5 Head-lease

Y is the landlord of the site which was let to Z on a 125-year ground lease in 1995. The initial rent that was agreed was £10,000 per annum and the landlord has no responsibility for the insurance or repairs of the office building on the site.

Table 6.2 Sub-leases.

Floor	Tenant	Use	Business	Covenant[1]	Area (m^2)	Current rent (£)	Date lease commenced	Length of lease (yrs)
Basement	A	Store	Solicitors	Good	305	21,350	2004	15
Ground	A	Office	Solicitors	Good	251[2]	40,160	2010	10
First	B	Office	Insurance	Good	449	76,330	2012	15
Second	C	Office	Travel	Poor	449	49,390	1995	25
Third	D	Office	Surveyors	Average	449	69,595	2007	10
Fourth	E	Office	Publishers	Poor	398	55,720	2004	15
Totals					2,301	312,545		

[1] The covenant describes the quality of the tenant in terms of ability to meet the terms of the lease. It is a subjective measure of the security of the income.

[2] *Entrance and reception areas are on this floor.*

Table 6.3 Service charge details.

Item	Cost (£/m²)
Staff	3.50
cleaning of common parts	2.00
general repairs	5.00
Services	2.75
lighting to common parts	1.25
Lifts	2.75
Insurance	2.75
Management	2.50
Total	22.50

Table 6.4 Service charge apportionment.

Floor	Sub-tenant	Use	Area (£/m²)	Service charge (£)
Basement	A	Store	305	3,431.25
Ground	A	Office	251	5,647.50
First	B	Office	449	10,102.50
Second	C	Office	449	10,102.50
Third	D	Office	449	10,102.50
Fourth	E	Office	398	8,955.00

The rent payable under the ground lease is reviewed every 25 years. At each review the rent is reviewed to the existing ground rent plus 5% of the estimated market rent of the head-lease in excess of the existing ground rent. The wording of the rent review clause in the ground-lease permits the head-lease to be valued assuming the building is vacant and to let.

6.3.2.6 Occupational sub-leases

All of the occupational sub-leases specify that the sub-tenants are responsible for all repairs and insurance (non-internal repairs and insurance payable via the service charge) and are subject to five year, upward only rent reviews. Table 6.2 lists the details of the sub-leases.

Each occupying sub-tenant must pay a portion of the annual service charge, itemised in Table 6.3.

This total service charge per square metre is then apportioned between the sub-tenants on a floor area basis with a reduction of 50% for the basement store. The apportioned charges are listed in Table 6.4.

After a review of your firm's internal records and discussions with colleagues at other surveying firms in the city, three properties have recently been the subject of transactions that provide comparable evidence for your subject property:

a) The basement of the office building next door was recently leased to the publishers who occupy the fourth floor of the subject property for additional archiving and general storage. The lease was agreed on standard terms for a

Table 6.5 Current and full rental values of the sub-leases.

Floor	Tenant	Date lease commenced	Length of lease (yrs)	Contract rent (£)	Next rent review	Current market rent (£)
Basement	A	2004	15	21,350	2014	27,450
Ground	A	2010	10	40,160	2015	42,670
First	B	2012	15	76,330	2012	76,330
Second	C	1995	25	49,390	2015	76,330
Third	D	2007	10	69,595	2012	76,330
Fourth	E	2004	15	55,720	2014	67,660
Totals				312,545		366,770

period of five years at an effective rent of £90/m². This provides evidence of the current market rent for storage space in this type of building.

b) The letting of the first floor of the subject property to the insurance company was recent and agreed on standard terms. It therefore provides good evidence of current market rent for the office space. The rent agreed equates to £170/m².

c) The fifth (top) floor of the office building next door was recently let on standard terms. The lease was for a term of 15 years at a rent that equates to £150/m². However, on inspection of this building it is noted that the lift only goes up to the fourth floor and clearly a reduction to the 'normal' market rent for office space in this area has been made to take this into account.

It is decided that the comparable evidence in (c) will be classed as secondary due to the poor lift access. Thus the current market rent for office space in this locality is estimated to be £170/m². The comparable evidence of market rents for storage and office space is used to calculate the current market rents for each floor of the subject property, shown in Table 6.5.

6.3.2.7 Valuation of the freehold interest

Term:				
Current (contract) head rent (£)			10,000	
YP 8 years @ 8%			5.7466	
				57,466
Reversion:				
Market rent of occupation leases (£)	366,770			
less current head rent (£)	–10,000			
	356,770			
5% share	0.05			
		17,839		
plus rent passing (£)		10,000		
			27,839	
YP in perpetuity @ 10%			10.000	
PV £1 for 8 years @ 10%			0.4665	
				129,871
Valuation (£)				187,337

6.3.2.8 Valuation of the head-leasehold interest

Given the long length of the ground-lease (125 years) and the relatively low ground rent (currently £10,000) this interest will be valued as though it were a freehold. The difference is negligible; the YP for the remainder of the ground lease (108 years) at 11% is 9.0906 whereas the YP in perpetuity at 11% is 9.0909. There are various ways of setting out this type of valuation; lease by lease, unit by unit or year by year. The latter approach is adopted here, and so the valuation takes the form of a cash-flow. It runs year-by-year until the rent on each floor is reviewed to market rental value and the review of the ground rent has taken place in eight years time. The main decision that a valuer must make is the choice of TRR. Although this long leasehold interest is, in many ways, similar to a freehold interest, it is ultimately a wasting asset and usually not as desirable. The TRR should reflect such market perception as well as opportunity cost of capital, potential for growth and a return for risk taken. TRR choice is always difficult and is particularly so with interests such as this where comparable evidence is hard to obtain. In practice different TRRs may be applied to the capitalisation of the various rental income streams. For example, a higher TRR may be adopted for the capitalisation of the reduced profit rent receivable after the review of the ground rent in 2013. Similarly, different rates may be chosen depending on which sub-tenant the rental income originates from. This may help to reflect the security value of each portion of the rental income. The following assumptions have been made: rent is received annually in arrears, the all risks yield and exit yield are both 10%, the target rate of return is 12% and the rent review period is five-yearly, implying an annual rental growth rate of 2.42% per annum.

Tenant A - Basement		
Current rent	21,350	
YP 2 years @ 12%	1.6901	
		36,084
Reversion to market rent	27,450	
FV £1 2 years @ 2.42% pa	1.0490	
YP perp @ 10%	10	
PV £1 2 years @ 12%	0.7972	
		229,554
		265,638
Tenant A - Ground Floor		
Current rent	40,160	
YP 3 years @ 12%	2.4018	
		96,456
Reversion to market rent	42,670	
FV £1 3 years @ 2.42% pa	1.0744	
YP perp @ 10%	10	
PV £1 3 years @ 12%	0.7118	
		326,322
		422,778

Tenant B - First Floor			
Current rent (market rent)	76,330		
YP perp @ 10%	10		
		763,300	
Tenant C - Second Floor			
Current rent	49,390		
YP 3 years @ 12%	2.4018		
		118,625	
Reversion to market rent	76,330		
FV £1 3 years @ 2.42% pa	1.0744		
YP perp @ 10%	10		
PV £1 3 years @ 12%	0.7118		
		583,740	
		702,365	
Tenant D - Third Floor			
Current rent	69,595		
YP 1 years @ 12%	0.8929		
		62,141	
Reversion to market rent	76,330		
FV £1 1 year @ 2.42% pa	1.0242		
YP perp @ 10%	10		
PV £1 1 year @ 12%	0.8929		
		698,044	
		760,185	
Tenant E - Fourth Floor			
Current rent	55,720		
YP 2 years @ 12%	1.6901		
		94,172	
Reversion to market rent	67,660		
FV £1 2 years @ 2.42% pa	1.0490		
YP perp @ 10%	10		
PV £1 2 years @ 12%	0.7972		
		565,815	
		659,988	
Capital value of sub-leases			3,574,254
Head-lease			
Current ground rent	10,000		
YP 8 years @ 12%	4.9676		
		49,676	
Reversion to market ground rent	27,839		
YP perp @ 10%	10		
PV £1 8 years @ 12%	0.4039		
		112,442	
Value of head-lease (to be deducted)			−162,118
Value of head-leasehold interest			3,412,136

Key points

- The yield describes ratio of income to capital value and is used to compare investments because yields are often comparable for similar types of property in the same area. The unit of comparison for rack-rented freeholds is the current rental income yield (initial yield) and for reversionary investments it is the equivalent yield. A **running yield** follows changes in income as a result of rent reviews, rent steps, cost changes, etc.
- The value of an investment depends on expected rental income and the yield. Capital value is very sensitive to changes in yield. The yield used to capitalise property investments is known as the all risks yield (ARY) and it is based on initial yields derived from the analysis of recent transactions of comparable property investments.
- With freehold property investments there is a limit (based on land value) to any loss that may be incurred but for leaseholds a decline to nil value must eventually be suffered (Baum, 1991). A leasehold interest can only have investment value if it produces income via a profit rent and is assignable. The conventional method of valuing leasehold investments was to convert the terminable interest (mathematically at least) into the equivalent of a freehold investment – the use of yields derived from freehold investments could then be justified. Valuers now tend to look much more closely at the nature of the cash-flow from a leasehold investment before applying a yield or yields.
- The ARY model does not explicitly reveal the total return that an investor expects; instead, future rental income is discounted (capitalised) at a rate that implies that the investor expects the income to grow in order to achieve a target rate of return. The DCF model involves selecting a suitable holding period, forecasting the cash-flow over this period and selecting an appropriate target rate and exit yield. All of these assumptions should reflect market behaviour so valuers need to interpret activities and expectations of market participants (Appraisal Institute, 2001).
- The value of an investment can be considered to be a multiple of the current rent where the multiplier is the reciprocal of the investor's required income yield (ARY valuation technique) or the present value of the expected future cash-flow (DCF valuation technique) (Fraser, 1993). Techniques vary depending on the extent to which assumptions are made explicit. For example a valuer may wish to include an explicit growth rate forecast rather than imply a long-term average from analysis of comparable evidence, or depreciation may be explicitly accounted for in the cash flow. The problem with being more explicit is that there is greater potential for valuation variance (Havard, 2000).
- The DCF technique is better at isolating factors affecting future income flow from those that affect the target rate of return required by the investor, thus allowing direct comparison with other investment opportunities. It can also deal with complexity and reveal assumptions explicitly. In cases where a property presents a non-standard pattern of income a DCF approach will usually be preferable. For example investments with a ground lease and an occupational lease granted at different times, phased development projects or leaseholds where the head-lease has infrequent reviews and the sub-lease does not. The DCF approach provides more information and helps focus attention on fundamental characteristics that the investor will be interested in, namely income growth, depreciation, the

holding period, timing of income and expenditure and the target rate of return. Rent tends to be subject to depreciation and capital values to obsolescence and the effect of these can be handled explicitly by adjusting the rental growth rate and exit yield or implicitly by adjusting the target rate of return (Sayce et al., 2006).

- Choice of method is a matter of availability of evidence and complexity of the property interest being valued: use the ARY technique when investments have a standard pattern of income and rent reviews, use the DCF technique for complex interests, long reversions and short leaseholds. When valuing leasehold investments complex gearing effects are much more suited to detailed cash-flow analysis rather than simple yield capitalisation.
- Long FRI leases meant net income capitalisation was easy. With short leases (together with associated vacancy re-letting costs) and increasing running costs (service charge, etc.), DCF is more appropriate.
- Whatever valuation technique is employed it must reflect the behaviour of market participants. Recourse to comparable evidence (which is generated by market transactions) whenever possible and the adoption of pricing models that are used by market participants will undoubtedly be the most reliable and consistent way of estimating market price.

Notes

1. It is assumed that, even though freehold property investments are usually let on leases of fixed terms, the property will re-let on expiry of current lease. Therefore, rent can be regarded as perpetual. This assumption might be altered if redevelopment or the like is planned, in which case a discounted cash-flow is more able to handle these sorts of cash-flow details – see later.
2. The relationship between the IRR and NPV is actually non-linear.
3. The remunerative rate for leasehold investments is typically 1-2% above comparable freeholds to reflect the top-slice nature of profit rent, the dual contractual burden suffered by leaseholder, risk of dilapidations expenses inherited from previous tenants (Baum and Crosby, 1995) and also to reflect the poor marketability of the interest and the cost of managing a sinking fund and purchasing another investment at the end of the lease.

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Chapter 7
Profits Method

7.1 Introduction

Certain types of property are inextricably linked to the businesses that operate from them: special characteristics of the real estate itself are central to the capacity of the business to generate profit. Such trade-related properties might be regarded as specialised either because they are purpose built, owner-occupied or have some monopoly value due to their unique location, legal status or planning permission. Consequently the attributes of the property with regard to the business operating therein are more important than the flexibility of the property for change of use. For example, a property (or, more accurately) the proprietor, may have a licence to conduct a particular type of business: to sell wines, beers and spirits in a public house, restaurant or hotel say. Such licences may, in combination with the location of the property, make for strong trading potential such as a petrol station on a busy road into town. Other businesses may trade well simply on the basis of their location alone; garden centres, theme parks, cinemas, theatres, car parks and so on.

For most types of commercial property, valuers do not need to determine the profitability of the business undertaken in the property in order to estimate a rent because they are able to examine comparable rents agreed and yields obtained in the market. But market evidence of rental values and capital values of trade-related properties is often difficult to acquire in the local area, firstly, because this type of business is usually sold as a going concern to an owner-occupier and, secondly, because of the specialist nature of these types of properties. Because the business and the real estate are closely linked, and tend to be bought and sold as operational entities rather than as vacant units, these premises are valued by capitalising their estimated future trading potential (as opposed to capitalising estimated rental income).

Property Valuation, Second Edition. Peter Wyatt.

Some trade-related properties are more commonplace than others: pubs, restaurants, hotels and entertainment complexes for example, so it may be possible to make comparisons with similar trades on a wider geographical scale, perhaps examining profit made per hotel bedroom or nightclub floor for example. Leisure properties tend not to make a standard amount of profit per square foot so comparison metrics based on unit floor areas are not particularly useful. Generally speaking evidence of comparable market transactions is limited and, even when available properties may be sold as part of a portfolio or business and individual property values are difficult to isolate. Trade-related properties are not usually held on a leasehold basis because of the significant investment in fixtures, fitting, furniture and equipment; consequently there is not much rental evidence. Having said this Hayward (2009) notes that an expanding leisure industry has led to more rental evidence but it is important to consider differences between properties such as lease length (which is typically longer for leisure properties) and user clauses (which are often more restrictive than those found in standard commercial leases due to specific planning permission or licensing for the use). Improvements and fit-outs are often more expensive and more frequently undertaken than on standard commercial premises and therefore it is particularly important to check the handling of tenants' improvements at rent review. Some small businesses such as a hotel, guest house or pub might attract purchasers willing to pay a price that includes a non-pecuniary return as well as capitalised financial income because it represents a lifestyle or location that they desire.

7.2 Method

Trade-related properties are valued on the basis of their potential net profit adjusted to reflect the trading of a reasonably efficient operator. This adjusted net annual profit is then either (a) capitalised at an appropriate yield to arrive at a capital value from an occupier's perspective or (b) divided into two, one portion of which is assumed to be available as rent for the premises in which the business takes place and the other portion is a residual profit for the operator of the business. The rent portion may be capitalised at an appropriate investment yield to arrive at a capital value from an investor's perspective. The method is therefore based on two economic assumptions; that the business makes a profit and that rent is a surplus paid out of this profit. It is also assumed that the current trading activity represents the optimum use of the property and that the business is efficiently run.

The property valuation is undertaken assuming that the business, will at all times, be effectively and competently managed, operated and promoted and that it is properly staffed, stocked and capitalised. The valuation includes land, buildings, trade fixtures, fittings, furnishings and equipment associated with the business and assumes that they are working and owned outright. It also includes market perception of inherent trading potential including transferable goodwill (i.e. attached to the property) and assumes that advanced bookings and order books can be transferred and that existing licences, consents, permits, certificates and registrations can be obtained and renewed. Moreover, freeholds are often offered for sale with the benefit of a trade inventory. The valuation excludes personal goodwill, wet and dry consumable stock and any badged items and the value attached to brand name should be separately identified. Value significant factors for trade related properties are shown in Box 7.1.

The first step is to estimate the **fair maintainable turnover** (FMT) that could be produced at the premises by a **reasonably efficient operator** (REO) on a year-by-year basis. FMT is defined as the '…level of trade that an REO could achieve assuming that the property is property equipped, repaired, maintained and decorated' (RICS, 2012: 90). It excludes any trade that can be attributed to personal goodwill of a specific operator.

The second step is to assess potential annual gross profit resulting from the FMT and from this an estimate is made of **fair maintainable operating profit** (FMOP). This is annual profit before depreciation and finance costs (including rent if leasehold) have been deducted but after an appropriate annual deduction for maintenance and repair, which may take the form of an annual sinking fund to cover periodic replacement of items. The estimate of profit will refer to income, expenditure and the operator's capital. Typically, these figures will be reported in the company's annual accounts, the previous three to five years of which should be analysed to identify whether the profit is maintainable over a period of time. It is advisable to examine profit over several years because profit in any one year may be due to exceptional circumstances. Audited accounts are to be preferred

Box 7.1 Value significant factors for trade-related properties

Property

- Efficiency of layout
- Level of comfort afforded in trading areas (e.g. floor-space per cover in a restaurant)
- Number and quality of rooms
- Quality of owner's accommodation
- External facilities
- Repair

Business

- Licenses, agreements, leases – look at detail such as restrictions on live entertainment, Beer supply agreements – basically 'soft' loans for refit etc. and paid back by discounting beer supply. But is this cheaper than going to market for discount supply? Can affect gross profit by 3–4%
- Compliance with Environmental Health and Fire Auth regulations
- Customer profile (age, type – demographic)
- Opening hours and peak trading periods (loss-making during week?)
- Staffing: costs, efficiencies of layout (valuations usually assume two-person proprietary team so record any variation from this assumption)[1]
- Tariffs (needed to assess gross yields): beer and wine tariff (compare to local area, last price increase?), catering, accommodation – discounting, occupation levels, average room rate, ration between rack room rate and average room rate
- Expenses; purchasing arrangements, promotion, functions, entertainments, methods of payment
- Trading information; accounts (purchase invoices are last resort), VAT returns, net sales per qtr, stock-takers reports and records, weekly / monthly records, management accounts

but should not necessarily be accepted at face value. It should be borne in mind that profit and loss accounts may be prepared for various purposes and when using them to estimate FMOP it is important to consider whether the business has more than one property. This is because consolidated accounts may not apportion expenditure on marketing, training, accountancy, depreciation, cyclical repairs or management expenses for head office premises between each property. When analysing accounts information, particular attention should be paid to:

- Costs associated with a head office (if relevant).
- Accounts of an owner occupied business may not show management salaries or director's remuneration.
- Depreciation policies vary and valuers should 'add back' depreciation that has been deducted when assessing maintainable profit.
- Adjustments to reflect repair and maintenance as well as refitting and re-equipping.
- Treatment of tips and effect on stated turnover and wage costs.
- Business mix, profit potential and risk attached to each component.
- For licensed properties the gross profit should reflect actual and projected terms of any supply tie (where operator is tied to the landlord for all or part of supplies).
- If the interest is leasehold, adjust to reflect ERV for the business rather than rent passing at the valuation date.

An inspection of the business identifies likely sources and amounts of income and expenditure and provides a basis for comparison with the accounts. The valuer should look for any unusual items and conditions such as cash sales and purchases, multiple bank accounts or additional revenue such as tips in the case of licensed premises. Purchases and working expenses including wages, repairs, insurance, rates, running costs, marketing, printing and stationery (but not rent, mortgage payments and depreciation) are then deducted to arrive at an **adjusted net annual profit** of the trading entity. This can be used to help estimate the FMOP of the property to be valued. When assessing whether the profit is maintainable it is important to consider impact of competition in terms of its degree (volume, local/regional/national), type (level and style) and the extent to which it is detrimental or indeed beneficial.

It must be stressed that the valuation of trade-related properties is a specialist area and requires a thorough understanding of the business for which the property is being used. Enquiries should be made into the background and history of the business – how long has the current operator owned it for, how much was paid for the business, was a mortgage taken out to help fund the acquisition and, if so, is the mortgage valuation available for inspection? Operators of small-scale and family-run businesses may use some personal items and capital to run the business and these costs may not be reflected in the annual accounts; these costs should be identified and added to the working expenses. Such items might include salary or remuneration to the proprietor, interest payments on personal loans used to support the business, depreciation of property and reduced wages to family members. However, if the market for the business in question generally encompasses family-run employees then this should be acknowledged (Hayward, 2009). If the information in the accounts does not contain sufficient detail the company should provide trading information on a property by property basis for current and previous years, perhaps including receipts if necessary and percentages of gross turnover allocated to individual income and expenditure sources.

It is useful to calculate gross and net yields, wage ratios and plot trends in key figures such as staff costs, turnover and so on over several years. If there are any peculiarities from year to year or season to season which distort the pattern of trade then these ratios will help to indicate these. The profits method assumes the business is operated at maximum capacity but some operators choose to undertrade, or indeed generate an extraordinary level of trade perhaps resulting from excessive levels of personal goodwill. It is useful, therefore, to assess the physical capacity of premises and compare this to the actual turnover data. This is more difficult in the case of new asset classes since the relationship between business and underlying property asset is unknown.

If the property is to be valued assuming that it is a fully equipped operational entity then care must be taken regarding how any trade inventory is handled. Some plant, machinery and equipment (tangible assets) may not be owned outright – they may be leased. Assumptions will need to clearly state how these things are handled. It may be assumed that leasing agreements can be transferred on sale. If they can't then the impact on valuation should be considered. Also need to think about how licences and other statutory consents can be transferred or renewed. The valuation may be subject to certain Special Assumptions and typical ones are (RICS, 2012: 24 and 63–64):

a) the business is trading when in fact it is not, or *vice versa*;
b) a trading inventory is included when in fact it is not, or *vice versa*;
c) trade has ceased and no trading records are available;
d) the fully equipped operational entity has yet to trade (a 'Day One' valuation);
e) subject to stated trade projections, assuming they are proven (appropriate for a new development);
f) accounts or records of trade would not be available to, or relied upon, by a prospective purchaser;
g) the licenses, consents, certificates and/or permits required in order to trade from the property are lost or are in jeopardy;
h) the business will continue to trade on its present terms, including any ties to the landlord for supply of liquor, gaming machines or other goods and services;
i) the valuation reflects the least cost to replace all elements of the service potential of the property to the owner of the interest being valued, which may include the margin gained from tied wholesale supplies of goods or the supply of services.

In licensed premises, the landlord may collect a share of some revenue (amusement machines, for example), at source in addition to property rent. For businesses operating from standard retail units, it may be appropriate to value on a floor area rate basis, but with regard to lease provisions, comparables and fit-out obligations.

Once the valuer is satisfied with the estimate of FMOP, the market valuation can take two forms: an estimate of capital value or an estimate of rental value.

To calculate capital value, FMOP is capitalised at a rate of return that reflects risk and rewards of the property and its trading potential. Where possible, comparable evidence would be used to select an appropriate rate. To estimate market rent a deduction is made from FMOP to reflect a return on any tenant's capital invested in the business[2] (such as cost of trade inventory, stock and working capital). The remaining amount is referred to as the **divisible balance** which is apportioned between landlord and tenant, having regard to the risks and rewards of each, with the landlord's proportion representing the annual rent. The rent portion is conventionally between 40 and 50 per cent with a more precise figure derived from comparison to similar businesses. It is this rent portion that is capitalised at an investment yield to arrive at an investment value for the business.

7.3 Example of a profits method valuation

Generically, a profits method valuation might proceed as follows. Accounts information is obtained from the company secretary and the following details are extracted.

Accounts information	£
Gross takings / turnover	708,750
Value of inventory (FFFE)	250,000
Value of stock at year start	105,000
Value of stock at year end	95,000
Cash (say 1 month's working expenses)	21,000
Value of operator's capital	271,000
Purchases	45,000
Staff costs	200,000
Operator's remuneration	50,000
Running expenses:	
Utilities	3,500
Rates	36,000
Building insurance	1,000
Annual repair & maintenance	2,500
Cleaning	2,500
Marketing	1,000
Contribution to HQ overheads	2,000
Contents insurance	1,250
Total running expenses	49,750

To value the premises, purchases and any depreciation in the value of stock is deducted from the gross turnover (any appreciation in value of stock is added). From the resulting gross profit, running expenses including wages and other staff-related costs are deducted to arrive at a net profit. From this figure, operator's remuneration and interest on operator's capital (assumed to be 10% per annum here) are deducted to arrive at an adjusted net profit. This figure is capitalised at appropriate yield, 10% in this case.

Property valuation	£	£
Gross takings / turnover	708,750	
Less purchases	−45,000	
Adjustment for appreciation / depreciation in value of stock	−10,000	
Gross profit	653,750	
Less running expenses	−49,750	
Less staff costs	−200,000	
Net profit	404,000	
Less operator's remuneration	−50,000	
Less interest on tenant's capital	−27,100	
Adjusted net profit	326,900	
Capital Value:		
Adjusted net profit	326,900	
x YP in perpetuity @	10	
Capital value of property		3,269,000

If the value of the business as a whole is also required then the value of the inventory, stock and cash float can be added to the value of the premises, as follows.

Business valuation	£
Capital value of property	3,269,000
Plus value of inventory	250,000
Plus ave value of stock for year	100,000
Plus cash	21,000
Capital value of business	3,640,000

To see how this might be applied to a specific type of trade-related property, consider a 50-bed hotel which has an average annual occupancy of 50% and

Table 7.1 Information extracted from hotel accounts.

Income	£	Expenditure	£
Accommodation (£70 x 365 days x 50 rooms x 50% occupancy)	638,750	Purchases during the year	45,000
Bar	45,000	Wages	200,000
Restaurant	25,000	Utilities	3,500
		Laundry and cleaning	2,500
Stock		Business rates	36,000
Value on 1 Jan	105,000	Advertising	1,000
Value on 31 Dec	95,000	Contents insurance	1,250
Value of fixtures, fittings, furniture and equipment	250,000	Repairs and renewals	2,500
		Building insurance	1,000
		Repairs to building[3]	1,500
		Mortgage[4]	1,250
		Contribution to HQ costs	2,000
		Operator's remuneration	50,000

charges, on average, £70 per room per night. To value this property, first, use the comparison method to check whether £70 is a reasonable price and whether the occupancy rate is satisfactory compared to other hotels in the area. The data in Table 7.1 has been extracted from the accounts and the next step is to ensure that all sources of revenue are accounted for. The premises are held on a freehold basis and the hotel is part of a small chain and must contribute towards head office overheads. The valuation is set out below.

FMT			
Accommodation (£)		638,750	
Bar (£)		45,000	
Restaurant (£)		25,000	
			708,750
Cost of sales			
Purchases (£)		−45,000	
Adjustment for depreciation in value of stock (£)	1 Jan: £105,000		
	31 Dec: £95,000	−10,000	
			−55,000
Gross Profit (£)			**653,750**
Less running expenses (including staff costs)			
Wages (typically 30–35% of turnover) (£)		−200,000	
Utilities (£)		−3,500	
Laundry & cleaning (£)		−2,500	
Rates (£)		−36,000	
Advertising, stationery, telephone, postage, etc. (£)		−1,000	
Contents insurance (£)		−1,250	
Annual sinking fund for repairs and renewals (£)		−2,500	
Building insurance (£)		−1,000	
Contribution to HQ overheads (£)		−2,000	
			−249,750
Net Profit (£)			**404,000**
Less estimate of operator's remuneration (£)			−50,000
Less interest on operator's capital (£)			
– Furniture, fixtures, fitting & equipment (FFFE)	−250,000		
– Stock (average)	−100,000		
– Cash (1 month's working expenses)	−21,000		
		−371,000	
De-capitalised @ 10%		0.10	−37,100
Adjusted Net Profit (£)			316,900
Capital Valuation:			
YP in perpetuity @ 10%			10

Property Valuation (£)		**3,169,000**
If the business is to be sold as a fully equipped operational entity the trade inventory, stock and cash items are added to the property valuation:		
Furniture, fixtures, fitting & equipment (£)	250,000	
Stock (average value) (£)	100,000	
Cash (£)	21,000	
		371,000
Total value of business (£)		3,540,000

Further examples are given in chapter 15.

7.4 Summary

A summary of the steps in the profits method is shown below.

	Fair maintainable turnover (FMT)
Less	cost of sales (purchases and adjustment for change in value of stock)
=	gross profit
Less	running expenses (including staff costs)
=	net profit
Less	Remuneration to operator
Less	Interest on capital invested, stock and consumables
=	Adjusted net profit
Then either	(1) Capital Valuation: capitalise adjusted net profit at an appropriate freehold or leasehold yield
	(2) Rental Valuation: apportion adjusted net annual profit between rent and profit

The valuation can reflect development or redevelopment potential if the market would assume that possibility. For example, there may not be planning permission but it is recognised as likely 'hope value' in the market. If alternative uses exceed value of business, these should be reported.

Because of the specialised nature of the businesses concerned, valuers tend to specialise in the valuation of properties used for particular trades. Some valuers may concentrate on the valuation of licensed premises such as pubs, clubs, restaurants and casinos, others may specialise in the valuation of hotels, guest houses or care homes. The over-riding requirement for any valuer agreeing to value a specialised trading property is to have adequate knowledge and experience of the relevant business sector operating from the property. Marshall and Williamson (1996) cover the legal and valuation principles and methods of valuing all sorts of leisure property including caravan parks, cinemas, bingo clubs, night clubs, ten-pin bowling centres, hotels, garden centres, golf courses, pubs and restaurants. For cables and telecommunication installations, see Chapter 8 of Askham (2003).

It should be borne in mind that specialised trading properties can be of interest to conventional property investors and to business operators and the rate of return that these groups of purchasers require may be different. For the former it may relate to the perceived risk of the market and specific asset and the return that can be achieved on alternative investment assets. For the latter the rate of return may relate to the return required from the business as a whole, taking into account any mortgage and equity requirements for the type of property being valued. Consequently, the yield at which rent or the YP and which profit is capitalised should be chosen with these distinct markets in mind.

Key points

- The valuation of specialised trading properties requires specialist skill. Only a few examples of the diverse range of trading properties that are valued using the profits method have been given here.
- There is a heavy reliance on accounts and other financial information about the business and also reliance on expertise to value the goodwill element of the business.
- Attention should be focused on two things. First, the adjustment of the costs to bring net profit back to a point where there is no regard to the individual operator – the business is assumed to be run by an averagely competent operator. And second, the selection of an appropriate capitalisation rate (yield).
- Further guidance can be found in the RICS Red Book (RICS, 2012) in 'GN2 – Valuation of individual trade-related properties'.

Notes

1. Typical two-person assumption staff costs: wet sales pub=15% net turnover, restaurant=25% net turnover, hotel=35–40% net turnover.
2. This is personal and not transferable.
3. These are regarded as one-off repairs and not an annual expenditure.
4. Not regarded as a typical business expenditure and therefore excluded.

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Chapter 8
Replacement Cost Method

8.1 Introduction

Some properties are regarded as specialised because their use requires them to be constructed in a particular way, including highly production-specific manufacturing plants such as chemical works and oil refineries; public administration facilities such as prisons, schools and colleges, hospitals, town halls, art galleries and court facilities; and transport infrastructure such as airports and railway buildings. Alternatively, the property might be specialised by virtue of its size or location such as a large research and development facility in a remote location – ideal for a company's specific requirement but with little or no demand in the open market. Valuations of the existing use of specialised properties are required for financial reporting purposes, property taxation, compulsory purchase and compensation. It is seldom possible to value specialised properties using a sales comparison or income capitalisation method because they are rarely, if ever, sold or let in the open market except as part of a business or entity. Instead a replacement cost method is used. This method is based on the economic theory of substitution – that a potential buyer would pay no more for the subject property than the cost of acquiring an equivalent new one. The value is essentially a deprival value of the property to the owner. Because the subject property already exists, and may have done so for some time, the cost of an equivalent new one must be written down or depreciated to reflect differences between it and the subject property being valued. These differences might be a reflection of age (and estimated remaining economic life[1]), comparative efficiency, functionality and running costs, and because these factors relate to the building rather than the land, the replacement cost method involves the separate assessment of the value of the land and the depreciated replacement cost of the building(s). Depreciation refers to the writing down of the cost of

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modern equivalent asset to reflect obsolescence and disabilities affecting the actual asset (RICS, 2012: GN6[2]).

The method has been widely used to estimate the rateable value of certain types of specialised premises for tax purposes and is known as the contractor's test in this particular field of application. The first step in the contractor's test was to estimate an 'effective' capital value, defined as market value assuming the building cannot be structurally altered or used for anything other than current mode of occupation – what may be regarded as existing use value. But since market transactions rarely occur, effective capital value is invariably a matter of opinion (Emeny and Wilks, 1984). This effective capital value had to be decapitalised at an appropriate rate to arrive at a hypothetical rental value on which the rateable value was based. In the 1970s a depreciated replacement cost (DRC) version of the method evolved as a means of valuing specialised private and public sector property assets corporate disclosure purposes (reporting the value of property assets in company accounts), but the method is also used to value the existing uses of specialised properties for compulsory purchase and compensation and to estimate replacement cost for insurance valuations. However, when these sorts of properties are offered for sale, perhaps because they are no longer required for their current use, the primary market is likely to be for alternative uses.

DRC is defined as: [. . .] [t]he current cost of replacing an asset with a modern equivalent asset less deductions for physical deterioration and all relevant forms of obsolescence and optimisation (IVSC, 2007). Although DRC is only one application of the replacement cost method, it is the one that valuation standards concentrate on; neither International nor UK Valuation Standards describe the application of the replacement cost method for taxation and expropriation purposes. If an otherwise conventionally designed property has been specifically adapted (including the installation of plant and machinery), it may be valued subject to a special assumption that the adaptations do not exist and then treating the adaptation costs separately. The valuation should set out which adaptations are included with the property and which have been treated separately.

8.2 Method

The method does not actually calculate a market value. Instead, it calculates a replacement cost for the improvements that have been made to the land, typically in the form of buildings and ancillary man-made land uses such as car parks and the like. It is therefore fundamentally different from the valuation methods described so far. Because of an almost complete lack of comparable market transaction information, the method seeks to estimate replacement cost rather than exchange price. It does not produce a market valuation (value-in-exchange) as such because cost relates to production rather than exchange and it is often regarded as the method of last resort for this reason. The method involves assessing the value of the land in its existing use and adding the replacement cost of the building, adjusted for depreciation and obsolescence. Mathematically the method can be stated as follows:

Replacement cost of improvements[3] (either identical or modern equivalents)
– Depreciation allowance due to age and / or obsolescence
= Current cost of existing improvements
+ Value of land
= Value of property

a) Replacement cost
Often, a modern equivalent building (defined in terms of function rather than form) will be more cost-effective than an identical replacement and should be chosen so long as it is capable of providing an equivalent level of output or service. The replacement cost will cover all of the usual costs associated with the constructing of a building as well as site improvements but not developer's profit. If replacement is likely to take a long time then it may be justifiable to forecast variation s in costs. Plimmer and Sayce (2006) suggest that the land and the buildings should be valued as at the same date, an instant build in other words, as this avoids the difficulties of backdating costs during what could be a long assumed construction period. Estimates of construction costs can be obtained from professional cost estimators (quantity surveyors), cost manuals (such as 'Spon's Architects and Builders Price Book' published by Davis Langdon Everest and updated each year), builders and contractors. The actual cost of constructing the original property may be useful evidence once it is adjusted for inflation but with due regard for any variation that might be due to the existence of prepared site, the need to reconstruct as quickly as possible, possible changes to planning policy, building regulations and so on. Building costs can be broken down into component parts and based on a quantity surveyor's 'bill of quantities' and building area can also be broken down.

If the premises are historic, the extra cost associated with their direct replacement is usually ignored if the service or output could be provided from modern equivalent premises. However, if the historic nature of the premises is intrinsic to the use (a museum for example) then the cost of reproduction would be appropriate. If reproduction is not feasible, the construction of a building with a similarly distinctive design and specification might be appropriate. Of course, some buildings may simply be irreplaceable.

b) Depreciation in the value of existing buildings
Throughout a building's life both its investment value to the owner and utility value to the occupier will tend to depreciate. There are two causes of depreciation; deterioration (sometimes referred to as physical obsolescence) and obsolescence. Physical deterioration results from the wear and tear, is hastened by a lack of maintenance and is usually measured by reference to the estimated physical life of the asset. The physical fabric of a property will deteriorate due to use and the passage of time. It is not easy to generalise about the life of various building types but prime shop units are much less prone to deterioration than industrial units due to the nature of the use of the building and the proportion of total value attributable to land. The aim of every occupier and owner is to delay the onset of deterioration as much as possible and this is achieved through good design and construction and active

property management. Sound maintenance and management policies help to identify, plan and budget for the onset of deterioration. But inevitably as the building gets older the maintenance cost increases and the rental value falls because the building is no longer modern and attractive. Consequently, the value of the building declines relative to site value until it becomes economically viable to redevelop the site.

Obsolescence refers to a decline in investment and/or utility value resulting from changes which are extraneous to the property. In other words, the physical condition of the building may be sound but external influences have rendered it obsolete. It is a decline in utility not directly related to physical usage or the passage of time. A good quality, flexible design can combat obsolescence but to a certain extent matters are beyond the control of the property owner or occupier and management and maintenance will have little impact. A building may become obsolete for any number of reasons that rarely work in isolation. Common causes are:

- Functional. The property can no longer be used for its intended purpose, perhaps as a result of technological changes rendering layout, configuration or internal specification of the property obsolete and adaptation is not economically viable. The property may be perfectly adequate in terms of its physical characteristics but it is in the wrong location.
- Socio-economic. Changes in the optimum use for a site due to market movements may render the existing use obsolete, the building may not depreciate but the development potential of the site appreciates due to changes in the social fabric of the locality or change in consumer demand (refrigerated food), working environment and so on.
- Aesthetic. Image and design requirements are constantly changing and a property that no longer projects the right image may become obsolete.
- Regulatory. Planning policy, environmental regulations and legislation; new legislation or regulations, changes in wording of leases (rent review period) for example.

So deterioration may be a continual but gradual process whereas obsolescence may strike at irregular intervals regardless of age. The responsibility for maintaining the physical condition of a property is usually passed on to the tenant when a commercial property is let on full repairing and insuring (FRI) lease terms, but the risk of obsolescence cannot be managed in this way and is ultimately borne by the owner. The onset of deterioration or obsolescence can be measured by looking at depreciation in the value of the building in relation to modern replacements and by looking at the development value of the land in comparison to its value in its existing state. A sudden switch in the relative magnitudes of development land value and existing use value may occur as a result of a 'trigger event' that presents an opportunity for a more valuable use such as the granting of planning permission. For example, suppose a small industrial estate located on the edge of a town is around 15 years old and the units are looking a little tired. The owner is able to fill the units with small businesses paying low rents. A by-pass has been constructed around the town and accessibility to the industrial estate is greatly improved. At the same time 'factory outlet shopping' has become popular and planning permission to allow an element of retail trade from the industrial units is forthcoming. The owner of the industrial estate anticipates being able to charge higher rents to the factory outlet traders and therefore decides to redevelop the site.

Baum (1991), building on the work of Salway (1986 and 1987), Miles (1987) and Harker (1987) found, for offices in the City of London, a straight-line relationship between age and market rent over the first 20 years of a building's life, but also found that only 39% of the depreciation in value can be explained by age. Instead, a classification of building quality (measured in terms of internal specification, physical deterioration, configuration and external appearance) was a stronger determinant (73%) of depreciation. Indeed Baum found that building obsolescence factors (internal specification, external appearance and configuration) were more important causes of building depreciation than physical deterioration and went on to argue that internal specification (e.g. partitioning, layout) was a form of depreciation that was curable and that configuration (building design, walls and doors, etc.) was not, thus underlying the need for flexible buildings to combat obsolescence. Depreciation in rental value strikes hardest after the third and fourth rent review and internal specification and configuration deficiencies are the two predominant causes of depreciation in office buildings in the City of London. For industrials, deterioration was the most important factor. For a more detailed examination of depreciation in the property market, see: Salway (1986), Baum (1988 and 1991) and Barras and Clark (1996).

Depreciation can vary according to type of structure and obsolescence may affect different parts of the building at different rates. In attempting to counter depreciation, there may be a trade-off between spending more money on the initial design and specification of the building, thus achieving relatively low future costs-in-use; or spending less at the start and instead spending relatively more to maintain the premises over its life. The time value of money affects this trade-off significantly. In quantifying the diminution in value that results from depreciation, the objective is to reflect the way the market would view the asset. When there is a group of buildings to be valued it is important to consider alternative uses for the premises and their associated lifespans. It is reasonable to assume that routine servicing and repairs are undertaken when estimating lifespan but not significant refurbishments or replacement of components. If refurbishment takes place then the economic life of the building might be extended. There are four methods used to account for depreciation and they all work by spreading the reduction in value in a regular pattern over the estimated remaining economic life of the premises.

- Straight line. By far the most common approach, it applies a straight-line percentage deduction based on the proportion of estimated remaining economic life of the premises, see Figure 8.1.
- Reducing balance. A fixed percentage is deducted each year from a reducing balance,[4] see Figure 8.1.
- S-curve. A varying rate of depreciation is devised, usually in the shape of an s-curve to reflect a low rate in early years, accelerating depreciation in

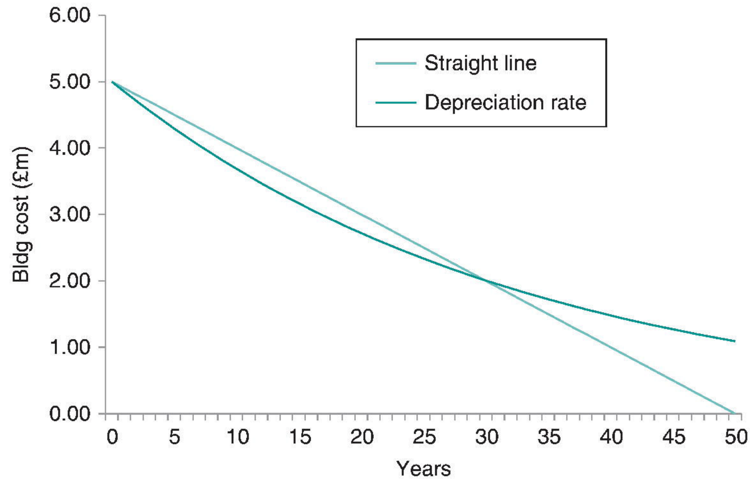

Figure 8.1 Straight line and reducing balance depreciation rates.

middle years but then tailing off in final years. It is important to base the variation on empirical evidence.

- Sinking fund. A sinking fund may be set up that requires an annual investment to replace the capital value of the building at the end of its estimated economic life.

c) Land value

The market value of the land is estimated by referring to evidence of transactions of comparable size, tenure and location. According to Plimmer and Sayce (2006), in the absence of better evidence, or where the building exists on a site of exceptionally high value, it may be appropriate to assume a notional replacement site, within the same locality and which is equally suitable for the existing use. Such an approach is particularly appropriate where, historically, city centre locations were preferred for local government offices, prisons and hospitals, but which now tend to locate on more peripheral, lower value sites. If the actual site uses space inefficiently or even inappropriately given changes in technology or production then modern equivalent sites should be considered. The fundamental principle is an economic one; a hypothetical buyer would purchase the least cost site that is suitable and appropriate for the use. The valuer should also consider whether the actual site location is now one that a modern equivalent would use and whether any vacant land at the actual site is still required for a modern replacement. These considerations can be somewhat subjective as vacant land may be held for expansion, for security or simply may be surplus to requirements.

Because of the specialised nature of the businesses and operations, finding comparable land values is difficult; the planning use-class may be *sui generis*. If the use is specialised industrial then reference to general industrial land prices is usually acceptable. RICS guidance suggests that if the use is very specialised the valuer should broaden the search to include a wider range of alternative site uses. The aim is to select the lowest cost site for an equivalent operation in a relevant location.

Figure 8.2 Accounting for depreciation.

The final stage of the valuation is to stand back and look – a final reconciliation to ensure that depreciation has not been double-counted or ignored and to check the characteristics of the property being valued that might lead a buyer to bid more than a modern equivalent. When reporting a valuation that is based on the replacement cost method, this must be stated in the report, along with the assumption that the value is subject to adequate profitability of company if the asset is held in the private sector and subject to prospect and viability of continued occupation and use if in the public sector. If the replacement cost value is significantly different from the market value of an alternative use for which planning permission is likely to be forthcoming, both should be reported in the accounts but the latter need not take account of the costs associated with business closure or relocation. If appropriate, report that the value of the premises would have a substantially lower value if the business ceased but there is no requirement to report a figure.

The effect of depreciation on property value obviously depends on how it is accounted for. If, for example, depreciation is accounted for as a percentage of property value then land value is a component of this. At some point the property value will fall below land value and redevelopment becomes viable. This would occur at different times depending on the ratio between land and building components of property value. Figure 8.2 provides an example where there are two sites; a city centre site with a land value of £6 m and an out of town site with a land value of £2 m. Building costs and estimated lifespans of the buildings are the same at £5 m and 50 years respectively, and the property depreciation rate is 2% in both cases. Because the city centre site has a higher ratio it has the shorter economic life. Alternatively, property value might be split into its depreciating and non-depreciating components (it will be seen later that this is a standard accounting treatment for real estate assets), and an appropriate method of depreciation needs to be applied to the depreciation building component. An accountant simplifies the process by assuming buildings have fairly standard lifespans, typically 50 years, after which their value is written off, leaving just the land value. In economic terms this would be the point at which land value exceeds building value, signifying redevelopment. Figure 8.2 illustrates this arrangement and shows that now the two properties have the same economic life. This treatment of depreciation is forced by the 50-year lifespan assumption.

8.3 Application

8.3.1 *Valuation of an owner-occupied property for accounts purposes*

A purpose-built industrial property with an estimated life of 90 years with 16 years remaining has a floor area of 2,500 square metres and a site area of 0.8 hectares. The current value of this property needs to be estimated for inclusion in the company accounts.

Land	0.8 ha @ £200,000 [a] per ha (£)		160,000
Building	modern replacement cost including fees @ £300/m^2 [b] (£)	750,000	
	Less depreciation @ 74/90 years = 82% (£)	-615,000	
			135,000
Estimated depreciated replacement cost (£)			295,000

[a] Figure obtained from comparable evidence of land sales
[b] Figure obtained from building cost information services

8.3.2 *Valuation for insurance purposes*

These are also known as **reinstatement valuations** and are undertaken on behalf of lenders, normally in conjunction with a market valuation but are also undertaken for insurers and insurance brokers, property owners and occupiers. A reinstatement valuation provides for a similar property as at the date of the valuation or at the commencement of insurance policy cover and should be carried out at least every three years. In the case of insurance valuations the site is assumed to continue in existence despite whatever disaster may have affected the buildings. Consequently it does not include a valuation of the land. Furthermore, if the insurance policy provides for a replacement 'new' property (a 'new-for-old' policy as it is known) then no deduction should be made to reflect deterioration and obsolescence.

8.4 Issues

Several issues arise from the current valuation standards and guidance in relation to the replacement cost method and they can be classified as definitional and methodological. Definitional problems include confusion over the precise meaning of the terms cost, price and value and clarification of the economic concepts of substitution and 'highest and best use' in the cases of market-based and replacement cost methods. Methodological problems include the difficulty in finding market-derived inputs, particularly when estimating depreciation, and the need to make end adjustments.

8.4.1 Definitional problems

8.4.1.1 Cost and value

Under its General Valuation Concepts and Principles the IVSC defines price as a 'term used for the amount asked, offered, or paid for a good or service' whereas in paragraph 4.1 cost is defined as 'the price paid for goods or services or the amount required to create or produce the good or service' (IVSC, 2005). In other words cost can mean price paid or cost to produce and it is this double meaning that causes confusion because they are rarely the same. The IVSC (2005, Property Types, paragraph 2.7.3.2) and the US Appraisal Institute (2001) believe that cost and market value are more closely related when properties are new but there are many examples of investment sales of recently completed developments that would seem to challenge this view. Later in the standards (IVSC, 2005: Introduction to International Valuation Standards 1, 2, and 3, paragraph 3.1) a more logical distinction is made between price and cost: price is regarded as a 'concept that relates to the exchange of a commodity, good or service' and is defined as 'the amount that has been asked, offered, or paid for the item'. Whereas, in paragraph 3.2, cost is regarded as 'a production-related concept, distinct from exchange, which is defined as the amount of money required to produce a commodity, good, or service' and may be based on either an estimate of reproduction cost or replacement cost.

Value is defined as 'the price most likely to be concluded by buyers and sellers of a good or service available for purchase' (IVSC, 2005, par. 3.3). It refers to the economic concept of value-in-exchange, the price that would be paid in a market for the utility or satisfaction that a property might be expected to provide. A market is defined as an 'environment in which goods, services and commodities trade between buyers and sellers through a price mechanism' (IVSC, 2005, International Valuation Guidance Note 1, paragraph 3.5) and paragraph 4.9 states that market value represents the market-recognised utility of real estate rather than its purely physical status. Two matters arise from these definitions of value and market value. First, it is the physical status of the property that forms a substantial part of the inputs in a replacement cost valuation and this is at odds with the market value concept as internationally defined. Second, and more fundamentally, market value cannot be derived from a non-market method of valuation. These matters raise the question as to whether a replacement cost method is compatible with a market basis of value. Defining replacement cost as a method of estimating market value rather than a separate basis of value blurs the distinction between cost and value.

8.4.1.2 Substitution

There are three internationally recognised methods of valuation: sales comparison, income capitalisation and replacement cost. All three methods are founded on the economic principle of substitution; that an economic agent would not pay more for a good than a replacement capable of providing the same utility. Central to valuation theory is the premise that it is possible to estimate the amount of money that would be paid for the good – a property in this case. The principal difference between the sales comparison and income capitalisation methods on the one hand and the replacement cost method on the other is as follows. Because non-specialised properties have close substitutes, market transaction data (i.e. direct evidence of the prices paid for close substitutes) are available on which to base an estimate of value in the case of the sales comparison and income capitalisation methods. By contrast, specialised properties have no close substitutes and market data cannot be relied upon to help estimate market value. Consequently the replacement cost method reverts to the first principles of substitution to argue that cost is the same as value. The logic is thus: a hypothetical tenant, instead of renting a property, could purchase a site and build a facsimile for own occupation, and the rent would relate to the annual equivalent of the capital cost of the land and building(s) constructed (Scarrett, 1991; RICS, 1995). This logic has been accepted by the courts but with the proviso that rent must be substantially below the interest payments because the owner would be entitled to a freehold equity interest rather than a leasehold wasting asset. This is why it is commonly acknowledged that the method establishes a cost ceiling rather a market value. The logic relies on cost equating to value but we have already noted that this is not so in the case of property. The method: '..is based on the valuation fallacy that "cost is value", i.e. that because a property cost a lot of money to build, it would necessarily let for a high rent. This is plainly not so… The rental value of a property is determined by the supply and demand for that property and not by its cost of construction' (Emeny and Wilks, 1984).

8.4.1.3 Highest and best use or existing use

Highest and best use is defined as 'the most probable use of a property which is physically possible, appropriately justified, legally permissible, financially feasible, and which results in the highest value of the property being valued' (IVSC, 2005) and the concept is central to the basis of market value. But a replacement cost valuation is based on an assumption of a continuation of the existing use. For example, French and Gabrielli (2007) argue that DRC produces an estimate of 'market value in an existing state'. In fact, a DRC-based valuation for financial reporting purposes must be accompanied by a statement that the property is subject to the adequate profitability of the business in the private sector or subject to the prospect and viability of the continued occupation and use in the public sector. This existing use assumption is at odds with the highest and best use concept of market value in the same way that the existing use value basis defined in the Red Book is at odds with the international definition of market value. The replacement cost method does not appear to be compatible with the market value basis.

8.4.2 Methodological problems

8.4.2.1 Market-derived valuation inputs

International valuation standards state that '[w]here there is sufficient market data to support the valuation, Market Value is derived. In other circumstances, where there is insufficient market data..., the result will be Non-Market Value' (IVSC, 2005, General Valuation Concepts and Principles, paragraph 5.16).

The replacement cost method is used in circumstances where there is insufficient market data, when use of the sales comparison or income capitalisation method is not possible, and so the output will be a non-market value. However, when valuing specialised property '[w]here possible, the Valuer develops land value, cost, and accumulated depreciation estimates from market information...' (IVSC, 2005: General Valuation Concepts and Principles, paragraph 8.2). More specifically: '[i]n the cost approach, comparable data refer to the cost of building or development, and adjustments are made to account for differences in quantities, qualities, and utility. In addition, analysis of comparable land data and comparable depreciation estimates is undertaken' (IVSC, 2005, International Valuation Guidance Note 1, paragraph 5.20.3). So it would appear that the replacement cost method is regarded as a method of estimating market value because the input variables are required to be derived from the market. Leaving aside the difficulty of finding market data to support these variables for the moment, the confusion here stems from a fundamental difference in the way that market-based data are applied to a valuation.

With sales comparison and income capitalisation methods market data relating to capital prices, rents and the relationship between them (yields) are used to support the valuation: the methods simply rely on comparison metrics relating to the valuation output. The output from a replacement cost valuation has no comparable market values with which to compare it so the international valuation guidance states that if market data are used to derive the valuation inputs (land price, building costs and deprecation rates) the output will be a market value. This is incongruous; on the one hand it is argued that the replacement cost method is used when there are insufficient market data to support a valuation estimate, then, on the other, that the output is market value because it is based on market-derived valuation inputs. It is difficult to understand how the existence of markets in factor inputs (construction costs, land prices) in the valuation model means that the output is a market valuation. How does a valuer find market data to support these inputs? Difficulties are encountered in assessing land value because it is a hypothetical exercise; it is not a bare site and improvements to the land are, by definition, specialised. Building costs are derived from the construction market rather than the real estate market (Whipple, 1995) and are therefore influenced by different market forces even before depreciation is estimated. However, the main problem surrounds the market-derived estimate of a depreciation rate. It is difficult to imagine a market in depreciation adjustments that is capable of being monitored and from which reliable adjustment factors can be derived.

Indeed, the US Appraisal Institute (2001) argues that: '[t]he cost approach can be applied to older buildings given adequate data to measure depreciation' but 'the difficulty of estimating depreciation in older properties may diminish the reliability of the cost approach in that context'. Certainly no research or textbook explains the nature of this market in depreciation or how it should be analysed to determine market-based depreciation adjustments. When listing the sort of comparable data that valuers use, international guidance mentions prices, rents, income, expenses, yields and discount rates but nothing about depreciation rates (IVSC, 2005, International Valuation Guidance Note 1, paragraph 3.2).

It is suggested elsewhere in the international standards that valuers observe the economic lives of existing buildings and other improvements in comparison with new or recent replacements as a way of calculating depreciation rates. Given the specialised nature of the properties concerned it is not clear how comparable or otherwise these existing and new buildings should be. Notwithstanding this, the guidance suggests that these analysed depreciation rates may be 'all-encompassing' or separated into 'physical deterioration, functional and economic obsolescence elements'. How this is done is not clear but it would be necessary because the magnitudes of different elements will vary from one property to the next. Furthermore, valuers must identify changes in depreciation rates and remaining economic life estimates caused by market fluctuations. The guidance suggests that, for physical deterioration, costs of specific elements of rectification may be considered or direct unit value comparisons between properties in a similar condition may be undertaken. According to RICS (2007, section 9.4), when determining the allowance to be made for physical deterioration, the 'valuer compares the decline in value of an asset of a similar age for which there is a market with the value of new assets in that market'. Would these assets have to be comparable to the subject property which has no comparables? Then section 9.5 adds that this allowance must take account of the repair and maintenance regime of the asset which may well be different from these 'comparables'. No guidance is offered on how the valuer might derive specific market adjustments for functional and economic obsolescence either in the Red Book or in textbooks.

Whipple (1995) highlights the problems of estimating depreciation from an Australian perspective. He suggests that if the value of the land was deducted from the sale price of a property the result would equal the value of improvements to the land and the difference between this figure and replacement cost might be a measure of depreciation. Converting this figure to a metric per unit area means that it could be used as comparable evidence. Yet, as Whipple argues, there would seem little point in doing this if the property was in the same sub-market because the sales comparison method could be used instead. Also, this approach only gives an overall figure for depreciation and is not broken down by type (physical, functional or economic) so judgement is required to adjust and apply comparable evidence. Crosby et al. (2011) conducted a longitudinal study of seven major office locations in Europe and found depreciations rates that ranged from 2% to 5% per annum over a ten-year period. One of the key limitations of this sort of analysis is the paucity of data and often valuations must be used as a proxy for price data.

Usually though it is not possible to obtain market data on which to base such a measure of depreciation. Instead valuers make assumptions about how improvements depreciate over time (straight line, reducing balance and so on). Indeed, that is the guidance offered by the RICS (2007); after discussion on how comparables of similar age must be identified and how asset-specific maintenance regimes should be considered (RICS, 2007, paragraphs 9.4 and 9.5) the guidance states that a physical deterioration allowance is usually measured by reference to the anticipated physical life of the asset. This is typically a straight line rate of depreciation based on the ratio between the estimated life of the building and its actual age at the valuation date. In other words the depreciation adjustment is not based on market evidence nor is it broken down into elements. But, unlike accountants who employ simple rules of thumb to estimate economic lives of fixed assets, valuers are required to estimate full life and remaining life of each asset in some other way (RICS, 2007, paragraphs 9.19 to 9.21), but how? European valuation guidance (TEGOVA, 2003, Standard 4, paragraph 4.43) suggests that, because of the difficulty in putting a precise lifespan on a building, bands of say less than 20, 20 to 50 and over 50 years are used. Clearly such an approach, based as it is on non-market assumptions, cannot be considered to be market-derived. This has long been known. In the UK the lack of market evidence on which to base depreciation estimates is acknowledged in the contractor's test approach to the replacement cost method. Britton et al. (1991) argue that case law provides detail on which items allowance should be made for and their quantification. In the US 'where a cost approach to value has been run in parallel to a market approach, the appraisal profession has come no nearer to quantifying depreciation allowances than have valuers in the UK' (Britton et al., 1991). The replacement cost method suffers from a serious deficiency: the subjectivity of the depreciation estimate (Shenkel, 1978: p160).

8.4.2.2 End adjustments

The replacement cost method assumes that value is derived from an additive relationship between land value and depreciated building cost. This simple relationship is open to question: as Whipple (1995) argues, land and improvements 'merge to provide an undifferentiated stream of utility' so not only is it virtually impossible to determine the contribution to value made by each individual capital item, but their aggregate contribution is also highly unlikely to be a simple additive one. The method attempts to handle this by suggesting the valuer makes 'end adjustments'. The RICS (2007, paragraphs 10.1, 11.1 and 11.2) recommends that the valuer should add up all of the depreciated replacement costs of improvements and add these to the land value and then 'stand back and look' to determine whether the resulting figure is compatible with market value. But where did this market value come from? How is compatibility determined? Actually, in section 11.2, this 'stand back and look' is taken to mean a check on whether any double-counting or ignoring of depreciation has occurred (so this is unlikely to determine whether the output figure is compatible with 'market value') and a consideration of bid factors extraneous to the DRC method, such as alternative use or hope value (but these should be reported separately anyway). International valuation standards are similarly vague when it comes to end adjustments, stating that the valuer must adjust the DRC estimate to reflect the legal interest being valued (IVSC, 2005: chapter 'Property Types', paragraph 2.7.3.1) but how does a valuer make an adjustment from, say, a freehold to a leasehold?

8.5 Summary

Over the years a replacement cost method of valuation has been regarded as something different; a method of last resort to be used when other methods are not appropriate due to a lack of market data: '…depreciated replacement cost combines market and non-market elements and cannot be regarded as market value. The different cost applications must not be confused or misconstrued in making, presenting or applying market value estimates' (Adair et al., 1996: 23). The strong cost element and the necessity for extensive subjective input by the valuer throughout the valuation has led the courts to express 'considerable reservations about a basis which gives full rein to a valuer's judgement without offering any market evidence to support the opinion of value against which the results may be judged' (Scarrett, 1991). But now international and UK valuation guidance states that the method produces a market value because '[t]he methodology is based on the same theoretical transaction between rational informed parties as the MV concept'. This chapter has argued that market value assumptions do not hold in the case of the replacement cost method and requiring inputs to be based on market evidence is neither practicable nor sufficient justification to regard the output as market value. The replacement cost method is used to value properties for which there is no market. It is possible to assume that there is a market, with transactions and parties willing to transact but it should not be forgotten that the point of doing so is to homogenize a market place so valuers can collect and adjust comparable evidence to an industry standard benchmark. No such comparables exist with specialised properties so a replacement cost method is used instead. As Whipple (1995) argues:

> If a property is of the type that its productivity is never offered to the market, the valuer cannot estimate a market price because, by definition, no market test is possible. To assert that such properties have a market value is absurd because no realisable price can be ascribed to them… This is not to deny that such facilities are without utility to the community or to the entity using it. The difficulty is that no test of market value is possible… In view of this, the valuer has no recourse other than to use the cost approach. It is not probable price that is estimated for, as Ratcliff (1972) points out, the formula of $L+C\text{-}D$ simply measures unrecouped cost in the traditional accounting sense [deprival value]. Furthermore, the magnitude arrived at is a product of the depreciation convention used… The estimate is not realisable price.

The RICS (2007, Appendix B) distinguishes market value estimated using sales comparison from market value estimated using DRC stating that a DRC valuation would often not equate to an exchange price obtained if the asset were retired and sold. It is suggested that different market values might result if a property is valued using sales comparison and DRC. Clearly this should not happen; market value is market value. The problem lies in the incorrect assumption that DRC is estimating market value.

US Financial Accounting Standard 157, under the 'cost approach' heading, is similarly circumspect in describing DRC as a method of estimating market value; instead the method is described as one that estimates replacement cost. Similarly, section 10.2 of the same publication states that it is 'the objective of the DRC approach is to establish how valuable the specialised property is in comparison with a modern equivalent' Is this market value? Because of an almost complete lack of comparable market transaction information the method estimates replacement cost rather than exchange price. It does not produce a market valuation (value-in-exchange) because cost relates to production rather than exchange and it is regarded as the method of last resort for this reason. French and Gabrielli (2007) state that: '[. . .] [i]n continental Europe the cost approach [DRC] is often the principal method of valuation and has always been considered to produce market value'.

It is difficult to see how a method of valuation that has no reliance on market evidence for valuing the building and limited reliance on evidence for valuing the land can be a principal means of estimating market value. The confusion stems from the presumption that replacement cost is a method of estimating market value. It should be remembered that the Anglo Saxon derived concept of market value was one that originated from market-based assessments of property value for lending purposes and property investment activity. That is why DRC, as a cost-based assessment, was regarded as something different: a means of estimating the replacement cost or deprival value of company and public sector property assets for which there is no market.

Key points

- The replacement cost method is used to value properties that very rarely trade on the open market and therefore there is little or no evidence of comparable market prices on which to base value estimates.
- As a valuation method it is generally regarded as a 'method of last resort' because it does not really produce an estimate of market value, at least not of the building component anyway.
- The method does however have wide application in the valuation of public and private sector specialised property assets for accounts purposes and it is also used to estimate building reinstatement costs for insurance purposes.
- Deterioration and obsolescence are the causes; depreciation in value is the effect. Property, although rightly regarded as a long-term investment and factor of production, does depreciate over time. Physical deterioration can be mitigated through an active property management programme. Obsolescence is harder to predict and control but good design helps.

For further information on the cost approach to valuation see Connellan and Baldwin (1993) and Guidance Note 6 of the Red Book (RICS, 2011).

Notes

1. The economic life of a building can be thought of as that period over which it proves to be the most appropriate (least cost) built asset needed to deliver the business function. If kept beyond its economic life, a building may continue to give service, but a replacement will do the job more cost effectively.

2. When DRC valuations are of public sector assets there may be rules that take precedence over RICS guidance.
3. A generic term covering all additions to the land including services, paving, fencing, etc. even though they may have different uses and economic lives.
4. The depreciation rate can vary depending on the type of structure and obsolescence may affect different parts of the building at different rates.

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Chapter 9
Residual Method

9.1 Introduction

The need for development arises in three situations: where new buildings are to be created on previously undeveloped land (new development), where existing buildings on vacant / derelict sites are to be replaced by new structures (redevelopment) and where existing buildings are to be substantially converted or modernised (refurbishment). The generic term **development** will be used for all of these situations. Redevelopment sites compete with new development sites for potential uses. New development sites may have the advantage of being clear of any previous development but redevelopment sites often benefit from existing infrastructure and services.

Development activity is a highly visible, often intrusive process that is responsible for creating a landscape that influences the way that we interact with each other and with the built and natural environment. But here we focus on the financial economics of development because that is where valuation fits in to the process of development. Development valuations differ markedly from other areas of valuation, principally because the properties being valued do not yet exist. The process, therefore, needs to appraise the financial viability of increasing supply. The main concerns of the developer are how much should be paid for the development site, what will the construction costs be and what profit might be expected? For the development of a particular piece of land or site to be economically viable, the value of the completed development less all expenditure on land, construction and profit, must exceed existing use value. This concept is the basis of the **residual method of valuation**. Widely used to estimate land value, the residual method can be adapted to estimate the level of potential profit.

Land has value because it offers utility and therefore attracts a derived demand. The actual value of a particular piece of land (or site) will depend not only on its

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current or existing use but also on its potential use and the anticipation of development rights – often referred to as **hope value** or development value. Changes in supply and demand may influence the development value of a piece of land to an extent that competition may increase the value of the land for reasons that have little to do with its current use and it is the valuation of these potential development rights that we are concerned with here.

Obtaining comparable evidence of development land values is very difficult. Each site will differ widely in terms of size, condition, potential use or uses, permitted density of development, restrictions and so on, making adjustments to a standard value per hectare almost impossible. Instead a project-based valuation approach, known as the **residual method of valuation**, is used. It is based on the assumption that an element of latent or residual value is released after development has taken place. The value of the site in its proposed state is estimated, as are all of the costs involved in the development, including a suitable level of return to the developer. If the value of the completed development is greater than its cost to build, the difference, known as the **residual value**, is the value of site.

In practice the valuer will frequently rely on comparable evidence to assess development value and costs. In fact, for commercial development valuation, the investment method is usually employed to calculate development value. Essentially, there are two ways in which the residual method is employed: in a conventional snapshot format and in a cash-flow format. Typically, the former is used to estimate the market value of a piece of land whereas the latter is the mainstay of development appraisal, with the cash-flow taking on a more detailed breakdown of income and expenditure as the scheme progresses from inception to fruition. Computer modelling may be used to assess the implications of changes in costs and expected value.

Cash-flow techniques are investigated because, once the initial feasibility has been established, a more detailed financial assessment is usually required not only by the developer but also by the lender (who may be financing the development) and the investor (who may be acquiring the scheme on completion). Being able to identify the cash-flow at any point in time during a development project has obvious advantages over the 'snap-shot' estimate produced by a residual valuation.

9.2 Conventional residual land valuation

The basic equation for calculating site value is:

Value of completed development
Less development costs
Less developer's profit
Equals site value

More specifically, the equation for the conventional (no forecasting) residual valuation of a development site can be formalised as follows:

$$LV_0 = (1+i)^{-t}\left[\frac{DV_0}{(1+p)} - DC_0 - I\right] \qquad [9.1]$$

Where LV_0 = present net land value
i = cost of finance (annual interest rate)
t = development period
DV_0 = current estimate of development value
p = profit as a percentage of DV
DC_0 = current estimate of development costs
I = finance costs (usually calculated over the construction phase of the development period only)

The model produces a simplified representation of the financial flows in development based on the following assumptions:

- The development value, expressed in current values, is received at the end of the development period.
- All development costs (land and construction) are debt financed with repayment in full at the end of the development period.
- Building costs are incurred evenly throughout the construction period and interest is calculated by halving the time period over which interest accrues. The use of the finance rate effectively delays payment for the costs of development to the end of the development; placing them at the same date at which development value is received.
- Profit is deducted as a cash lump sum taken as a proportion of total development costs or development value. As profit is also a cost to the development at the end of the development, all the income and outgoings are now placed at the end.
- Finally, the gross residual amount is the amount that can be paid for the site at the end of the development. But site value is a current value and therefore the residual surplus at completion of the development is discounted back from the end of the development to the beginning at the finance rate. As a consequence, it is assumed that the land value is paid to the landowner at the commencement of the development and is also funded entirely by debt.

The residual method involves the estimation of a large number of cost and value-related variables and this can lead to wide variations in site valuations as small differences in the inputs propagate to a large difference in the output valuation. Land prices per hectare of similar sites that have recently been sold may provide a useful check. The overriding aim for the developer is to choose the optimum use, or uses, of the site in order to maximise value. It is assumed that developers seek to maximise profit and inevitably this involves identifying the permitted use that will yield the highest return.

Taking a simple example, a property development company is thinking of acquiring a site to construct 5,000 square metres (net) of office space. Local property agents anticipate that the new space will let at an average of £130 per square metre and are confident that the freehold interest in the completed development can be sold to an investor at a price reflecting an initial yield of 8%. Construction costs are estimated to be in the region of £800 per square metre and the development will take one year to complete. If finance is available at 10% per annum and the developer is seeking a minimum return on development value of 20% what is the value of the site?

Development value			
Total constructed area (m^2)	5,000		
Estimated market rent (£/m^2)	130		
Estimated annual market rent (£)		650,000	
YP in perpetuity @ 8%		12.5	
			8,125,000
Development costs			
Construction costs (5,000 m^2 @ £800/m^2)			
Interest on half construction costs over			
one year (£)		−4,000,000	
(4,000,000 × $[(1+0.10)^1-1]$ (£)		−400,000	
Profit on development value @ 20% (£)		−1,625,000	
			−6,025,000
Site valuation (£)			2,100,000

Identification of recently transacted comparable sites will allow the site valuation to be put into a market context.

Now consider a more detailed example of an office scheme proposed for a business park on the northern fringe of Bristol, UK. The relevant steps of the valuation are explained in the numbered sections that follow.

Conventional residual valuation to calculate site value

	Development value:					
1	Gross Internal Area (GIA) (m^2)		2,000			
2	Net Internal Area (NIA) (m^2)		1,700			
3	Estimated rent / sqm (ERV)		£200			
				£340,000		
4	Capitalised into perpetuity @	7.00%		14.2857		
5	Gross development value (GDV)				£4,857,143	
6	less purchaser's costs (@ % NDV)	5.75%			£264,100	
7	Net development value (NDV)					£4,593,043
	Construction costs and fees:					
8	Site Preparation		£25,000			
9	Building costs (£/m^2 GIA)	£969	£1,938,000			
10	External works		£120,000			
11	Professional fees: (% construction costs and external works)	13.00%	£267,540			

Conventional residual valuation to calculate site value						
12	Misc costs		£80,000			
13	Contingency @ % above costs (but not site prep costs)	3.00%	£72,166			
				£2,502,706		
	Regulatory fees:					
14	Planning		£5,000			
15	Building Regs		£20,000			
16	S106		£0			
17	Other		£95,238			
				£120,238		
	Total Costs and Fees:				£2,622,944	
	Interest:					
18	on half total costs and fees for whole building period @	10.00%	£165,934			
19	on total costs & finance for void period @	10.00%	£67,250			
20	*Total Interest Payable (£'s):*				£233,184	
	Letting & Sale Costs:					
21	Letting agent's fee (% ERV)	10.00%	£34,000			
22	Letting Legal fee (% ERV)	5.00%	£17,000			
23	Marketing (£'s)		£10,000			
24	Sale agent's fee (% NDV)	0.00%	£0			
25	Sale legal fee	0.00%	£0			
26	*Total Letting & Sales Fees (£'s):*				£61,000	
27	*Total Development Costs (TDC):*				£2,917,128	
28	**Developer's profit on construction costs (% TDC):**	20.00%			£583,426	
29	*TDC plus Developer's profit on TDC (TDC+DPC)*					£3,500,554
30	*Future residual balance (NDV-(TDC+DPC))*					£1,092,489
31	**Developer's profit on Land Costs (% future balance):**	20.00%				£182,081
32	*Future balance (Inc.interest on land & acquisition costs)*					£910,407
33	*less* interest on land and acquisition costs for total development period	10.00%	2.00			0.8264
34	*Present residual balance for land and acquisition costs:*					£752,403
35	*less* Acquisition Costs (% land acquisition bid price)	5.75%				£40,911
36	**Residual valuation for site**					**£711,492**

[1] The total internal area of the building to be developed (the area contained within the perimeter walls of the building) is termed the **gross internal area (GIA)**.

[2] The **net internal area (NIA)** is that part of the building on which rent can be charged and excludes corridors, plant rooms, lift lobbies, toilets, etc. (see Chapter 2 and RICS, 2001). Some properties such as supermarkets and industrial buildings are let on a GIA basis whilst shops are zoned to reflect the higher value attached to floor area (or sales space) nearer the front of the premises. The ratio of GIA to NIA is called the **efficiency ratio**. The more efficient a building, the more space there is to charge rent on. Higher efficiency ratios lead to higher annual rentals per unit of constructed space so efficiency ratios should be maximised (e.g. open plan) without impinging unduly upon the aesthetics of the space. The proposed development is ideally suited to an open plan design and so an efficiency ratio of 85% was used. In practice comparable properties would be examined to determine an appropriate efficiency ratio.

$$\begin{aligned}
\text{GIA} &= 2{,}000\,\text{m}^2 \\
\text{Efficiency ratio} &= 85\% \\
\text{So NIA} &= 2{,}000 \times 0.85 \\
&= 1{,}700\,\text{m}^2
\end{aligned}$$

[3] Rental value is estimated by considering rents that have been achieved on comparable properties. Comparable evidence was drawn from recent transactions relating to office space located on the northern fringes of Bristol and is shown in Table 9.1.

Though agents suggested rents in the region of £210 per square metre, evidence of recent transactions in the Bristol North Fringe indicate rents levels slightly lower than this. On this basis an estimated rent of £200 per square metre was used for the proposed development.

A net rent should be estimated that has been reduced to account for any regular expenditure such as management, repairs or insurance. It is usual to estimate current rent rather than predict the rent that might be achieved when the development is complete.

$$\begin{aligned}
\text{Estimated annual rent} &= \text{NIA} \times \text{estimated rent/m}^2 \\
&= 1{,}700\,\text{m}^2 \times £200/\text{m}^2 \\
&= £340{,}000
\end{aligned}$$

Table 9.1 Comparable evidence.

Scheme	Size (sqm)	Rent (£/sqm)	Capital value (£)	Yield (%)	Tenant / Agent
550 Bristol Business Park	1,550	206.45	4,571,389	7.00	Thales
Building 650, Aztec West	3,817	202.50	11,042,250	7.00	Thales
530 Bristol Business Park	425	186.22	1,128,207	7.00	King Sturge
310 Bristol Business Park	282	188.37	760,750	7.00	Hartnell Taylor Cook

[4–5] **Gross development value** (GDV) is the price for which the completed development could be sold. For commercial property GDV is calculated by undertaking an investment valuation based on the capitalisation of expected annual rent at an appropriate ARY. Comparable evidence suggested an investment yield of 7% and since the current market is characterised by low supply and pre-letting, a yield of 7% is deemed appropriate.

$$\begin{aligned} \text{GDV} &= \text{Estimated annual rent} \div \text{yield} \\ &= £340{,}000 \div 0.07 \\ &= £4{,}857{,}143 \end{aligned}$$

[6–7] The price that an investor would be prepared to pay for the completed development would be net of any purchaser's costs. These costs will include Stamp Duty Land Tax, agent's fees for marketing the scheme and negotiating sale terms, plus legal charges. If the completed development is to be retained as an investment it will usually need to be refinanced (converting the short term development loan into a long term debt) and it is assumed that the lender will charge an arrangement fee together with the costs of a valuation of the investment. A percentage deduction is therefore made from GDV to reflect these costs and to arrive at a net development value (NDV). A disposal fee of 5.75% of NDV has been assumed here.

$$\begin{aligned} \text{NDV} &= \text{GDV} \div (1 + 0.0575) \\ &= £4{,}857{,}143 \div 1.0575 \\ &= £4{,}593{,}043 \end{aligned}$$

[8–12] Construction costs and fees are usually estimated by a quantity surveyor, but an approximation can be gained by reference to recent contracts for similar developments or from building price books such as Spons Architects and Builders Price Book. It is usual to use current cost estimates and assume that cost inflation will match rental growth over the development period. Having said this, it is worth noting that construction contracts vary; they may be agreed on a 'rise and fall' or 'fixed price' basis. A building contractor who agrees to a fixed price contract is likely to charge a higher price because risk exposure is greater. Spons Architects and Builders Price Book 2005 (Davis Langdon Everest, 2004) indicates low-rise offices cost £850-1,000 per square metre to build. £969 per square metre is the estimated building cost in this example.

$$\begin{aligned} \text{Building costs} &= \text{building cost} / \text{m}^2 \times \text{GIA} \\ &= £969/\text{m}^2 \times 2{,}000\,\text{m}^2 \\ &= £1{,}938{,}000 \end{aligned}$$

External works might include demolition, access roads, car parking, landscaping, ground investigations or other costs associated with the development that are in addition to the unit price building cost estimated above. Professional fees are usually agreed as a percentage of the construction costs, but may be a fixed sum. Marshall and Kennedy (1993) found that a typical total for fees averaged 14.5%; Table 9.2 shows a representative breakdown of these fees.

Table 9.2 Typical professional fee levels.

Professional	Fee as a % of building costs
Architect	5–7.5%
Quantity Surveyor	2–3%
Structural engineer	2.5–3%
Civil engineer	1–3%
Project manager	2+ %
Mechanical & Electrical consultants	0.5–3%

The appropriate fee level depends on the type and location of the development. Professional fees have been extracted from Spons and include; Project Manager (2%), Quantity Surveyor (3%), M & E Engineer (1%), Structural Engineer (1%) and Architect (6%). In using these figures it is assumed that the development will be of a conventional design and construction method. Total professional fees of 13% of building costs and external works have been assumed here.

$$\begin{aligned}\text{Professional fees} &= (\text{building costs} + \text{external works}) \times 13\% \\ &= (£1{,}938{,}000 + £120{,}000) \times 0.13 \\ &= £267{,}540\end{aligned}$$

Miscellaneous costs might include planning fees, building regulation fees, insurance and other, more minor, incidental costs.

[13] The **contingency allowance** is a reserve fund to allow for any increase in costs. As construction costs are the single largest sum after land, any inflationary effect is likely to have a significant impact on costs. If the economy is particularly volatile, a cautionary approach is to apply the contingency allowance to *all* costs, including finance costs, but this will depend on the perceived risk of the project. Marshall and Kennedy (1993) found that the contingency fund is generally set at 3–5% of building costs and professional fees (and sometimes interest payments) but the figure varied depending on the nature of site (restrictive site, subsoil, etc.) and the development project itself. Generally, the longer the development period and the more complex the construction of the building, the higher the risk of unforeseen changes, therefore, the higher the contingency allowance.

$$\begin{aligned}\text{Contingencies} &= (\text{building costs} + \text{external works} + \text{misc. costs} + \text{fees}) \times 2\% \\ &= (£1{,}938{,}000 + £120{,}000 + £267{,}540 + £80{,}000) \times 0.03 \\ &= £72{,}166\end{aligned}$$

[14–17] Depending on the level of detail required from the residual valuation, estimates for various additional costs and fees can be included.

[18–19] The total development time needs to allow for obtaining planning consent, preparing drawings and so on. This is sometimes referred to as a **lead-in period** because it precedes the construction phase. Finally there may be a period of time between completion of the development and occupation by a tenant, including a possible rent-free period and this is referred to as a **void period**. During a void period interest is payable on *all* costs so any extensions to this time period will significantly increase the amount of loan finance incurred. In Figure 9.1 a

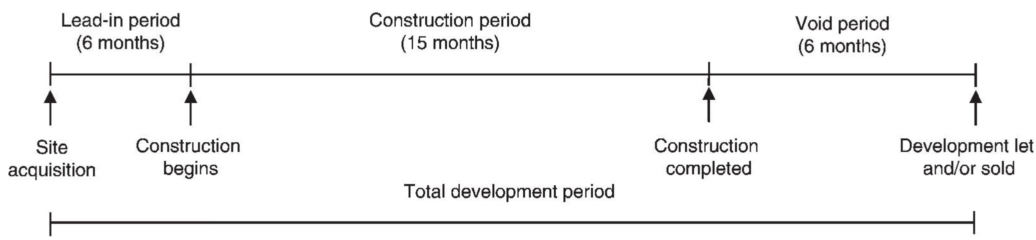

Figure 9.1 Development time-line.

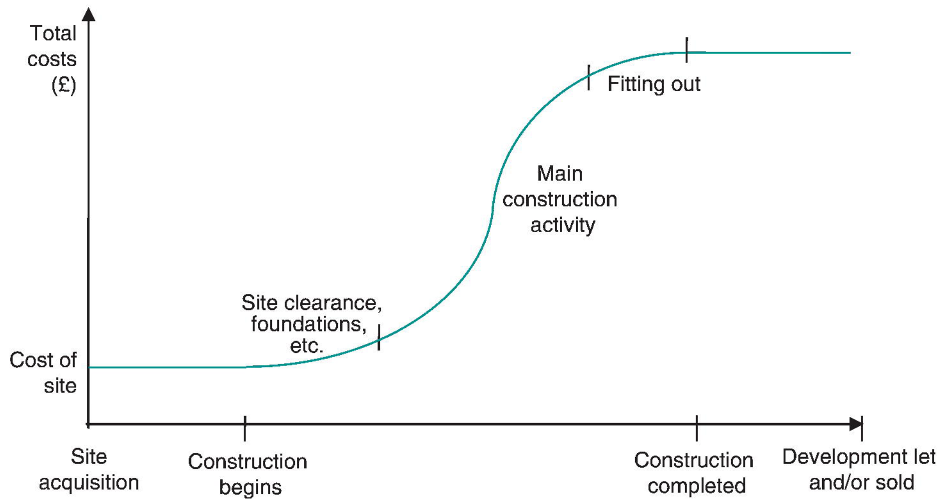

Figure 9.2 Build-up of costs over time.

lead-in period of six months, a construction phase of 15 months and a void period of three months is assumed.

A lender will charge interest at the bank base rate for lending plus a return for risk. The magnitude of the risk premium will depend on the nature of the scheme, the status of developer, the size and length of loan and the amount of collateral the developer intends to contribute. The level of risk for this development is considered to be comparatively low and a premium of 4% above the base rate has been added to reflect this. A typical range for the risk premium would be 2–6%.

Interest payments on money borrowed to fund construction usually accrue monthly but are rolled up over the development period and paid back when the development is let or sold. Rather than calculating the interest charges on a monthly basis, an approximation (for the purposes of the residual valuation) is obtained by calculating the annual interest on half of the costs over the construction period. This is a rudimentary method of reflecting the fact that interest is not paid on the full amount over the entire building period. Usually costs start off low, peak in the middle and then tail off towards the end as illustrated in Figure 9.2. By compounding interest on half of the costs over the period, we are assuming a straight line rather than an s-shaped build-up of costs, as illustrated in Figure 9.3.

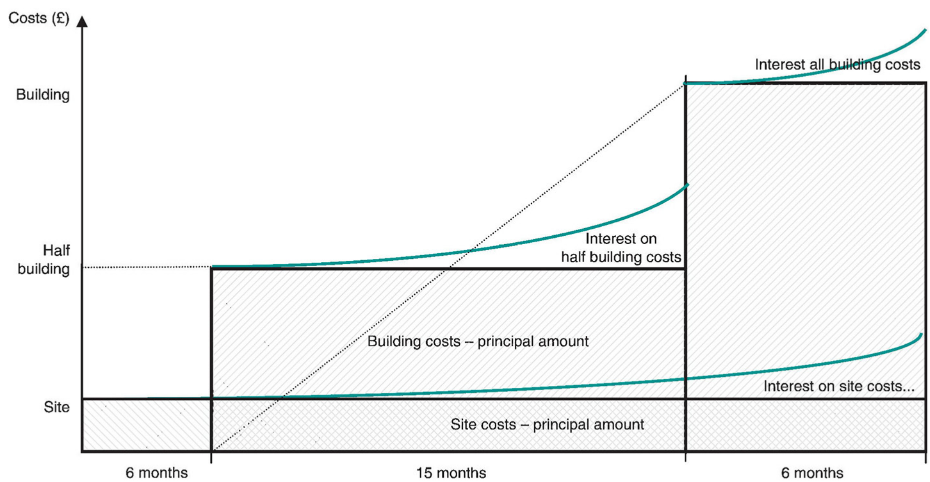

Figure 9.3 The amounts on and durations over which interest is calculated.

With regard to the interest on site costs, we know we need to finance land acquisition but we do not yet know the price is (that is what we are trying to estimate) so this needs to be calculated at the end of the valuation. Finance during the construction phase is calculated by compounding interest at 10% per annum on half of the building costs.

$$= (£2,622,944 \div 2) \times [(1+0.10)^{1.25} - 1]$$
$$= £165,934$$

Sometimes interest on professional fees is calculated separately by compounding the amount over two thirds of the building period. This reflects the presumption that such fees tend to be incurred early on in the development, during the planning and design phase and hence interest will be incurred for a longer period of time. Alternatively, and more frequently these days given the ubiquity of spreadsheets, a simple cash-flow would be constructed to reflect the probable timing of costs and fees on, say, a quarterly basis.

Interest accrued during the void period is calculated by compounding the total construction costs and interest rolled up during the construction period over three months at 10% per annum interest.

$$= (£2,622,944 + £165,935) \times [(1+0.10)^{0.25} - 1]$$
$$= £67,250$$

It can be seen that a significant amount of interest has accrued in the three-month void period. That is why it is very important to keep the length of any void period to a minimum. Detailed cash flow projections are essential once the project is under way in order to incorporate changes in revenue and costs, and particularly so for **phased developments**.

[21–25] The fees that agents and solicitors charge for either letting the completed development are usually calculated as a percentage of the estimated market rent. If the space is to be sold on long leasehold basis (residential apartments for example), the fees are usually quoted as a percentage of sale price. The fee that agents charge will vary depending on whether they have been given sole or joint marketing rights.

$$\text{Letting agent fee} = \text{estimated annual rent} \times 10\%$$
$$= £34,000$$
$$\text{Letting legal fee} = \text{estimated annual rent} \times 5\%$$
$$= £17,000$$

Marketing costs would cover items such as advertising, opening ceremony, brochure design and production and would obviously depend on the nature of the development.

[28] Developer's profit is the reward for initiating and facilitating the development and is dependent upon the size, length and type of development, the degree of competition for the site and whether it is **pre-let** or sold before

construction is complete (**a forward sale**). Property development is perceived as more risky than investment in completed and let properties. Consequently the required return will be higher than these 'standing' property investments. Developers of commercial property tend to express profit as a margin on costs whereas residential developers express it as a margin on value. Actually, it doesn't matter as there is a mathematical relationship between the two measures as follows:

$$x(DC + LV) = DV\left(1 - \frac{1}{1 + x}\right)$$
$$\text{Where } 0 > x < 1$$

A typical range of profit as a percentage of costs is 15–25%.

$$\begin{aligned}\text{Developer's profit on construction costs} &= £2{,}917{,}128 \times 20\% \\ &= £583{,}426\end{aligned}$$

[31] The acquisition of the site is a development cost just like any other cost. The equation below shows how developer's profit on land cost is calculated.

$$\begin{aligned}\text{Developer's profit on site costs} &= \text{future residual balance} \times [1 - (1/(1 + 0.2))] \\ &= £1{,}092{,}489 \times [1 - (1/1.2)] \\ &= £182{,}082\end{aligned}$$

[33–34] Assuming the site was purchased by the developer at the start of the development, interest on site costs must be paid over the total development period. To do this the figure calculated thus far must be discounted to determine its present value at the short-term finance rate of 10% over the total development period. Even if money is not borrowed to fund site purchase or construction the opportunity cost of funds used should be reflected in the valuation and the lending rate is regarded in this simplified approach to development valuation as a good proxy for the opportunity cost of capital.

$$\begin{aligned}\text{Interest on site and site acquisition costs} &= £910{,}407 \times [1 \div (1 + 0.10)^2] \\ &= £752{,}403\end{aligned}$$

[35–36] **Acquisition costs** must be deducted to leave the net amount remaining for purchase of the site. These acquisition costs usually include legal costs, tax (stamp duty and VAT), valuation and agents' fees plus any pre-contract investigations such as soil surveys, environmental impact assessments and contamination reports.

$$\begin{aligned}\text{Site value} &= \text{residual balance} \div (1 + 5.75\%) \\ &= £711{,}492\end{aligned}$$

The final figure is the residual land value and represents the maximum amount that should be paid for the site if the proposed development was to proceed and

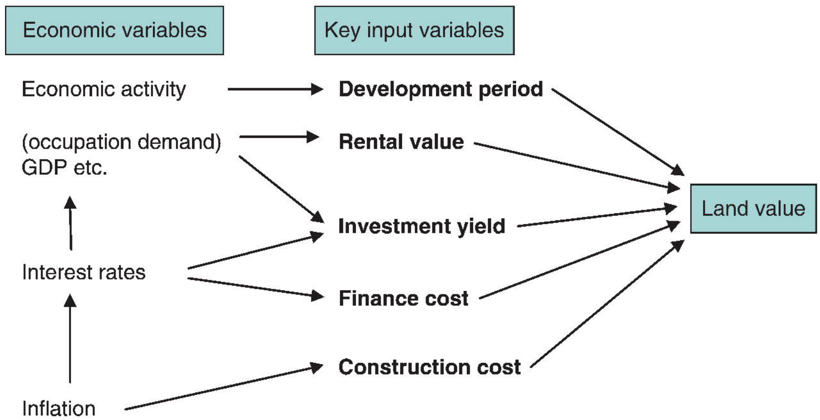

Figure 9.4 Key input variables in a development valuation.

all of the valuation assumptions held true. The valuation has not taken account of taxation (Capital Gains Tax or VAT).

Figure 9.4 shows the key input variables in a development valuation.

9.3 Problems with the residual method

The residual method of valuation is a simple means of estimating development land value. However, its simplicity comes at a price and the method is often criticised for several reasons.

First, by calculating interest on half of the building costs over the construction period, it is assumed that these costs are incurred evenly throughout this period. But, more often than not, building costs are not incurred in regular, equal instalments. In general, the initial build up of costs tends to be gradual, peaks at 60% and then tails off. Typically only 40% building costs are incurred half way through the construction period whereas the residual method assumes 50%. Consequently accrued interest is often different from the amount assumed. In addition, interest on money borrowed usually accumulates quarterly rather than annually as assumed in the residual method.

Second, the method is ambiguous as to whether interest on building costs is calculated by halving the amount and compounding interest over the whole building period (as in the above example) or compounding interest on total building costs over half of the building period. The difference is usually small but not insignificant as shown in Table 9.3.

Third, the method cannot deal with revenue that may be received and expenditure that may be due at various times during the development period. For example, a development may be undertaken in stages; an industrial estate may be constructed a few units at a time rather than developing the whole site in one go. Consequently development costs will be phased and revenue from lettings

Table 9.3 Calculating finance on total costs over half the buildings period.

GDV	£4,593,043
Bldg cost	£2,622,944
Interest over build period	£160,993
Interest over void period	£67,131
Letting costs	£61,000
Profit	£765,508
Residue at end	£915,467
Residue at start	£715,446

and sales will probably be received incrementally. Another example is the redevelopment of a town centre; shops and other key sites such as car-parks and service access areas may well be purchased incrementally, sometimes over a long period of time. The shops might be let on short-term leases until the whole site has been assembled and income from these lettings should be reflected in the development valuation.

Lastly, it is evident from the above example valuation that there are many inputs into a residual valuation and this raises two concerns. The first concern is error propagation. Two valuers, disagreeing only slightly but across a large number of the inputs may find themselves defending two very different estimates of residual land value. The second concern is sensitivity. If the magnitude of the output (the residual land value) is small in relation to the size of the inputs (development value and development costs in particular) then small changes in those inputs will be magnified in the output. For example, site A is a prime city centre location with high land cost relative to other costs and site B is out-of-town, in a greenfield location with low land cost relative to other costs. Residual valuations have produced the following estimates of development value, development cost and site value:

Site A	Development on a prime site:	
	Development value (£)	10,000,000
	Development cost, inc. finance (£)	– 7,000,000
	Residual land value (£)	3,000,000
Site B	Development on a cheap site:	
	Development value (£)	10,000,000
	Development cost, inc. finance (£)	– 9,000,000
	Residual land value (£)	1,000,000

Three scenarios may be constructed based on changes to development cost and value over the period of the development:

i. Development value and cost increase by the same percentage:
If this happens, site value at both locations will increase by the same percentage amount.

Table 9.4 Sensitivity Analysis – impact on land value.

One-variable sensitivity analysis

	(a) Rent			(b) Yield	
Original value	**£200**	£711,492	**Original value**	**7.00%**	£711,492
–5%	**£190**	£563,922	**–5%**	**7.35%**	£569,051
–10%	**£180**	£416,352	**–10%**	**7.70%**	£439,560

Two-variable sensitivity analysis: rent and yield

		Yield		
		7.00%	**7.35%**	**7.70%**
	£200%	£711,492	£569,051	£439,560
Rent%	**£190**	£563,922	£428,603	£305,586
	£180	£416,352	£288,155	£171,613

ii. Development value increases by 25% and cost by 5%:

Site A	Development value (£)	12,500,000	
	Development cost, inc. finance (£)	– 7,350,000	
	Residual land value (£)	5,150,000	(+72%)
Site B	Development value (£)	12,500,000	
	Development cost, inc. finance (£)	– 9,450,000	
	Residual land value (£)	3,050,000	(+205%)

iii. Development value increases by 5% and cost by 25%:

Site A	Development value (£)	10,050,000	
	Development cost, inc. finance (£)	–8,750,000	
	Residual land value (£)	1,300,000	(–57%)
Site B	Development value (£)	10,050,000	
	Development cost, inc. finance (£)	–11,250,000	
	Residual land value (£)	–1,200,000	(–220%)

The sensitivity of residual land value to changes in development cost and value is due to the fact that it is a geared residual. If the residual land value is small relative to other costs, changes in development value and development cost will magnify changes in the residual, so much so that it can easily disappear. Therefore, a procedure known as sensitivity analysis is undertaken to observe the effect on the residual site valuation when key input variables (see Figure 9.4) are altered. A simple sensitivity analysis is shown in Table 9.4. Regarding the development period, Fraser (1993) notes that the longer this is the greater the impact of finance cost; so bigger projects tend to be regarded as more risky. As we shall see later these variables do not move in isolation – they tend to vary concurrently. The developer may attempt to fix one or more of them as a way of reducing risk but this can reduce the land valuation as well.

9.4 Cash-flow residual model

Whereas a conventional residual valuation is often used at an early stage to provide a snapshot of development feasibility, a cash-flow provides a more detailed assessment, usually reserved for larger, more complex proposals. Projecting a cash-flow is particularly useful for developments where the initial land acquisition or disposal of the completed development is phased, such as residential or industrial estates, where some units may be sold before others are constructed; or complex central area shopping schemes where parts may be let or sold before the remainder is complete. In short, the advantage of the cash-flow technique is its dynamic capability.

The essential difference between a residual development valuation and a cash-flow development valuation is the way that the *timing* of expenditure and revenue is handled. The conventional residual model assumes that revenue from the development is received at the end of the development and interest on expenditure is calculated on the assumption that 50% of all costs over the building period (alternatively, that interest is calculated on the total costs over half of the building period). In contrast the cash-flow model divides the development project into time periods (usually months or quarters) to allow more accurate judgements to be made regarding the flow of income and expenditure. Payments and receipts which were stated as aggregate figures in the residual valuation may now be estimated as to when they are likely to occur. This permits a more accurate calculation of interest payments to be incorporated and allows the valuer to examine how changes in the timing of costs and revenue might affect value or profitability of the development. Throughout the construction phase adjustments can be made to the cash-flow as and when costs and income are realised. This will determine how the project stands at any point in time in terms of potential profit and what began as a valuation becomes an appraisal tool. In the conventional residual model it is usually assumed that income is received (and costs incurred) annually in arrears. The development cash-flow typically assumes that costs and revenue are incurred and received quarterly in arrears. In reality, there may be a mixture of timings for incurring expenditure and receiving revenue: construction costs are usually paid in arrears whereas income from property in the form of rent is usually receivable quarterly in advance.

A key advantage of a cash-flow valuation is that it can deal with non-standard patterns of revenue and expenditure. Whereas a conventional residual valuation assumes sales must come at the end of the development (albeit after a possible void period), the cash-flow method easily deals with phased schemes, allowing rental income to be accounted for when rent commences before the investment is sold. This is simple to include by incorporating two income lines; one for rent and one for sales. Where phased sales occur the associated costs, such as agent and legal fees, should also appear in the calculation at the appropriate time. Also, when the opening balance becomes positive, no interest should be charged.

Cash-flow models can more accurately reflect (mathematically at least) the timing of revenue and expenditure over the development period and are particularly useful for developments where the initial land acquisition or disposal of the completed development is phased. The basic approach of the discounted cash flow approach is that the net present value (NPV) of the development scheme is estimated where

$$LV_0 = R_0 + \sum \frac{R_i - p}{(1+f)} + \frac{DV_n}{(1+f)} \qquad [9.2]$$

Where: R=recurring periodic net revenue received at the end of each period
f=cost of finance
n=number of periods
and other variables are as defined above

In a conventional cash-flow development valuation, f is taken as the cost of finance and profit is included as a cash outflow that may be taken out as revenue is received or at the end of the development period. The NPV (assuming that it is positive) is when the surplus that is available for land after all costs (including profit) have been deducted. A simple residual model and a cash-flow residual model will reconcile when all receipts and profits are received at the end of the development period, costs are spread equally over the development period, and costs and revenues are expressed in current terms.

CF1: Translation of conventional residual valuation to a cash-flow template. This example begins by inputting a residual land value of £729,481, the estimate from the properly discounted conventional residual that calculated interest on total building costs over half of the building period. The cash-flow, when discounted at the 10% per annum finance rate (nominal quarterly equivalent rate of 2.41% per quarter), produced a small surplus NPV. If we use interpolation (‘goal seek’ on Excel) to set the NPV to zero by changing the land price input, it is possible to ‘back out’ the residual land value arrived at using this cash-flow. This is £741,834.

CF2: A more realistic breakdown of the timing of costs produced a negative NPV; the assumption of earlier costs means higher interest payments. Using goal seek, the residual land value is £688,918.

To summarise, there is a great deal of uncertainty in the residual method. Although there may be a fairly predictable set of costs associated with parts of a (re)development project, there will inevitably be unforeseen costs and delays. Typically, these are handled by a contingency allowance and adoption of a suitably risk-adjusted return to the risk-taker; more sophisticated risk management approaches have yet to be widely adopted. Nevertheless, given very high yet relatively predictable costs (building, fees, finance, etc.) and more volatile revenue (rent, yield, letting void), developers face high operational gearing. Most projects are lengthy and costs, values and market activity will change during the development timeframe. Little or no forecasting is undertaken in current residual appraisals and so this represents additional risk to the developer. Because of inherent uncertainty in the model and the highly geared nature of the residual land value, the method comes with two major health warnings: it’s highly site specific and has a very limited shelf-life.

Conventional cash-flow residual (no cost spread)										
Quarters	0	1	2	3	4	5	6	7	8	*TOTALS*
REVENUE										
Net Development Value – Commercial	0	0	0	0	0	0	0	0	4,593,043	4,593,043
EXPENDITURE										
LAND:										
Land price	–715,446	0	0	0	0	0	0	0	0	–715,446
Land acquisition costs	–41,138	0	0	0	0	0	0	0	0	–41,138
Site preparation costs	0	0	0	0	–12,500	–12,500	0	0	0	–25,000
CONSTRUCTION:										
Building costs	0	0	0	0	–969,000	–969,000	0	0	0	–1,938,000
External works	0	0	0	0	–60,000	–60,000	0	0	0	–120,000
Professional Fees (% bldg costs & external works)	0	0	0	0	–133,770	–133,770	0	0	0	–267,540
Misc costs	0	0	0	0	–40,000	–40,000	0	0	0	–80,000
Contingency (% bldg costs)	0	0	0	0	–36,083	–36,083	0	0	0	–72,166
REGULATORY FEES:										
S106				0						0
Planning					–2,500	–2,500				–5,000
Building Regs					–10,000	–10,000				–20,000
Other					–47,619	–47,619				–95,238
OTHER FEES:										
Marketing	0	0	0	0	0	0	0	0	–10,000	–10,000
Letting agent(s) fee	0	0	0	0	0	0	0	0	–34,000	–34,000
Letting legal fee	0	0	0	0	0	0	0	0	–17,000	–17,000
DEVELOPER'S PROFIT									–765,507	–765,507
Net cash-flow	–756,584	0	0	0	–1,311,472	–1,311,472	0	0	3,766,536	
PV £1 @ discount rate (quarterly nominal)	1.0000	0.9765	0.9535	0.9310	0.9091	0.8877	0.8668	0.8464	0.8264	*NPV:*
PV of net cash flow	–756,584	0	0	0	–1,192,247	–1,164,175	0	0	3,112,839	–167

Conventional cash-flow residual (cost spread)										
Quarters	0	1	2	3	4	5	6	7	8	***TOTALS***
REVENUE										
Net Development Value – Commercial	0	0	0	0	0	0	0	0	4,593,043	4,593,043
EXPENDITURE										
LAND:										
Land price	–715,446	0	0	0	0	0	0	0	0	–715,446
Land acquisition costs	–41,138	0	0	0	0	0	0	0	0	–41,138
Site preparation costs	0	–25,000	0	0	0	0	0	0	0	–25,000
CONSTRUCTION:										
Building costs	0	0	–193,800	–387,600	–775,200	–387,600	–193,800	0	0	–1,938,000
External works	0	0	0	0	–120,000	0	0	0	0	–120,000
Professional Fees (% bldg costs & ext. works)	0	0	–26,754	–53,508	–107,016	–53,508	–26,754	0	0	–267,540
Misc costs	0	0	0	0	–80,000	0	0	0	0	–80,000
Contingency (% bldg costs)	0	0	–6,617	–13,233	–32,466	–13,233	–6,617	0	0	–72,166
REGULATORY FEES:										
S106				0						0
Planning						–5,000				–5,000
Building Regs						–20,000				–20,000
Other						–95,238				–95,238
OTHER FEES:										
Marketing	0	0	0	0	0	0	0	0	–10,000	–10,000
Letting agent(s) fee	0	0	0	0	0	0	0	0	–34,000	–34,000
Letting legal fee	0	0	0	0	0	0	0	0	–17,000	–17,000
DEVELOPER'S PROFIT									–765,507	–765,507
Net cash-flow	–756,584	–25,000	–227,171	–454,341	–1,114,682	–574,579	–227,171	0	3,766,536	
PV £1 @ discount rate	1.0000	0.9765	0.9535	0.9310	0.9091	0.8877	0.8668	0.8464	0.8264	***NPV:***
PV of net cash flow	–756,584	–24,411	–216,599	–422,997	–1,013,348	–510,046	–196,908	0	3,112,839	–28,053

Key points

- The residual method is based on a very simple economic concept – that the value of the land is calculated as a surplus remaining after all estimated development costs have been deducted from the estimated value of the completed development. The residual valuation of a site is calculated by first estimating the value of the proposed development and then deducting construction costs, including payments for any money borrowed and expected profit. In practice the residual method is first employed in its simplest form at the evaluation stage and then the complexity level increases as development plans crystallise.
- The residual valuation method is often regarded as inflexible and sensitive to small but compounded changes in the increasing number of variables that are input as a development progresses.
- The cash-flow method enables the valuer to be explicit about the breakdown of costs and revenue. It provides a reasonably accurate assessment of monetary flow over a specified time period. A detailed projection of construction and related costs over the development period can provide a more considered estimation of land value. Once the acquisition price of a development site is known the cash-flow projection can be used to keep a close eye on how actual costs compare to the estimates and thus how the developer's profit might be affected by any variation.

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Chapter 10
Automated Valuation Models and Computer-Assisted Mass Appraisal

10.1 Introduction

Automated valuation models (AVMs) and computer-assisted mass appraisal (CAMA) refers to the valuation of groups of properties using a statistical model. AVMs are typically used to value residential dwellings for mortgage lending purposes either on a unit-by-unit basis or at a portfolio level, perhaps for due diligence purposes when trading residential mortgage-backed securities. CAMA is used primarily for the mass appraisal of residential dwellings for tax purposes. The statistical model uses multiple regression analysis (MRA) to estimate property values. The basic idea is that a statistical relationship can be identified between property attributes (such as size, location and age) and the prices that have been paid for them. This relationship, encapsulated in a mathematical equation, can then be used to estimate the values of properties where the attributes are known but the prices are not. Baum (1982) was the first to consider the application of MRA to commercial property valuation in the UK. A key difference between this statistical approach and conventional valuation is the way in which data is used: MRA relies on a large quantity of data to produce a mathematical equation that can be used to predict property value. The method is capable of valuing many properties quickly, is objective and impartial. With adequate data MRA is regarded as a statistically sound valuation technique (Gloudemans 1991).

10.2 Method

To explain the method it is best to start with a simple linear regression before moving on to a multiple linear regression.

Property Valuation, Second Edition. Peter Wyatt.

10.2.1 Simple linear regression (dependence of one metric variable on another)

10.2.1.1 Building the model

Simple linear regression is a mathematical model of the linear[1] relationship between two variables. The model can be used to predict the value of one variable given the value of the other variable. It should be possible to draw a 'best fit' line through points on a scatter-plot of two variables by eye, the slope of which is the average predicted change in the response variable per unit of change in the predictor variable. But, to be more precise, we could devise a best fit line that minimises the deviation (measured in terms of the sum of squared errors or residual term) of each observed value from the line, known as *least squares*. This best fit line is called the *regression line* (of response variable y on predictor variable x). In this way, any linear function involving two variables can be expressed in the form:

$$y_i = b_0 + b_1 x_i + u_i \qquad [10.1]$$

where: y = estimate of the average value of the response variable y corresponding to a given value of x
x = actual value of the predictor variable
b_0 = estimate of y when x = 0, i.e. the intercept of the regression line
b_1 = estimate of the gradient of the regression line
u = random component (residual error term)

Using the least squares principle (which minimises the sum of the squared differences between actual and predicted values of y) the regression line can be derived by solving for b_1 and b_0 using the variance of x and the covariance of x and y. The expression from which b_1 can be calculated is

$$b_1 = \frac{Cov_{xy}}{Var_x} = \frac{s_{xy}^2}{s_x^2} = \frac{\sum_{i=1}^{n}(x_i - \bar{x})(y_i - \bar{y})}{\sum_{i=1}^{n}(x_i - \bar{x})^2} \qquad [10.2]$$

For b_0 the expression is

$$b_0 = \frac{\sum y - b_1 \sum x}{n} = \bar{y} - b_1 \bar{x} \qquad [10.3]$$

The mean value of the response variable y (sale price for example) would appear as a straight line on a scatter-plot as it would be the same for all values of a predictor variable x (say, floor-space). This is illustrated in Figure 10.1

Total variation (SS_T) of each value of y about the mean value of y is calculated by taking the sum of the squared differences between observed values of y and the mean value of y.

$$SS_T = \sum (y_i - \bar{y})^2 \qquad [10.4]$$

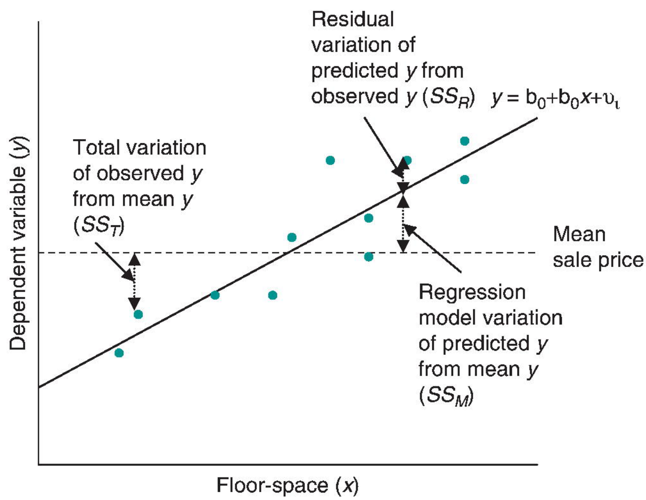

Figure 10.1 Regression line of y on x.

Where y_i = sale price of property i
$\bar{y}$ = average sale price
i = 1, … , n (where n is the number of sales)

Each point on the regression line (which slopes) varies from the mean value of y. This regression model variation (SS_M) can be calculated as the sum of the squared differences between mean value of y and the regression line.

$$SS_M = \sum (\hat{y}_i - \bar{y})^2 \qquad [10.5]$$

Where $\hat{y}_i$ = modelled sale price of property i

Finally, residual variation (SS_R) (variation unexplained by the regression model) can be calculated as the sum of the squared differences between observed values of y and the regression line.

$$SS_R = \sum (y_i - \hat{y}_i)^2 \qquad [10.6]$$

We would expect the total variation to comprise variation explained by the regression model plus residual variation, i.e.

$$SS_T = SS_M + SS_R \qquad [10.7]$$

10.2.1.2 Interpreting the model

a) Model performance
As a measure of the relationship between the two variables we can calculate the amount of variance in the values of the dependent variable (SS_T) which is explained by the model (SS_M), i.e. explained variation divided by total variation. This is known as the *coefficient of determination*, R^2.

$$R^2 = \frac{SS_M}{SS_T} = \frac{\sum(\hat{y}_i - \bar{y})^2}{\sum(y_i - \bar{y})^2} \qquad [10.8]$$

R^2 ranges from 0 to 1 and if we take the square root of R^2 we get *Pearson's Correlation Coefficient*, R. R provides an estimate if the overall fit of the regression model and R^2 provides a measure of the size of the relationship. Note that R^2 can also be written as

$$R^2 = 1 - \frac{SS_R}{SS_T} \qquad [10.9]$$

And from this it is clear that the smaller the residual variation as a percentage of total variation, the larger the R^2.

The F-ratio is the mean squares for the model (MS_M) divided by the residual mean squares and is a measure of how much the model has improved the prediction of the outcome compared to the level of inaccuracy in the model. A good model will have a high F-ratio.

$$F = \frac{MS_M}{MS_R} \qquad [10.10]$$

The *coefficient of variation (CoV)* is

$$CoV = \frac{SEE}{\bar{y}} \qquad [10.11]$$

Where *SEE* is the standard error of the estimate, a measure of the *amount* of deviation between actual and predicted values of the dependent is variable. It is a measure of the average squared error or variance of the regression model, calculated by dividing the sum of the squared errors by the degrees of freedom *(n-p-1)*:

$$SEE = s_{y,x} = \sqrt{\frac{\sum(y - \hat{y})^2}{N - p - 1}} \qquad [10.12]$$

Where N is the sample size and p is the number of predictor variables.

Statistical software can calculate standard errors and confidence intervals for individual predicted values. These values are a function of overall SEE and the individual characteristics of the observation: the more typical the characteristics (closer to average), the lower the standard error and confidence intervals about the predicted value.

The CoV is a standardised SEE and is analogous to the conventional CoV (standard deviation divided by mean). It can be regarded as the standard deviation of the regression errors. So if the errors are normally distributed, two thirds of actual values of y fall within one SEE of the predicted values, 95% within two SEEs and so on. The result provides confidence intervals around the regression line. Unlike R^2, which evaluates seriousness of errors indirectly by comparing them with variation in observed values of y, SEE evaluates them directly in units of y.

b) Model parameters
Un-standardised *b*-coefficients are in the source units for the variable[2]. If *x* significantly predicts *y* then it should have a *b*-coefficient significantly different from zero (i.e. significantly different from the mean as a model – as the mean is a horizontal line its *b* (gradient) is zero). This hypothesis is tested using a *t*-test. The *t*-statistic measures the significance of a predictor variable in explaining differences in the response variable. It is the ratio of the regression coefficient of the predictor variable *b* to its standard error *s*[3].

$$t = \frac{b}{s} \qquad [10.13]$$

The larger *t* is and the smaller *s* is the greater the contribution of that predictor.[4] Generally, for samples with at least 60 observations (plus one additional observation for each parameter to be estimated) a predictor variable with a *t*-statistic >= +/–2.00 indicates 95% confidence that *b* does not equal 0 and therefore *x* is significant in predicting *y*. If>+/2.58 then 99% confident.

c) Residuals
Standardised residuals (difference between observed and predicted outcomes) should be normally distributed about the predicted responses with a mean of zero. A normal P-P plot of regression standardised residuals is a check on normality. Plotted points should follow a straight line. When the model fit is appropriate a scatter-plot of standardised residuals (residual divided by standard deviation) against predicted responses should be random, centred on the line of zero standard residual value. Standardised residuals with z-scores>+/–3 are outliers and therefore concerning. If more than 1% standardised residuals have z-score over 2.5 the error in model is unacceptable. If more than 5% of standardised residuals have z-score over 2 this is also evidence that the model poorly represents the data. The variance of the residuals about the predicted responses should be the same for all predicted responses (homoscedastic). A normal P-P plot of regression standardised residuals is a check on normality. Plotted points should follow a straight line. Scatterplot of standardised residuals should be random centred around the line of zero standard residual value. When standardised residuals (ZRESID*) are plotted against standardised predicted residuals (ZPRED*), random dots show homoscedasticity, a funnel indicates heteroscedasticity, a pattern is a violation of linearity assumption. If the dots are more spread out at some points than others this indicates a violation of homogeneity of variance and linearity assumptions.

10.2.2 Multiple linear regression (dependence of one variable on two or more variables)

Multiple linear regression seeks a linear combination of independent variables that correlate maximally with the dependent variable. The model looks like this:

$$y_i = b_0 + b_1x_1 + b_2x_2 + \ldots + b_kx_k + u \qquad [10.14]$$

The model assumes that:

- All predictor variables must be continuous or categorical with only two categories (coded as dummy variables) and the response variable must be continuous and unbounded.
- Predictors should not have variances of 0 and at each level of the predictor variable the variance of the residual terms should be constant, i.e. have the same variance (homoscedastic).
- Predictors should not correlate too highly, i.e. display multicollinearity. This is investigated by scanning the correlation matrix of predictors to see if any have correlations above 0.80–0.90 (statistical software has multicollinearity diagnostics). Also,
  - If largest *variance inflation factor* (VIF) is > 10 there is cause for concern.
  - If average VIF is substantially > 1 the regression may be biased.
  - Tolerance < 0.1 is a serious problem, < 0.2 is a potential problem.
  - Check *eigenvalues* (how many distinct dimensions there are among independent variables). If several are close to zero, variables are highly inter-correlated. *Condition indices* are the sq roots of the ratios of largest eigenvalue to each successive eigenvalue. A condition index > 15 is a possible problem and > 30 is a serious problem. *Variance proportions* are the proportions of the variance of the estimate accounted for by each principal component associated with each of the eigenvalues. Collinearity is a problem when a component associated with a high condition index contributes substantially to the variance of > 2 vars.
- Predictors are uncorrelated with 'external variables'.
- For any two observations the residual terms should be uncorrelated (independent), i.e. they should lack autocorrelation. The Durbin-Watson test checks for serial correlation between the errors – it tests whether adjacent residuals are correlated or independent – the test statistic varies between 0 and 4 with 2 meaning residuals are uncorrelated, > 2 means negative correlation, < 2 means positive correlation – size of the test statistic depends on number of observations and number of predictor variables. If < 1 or > 3 is cause for concern.
- Standardised residuals are random, normally distributed and with a mean of 0.
- All values of response variable are independent.
- It is a linear relationship between response and predictor variables.

10.2.2.1 Data

Untransformed data directly describes attributes such as age and floor area. Some qualitative attribute data may need to be transformed into quantitative data before it can be included in the model. Category data can be transformed into sets of binary or 'dummy' (yes/no) variables using the most typical category as benchmark and then coefficients of other categories are interpreted relative to the benchmark, e.g., how much more would someone pay for a detached dwelling relative to a terraced house? Qualitative scale variables (such as age bands) can also be transformed into quantitative ones. Scale variables should be centred on 0 in additive models and 1 in multiplicative models. Some predictor variables may explain variation in the response variable non-linearly. Also, combinations of predictor variables might be included. An example would be two variables multiplied together such as floor area (a continuous variable where values get bigger as floor area increases) and quality of space (perhaps measured as a scale variable where poor is 1, average is 2 and good is 3. The resultant multiplicative variable should capture interactive effects. Another more commonly used example is a quotient variable whereby one variable, such as floor area, is divided by another, number of rooms for example, to produce average room size.

The minimum ratio of cases observations to predictor variables is 5:1 but if the response variable is skewed, many more cases may be needed. Univariate outliers can be identified using box-plots and multivariate outliers using Mahalanobis distances or residual scatter-plots.

10.2.2.2 Interpreting multiple linear regression

a) Multicollinearity between independent variables
Using a matrix of correlation coefficients, r, between each pair of predictor variables, check whether correlations are >0.9. Note that r requires values of each variable to be normally distributed so if the independent variable is dichotomous (a dummy variable for example) then the correlation between it and a continuous variable is called a serial point correlation and equivalent to the independent sample t test. Therefore do not put too much weight on these observations.

b) Model performance
Examine whether the change to R^2 resulting from adding each predictor is significant. But as more independent variables are added to the model R^2 can only increase or stay the same and this can overstate goodness of fit when insignificant variables are included or the number of variables is large compared to the sample size.[5]

Standard error of the estimate (SEE) measures the *amount* of deviation between actual and predicted vales of the dependent variable. It is a measure of the average squared error or variance of the regression model, calculated by dividing the sum of the squared errors by the degrees of freedom:

$$SEE = \sqrt{\frac{\sum (y_i - \hat{y}_i)^2}{n - p - 1}}$$

The square root is taken to extract the standard error. Its calculation is analogous to the sd and can be regarded as the sd of the regression errors. So if the errors are normally distributed, two thirds of actual values of y fall within 1 SEE of the predicted values, 95% within 2 SEEs and so on. Unlike R^2 which evaluates seriousness of errors indirectly by comparing them with variation in observed values of y, SEE evaluates them directly in units of y.

Regression software can calculate std errors and confidence intervals for individual predicted values. These values are a function of overall SEE and the individual characteristics of the observation: the more typical the characteristics (closer to average), the lower the std error and confidence intervals about the predicted value.

Change Statistics: the significance of R^2 can be tested at each stage of model building using an F-ratio, which represents the ratio of improvement in model prediction relative to inaccuracy that remains:

$$F = \frac{(n-k-1)R^2}{k\left(1-R^2\right)}$$

Where n is the number of cases and k is the number of predictors in the model.

Independence of error terms: Durbin-Watson statistic: tests whether the assumption about independent errors is tenable. If <1 or >3 is cause for concern. A value close to 2 is preferred; a value less than one or greater than 3 is cause for concern.

c) Model parameters
In multiple regression analysis, the objective is to examine the relative importance of each predictor variable. b-values quantify the degree to which each predictor variable explains y if all the others are held constant. As in simple linear regression, the associated standard error indicates extent to which b-values would vary across samples and is used to determine extent to which they are significantly different from zero. Because βs are all in units of standard deviation, relative importance of each predictor can be compared.[6] t-statistics and corresponding p-values allow comparisons of explanatory importance to be made. The t-statistic measures the significance of a predictor in explaining differences in the dependent variable. It is the ratio of the regression coefficient of the independent variable b_j to its standard error s.[7]

$$t = \frac{b}{s}$$

The larger t is and the smaller *sig* is the greater the contribution of that predictor.[8] Degrees of freedom are $= n - p - 1$. Provided the sample is large (>= 50) a t-statistic $> +/-2.00$ indicates that one can be 95% confident that b_j does not equal 0 and therefore x_j is significant in predicting y. If $> +/2.58$ then one can be 99% confident. Statistical software usually computes the probability, p, that the observed value of t would occur if b was 0, and if $p < 0.05$ then b is significantly different from 0.

d) Residuals:

Multicollinearity:

- If largest *variance inflation factor* (VIF) is > 10 there is cause for concern.
- If average VIF is substantially > 1 the regression may be biased.
- Tolerance < 0.1 is a serious problem, < 0.2 is a potential problem.
- Check *eigenvalues* (how many distinct dimensions there are among independent variables). If several are close to zero, variables are highly intercorrelated. *Condition indices* are the sq roots of the ratios of largest eigenvalue to each successive eigenvalue. A condition index > 15 is a possible problem and > 30 is a serious problem. *Variance proportions* are the

proportions of the variance of the estimate accounted for by each principal component associated with each of the eigenvalues. Collinearity is a problem when a component associated with a high condition index contributes substantially to the variance of>2 vars.

Influence of observations:

The observations should be checked to see if more than 5% have standardised residuals greater than +/–2. Also, Cook's distance checks whether individual observations have an undue influence on the model. If the statistic is greater than 1 then this is cause for concern. Leverage gauges influence of the observed value of the response variable over the predicted values. If no cases exert undue influence over the model then leverage values should all be close to average $((k+1)/n)$. It would be cause for concern if a case is more than two or three times the average. Mahalanobis distances measure the distance of cases from mean(s) of the predictor(s). For large sample ($n>500$) and five predictors, values greater than 25 are concerning, smaller samples ($n = 100$) and three predictors, values greater than 15 would be cause for concern. DFBeta statistics show whether any case would have a large influence on regression parameters. An absolute value greater than 1 is a problem.

10.3 Example

10.3.1 Data

Prices and property characteristics have been recorded for 60 dwellings sold for investment purposes in a UK city in 2011. The data set consists of the fields described in Table 10.1. The average sale price was £302,000 with a standard deviation of £65,000.

Table 10.1 Variables.

Name of variable	Description of variable	Type of variable	Sub-type	Values
ID	Identification number	Quantitative	Category	Unique identifiers
TYPE	Type of dwelling	Qualitative	Category	D - Detached SD - Semi-detached ET - End-terrace MT - Mid-terrace
ROOMS	Number of rooms	Quantitative	Interval	Ranges from 3 to 8 rooms
HTG	Type of heating	Qualitative	Category	G - Gas AD - Air duct E - Electricity SF - Solid fuel O - Oil
PRICE	Capital value	Quantitative	Continuous	Capital value (£000s)
RENT	Rental value	Quantitative	Continuous	Rental value (£ per month)

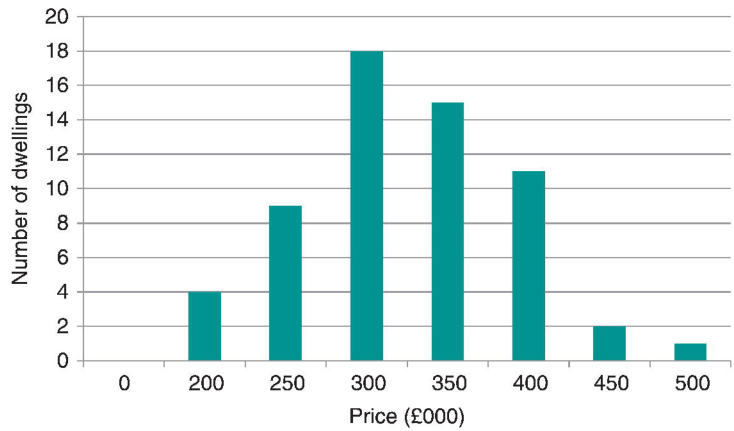

Figure 10.2 Histogram of sale prices.

10.3.2 Descriptive statistics

The sale price will be the dependent variable. Plotting a histogram of sale prices shows that the frequency distribution is slightly positively skewed. The mean sale price was £301,860 with a standard deviation of £65,140 and the median was £297,000.

10.3.3 Simple linear regression

In the first instance a simple linear regression model will be constructed using monthly rent which will be the predictor variable and price as the response variable. Recalling that, in the ordinary least squares (OLS) regression model (Equation 10.1), x will be the actual value of the monthly rent. Equations 10.2 and 10.3 can be applied to the data to estimate the coefficients. Table 10.2 shows, for a sample of dwellings, how the coefficients are calculated.

The un-standardized coefficients are:

$$b_1 = 215{,}747 / 233{,}509 = 0.9239$$
$$b_0 = 302 - 0.9239 * 251 = 70.10$$

Both are significantly different from 0 at the 0.01% level. The model is therefore:

$$y = 70.10 + 0.9239x$$

So that's £70,100 plus 0.92 times the observed monthly rent. This simple linear relationship is illustrated in Figure 10.3.

In terms of model performance, the R^2, calculated using Equation 10.8 is 0.7962 or 79.62% and Pearson's Correlation Coefficient, r, is 0.8923. The F-ratio = 199,336/880 = 226.52 and this is significantly different from zero at the 1% level. The standard error of the estimate is

$$\text{SEE} = \sqrt{\frac{51033}{58}} = 29.66$$

Table 10.2 Calculation of regression parameters.

ID	Capital value (£000) [y]	Rent (£) [x]	x − $\overline{x}$ [a]	y − $\overline{y}$ [b]	(a) * [b]	[a]^2	[b]^2	predicted value of y ($\hat{y}$)	model variation from mean ($\hat{y}$ − y–bar)	square of modelled variation from mean	residuals	square of residuals	y − $\hat{y}$	(y − $\hat{y}$)^2
1	341	268	17.01	39	666	289	1,532	318	16	263	22.93	526	23	526
2	242	130	−121.59	−60	7278	14783	3,583	190	−112	12507	51.98	2,702	52	2,702
3	242	130	−121.59	−60	7278	14783	3583	190	−112	12507	51.98	2702	52	2702
4	297	253	1.61	−5	−8	3	24	304	2	4	−6.85	47	−7	47
5	297	211	−40.19	−5	195	1615	24	265	−37	1342	31.77	1009	32	1009
6	396	343	91.81	94	8643	8430	8863	387	85	7280	8.82	78	9	78
7	270	134	−117.19	−32	3792	13733	1047	194	−108	11615	75.41	5687	75	5687
8	462	378	127.01	160	20340	16132	25645	420	118	13888	42.30	1789	42	1789
9	176	157	−94.09	−126	11842	8852	15840	215	−86	7470	−39.43	1555	−39	1555
10	176	157	−94.09	−126	11842	8852	15840	215	−86	7470	−39.43	1555	23	526
…	…	…										…	…	…
50	407	317	65.41	105	6878	4279	11055	363	61	3713	44.21	1954	44	1954
51	231	191	−59.99	−71	4251	3598	5021	247	−55	3017	−15.93	254	−16	254
52	231	191	−59.99	−71	4251	3598	5021	247	−55	3017	−15.93	254	−16	254
53	226	178	−73.19	−76	5588	5356	5831	235	−67	4505	−9.24	85	−9	85
54	215	178	−73.19	−87	6393	5356	7631	235	−67	4505	−20.24	410	−20	410
55	220	178	−73.19	−82	5991	5356	6701	235	−67	4505	−14.74	217	−15	217
56	209	178	−73.19	−93	6796	5356	8623	235	−67	4505	−25.74	662	−26	662
57	220	178	−73.19	−82	5991	5356	6701	235	−67	4505	−14.74	217	−15	217
58	264	211	−40.19	−38	1521	1615	1433	265	−37	1342	−1.23	2	−1	2
59	330	297	45.61	28	1284	2081	792	344	43	1818	−14.50	210	−14	210
60	341	303	51.11	39	2001	2613	1532	350	48	2277	−8.58	74	−9	74
Totals					215747	233509	250355			199336		51033		51033
Averages	302 ($\overline{y}$)	251 ($\overline{x}$)								3,322		880		

Part B

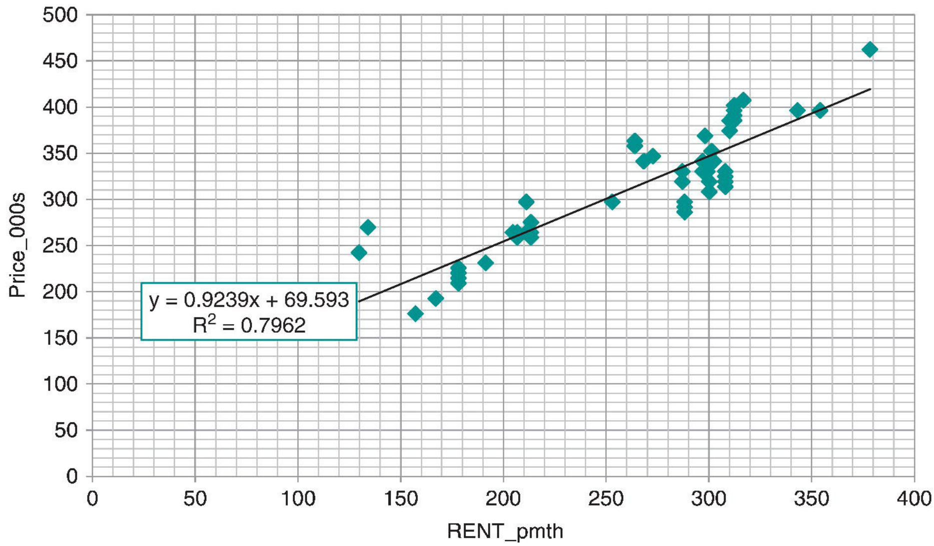

Figure 10.3 Plot of regression line.

Table 10.3 Coefficients.

Model[a]		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	95.0% Confidence Interval for B Lower Bound	95.0% Confidence Interval for B Upper Bound
1	(Constant)	69.593	15.897		4.378	.000	37.772	101.415
	RENT_pmth	.924	.061	.892	15.054	.000	.801	1.047

[a]Dependent Variable: Price_000s

Table 10.4 Residuals statistics.

Model[a]	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	189.520172	419.210388	301.858333	58.1256071	60
Residual	–49.8714561	75.9145203	.0000000	29.4059720	60
Std. Predicted Value	–1.933	2.019	.000	1.000	60
Std. Residual	–1.682	2.560	.000	.991	60

[a]Dependent Variable: Price_000s

The CoV is therefore SEE / $\bar{y}$ = 29.66 / 302 = 0.0982 = 9.82%.

Statistical software can be used to calculate the outputs more easily. Using SPSS, model coefficients are shown in Table 10.3 with slight differences to the figures above due to rounding.

Statistics for the residuals are shown in Table 10.4. The standard residual has a mean of zero and a standard deviation of one which is good but Figure 10.4 shows that the distribution is not particularly normal.

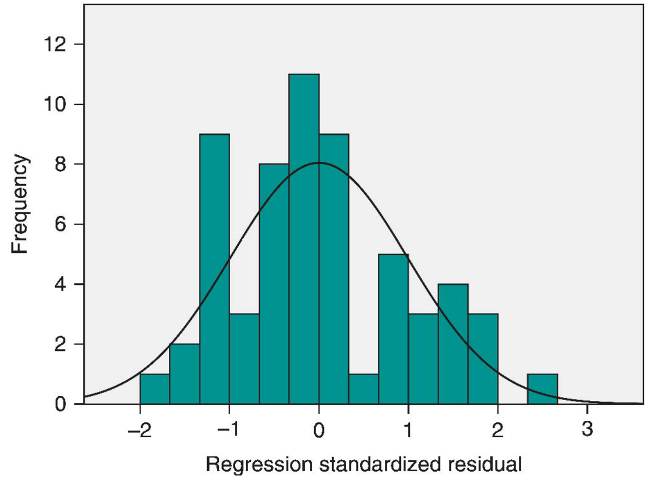

Figure 10.4 Histogram of dependent variable (Price £000).

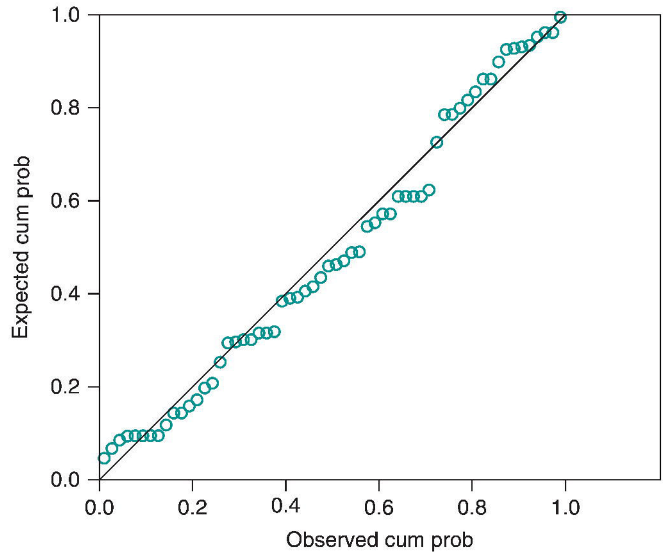

Figure 10.5 Normal P-P plot of regression standardised residuals for dependent variable (Price £000).

As a check on normality, the normal P-P plot in Figure 10.5 shows that the standardised residuals follow a relatively straight line.

As a check on model fit, the scatter plot of standardised residuals against predicted responses in Figure 10.6 is relatively random and centred on 0. There were no outliers.

So rent is a pretty good predictor of price. This is unsurprising as investors (buy-to-let) pay prices that bear a relationship (expressed as a yield or multiple) to the rent.

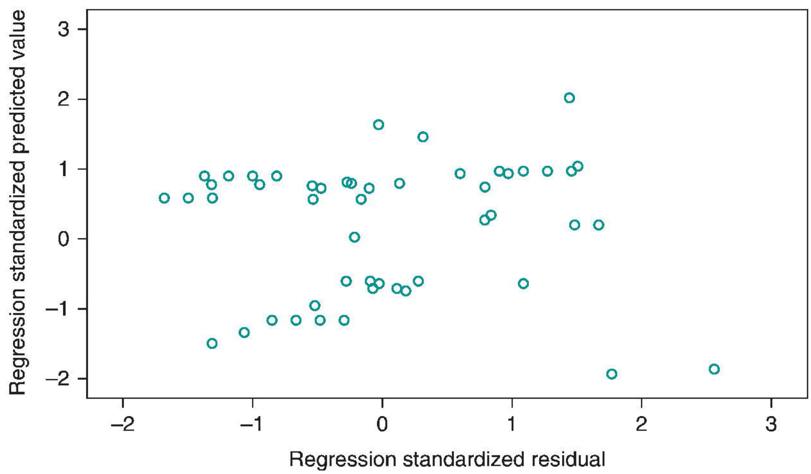

Figure 10.6 Scatter plot of standardised residuals against predicted responses of dependent variable (price £000).

10.3.4 Multiple linear regression

The simple model described above can be enhanced by introducing additional explanatory variables. These are: type of dwelling, type of heating and number of rooms, a sample of the data points are shown in Table 10.5.

None of these additional variables are continuous measures; two are categorical and one is ordinal (number of rooms), so they need to be converted to dummy variables. To do this, a baseline dwelling is established with the following attributes: detached, gas central heating and eight rooms, and dummy variables are created for other categories of these variables.

Frequencies of observations in each category are shown in Table 10.6. Some of the numbers are low – the end and mid-terraced dwellings for example but, as this is a hypothetical example, we won't worry too much about that. In practice it will be necessary to collect a much bigger sample.

To look for multicollinearity between predictor variables a correlation matrix is shown in Table 10.7. None of the correlations are higher than 0.9 but this should not be given too much weight as the variables are dichotomous (dummy).

Model performance is reported in Table 10.8. Inclusion of the heating variables would appear to add little explanatory power so the tables hereafter relate to model number three.

Statistics for model parameters (coefficients) are shown in Table 10.9. The variable indicating whether the property is mid-terraced (TypeDumMT) is not a statistically significant predictor of price, nor is the variable indicating seven bedrooms (Rms7).

Residual statistics: there are no Cook's distances greater than 1. The Leverage Values are fairly closely packed around the mean. There are two data points with quite high Mahalanobis distances (28.517).

Standardised residuals: see if any observations are greater than plus or minus two standard deviations adrift. If the number is less than 5% of all observations, then this is satisfactory. In this case there are only three, shown in Table 10.11.

Table 10.5 Additional variables.

ID	Price (£000s)	RENT (£/mth)	Type	Rooms	Heating
1	341	268	D	6	G
2	242	130	D	4	AD
3	242	130	D	4	AD
4	297	253	D	6	G
5	297	211	D	5	G
6	396	343	D	7	G
7	270	134	D	5	G
8	462	378	D	8	G
9	176	157	ET	3	E
...					
50	407	317	D	8	O
51	231	191	SD	4	O
52	231	191	SD	4	O
53	226	178	ET	4	E
54	215	178	ET	4	E
55	220	178	ET	4	E
56	209	178	ET	4	E
57	220	178	ET	4	E
58	264	211	D	6	G
59	330	297	MT	6	E
60	341	303	MT	6	G

Table 10.6 Frequency distributions of additional variables.

Number of rooms	Frequency
3	2
4	11
5	18
6	18
7	8
8	3

Heating type	Frequency
AD	20
E	8
G	18
O	7
SF	7

Type of dwelling	Frequency
D	21
ET	9
MT	8
SD	22

Checking assumptions:

The scatter-plot of standardised residuals against standardised predicted values in Figure 10.7 appears random indicating homoscedasticity.

Figure 10.8 shows that the distribution is closer to normal than was the case with the simple linear regression (see Figure 10.4).

As was the case in Figure 10.5 the normal P-P plot in Figure 10.9 shows that the standardised residuals follow a relatively straight line.

Commercial, income-producing properties may require separate models for different property types or dummy variables to distinguish types. In additive models the dependent variable should be value per unit area but multiplicative models are probably preferable due to wide variation in prices.

Table 10.7 Correlation matrix.

	RENT pmth	Type DumSD	Type DumET	Type DumMT	Rms3	Rms4	Rms5	Rms6	Rms7	HtgSF	HtgO	HtgE	HtgAD
	Pearson Correlation												
RENT_pmth	1.000	–.033	–.541	.360	–.280	–.620	–.220	.390	.393	.387	–.102	–.400	–.050
TypeDumSD	–.033	1.000	–.320	–.298	–.141	–.182	.257	.257	–.298	–.277	–.061	–.298	.783
TypeDumET	–.541	–.320	1.000	–.165	.442	.645	–.275	–.275	–.165	–.153	.138	.796	–.297
TypeDumMT	.360	–.298	–.165	1.000	–.073	–.186	–.257	–.043	.712	.774	–.143	–.010	–.277
Rms3	–.280	–.141	.442	–.073	1.000	–.088	–.122	–.122	–.073	–.067	–.067	.473	–.131
Rms4	–.620	–.182	.645	–.186	–.088	1.000	–.310	–.310	–.186	–.172	.365	.448	–.152
Rms5	–.220	.257	–.275	–.257	–.122	–.310	1.000	–.429	–.257	–.238	–.238	–.257	.154
Rms6	.390	.257	–.275	–.043	–.122	–.310	–.429	1.000	–.257	–.238	–.011	–.150	.309
Rms7	.393	–.298	–.165	.712	–.073	–.186	–.257	–.257	1.000	.774	–.143	–.154	–.277
HtgSF	.387	–.277	–.153	.774	–.067	–.172	–.238	–.238	.774	1.000	–.132	–.143	–.257
HtgO	–.102	–.061	.138	–.143	–.067	.365	–.238	–.011	–.143	–.132	1.000	–.143	–.257
HtgE	–.400	–.298	.796	–.010	.473	.448	–.257	–.150	–.154	–.143	–.143	1.000	–.277
HtgAD	–.050	.783	–.297	–.277	–.131	–.152	.154	.309	–.277	–.257	–.257	–.277	1.000
	Sig. (1-tailed)												
RENT_pmth	.	.402	.000	.002	.015	.000	.045	.001	.001	.001	.218	.001	.351
TypeDumSD	.402	.	.006	.010	.141	.082	.024	.024	.010	.016	.322	.010	.000
TypeDumET	.000	.006	.	.104	.000	.000	.017	.017	.104	.122	.146	.000	.011
TypeDumMT	.002	.010	.104	.	.290	.078	.024	.373	.000	.000	.139	.471	.016
Rms3	.015	.141	.000	.290	.	.252	.177	.177	.290	.304	.304	.000	.159
Rms4	.000	.082	.000	.078	.252	.	.008	.008	.078	.094	.002	.000	.123
Rms5	.045	.024	.017	.024	.177	.008	.	.000	.024	.034	.034	.024	.120
Rms6	.001	.024	.017	.373	.177	.008	.000	.	.024	.034	.466	.127	.008
Rms7	.001	.010	.104	.000	.290	.078	.024	.024	.	.000	.139	.120	.016
HtgSF	.001	.016	.122	.000	.304	.094	.034	.034	.000	.	.157	.139	.024
HtgO	.218	.322	.146	.139	.304	.002	.034	.466	.139	.157	.	.139	.024
HtgE	.001	.010	.000	.471	.000	.000	.024	.127	.120	.139	.139	.	.016
HtgAD	.351	.000	.011	.016	.159	.123	.120	.008	.016	.024	.024	.016	.

Table 10.8 Model summary.

					Change Statistics					
Model[e]	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.892[a]	.796	.793	29.6583884	.796	226.617	1	58	.000	
2	.961[b]	.924	.919	18.5888583	.128	30.882	3	55	.000	
3	.981[c]	.963	.956	13.6630103	.039	10.361	5	50	.000	
4	.982[d]	.964	.954	13.9581541	.001	.477	4	46	.752	1.652

[a]Predictors: (Constant), RENT_pmth

[b]Predictors: (Constant), RENT_pmth, TypeDumSD, TypeDumMT, TypeDumET

[c]Predictors: (Constant), RENT_pmth, TypeDumSD, TypeDumMT, TypeDumET, Rms3, Rms6, Rms5, Rms7, Rms4

[d]Predictors: (Constant), RENT_pmth, TypeDumSD, TypeDumMT, TypeDumET, Rms3, Rms6, Rms5, Rms7, Rms4, HtgO, HtgAD, HtgSF, HtgE

[e]Dependent Variable: Price_000s

Table 10.9 Coefficients.

		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
Model[a]		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
3	(Constant)	227.285	23.023		9.872	.000	181.042	273.528					
	RENT_pmth	.556	.062	.537	8.987	.000	.431	.680	.892	.786	.245	.209	4.783
	TypeDumSD	−33.163	4.436	−.247	−7.476	.000	−42.073	−24.252	−.225	−.726	−.204	.681	1.469
	TypeDumET	−50.544	8.880	−.279	−5.692	.000	−68.379	−32.708	−.644	−.627	−.155	.309	3.231
	TypeDumMT	1.726	7.695	.009	.224	.823	−13.730	17.182	.446	.032	.006	.455	2.199
	Rms3	−88.152	19.865	−.245	−4.438	.000	−128.052	−48.252	−.362	−.532	−.121	.245	4.087
	Rms4	−63.448	15.747	−.380	−4.029	.000	−95.077	−31.820	−.600	−.495	−.110	.084	11.933
	Rms5	−43.554	11.458	−.309	−3.801	.000	−66.568	−20.540	−.086	−.473	−.104	.113	8.861
	Rms6	−52.818	9.679	−.375	−5.457	.000	−72.259	−33.377	.149	−.611	−.149	.158	6.323
	Rms7	−15.956	11.140	−.084	−1.432	.158	−38.331	6.419	.517	−.199	−.039	.217	4.609

[a] Dependent Variable: Price_000s

Table 10.10 Residuals Statistics.

Statistic[a]	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	176.000000	437.559479	301.858333	63.9147543	60
Std. Predicted Value	−1.969	2.123	.000	1.000	60
Standard Error of Predicted Value	3.786	9.661	5.348	1.599	60
Adjusted Predicted Value	176.000000	438.192657	302.101918	64.1676400	60
Residual	−28.1117153	32.5655594	.0000000	12.5778205	60
Std. Residual	−2.058	2.383	.000	.921	60
Mahal. Distance	3.546	28.517	8.850	6.281	60
Cook's Distance	.000	.318	.024	.056	60
Centered Leverage Value	.060	.483	.150	.106	60

a. Dependent Variable: Price_000s

Table 10.11 Casewise Diagnostics (Dependent Variable: Price_000s).

Case Number	Std. Residual	Price_000s	Predicted Value	Residual
2	−2.058	396.0000	424.111715	−28.1117150
27	−2.037	264.0000	291.829285	−27.8292851
38	2.383	363.0000	330.434440	32.5655604

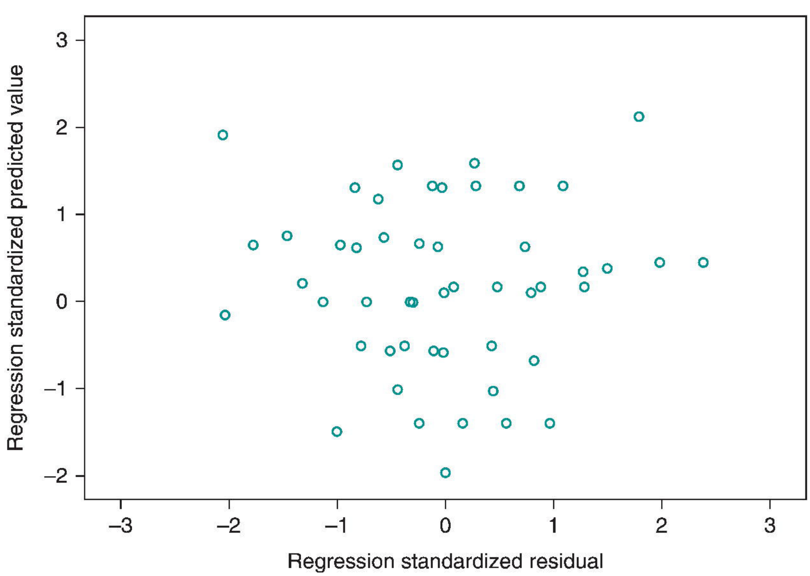

Figure 10.7 Scatterplot (dependent variable – Price £000).

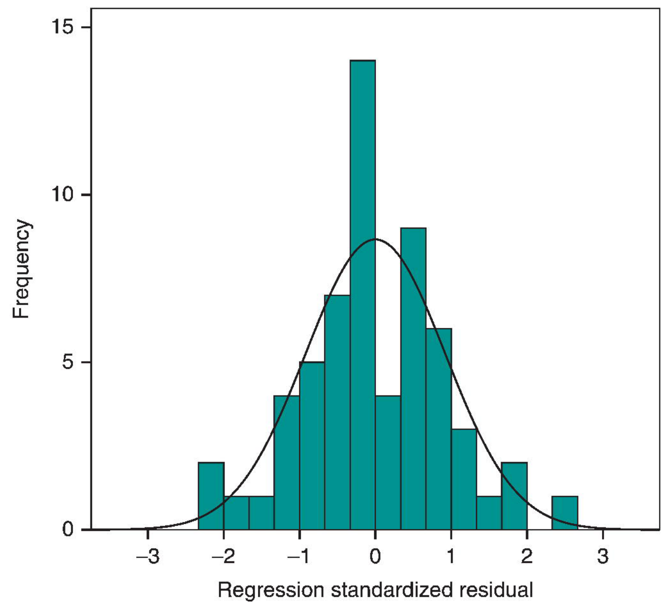

Figure 10.8 Histogram (dependent variable – Price £000).

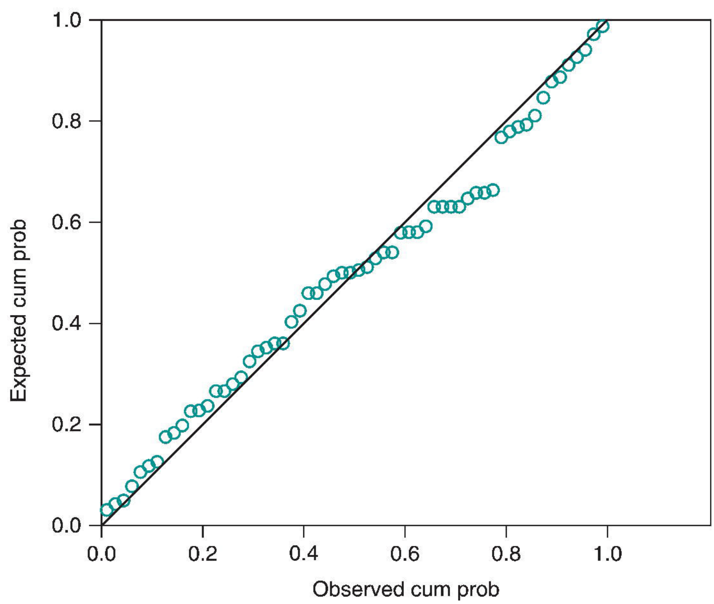

Figure 10.9 Normal P-P plot of regression standardised residual (dependent variable – Price £000).

10.4 Multiple regression analysis: Research and applications

The application of multiple regression analysis to property valuation was pioneered in the US and can be traced back to the 1960s. In the UK it has received much less attention: generally the profession has resisted statistical methods of valuation, a situation exacerbated by a lack of data on which to base statistical analysis.

Pendleton (1965) produced a statistical model that could predict the sale prices of a sample of properties to within 6–7% of the transaction price. He argued that property characteristics (house size, plot area, accommodation / equipment in the house, a job accessibility index and the mean income of occupants) could be identified that accounted for approximately 90% of the variation in sale prices. Similar research was undertaken throughout the 1960s and 1970s, advancing and refining the technique. All of the studies showed that it was possible to predict price from a group of comparables using measures of location, house attributes and environmental characteristics.

Donnelly (1989) compared the traditional comparison method with linear and non-linear regression models and concluded that the linear model provided more consistency with fewer variables and was simpler than the non-linear model. A linear model also has the advantage of being intuitively clear in terms of each value factor's contribution to the overall price. Research undertaken by Dodgson and Topham (1990) investigated whether computerised statistical techniques are able to provide valuations comparable to those of professional valuers. The study compared the valuations of 32 residential properties with independently derived statistical estimates. Regression equations were derived for each locality. Before comparing the statistical predictions of value to the valuer's estimates the former had to be adjusted to account for time differences using a building society price index. The average difference between the professional and regression-based valuations was 15%. Dodgson and Topham concluded that regression could be used to value particular types of property in homogeneous areas. However, regression may not account for unusual attributes, such as a transaction not conducted at arm's length or the purchase price including incentives. Kang and Reichert (1991) used multiple regression analysis to generate the adjustment coefficients for use in a comparison method valuation (see Table 5.2 in Chapter 5). It was found to be helpful when valuing dwellings in relatively homogeneous markets. In less homogeneous markets conventional ordinary least squares regression using a log-linear model was found to be more appropriate.

In the UK, Adair and McGreal (1988) investigated the application of multiple regression analysis to property valuation in Northern Ireland using data provided by an estate agents on the physical attributes of a sample of 1,095 terraced houses; sale price, address, date, property type, age (new or old), floor area, number of bedrooms and reception rooms, presence of a bathroom, central heating and garage and whether modernisation or repair was needed. To control for spatial influences on value, separate regression models were developed at different levels of spatial aggregation. These included regional, city, postcode / ward and street levels. Explanatory power increase as spatial disaggregation increased from regional level (R^2 0.511, se £4,550) to street level ($R^2 = 0.910$, se £1,870). The significant increase in R^2 accords with American literature that highlights the need for homogeneous sets of properties at a more clearly defined spatial level and the results illustrate the importance of incorporating a detailed measure of location in regression analysis. In this case this was achieved by producing regression models for progressively smaller, and therefore more spatially homogeneous, areas but it could have also been achieved by including some measure of location within the regression equation itself. Indeed, if this is done the analysis does not have to limit itself to such small study areas. Adair and McGreal argue that as the spatial extent of the study area increases then the reliability of multiple regression analysis decreases unless good indicators of location can be generated. This suggests that micro-locational or other factors must be added to the model to improve its accuracy. McClusky and Anand (1999) consider the expansion of multiple regression analysis into technologies including expert systems and neural networks and McClusky et al. (2000) extend multiple regression analysis to include location adjustment factors. This is done by generating a 'surface' or contour map of location weights that can be used to explain spatial variation in property value.

10.4.1 Computer-assisted mass appraisal

Countries with *ad valorem* tax systems for property need to appraise large numbers of properties as of a common date (McClusky and Anand, 1999). Multiple regression analysis is used by several US counties to mass appraise dwellings for tax purposes. King and Cane (1971) explain how this was achieved for Orange County in California using a sample of 1,553 transactions. Sale price was the response variable and the predictor variables are shown in Box 10.1. Factor analysis identified the logical structure of the data and showed that floor area, number of rooms and number of bedrooms was a similar variable and floor area could be used to represent them all. An automated technique was used to stratify the data, on the basis of mean sale prices, into homogeneous groups (representing each property type); these were the regression sub-models. Four main groups were identified: large residences, semi-detached dwellings, modern houses with and, lastly, without garages. The best results were obtained for semi-detached dwellings where the estimated sale price was +/–10% of the actual sale price 98% of the time and surprisingly this was achieved using only three predictor variables that described building size, lot size and location. The major advantages over conventional tax assessments were objectivity and impartiality, both prerequisites for tax assessment. Moreover, it was a low cost method of assessing the values of a large number of properties quickly.

Box 10.1 Classification of independent variables (King and Cane 1971)

building characteristics;	site characteristics;	transaction characteristics;
– floor area	– area	– sale price
– rooms	– frontage	– date of sale
– bedrooms	– depth	– ratio of cash to total price
– bathrooms	– shape	
– stories	location characteristics;	
– design	– community	
– structure	neighbourhood	
– quality	– block	
– age	distance downtown	
– garage	– distance to major throughway	

Regression analysis is being used in the Netherlands to help assess values of dwellings in Amsterdam for tax purposes (Needham et al., 1997/8). Month of sale is included in the model to handle time variance and variable are also added for neighbourhood and neighbourhood constant. It is assumed that location parameters vary over time (a trend for neighbourhood and a general trend). The model thus generates trends which provide a way of correcting sale prices to a valuation date. Statistically significant predictor variables include floor-space, condition, quality, area of plot, age, neighbourhood variables (distance to centre, extent of vandalism, population density and proportions of unemployment, green-space, open space, ethnic minorities).

10.4.2 Automated valuation models

In real estate, automated valuation models are used for two main purposes. The first is for desktop valuations of properties subject to what are considered to be low risk residential mortgage and remortgage applications. The second is for rapid valuation of the properties that underpin mortgage portfolios for residential mortgage-backed securities (RMBS).

The loan-to-value (LTV) ratio is a major determining factor in assessing likelihood of borrower default and magnitude of loss. Using inputs that include the address and certain property attributes, the model returns a value. Models are derived using large data sets of property attributes (from valuations) and sale prices (from market). When the valuer enters address and attributes (number of rooms, age, floor area, property type) of the property to be valued, comparables are selected. A confidence measure is provided with the valuation based on either:

a) physical similarity between subject and comps, proximity of target to comps and homogeneity of neighbourhood in which the target property is located;
b) forecast standard deviation of the valuation.

CoreLogic's (previously UKValuation) is called ValuePoint, Hometrack's is called Real time AVM and Calnea Analytics' is InstantValue. These desktop valuations are mainly used by lenders in place of full inspections for remortgages as the risk is perceived to be lower. Waller (1999) examines the way in which MRA, expert system and neural network-based AVMs might be used by the appraisal profession in the US, while Kelley-Pace et al. (2002) consider the application of CAMA in particular. Mooya (2011) contemplates the future of the residential valuation profession in the UK in the face of AVMs. Thibodeau (2003) points out that Freddie Mac, Fannie Mae and other real estate organisations have developed AVMs to estimate the market value of single-family dwellings. In an empirical study, he splits the characteristics that affect dwelling prices into those that are property specific and those that are neighbourhood-wide and questions whether regression models that include neighbourhood indicator variables adequately capture the influence of local public services on value. It was found that spatial disaggregation yields a significant increase in prediction accuracy and that adjusting predicted values using neighbourhood residuals also increases prediction accuracy. Thibodeau also found that prediction accuracy is related to size and age of dwellings in a neighbourhood, to heterogeneity of properties in the neighbourhood and to the rate of turnover in the local housing stock. In relation to commercial real estate, O'Neill (2004) developed a regression-based AVM for valuing hotels. Based on sales comparison rather than income capitalisation or profits methods, it relies on four predictor variables: NOI per room, average daily rate for a room in year prior to sale, number of guest rooms and occupancy rate in year prior to sale. These four variables explained 90% of the variation in sales prices for a sample of 327 hotel transactions.

10.5 Advantages and disadvantages of regression-based valuation

US studies show that multiple regression analysis works best in well-defined and relatively homogeneous markets. Whereas the comparison method only needs a handful of comparables, it is generally agreed that 30 or more are required for statistical inference. Indeed, Shenkel (1978) argued that 100 comparables with reliable data on size, location, physical and neighbourhood characteristics would be required. Advocates regard multiple regression analysis as an advancement of the comparison method because it is able to reconcile a large number of property characteristics which a human valuer could not do without error, omission or bias. When using the comparison method the valuer must decide which comparables to use and how to combine the data to arrive at an opinion of value; there is potential for judgemental errors to be made when selecting comparable evidence and value factors. Furthermore, error due to bias may be present in human valuation if data availability is restricted (Langfield-Smith and Locke, 1987).

Disadvantages include an inability to: check the state of repair or condition, properly investigate geographical attributes such as views, smells, noise and so on, and more difficulty in detecting fraud. In many mass appraisal models location is incorporated by analysing small homogeneous areas within which the properties can be assumed to be similar. This is simplistic and requires the zoning of values dependent on location by an experienced valuer, but as the homogeneous areas become smaller the number of regression models that must be developed grows larger and the efficiency of using multiple regression analysis diminishes. An alternative is to devise a measure of location for each property that is incorporated in a single regression equation. Perhaps the biggest disadvantage is lack of sufficient data on which to base the statistical analysis. This is particularly so with regard to commercial and industrial real estate.

Eckert (1991) is the main reference regarding use of computer-assisted mass appraisal for tax purposes. The advantages of using such an approach to tax assessment are increased objectivity, high speed and low cost (which means more regular revaluations are possible), equity, fairness and economies of scale. Disadvantages are accuracy, explanatory power, ease of application and defensibility. The International Association of Assessing Officers publishes standards on the mass appraisal of property (IAAO, 2012) and on automated valuation models (IAAO, 2003).

Part B

Notes

1. It is possible to model non-linear relationships between two variables by transforming one or both sets of values using, say, reciprocal, exponential, logarithmic or power functions. For example, the relationship between price and distance to town centre may be non-linear; price might fall at a decreasing rate. Transforming one of the variables would allow the relationship to be included in the model.
2. β-coefficients are standardised b-coefficients and reveal the number of standard deviations that y will change by as a result of a one standard deviation shift in x.
3. The standard error s_j of b_j is akin to the sd; it measures the error associated with using b_j as an estimator of the true, but unknown, relationship between dependent variable x_j and dependent variable y.
4. When t is small one cannot reject H_0 that b equals 0 and that the predictor is unimportant in explaining y. This does not mean that the predictor isn't correlated with y: the t-value measures the marginal contribution of a dependent variable in predicting y when all other variables in the equation are held constant. Because of multicollinearity some variables that duplicate information provided by others may be highly correlated with y but insignificant predictors as indicated by their t-values. Conversely some variables might predict y in combination with others but individually none may be highly correlated with y.
5. Adjusted R^2, $\bar{R}^2 = 1 - \frac{(n-1)SS_R}{(n-p-1)SS_T}$ where n is the sample size (number of observations) and p is the number of independent variables. It adjusts for the number of explanatory terms by limiting the degrees of freedom and increases only if the new term improves the model more than would be expected by chance. $\bar{R}^2$ can be negative and will always be less than or equal to R^2. It is relevant when data sets are small (<30 observations) in relation to the number of explanatory variables.
6. To interpret βs literally requires std deviations of the variables. For example, if a predictor variable's $\beta = 0.5$ and sd was 10 and the sd of the response variable was 15 then, as the predictor value increases by 10, the response variable increases by 7.5 (with other predictors held constant).
7. The standard error s of b is similar to the standard deviation; it measures the error associated with using b as an estimator of the true, but unknown, relationship between dependent variable x and dependent variable y.
8. When t is small one cannot reject H_0 that b equals 0 and that the predictor is unimportant in explaining y. This does not mean that the predictor isn't correlated with y: the t-value measures the marginal contribution of a dependent variable in predicting y when all other variables in the equation are held constant. Because of multicollinearity some variables that duplicate information provided by others may be highly correlated with y but insignificant predictors as indicated by their t-values. Conversely some variables might predict y in combination with others but individually none may be highly correlated with y.

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Part C
Valuation Applications

Part C

Not all businesses are able, or indeed want, to purchase the property that they intend to occupy. Many of those businesses that do own the properties that they occupy will have financed the acquisitions by borrowing money, perhaps secured against the value of the properties themselves. Many businesses prefer to rent their properties from owner-investors. Doing so means that the occupier does not have to finance its acquisition and the firm has greater flexibility to move when the property is no longer suitable / has become obsolete. The ownership of property, where occupation is transferred to a tenant, is a form of investment, the financial return from which must be sufficient to compensate for the effort of owning the property and leasing it out. Consequently, valuations for investors and valuations for occupiers are two sides of the same coin.

The split between occupation and ownership is personified by the landlord / tenant relationship where, in general terms, the landlord owns a freehold interest in a property and the tenant owns a leasehold interest in the same property. The legal relationship can be more complicated than this with head-leaseholds, sub-tenants, overriding leases for example, which can lead to situations where legal advice may be needed to identify the various interests in a single building

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before any valuation can be tackled. Valuations are required by the owners and occupiers within this landlord / tenant relationship to determine the level of rent that should be paid (the rental value) at the commencement of a new lease, at rent reviews during a lease, at the renewal of an existing lease, and to determine the amount of any compensation payments that might be payable to the tenant by the landlord at the end of the lease end or at its renewal. Moreover, occupiers – whether tenants or owner-occupiers – may require capital valuations of their property assets for inclusion in company financial statements. If a business operator wishes to purchase a property it may well do so using debt finance and the lender will require a capital valuation of the property if it is going to be used as collateral for the loan. These are probably the most common reasons for valuers being asked to conduct rental and capital valuations of commercial property from an occupation perspective but there are other reasons too: rental and capital valuations of properties are required by Government for tax purposes; capital valuations are required when business property is to be compulsorily acquired or when compensation payments are due; and insurance companies require capital valuations of business premises that they insure. This part of the book will look at each of these.

Chapter 11
Lease Pricing

11.1 Introduction

This chapter is concerned with the assessment of rental value at the commencement of a new lease, at a rent review or at the point when an existing lease is renewed. Usually this is a matter of gathering and adjusting comparable evidence from recent lettings of similar properties in the locality using the comparison method of valuation. However, the increasing diversity of lease contracts means that this process is no longer as straightforward as it sounds: as French et al. (2000) put it:

> In the late 1990s the business environment experienced substantial structural change and tenants began to demand bespoke leases to suit their particular occupational requirements. This led to a plethora of different lease contracts, as tenants require shorter leases, the ability to expand and contract, break clauses and upwards/downwards rent reviews. The market is now as diverse as it was uniform.

This structural change in the business environment was caused initially by an over-supply of commercial property (office space in London in particular), but then there was a shift in the organisational structure of businesses in all sectors. In the office sector changing working practices brought about by increased use of IT such as hot-desking, home-working and peripatetic office use, outsourcing not only of non-core or peripheral business but also management of property and estates, increased use of serviced offices and other ways of using accommodation over short time periods. All of this has had a profound effect on the conventional lease contract and has shortened the economic life of many commercial buildings due to the early onset of obsolescence. Many of these buildings are otherwise physically sound and have found new uses, such as

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residential apartments. In the retail sector, internet shopping, home delivery and the perception of shopping as leisure activity has changed occupier requirements. In the industrial (factories and warehouses) sector these retail trends have led to an increased demand for large shed-style warehousing facilities and, in cases where manufacturing does take place in the UK, the automation of production has meant that factory requirements can be highly specified. The growth of data centres within a 25 mile radius of London has been rapid and these are often located on industrial parks.

Up until the end of the 1980s standard leases in the UK were 20–25 years long with all repair and insurance liabilities imposed on the tenant, either directly or via a service charge in a multi-let property. Most leases provided for upward-only rent reviews every five years. Tenants had the right to renew their leases under the Landlord and Tenant Act 1954 and could usually assign or sub-let any unexpired lease term with the landlord's consent, which could not be unreasonably withheld. Until 1996 tenants had a continuing liability for lease terms after assignment. In 1996 this liability was removed but, as a partial compromise, landlords were given greater scope for refusing to allow an assignment. Where assignment is permitted, the landlord can require the outgoing tenant to guarantee the lease obligations of the incoming tenant (Crosby et al., 1998). Much of this conventional lease structure remains intact but there has been a significant reduction in average lease length and the number of leases with break options has increased substantially. Tenants now want a choice of flexible lease contracts that allow them to respond quickly to changing business circumstances. The BPF / IPD Annual Lease Review (2011) reveals a reduction in average lease length across all commercial real estate from 8.7 years in 1999 to 5.3 years in 2010. By sector, the average lease length for office space was 4.7 years, for retail it was 5.7 years and for industrial it was 4.2 years. Around a third of all leases contain a break clause.

11.2 Lease incentives

Landlords sometimes offer incentives to tenants and in the sections that follow the financial impact on *rental value* of typical incentives are considered. In each case the valuer is trying to estimate the **effective rent** that is being paid and this comprises the **headline rent** *less* the annual equivalent value of any incentives offered by the landlord *plus* the annual equivalent of any capital expenditure for the acquisition of the interest and expenditure on alterations or improvements by the tenant. It is important to remember that cost does not always equate to value and therefore not all expenditure need be amortised – each item must be considered carefully. Rents agreed between parties to a new letting provide useful comparable evidence for valuers but, in order to derive the effective market rent, it is important to consider the financial impact of any incentives that may have been agreed. The RICS provides some guidance on the way in which the financial impact of lease incentives might be taken into account when assessing market rent (RICS, 2006b) and this section provides further discussion and examples.

11.2.1 Rent-free periods

A rent-free period refers to a fixed length of time within the term of a lease during which no rent is paid. If a rent-free period is offered to a prospective tenant as an incentive to take occupation of a particular property and such an incentive is not regarded as standard practice for the property type and location in question then a valuer may wish to calculate the market rent of the property assuming no incentive was granted (the effective rent). It should be borne in mind that it is common, especially in the case of retail property, for a landlord to grant a short (say three to six month) rent-free period for fitting-out the premises. If this is the case, and the tenant is not trading from the premises during the 'fitting-out period', then its financial benefit to the tenant (or financial loss to the landlord) should be ignored when estimating the market rent. The assumption is that it has taken place before lease commencement. Over-and-above this fitting-out period a landlord may offer a more substantial rent-free period as a way of inducing a tenant to take occupation of the property. Landlords offer rent-free periods as a way of maintaining a headline rent so that at rent review a case can be made for a revision to market rent which includes the financial value of the incentive. Also, declaring a headline rent rather than the effective rent can be beneficial in terms of bank lending ratios if debt has been used to help finance the purchase of the property investment and, in the case of long leases and an occupier of high quality, will assist in raising the valuation of the asset (Sayce et al., 2006).

To determine the financial effect of this rent-free period on the market rent it is necessary to amortise the capital value of the rent that is actually paid, known as the headline rent, over a period that includes the rent-free period. There are several approaches to this calculation:

a) straight line;
b) growth-implicit all risks yield (ARY);
c) growth-explicit discounted cash-flow (DCF).

These approaches are best illustrated using an example. A ten-year lease has been agreed at a 'headline' rent of £50,000 per annum with a one-year rent-free period and a rent review at the end of the fifth year. What is the effective rent assuming that the benefit of the incentive is written off over the period to the rent review.

a) Straight line (five-year write-off)

Headline rent	50,000		
Received for 4 years	x 4		
CV of headline rent		200,000	
Spread over 5 years		÷ 5	
Annual equivalent of headline rent (effective rent)			£40,000

b) ARY (five-year write-off)

Headline rent	50,000		
YP 4 yrs @ 8%[1]	3.3121		
PV £1 1 yr @ 8%	× 0.9259		
CV of headline rent		153,334	
Divided by YP 5 yrs @ 8%		÷ 3.9927	
Annual equivalent of headline rent discounted up to rent review (ER)			£38,404

[1] Money discount rate

Using an all-risks yield to calculate the effective rent implies that the gap between the headline rent and the market rent widens over the amortisation period rather than that the market rent rises. In fact, because the amortisation period is so short the rental value difference is minor. If we assume that there is a three-month fitting-out period, on top of which the landlord has offered the one-year rent-free period, what is the effective rent? There are two ways of handling this: assume the fitting-period begins at the start of the lease or assume it has already taken place before the lease starts. So, amortising the incentive over five years and assuming the fitting out period starts at commencement of lease:

Headline rent	50,000		
x YP 3.75 years @ 8%	3.1336		
PV £1 1.25 years @ 8%	0.9083		
CV of headline rent		142,312	
Divided by YP 4.75 years @ 8%		3.8274	
ER			£37,182

If it is assumed that the fitting-out period has already taken place then the period over which the headline rent is capitalised is increased to four years, the discount period is one year and the amortisation period is five years. This produces an effective rent of £38,404 per annum for the five-year amortisation period, as shown below. This is, obviously, the same as (b).

Headline rent	50,000		
YP 4 years @ 8%	3.3121		
PV £1 1 year @ 8%	0.9259		
CV of headline rent		153,334	
Divided by YP 5 years @ 8%		3.9927	
ER			£38,404

c) DCF (five-year write-off)

Using a DCF approach to estimate the effective rent over the first five years to the first rent review is straightforward because there is no rental growth during this period. Assuming a target rate of return of 10%, the effective rent is calculated as follows:

Headline rent	50,000		
YP 4 yrs @ 10%	3.1699		
PV £1 1 yr @ 10%	0.9091		
CV of headline rent		144,088	
Divided by YP 5 yrs @ 10%		3.7908	
ER			£38,010

The effective rent can also be calculated using the goal-seek and NPV functions on a spreadsheet. The easiest way to do this is to calculate the total present value of the headline rent over the period to the first rent review. This has been done in the rental valuation below using the NPV function[1] to sum the present values of the annual rent payments, remembering that no rent is received in year one. The total present value in this case is £153,339. Next, set up another valuation where a first guess at the effective rent is input, remembering that these are equal payments. The goal-seek function can then be used to equate the total present value of the headline rent with the total present value of the effective rent by changing the amount of effective rent. The effective rent differs slightly from the valuation above due to rounding.

Amortising incentive over 5 years...

Year	Effective rent	Headline rent
1	£38,405	£0
2	£38,405	£50,000
3	£38,405	£50,000
4	£38,405	£50,000
5	£38,405	£50,000
Yield	8%	8%
NPV	£153,339	£153,339

The period over which the headline rent is amortised has a significant effect on the calculation of the effective rent. If it was felt that effective rent would overtake the headline rent by the rent review, i.e. rental growth is not sufficient to outstrip £50,000 p.a. (assuming upward-only rent reviews), then the headline rent should be capitalised and amortised up to the next review opportunity.

a) Straight line (ten-year write-off)

Headline rent	50,000		
Received for 9 years	9		
CV of headline rent		450,000	
Divided by 10 years		10	
Effective rent (ER)			£45,000

b) ARY (ten-year write-off)

Headline rent	50,000		
YP 9 years @ 8%	6.2469		
PV £1 1 year @ 8%	0.9259		
CV of headline rent		289,200	
Divided by YP 10 years @ 8%		6.7101	
ER			£43,100

Spreading/amortising the incentive over a short period, such as five years, favours the tenant and the over a longer period favours the landlord. This is particularly so if the rent review is upward-only. For longer leases, the key determinant of the length of the amortisation period is when the effective rent will overtake the headline rent and this depends on the rental growth rate assumption. Using the ARY method, the growth rate necessary for the effective rent to overtake the headline rent at the rent review in year five is 5.42% p.a., calculated as follows:

$$£38{,}404 \times (1+g)^5 = £50{,}000$$
$$(1+g)^5 = \frac{50{,}000}{38{,}404} = 1.3019$$
$$(1+g) = \sqrt[5]{1.3019} = 1.0542$$
$$g = 0.0542 (5.42\% \text{pa})$$

Whereas the growth rate required for the effective rent to exceed the headline rent in year ten is:

$$43{,}100 \times (1+\mathrm{g})^{10} = 50{,}000$$
$$(1+\mathrm{g})^{10} = 1.1601$$
$$\mathrm{g} = 0.015 \text{ or } 15\% \text{pa}$$

This sort of growth rate analysis can be used to help decide the period over which the value of the incentive should be amortised prior to estimating the effective rent being paid by the tenant (Crosby and Murdoch, 1994). Difficulties centre on the choice of appropriate discount rate; should it be the borrowing rate or investor's target rate of return, and the selection of rental growth rate. Using a spreadsheet, the solution is as follows.

Amortising incentive over 10 years…		
Year	Effective rent	Headline rent
1	£43,101	£0
2	£43,101	£50,000
3	£43,101	£50,000
4	£43,101	£50,000
5	£43,101	£50,000
6	£43,101	£50,000
7	£43,101	£50,000

8	£43,101	£50,000
9	£43,101	£50,000
10	£43,101	£50,000
Yield	8%	8%
NPV	£289,208	£289,208

c) DCF (ten-year write-off)

Headline rent	50,000		
YP 9 years @ 10%	5.7590		
PV £1 1 year @ 10%	0.9091		
CV of 10 yrs of headline rent		261,775	
Effective rent	x		
YP 5 yrs @ 10%	3.7908		
CV of first 5 yrs of ER		3.7908x	
Growth in ER @ 3.5% p.a. at review,			
(1.035)^5	1.1877x		
YP 5 yrs @ 10%	3.7908		
PV 5 yrs @ 10%	0.6209		
		2.7955x	
CV of 10 yrs of effective rent		6.5863x	
If deals are financially equal	£261,775		= 6.5863x
So x (effective rent)			= £39,745 p.a.

On a spreadsheet:

Growth-explicit DCF over 10 years...		
Year	Effective rent	Headline rent
1	39,745	0
2	39,745	50,000
3	39,745	50,000
4	39,745	50,000
5	39,745	50,000
6	47,205	50,000
7	47,205	50,000
8	47,205	50,000
9	47,205	50,000
10	47,205	50,000
TRR	10%	10%
Growth rate	3.5%	
NPV	£261,774	£261,774

The calculation can be extended to 15 years and so on if the growth rate suggests such a timescale.

11.2.2 Capital contributions

A capital contribution is a financial payment by a landlord to induce a tenant to take occupation and usually takes the form of a financial payment but may also be for fitting out, taking financial responsibility for an existing lease or some other non-pecuniary contribution. In lieu of making such a capital contribution the landlord would expect to receive a rent from the tenant in excess of the market rent. The calculation of the effective rent of a property where a capital contribution has been made and a headline rent is paid is conducted by applying the same principles as for rent-free periods and reverse premiums: determine the amount of the contribution and the length of the amortisation period (typically to a rent review or to the end of the lease). For example, a landlord offers a tenant £100,000 to induce occupation under a new 15-year lease with five-year rent reviews at a rent of £300,000 per annum. Amortising the capital contribution over the period to the first rent review:

Headline rent (£)		300,000
Capital contribution (£)	–100,000	
Divided by YP 5 years @ 10%	3.7908	
Annual equivalent of capital contribution		–26,380
Effective rent (£)		273,620

Using the goal-seek and NPV functions:

Year	Capital contribution / headline rent (£)	Effective rent (£)
0	–100,000	0
1	300,000	273,620
2	300,000	273,620
3	300,000	273,620
4	300,000	273,620
5	300,000	273,620
Yield	10%	10%
NPV	1,037,236	1,037,236

Amortising the contribution over the 15-year lease term produces a market rent of £286,853 per annum.

11.2.3 Premiums and reverse premiums

A **premium** is a consideration by a tenant to a landlord for the grant or renewal of a lease on favourable terms. The consideration is usually financial but can be non-pecuniary such as the carrying out of repairs or improvements. Favourable terms might be a reduced rent, less frequent rent reviews, a percentage-based rent at review (say 80% of the market rent – known as a geared review), landlord taking responsibility for repairs or insurance (i.e. not FRI) or a wider user-clause. The benefit of a premium to a landlord is a cash-flow where a capital sum is received early and the benefit to the tenant will be an immediate profit rent. A premium may also be paid by the assignee when a lease is assigned and there is a profit rent available because the contract rent is below the market rent. When there is great demand for a property, such as prime retail, tenants may pay **key money** to secure the property – effectively a premium in addition to rent. This key money should be treated as the capital value of additional rent and amortised over the period for which future occupation is assumed (perpetuity in some cases) and added to the contract rent. Because a premium is different from key money it is important that the valuer determines the reason for the payment of a capital sum when valuing a property where one has been paid or when using a comparable with one. It is important for the valuer to determine whether the capital sum was payment for fixtures, fittings and equipment, whether it was for a monopoly position for a certain trade (key money) or whether it was a payment in lieu of a rent saving (premium).

A premium, then, is nothing more than capitalised rent so, if we assume that there is a normal situation where the tenant pays the landlord a market rent, the size of any premium that might be paid will clearly depend on how much reduction from the market rent the tenant receives. In effect the landlord is 'selling' part of the market rent and the tenant is 'buying' it in the form of a profit rent. To calculate a premium, the agreed rent reduction (profit rent) should be capitalised. For example, a property is let on a lease with four years remaining at a rent of £12,500 per annum. The current market rent is estimated to be £15,000 per annum. If the tenant assigns the lease what premium should be paid by the assignee to compensate for the profit rent? Capitalising the profit rent over the four years:

Profit Rent (£)	2,500	
YP 4 yrs @ 10%*	3.1699	
Premium (£)		7,925

*Risk-free rate plus premium for risk, lack of growth and illiquidity.

With no discounting the premium would simply be £10,000 (£2,500 × 4). Once again, goal-seek and the NPV function on a spreadsheet can be used to equate the total present value of the market rent over the remaining four years with the total present value of the premium and contract rent over the same time period.

Year	Premium + contract rent (£)	Market rent (£)
0	7,925	£0
1	12,500	15,000
2	12,500	15,000
3	12,500	15,000
4	12,500	15,000
Yield	10%	10%
NPV	47,548	47,548

To calculate the market rent when a premium has already been agreed, amortise the premium over the period of the benefit. For example, at the start of a new lease with five-year rent reviews the tenant agrees to pay a rent of £10,000 per annum plus a premium of £11,750. What is the effective rent?

Contract Rent (£)		10,000
Premium (£)	11,750	
Divided by YP 5 yrs @ 10%	3.7908	
Annual equivalent of premium (£)		3,100
Effective rent (£)		13,100

Similarly, using goal-seek and NPV spreadsheet functions:

Year	Premium / headline rent (£)	Effective rent (£)
0	11,750	0
1	10,000	13,100
2	10,000	13,100
3	10,000	13,100
4	10,000	13,100
5	10,000	13,100
Yield	10%	10%
NPV	49,658	49.658

If a premium is to be paid at some point in the future, the amount should be discounted at a low rate because the tenant has a contractual obligation to pay it and therefore the risk from the landlord's perspective is low.

Sometimes a lease might specify that, at each rent review, the rent is reviewed to a proportion of market rent; in other words the tenant receives a discount in the form of a profit rent at each review. A premium might be paid by the tenant to compensate the landlord for offering such an incentive. For example, a tenant pays a premium of £10,000 at the start of a ten-year lease where the rent is reviewed to 70% of market level in year five. The initial contract rent is £5,000 per annum but what is the effective rent of this property?

Effective rent for first 5 years (£)	x	
Less contract rent for first 5 years (£)	−5,000	
Profit rent (£)	$x-5{,}000$	
YP 5 yrs @8%	3.9927	
		$3.9927x - 19{,}964$
Effective rent for second 5 years (£)	x	
Less contract rent at review (£)	$0.7x$	
Profit rent (£)	$0.3x$	
YP 5 yrs @ 8%*	3.9927	
PV 5 yrs @ 8%	0.6806	
		$0.8152x$
Capital value of profit rent		$4.8078x - 19{,}964$

Premium to landlord should exactly compensate for the profit rent to tenant, therefore;

$$£10{,}000 = 4.8078x - 19{,}964$$

$$x \text{ (effective rent (£))} = 6{,}232$$

*All-risks yield because of growth potential at rent review

It may be necessary to consider the value of premiums and associated profit rents from both the landlord and tenant's viewpoints. The values will differ if different yields are used to amortise the rent reduction and the actual amount of premium may therefore require a negotiated settlement in practice.

A **reverse premium** is a capital payment usually made by an assignor of a lease to induce the assignee to take occupation. This situation may arise in a depressed market where the supply of accommodation exceeds demand and the current rent exceeds the market rent; the property is thus **over-rented**. If the lease contains upward-only rent reviews and the difference between the contract rent and the market rent is significant, the property may remain over-rented for some time. The assignor of a lease on a property that is over-rented may need to pay a reverse premium to the assignee equivalent to the capital value of the overage rent. For example, a property was let two years ago for £250,000 per annum on a ten-year lease with an upward-only rent review in the fifth year. The tenant wishes to assign the lease but is aware that the current market rent for the property is £235,000 per annum. What size of reverse premium should the assignor pay the assignee? This is calculated by determining the size of the overage rent (£15,000 per annum in this case) and then deciding over how long this overage rent would be paid for, bearing in mind that the rent review is upward-only and the future level of market rent will not be known. If we assume that market rental growth for this property will be negligible over the remaining term of the lease we can capitalise the overage for eight years at a yield based on fixed income investments suitably adjusted for risk. A relatively high yield of 12% has been used here to reflect the over-rented nature of the interest.

Market rent (£)	235,000	
Contract rent (£)	250,000	
Overage (£)	–15,000	
YP 8 years @ 12%	4.9676	
Reverse premium (£)		–74,514

Note that this time, using the goal-seek and NPV functions, the reverse premium is an expenditure incurred by the assignor and appears as a negative sum.

Year	Market rent (£)	Reverse premium / contract rent (£)
0	0	–74,515
1	235,000	250,000
2	235,000	250,000
3	235,000	250,000
4	235,000	250,000
5	235,000	250,000
6	235,000	250,000
7	235,000	250,000
8	235,000	250,000
Yield	12%	12%
NPV	1,167,395	1,167,395

If a valuer is seeking to use a property on which a reverse premium has been paid as comparable evidence, the market rent of the property is calculated by deducting the annual equivalent of the reverse premium from the contract rent. Using the example above, assume the tenant assigned the lease and paid a reverse premium of £75,000 to the assignee. Assuming the rent review is upward-only the market rent is calculated as follows:

Contract Rent (£)		250,000
Reverse premium (£)	–75,000	
Divided by YP 8 years @ 12%	4.9676	
		–15,098
Market Rent (£)		234,902

This brings us back to the £235,000 per annum with a small rounding error. Using the goal-seek and NPV functions:

Year	Reverse premium / contract rent (£)	Market rent (£)
0	–75,000	0
1	250,000	234,902
2	250,000	234,902
3	250,000	234,902
4	250,000	234,902
5	250,000	234,902
6	250,000	234,902
7	250,000	234,902
8	250,000	234,902
Yield	12%	12%
NPV	1,166,910	1,166,910

11.3 Alternative lease arrangements

11.3.1 Stepped rents

Stepped rents are a series of rent reviews at intervals more frequent than the standard five-year pattern we see in the UK. Normally the rent is reviewed to pre-agreed sums but this need not necessarily be the case. Stepped rents can help the tenant's cash-flow at the start of a lease if the initial rent is less than the market rent, but the final rent might be higher. In cases where a stepped rent is paid it may be necessary to determine the effective rent so that the transaction can be used as comparable evidence. This is done by calculating the present value of each stepped rent and then calculating the annual equivalent of the sum of these present values over the period of the incentive. For example, a property has just been let on a 15-year lease with five-year rent reviews but, during the first five years the rent payments are stepped as follows: £200,000 in year one, £225,000 in year two, £250,000 in year three, £275,000 in year four and £300,000 in year five. After year five the rent reverts to the market level. Assuming an all-risks yield of 9% the capital value (sum of the present values) of these stepped rents is:

Year	Rent (£)	PV £1	PV (£)
1	200,000	0.9174	183,480
2	225,000	0.8417	189,383
3	250,000	0.7722	193,050
4	275,000	0.7084	194,810
5	300,000	0.6499	194,970
Capital value (£)			955,693

This figure is then amortised over the period to the first rent review when the stepped rents end and the market rent is payable.

Capital value (£)	955,693	
Divided by YP 5 years @ 9%	3.8897	
Annual equivalent or effective rent over first five years (£)		245,698

Using goal-seek and NPV functions the same effective rent is calculated (with a slight rounding difference):

Year	Stepped rent (£)	Effective rent (£)
0	0	0
1	200,000	245,705
2	225,000	245,705
3	250,000	245,705
4	275,000	245,705
5	300,000	245,705
Yield	9%	9%
NPV	955,706	955,706

As the tenant is paying £300,000 per annum in year five and this is greater than the current estimated market rent of £245,700 per annum, the tenant must take a view on whether rental growth over the next five years will mean that the market rent at that time will exceed £300,000 per annum. If it does not, and the lease provides for upward-only rent reviews, the property will be over-rented at this point.

11.3.2 Turnover rents

Turnover rents allow landlords to participate in the underlying potential profitability of the tenant's business in addition to the rent that they receive. In the UK these are becoming popular in the case of individual shop units located in modern shopping centres, airports and other transport termini, and are sometimes found in high street retail and petrol stations too. A turnover rent provides a landlord with the opportunity to participate more directly in the equity of the tenant's business via a rent that is reviewed annually. Landlord's management costs are likely to be higher than for rack-rented properties but they provide the landlord with an incentive to maintain and enhance rental growth more directly than with five-year rent reviews. They tend to be favoured where comparables are either difficult to obtain (perhaps because the units are in a new development) or the landlord does not wish to share rental information with all the tenants in a centre. The level of rent generated by a turnover rent structure is dependent upon the performance of the shopping centre and on the success of individual retailers. With regard to the centre as a whole, tenant mix is important and the provision of loss-leading leisure facilities can increase retail trade, as can public areas and food courts. In shopping centres anchor tenants may be subject to beneficial turnover percentages to reflect their contribution to the success of the centre as a whole (Sayce et al., 2006). Indeed the landlord of a shopping centre is aware of the trading activity of all tenants and can try to actively manage the centre in order to optimise turnover. Information on the performance of the centre as a whole may also indicate the optimum time to refurbish.

With regard to individual retailers, the most common turnover rent arrangement is a minimum base rent (often a percentage of the market rent of the property, say 75–80%, and usually subject to five-yearly rent reviews) plus an additional rent based on a percentage of the turnover of the business (usually calculated with reference to annual audited accounts). The concept is a reflection of Ricardian rent theory – rent is paid out of the surplus revenue after other costs and normal profit have been deducted. Comparable evidence helps determine the level of base rent and select the appropriate percentage for turnover. The percentage of turnover paid to the landlord is determined by the profit margins obtainable from different trades and by the level of base rent – the lower the base rent the higher the percentage applied to turnover. Indeed, in the case of airports the turnover percentages are much higher and a base rent may not be paid. Food sales from supermarkets trade on large volumes but narrow profit margins whereas jewellery is very much the opposite. Typical percentages of turnover payable as rent on top of a base rent are shown in Table 11.1 but the percentage can depend on covenant strength as much as trade type. It may be necessary to vary the turnover percentage for different types of sales sold in the same shop because, for example, tobacco sales from a newsagent include a large amount of tax. It is also important to check the user-clause, especially in shopping centres where they may be a tenant-mix policy.

A turnover rent is usually derived from a percentage of turnover net of VAT, sales to staff (staff discounts), returned goods, goods traded in, defective goods, charges made by credit card companies and bad debts. The percentage applied to turnover is usually fixed for the term of the lease but there may be provisions for variations to take account of changes in use, occupation or longer term changes in retailing practice and profitability. Turnover lease terms can be complex, requiring a minimum trade performance level, notional turnover if closed for several days, restrictions that only allow assignments to similar trades for example. A clause may be inserted into the lease allowing the landlord to terminate the lease contract if a certain level of turnover is not attained during a specified period. The tenant will normally try to cap the turnover rent at say 120% of the market rent and the ability to reduce this to a lower percentage will depend on the covenant strength of the tenant.

McAllister (1996) found that the most common type of turnover lease in the UK is where the tenant must pay either a market rent or a turnover rent, whichever is highest. A stepped base rent plus a turnover rent is where the base rent increases

Table 11.1 Typical percentages of turnover paid as rent.

Trade	% turnover payable as rent
Department store	1–3
Food store	1–2
Variety stores	2–4
Furniture	5
Restaurant	6–12
Electrical	5–9
Fashion	7–15
Books, sports	8
Shoes	9–13
Leather, jewellery	9–13

annually to levels specified in the lease. When estimating the capital value of a property subject to a turnover rent the all-risks yield used to capitalise the turnover rent may be higher than that used to capitalise the base rent because, it is argued, it will vary annually and perhaps quite markedly. It is difficult to accurately predict turnover so capitalisation is usually of current turnover with an assumption that it will continue. The use of a higher yield on the turnover rent will reduce the capital value in comparison to a rack-rented property. This is one reason why base rents account for 75–80% of the total rent and why pure turnover rents are rare. Investment value could be enhanced by providing for reversion to market rent at some point in the future, perhaps at the first rent review. An example of a capital valuation of a shop subject to a turnover rent appears below. The base rent is 80% of the market rent for this type of property and the turnover rent is calculated as 5% of net turnover.

Base rent @ 80% MR (£)	80,000	
YP perpetuity @ 8%	12.5	
		1,000,000
Turnover rent @ 5% turnover (£)	20,000	
YP perpetuity @ 10%	10	
		200,000
Valuation (£)		1,200,000

11.3.3 Short leases and leases with break options

Internationalisation of business and changing business practice has led to pressure from tenants in the UK for shorter leases with more flexible terms (Baum, 2003). Tenants have shorter business time-horizons and shorter leases avoid over-commitment of financial resources and allow for possible expansion plans. Also, Stamp Duty Land Tax, introduced in 2003, makes the amount of tax payable dependent on lease length: leases are capitalised at a 3.5% discount rate for any remaining term and then taxed at 1% of capital value over £150,000. This might encourage shorter leases but with the caveat that, at the end of each short lease, tax will have to be paid on any new lease. The adoption of international accounting standards throughout the European Union in 2005 has changed the way occupational leases are reported in accounts, and Government has pressed (without legislation so far) for shorter more flexible leases (Sayce et al., 2006). Shorter leases are not evident across all sectors though. Because retailers, particularly those in prime locations, are paying high rents to secure a trading location, on which they often spend a lot of money fitting out to a corporate brand image, they are keen to remain there and build up goodwill. Consequently longer leases or leases that provide security of tenure are preferable. Baum (2003) found evidence that retail warehouses tend to let on longer leases of 20–25 years and that, across all sectors, longer leases were to be found in prime locations, on high value properties, bigger properties and major companies.

Most break clauses now coincide with five and ten-year review dates but the period of notice that the tenant is required to give and the penalty payment (if any) for exercising the break option does vary, typically between six and 12 months of rent. Also, there might be more than one break opportunity, the break option may be tenant-only (usual), landlord-only (very rare) or landlord and tenant activated, the break may or may not coincide with a rent review although most do now (the alternative is a break within first three years, known as a short term break, and these tend to be a feature of less valuable properties). Because of the diversity of break option terms, cash-flow uncertainty tends to be greater with a break clause than with a short lease (McAllister, 2001). It should also be noted that securing a break clause in a lease often requires the tenant to pay a rent in excess of the market rent so, if the break option is not exercised, the total cost of the lease to the tenant will be higher than if there was no break clause and a market rent was paid.

In a market where upward-only rent reviews are almost universal, a short lease offers not only an opportunity to vacate the property but also an opportunity to negotiate a downwards adjustment of rent. If a tenant vacates at the end of a short lease or at a break opportunity the landlord will incur a set of fixed and variable costs. Fixed costs will include fees for finding a new tenant and variable costs will include management and maintenance costs whilst the property is empty, loss of rent until a new tenant is found and for the duration of any rent-free period offered to a new tenant, and the cost of any other incentives that might need to be offered (McAllister, 2001). The magnitude of these variable costs will depend on the length of the void period. It should not be forgotten that the landlord may be better off in the long run if the rent agreed on a new lease is higher than the rent under the old lease, if the penalty payment made by the tenant more than compensates for the costs incurred or if the property is re-let to a tenant of a higher quality. On the plus side Baum (2003) notes that short leases may lead to faster letting and reduce the need for rent-free periods. Indeed, a short lease granted at a headline rent, together with penalty payments, may easily compensate for the risk of incurring voids and re-letting costs.

When it comes to valuing short, breakable leases Baum (2003) found that the most popular financial adjustment for short leases (say less than five years) and leases with break options in a similar time-frame was the inclusion of a rent void, but one which did not reflect the 'true' expected costs of the void. Instead it was moderated to reflect an estimated probability of the tenant breaking or not renewing. If it was certain that the tenant would exercise the break option or not renew the lease then a full void allowance was included. For breaks, the notice period and penalty payment would be factored in (i.e. a long notice period and big rent penalty would neutralise void allowance). When valuing shopping centres in which units are let on short leases, the valuer would build in a running void assumption into the cash-flow based on the average void rate and expected average void period.

A higher rent to compensate for the break option or short lease might be agreed but the level of the headline rent and the length of time over which it should be amortised will depend on views about rental growth over the lease term because, under a standard lease with upward-only rent reviews, the rent cannot fall whereas with a break the tenant could vacate. It will also depend on the size of the penalty payment. The level of this higher rent might be calculated by first valuing the flexi-lease with a rent void and perhaps a higher all-risks yield too, then valuing the same property assuming standard lease terms and finally equating the capital values of each by adjusting the rent reserved for the first five years (French, 2001) using the goal-seek function on a spreadsheet. For example, calculate the rent that should be paid for the first five years of a ten year lease which has a break option and a rent review in year five. It is assumed that there is a six-month void at the break after which the rent reverts to the market rent of £300,000 per annum and there is a one year void at the end of the lease (to cover marketing and any rent-free period granted) after which the property reverts to a standard lease.

Term 1 rent (£)	x	
YP 5 years @ 6%	4.2124	
		4.2124x
Term 2 rent (£)	300,000	
YP 4.5 years @ 6%	3.8442	
PV 5.5 years @ 6%	0.7258	
		837,036
Reversion to MR on standard lease	300,000	
YP perpetuity @ 6%	16.6667	
PV 11 years @ 6%	0.5268	
		2,634,005
Valuation (£)		3,471,041+4.2124x

Now assume that the standard lease arrangement for this property is a 15-year lease with five-year upward-only rent reviews let at a market rent of £300,000 per annum. The capital valuation would be as follows.

Market rent (£)	300,000	
YP perpetuity @ 6%	16.6667	
Valuation (£)		5,000,000

If we assume that the capital value of the property subject to the flexi-lease and the standard lease arrangement should be the same we can state that:

$$£3{,}471{,}041 + 4.2124x = £5{,}000{,}000$$
$$x = £362{,}966$$

Using goal-seek and NPV spreadsheet functions:

Year	Market rent (£)	Headline rent
1	£300,000	£362,621
2	£300,000	£362,621
3	£300,000	£362,621
4	£300,000	£362,621
5	£300,000	£362,621
6	£300,000	£150,000
7	£300,000	£300,000
8	£300,000	£300,000
9	£300,000	£300,000
10	£300,000	£300,000
11	£300,000	£0
12	£300,000	£300,000
13	£300,000	£300,000
14	£300,000	£300,000
15	£300,000	£300,000
Yield	6%	6%
NPV	£2,913,675	£2,913,675

So the initial contract rent under the flexi-lease terms must be set £62,966 per annum above the £300,000 per annum market rent to compensate for the estimated voids. Of course, there may be other adjustments to make including voids costs or raising the all-risks yield on the short lease but the valuer must be careful not to double-count the financial implications of flexible terms. Some may argue that the rent at the break point in the flexi-lease might not drop to £300,000 but the tenant would undoubtedly exercise the break to ensure the rent is the market rent (although this may incur costs). Also Baum (2003) found that the courts did not impose a premium rent for short (less than five years) unexpired terms.

Two difficulties arise, the first is finding a suitable comparable that is let on standard lease terms – an increasingly difficult prospect given the diversity of lease terms that now exists, the second is dealing with uncertainty in the cash-flow. Uncertainty arises because it is not known whether (a) a break option will be exercised or (b) a short lease will be renewed. But the uncertainty does not end there: how long will a rent void be, how much will re-letting costs be, will there be a downward movement in rent at the break or lease end (which, in turn, will depend on the rate of rental growth and length of time until the break or the end of the lease)? To reflect this uncertainty the valuation approach described above can be enhanced by assuming various outcomes with associated probabilities, calculating a weighted average flexi-lease capital value and then equating that to the capital value under standard lease terms. These probabilities can be obtained from previous cases but the individual circumstances of the subject property, the tenant and the economic environment at the time of the valuation must be considered too. For example the likelihood that a tenant might exercise a break or not renew a lease may depend on the amount of financial penalty, the expected cost of dilapidations, the amount spent on fitting out the premises, the availability of alternative premises, estimated relocation costs, growth or contraction of the tenant's business and expected rental growth (Baum, 2003). Some of the ways that uncertainty might be quantified using probability are examined in Chapter 16 when we look at these issues from the landlord's perspective.

11.4 Valuations at rent review, lease renewal and lease end

11.4.1 Rent reviews

In the UK a rent review clause is usually a feature of lease with terms longer than five years. They are there to ensure that rent is periodically revised to 'market' level and are typically every five years and upward-only.

The definition of market rent in the Red Book is subservient to terms set out in the rent review clause of a lease contract, and by legislation and case law in the case of lease renewal. A key difficulty in this regard is obtaining the necessary information from leases to enable informed value adjustments to be made to rent passing; the availability of information may be constrained by confidentiality clauses, so assumptions are often made. Examples of rent review assumptions include:

- the premises are vacant and available to let;
- both landlord and tenant are willing parties to the contract;
- the premises are fit for occupation and use;
- the premises are to be let on the same terms as the actual lease;
- the tenant has complied with lease terms;
- there is a 15-year term to expiry at each review and a prospect of renewal at the end of the lease;
- the value of the tenant's actual occupation and any effect of goodwill are disregarded;
- the value of any tenant's improvement is also disregarded.

A rent review is usually activated by the landlord giving notice to the tenant of the new rent. If the tenant is not happy then the mechanism for agreeing it is specified in the clause in the lease. The rent review clause usually specifies the rent as market rent assuming the premises are fitted out and ready for occupation and that the tenant has received a rent-free in respect of fit-out.

11.4.2 Surrender and renewal of leases

Sometimes a tenant may wish to surrender the current lease before its term has expired in order to preserve goodwill attached to a particular location or remove future uncertainty surrounding the terms of a new lease. If the landlord agrees to accept the surrender of the current lease for the grant of a new one then the capital value of any profit rent that the tenant was entitled to should be reflected in a rent reduction or some other financial benefit under the terms of the proposed lease. Valuations are undertaken to ensure that neither the landlord nor tenant jeopardise their existing financial positions. This is achieved by calculating the capital value of each party's present and proposed interests in order to determine the rent that should be reserved under the proposed lease. In practice a negotiated settlement between the landlord and tenant's positions usually takes place and the impact of landlord and tenant legislation strengthens the tenant's bargaining position in a 'surrender and renewal' situation.

For example, a tenant wishes to surrender the remainder of an existing lease in return for the grant of a new, longer one. The present lease has three years to run with no review and the rent passing is £20,000 per annum. The estimated market rent is £27,000 per annum and comparable evidence suggests that the current all-risks yield for freehold investments in similar properties is 10%. The landlord is willing to accept a surrender of the current lease and grant a new 15-year lease with rent reviews every five years. The rent that should be reserved for the first five years of the proposed lease is calculated by valuing the landlord's and tenant's interests under the present and proposed terms:

Valuation of the landlord's present interest:

Term (Contract) rent (£)	20,000	
YP 3 years @ 9%	2.5313	
		50,626
Reversion to market rent (£)	27,000	
YP perpetuity @ 10%	10.0000	
PV£1 3 years @ 10%	0.7513	
		202,851
Valuation (£)		253,477

Valuation of the landlord's proposed interest:

Let new rent be (£)	x	
YP 5 years @ 9%	3.8897	
		$3.8897x$
Reversion to market rent (£)	27,000	
YP perpetuity @ 10%	10.0000	
PV£1 5 years @ 10%	0.6209	
		167,643
Valuation (£)		$167{,}643+3.8897x$

If the landlord is to be in the same financial position under the proposed terms as under the present terms then:

$$167{,}643+3.8897x = 253{,}477$$
$$x \text{ (new rent)} = £22{,}067$$

Valuation of the tenant's present interest:

Market rent (£)	27,000	
Less Contract rent (£)	–20,000	
Profit rent (£)	7,000	
YP 3 years @ 12% [a]	2.4018	
Valuation (£)		16,813

[a] This is the freehold all-risks yield adjusted upwards to reflect the additional risk and relative unattractiveness of a short leasehold investment

Valuation of the tenant's proposed interest:

Market rent (£)	27,000	
Less new rent (£)	$-x$	
Profit rent (£)	$27{,}000 - x$	
YP 5 years @ 12%	3.6048	
Valuation (£)		$97{,}330 - 3.6048x$

Assuming the value of the tenant's present interest should equal the value of the proposed interest:

$$97{,}330 - 3.6048x = 16{,}813$$
$$x \text{ (new rent)} = £22{,}336$$

A single figure is usually negotiated that lies somewhere between the two rental values estimated from the landlord and tenant perspectives. In fact, in nominal cash-flow terms, the rent forgone by the landlord is the same as the profit rent gained by the tenant; the only reason different rental values are calculated is because the yields are different. This means that transferring the valuation to a spreadsheet is very straightforward and the value impact of yield selection can easily be modelled. In practice the agreed amount will depend on the relative bargaining strength of the parties.

11.4.3 Compensation for disturbance and improvements

In the UK there is a substantial body of legislation and case law – known as landlord and tenant law – that governs the legal relations between parties to a lease. Key statutes that regulate business tenancies and affect their valuation are described below.

The *Landlord and Tenant Act 1927* (as amended by *Landlord and Tenant Act 1954 Part III*): This statute requires the landlord to compensate a tenant who leaves at the end of a lease for 'qualifying'[2] improvements made during the lease. Shops, for example, are quite likely to have been subject to tenant's improvements – perhaps a staircase or an escalator was constructed at the front of the shop (in the valuable Zone A area) to entice shoppers to venture up to the first floor. Landlord's consent is normally required before the improvements can qualify but, under the Landlord and Tenant Act 1988, this consent cannot be unreasonably withheld. The amount of compensation is calculated as the lesser of the value added as a result of the improvements or the cost of the improvements at the lease termination date. The value added must relate to the intended use so no compensation is payable if the property is to be demolished. If the tenant renews the lease, the value of the improvement is disregarded (deducted) from the estimated market rent for a period of 21 years. Assuming the improvements qualify for compensation the initial valuation problem is determining the extent to which they impact on value.

The *Landlord and Tenant Act 1954 Part II* (as amended by the *Law of Property Act 1969*): This statute provides business tenants with security of tenure by allowing the original lease term to continue but subject to certain grounds that the landlord can establish to regain possession. The occupying tenant is entitled to automatic continuance of the original lease until terminated in accordance with the Act, i.e. as a result of some positive action by either party, usually the serving of a notice. The tenant's interest is assignable and therefore valuable. In addition to the right of automatic continuance the landlord or tenant can apply for new lease. Where a new lease is granted to the existing tenant the rent payable is normally the market rent but disregarding the effect on rental value of; the fact that the tenant or predecessors in title have been in occupation; any goodwill from the existing tenant; qualifying improvements for a period of 21 years;[3] and any licences that belong to the tenant in respect of licensed premises. In practice the quantification of the financial effect of these 'disregards' on market rent is very difficult. The tenant may continue to pay the existing rent beyond the end of the lease (known as 'holding over') but, while the terms of the new lease are being agreed, the landlord or the tenant can apply for an **interim rent**. In cases where the lease is not renewed or renewal proceedings are opposed, the interim rent is determined under Section 34(1) and (2) of the 1954 Act (i.e. a market rent disregarding any qualifying tenant's improvements) but assuming that; the tenancy is from year to year, the rent would be reasonable for a tenant to pay; regard is paid to the passing rent and rent payable under any sub-leases within the property. If the renewal is unopposed, the interim rent is the same as the rent agreed under the new lease (usually a market rent) subject to adjustment to reflect any difference in market conditions or lease terms during the interim period. In such cases the determination rules under an opposed renewal apply subject to these adjustments. Landlords could try and have an 'upward-only penultimate day review' drafted into the lease to ensure that the interim rent is not less than the rent passing.

If the parties cannot agree the terms of the new tenancy then the courts are able to grant the tenant a new lease of up to 15 years on expiry of the existing lease at the market rent assuming similar terms as the original lease. The prospective landlord and tenant can agree in writing to 'contract out' of (exclude themselves from) the provisions of the 1954 Act but the lease must be for a fixed term and the landlord cannot contract out of disturbance compensation (see below) liability if lease is longer than five years. Baum (2003) notes that contracting out occurs only occasionally but is more prevalent in the case of secondary and tertiary properties and may be increasing as landlords try to avoid renewals of short leases. Baum also found that, at lease renewal, tenants who secure a short lease do not pay a rent premium nor is a rent premium paid if a break clause is inserted. But, as with rent reviews, there is a precedent suggesting that a landlord's option to break leads to a rent discount.

The landlord is entitled to counter the tenant's application for a new lease by establishing one of seven grounds for possession prescribed by the Act. If the landlord regains possession on the grounds that the rent for the property would be increased if let as a whole, redevelopment is intended or the property is required for own occupation, then the tenant is entitled to 'disturbance compensation' for loss of **goodwill**. The amount of disturbance compensation that is payable is equivalent to the **rateable value** (RV) of the property (or twice the RV if the business has been in continuous occupation for the past 14 years or more).

Two examples will help illustrate the impact of some of the legislative points described above on the valuation of business property.

11.4.4 Example 1

A factory is held on a 15-year lease with five years left at a contract rent of £5,000 per annum. The tenant carried out qualifying improvements four years ago which increased the market rent by 20%. The cost of these improvements today would be £7,500. The market rent, including the value of the improvements, is £10,000 per annum, the rateable value of the property is £12,000 and the all-risks yield for investments in this type of property average 8%. Value the landlord's interest in the property assuming:

a) the tenant vacates at the end of the existing lease;
b) a new ten-year lease with a rent review in year five (with a clause that states that the value of improvements is disregarded) is granted to the existing tenant on expiry of the current lease;
c) the landlord repossesses the property at the end of the existing lease for own occupation;
d) the landlord repossesses the property at the end of the existing lease for redevelopment and the site value is estimated to be £100,000.

The tenant has the right to two types of compensation if required to vacate the premises at the expiry of the existing lease:

1. Disturbance compensation at twice the current rateable value of the premises. This equates to £24,000.
2. Improvements compensation at the lesser of the cost of the works or value added. The cost (as at the valuation date) is £7,500 and the value added is calculated as the capital value of the increase in rent resulting from the improvements.

Increase in Market Rent (£) [a]	1,000	
YP perpetuity @ 8% [b]	12.5	
Capital value of improvements (£)		12,500

[a] 20% of the £5,000 contract rent
[b] All-risks yield

Cost therefore prevails as improvements compensation.

But these are future liabilities of the landlord and it is important to consider possible changes in the amounts due to a rating revaluation or inflation in building costs for example. Here it is assumed that the rateable value remains constant and building costs rise at 3 per cent per annum.

a) Valuation assuming the tenant vacates on termination:

Term (Contract) Rent (£)		5,000	
YP 5 years @ 7% [a]		4.1002	
			20,501
Reversion to Market Rent (£)		10,000	
YP in perpetuity @ 8%		12.5000	
PV £1 5 years @ 8%		0.6806	
			85,075
			105,576
Less cost of improvements (£)	−7,500		
inflated over 5 years @ 3% pa	1.1593		
		−8,695	
PV £1 5 years @ 7% [b]		0.7130	
			−6,199
Valuation (£)			99,377

[a] Term yield based on all-risks yield of 8% but reduced to reflect security of term rent
[b] Cost of improvements has been discounted at same rate as term rent was capitalised

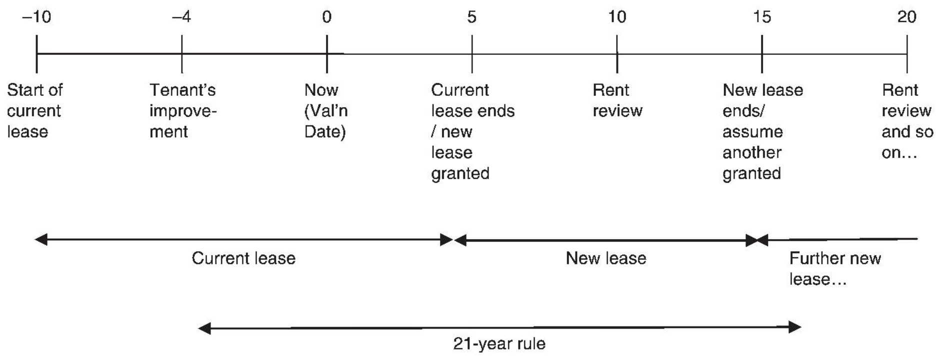

Figure 11.1 Events time-line.

b) Valuation assuming a new lease is granted at end of lease.
It is helpful to sketch a time-line and mark important dates as in Figure 11.1. It is easier to spot when the rent reduction in respect of improvements runs out. In this case the tenant benefits from a rent reduction for 20 years that reflects the value added by the improvements, after which the rent reverts to the market rent *including* the value added by the improvements.

Capital value of first 5 years' rent (as above) (£)		20,501
Subsequent 15 years rent (£)[a]	8,000	
YP 15 yrs @ 8%	8.5595	
PV 5 yrs @ 8%	0.6806	
		46,605
Final reversion Market Rent	10,000	
YP in perpetuity @ 8%	12.5000	
PV £1 20 years @ 8%	0.2145	
		26,813
Valuation (£)		93,919

[a] This is the market rent of £10,000 less 20% to reflect value added by tenant's improvements

c) Valuation assuming the landlord repossesses at the end of current lease for own occupation:

Value (as (a)) (£)		105,576
Less improvements (as (a)) (£)	–6,199	
Less disturbance; 2 x RV	–24,000	
	–30,199	
PV £1 5 years @ 7% [a]	0.7130	
		–21,532
Valuation (£)		84,044

[a] This discount rate should reflect the risk of an increase in improvement compensation and disturbance compensation may increase if there is a rating revaluation.

d) Valuation assuming the landlord repossesses at end of existing lease for redevelopment. The landlord must have owned the property for at least five years to regain the property at the end of the lease. There is no compensation for improvements because their value to the landlord will be zero in the case of redevelopment. In practice, few tenants receive compensation under the 1927 Act due to the negating impact of dilapidations.

Term (Contract) rent (£)	5,000	
YP 5 yrs @ 7% [a]	4.1002	
		20,501
Reversion to site value (£)	100,000	
Less disturbance; 2 × RV	(24,000)	
	76,000	
PV £1 5 years @ 7% [b]	0.7130	
		54,188
Valuation (£)		74,689

[a] Term yield

[b] This is a relatively low yield to reflect attraction of redevelopment potential

11.4.5 Example 2

The tenant of a shop in a prime position holds a 15-year internal repairing (IR) lease granted 11 years ago at a current rent of £24,000 per annum. Six years ago the tenant obtained consent to carry out improvements costing £60,000. The current freehold all-risks yield is 6%, the market rent on full repairing and insuring (FRI) terms is £50,000 per annum, £5,000 of which can be attributed to the improvements made by the tenant. The rateable value of the premises is £50,000 and building cost inflation is averaging 10% per annum. Value the current interests of the landlord and tenant assuming:

a) The landlord will get permission for his own occupation at the end of the lease
b) The tenant will continue in occupation under a new lease with a typical rent review pattern

As in the previous example, disturbance compensation is twice the rateable value, producing a figure of £100,000. Compensation for improvements is estimated as the lesser of the cost of or value added by the improvements:

Value added by improvements (£)	5,000	
YP perpetuity @ 6%	16.6667	
		83,333
Cost of improvements (£)	60,000	
Inflated at 10% pa over 6 years	1.7716	
		106,296

The value added produced the lower figure in this case.

a) Valuation assuming the landlord gets permission for his own occupation at the end of the lease:

Valuation of the landlord's interest:

Term (Contract) Rent (£)	24,000	
Less external repairs @ 10% of market rent on FRI terms (£)	–5,000	
Less insurance @ 2% of market rent on FRI terms (£)	–1,000	
Net income (£)	18,000	
YP 4 years @ 5%	3.5460	
		63,828
Reversion to Market Rent on FRI terms (£)	50,000	
YP perpetuity @ 6%	16.6667	
PV £1 4 years @ 6%	0.7921	
		660,085
Less disturbance compensation (£)	–100,000	
Less improvements compensation (£)	–83,333	
	–183,333	
PV £1 4 years @ 5%	0.8227	
		–150,828
Valuation (£)		573,085

Valuation of the tenant's interest:

Market Rent on FRI terms (£)	50,000	
Plus external repairs (£)	5,000	
Plus insurance (£)	1,000	
Market Rent on IR terms (£)	56,000	
Less rent paid (£)	–24,000	
Profit rent (£)	32,000	
YP 4 years @ 10% [a]	3.1699	
		101,437
Plus compensation (as above) (£)		125,216
Valuation (£)		226,653

[a] Risky, terminable, non-growth investment

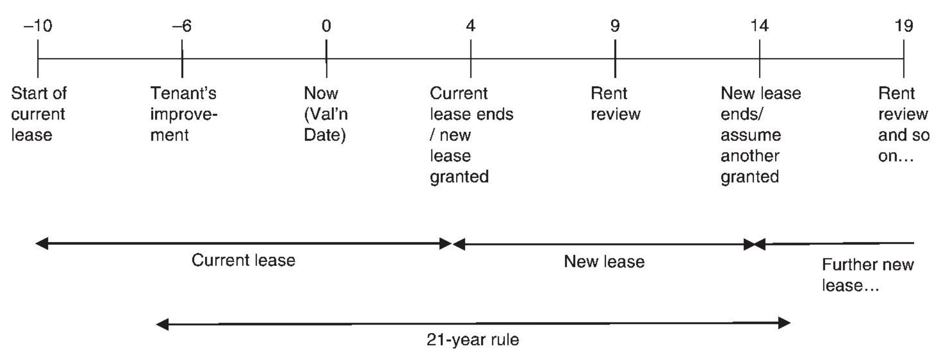

Figure 11.2 Events time-line.

b) Valuation assuming the tenant will continue in occupation under a new lease with a typical rent review pattern. Figure 11.2 illustrates the time-line.

Valuation of the landlord's interest:

Term net income (as above) (£)	18,000	
YP 4 years @ 6%	3.4651	
		62,372
Reversion to market rent on internal repairing (IR) terms, excluding improvements (£) [a]		
Market rent on FRI terms, excluding improvements	45,000	
less external repairs (calculated as above)	–5,000	
less insurance (calculated as above)	–1,000	
	39,000	
YP 15 years @ 6% [b]	9.7122	
PV £1 4 years @ 6%	0.7921	
		300,028
Reversion to market rent on internal repairing (IR) terms, including improvements (£)		
Market rent on FRI terms, including improvements	50,000	
less external repairs (calculated as above)	–5,000	
less insurance (calculated as above)	–1,000	
	44,000	
YP perpetuity @ 6%	16.6667	
PV £1 for 19 years @ 6%	0.3305	
		242,367
Valuation (£)		604,767

[a] Under the 1954 Landlord & Tenant Act the terms of the new lease will be based on the terms of the existing lease

[b] This yield may be reduced below the freehold all-risks yield to reflect security afforded to a tenant occupying on IR terms but the unattractiveness of an investment returning a non-market rent for 15 years may counter this. Consequently the yield remains at 6%.

Valuation of the tenant's interest:

Profit rent (as above) (£)	32,000	
YP 4 years @ 10%	3.1699	
		101,437
Reversion to profit rent equal to the increase in market rent made by improvements at lease renewal (£)	5,000	
YP 15 years @ 9% [a]	8.0607	
		40,304
Valuation (£)		141,741

[a] Growth potential due to possible rent reviews in sub-lease, so yield is based on freehold yield plus leasehold risk premium.

Key points

- As far as rented commercial property is concerned, different businesses require different types of accommodation and, increasingly, a single firm requires a range of accommodation types. The differentiation occurs along physical and legal lines; flexible space and flexible leases. This has significant implications for valuation.
- In an ideal world all leases of commercial property would be on the same terms and estimating rental value would simply be a case of making adjustments to reflect differences in location, physical attributes and unexpired term. But whereas in the past leases were fairly standard and comparison fairly straightforward, it is now necessary to identify the main features of flexi-leases and their scope for variation. These centre on lease length, incentive arrangements such as break clauses, rent free periods and reverse premiums, and rent revision arrangements such as stepped rents or turnover rents. There may be other arrangements too, such as a non-standard rent review pattern or a first review that is sooner or later, but the valuation principle is the same.
- The scarcity and variability of rental value evidence means that valuers find it difficult to analyse, adjust and apply data from what may appear to be physically comparable properties but which differ because of flexi-lease arrangements. This all sounds pretty hopeless but it must be remembered that valuation is all about quantifying economic benefits or costs financially in terms of rental or capital value. With this in mind any flexi-lease arrangement that is made in lieu of rent paid should be reflected in the valuer's estimate of rental and capital value. This typically involves amortising any financial benefit received by the occupier in place of rent over a period that has regard to the estimated life of the benefit, the lease term and rent review provisions in the lease contract.
- A lot of the flexi-lease arrangements can be regarded as short-term cash bonus to the tenant at the expense of increased rent later (similar to unsecured borrowing) and the financial impact can be modelled in a spreadsheet using 'goal-seek' to determine effective rent by changing various input variables. But flexi-leases can lead to a more uncertain cash-flow than a standard lease and the valuer needs to be able to reflect this uncertainty in the rental value.
- Legislation has a considerable influence on valuations undertaken in connection with the termination and possible renewal of business leases. It is essential that valuers have a full understanding of the relevant statutes and their impact on rental value.
- Conventionally a number of these types of valuations were undertaken from the perspective of the landlord and the tenant, the difference in value often resulting from the different yields that were used to capitalise income. Nowadays, the use of spreadsheets enables a more straightforward approach where various yields and other variables can be trialled and their impact on rental value measured.

Notes

1. The NPV function on a spreadsheet discounts each subsequent row in a cash-flow for an additional period at a specified discount rate, in this case 8%.
2. To qualify for compensation the improvements must have been made after 25 March 1928 and not in pursuance of a statutory or contractual obligation (except that after 1954 those in pursuance of a statutory obligation will qualify).

3. The value of improvements may not be disregarded (i.e. may be included) in the rent fixed at rent reviews within this 21-year period if the lease does not mention how they should be treated (*Ponsford v HMS Aerosols Ltd 1978*). However, most leases now explicitly state that the value of any tenant's qualifying improvements should be disregarded at rent reviews.

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Chapter 12
Valuations for Financial Statements and for Secured Lending Purposes

12.1 Valuing property for financial statements

Commonly referred to as **asset valuations**, these relate to the valuation of an entity's[1] property assets for inclusion in financial statements such as company accounts, stock exchange prospectuses and documents for takeovers and mergers. They are also used to report the value of the property assets held by pension funds, unit trusts and life funds. Asset valuations almost invariably end up in the public domain and may relate to very large amounts of money. Consequently there is a need for tight control and accounting standards regulate this process. Valuations for financial statements are classified by the RICS as Regulated Purpose Valuations and special rules ensure objective and independent valuations by valuers engaged in regular valuations for the same client (see RICS Red Book UKVS 4).

In the UK valuers must refer to international and national accounting standards and valuation standards and guidance when undertaking valuations for financial reporting purposes. The situation is rather complicated at the moment because there are different accounting standards in place around the world, although there is a concerted effort to consolidate these to a single worldwide standard. The International Accounting Standards Board (IASB) publishes International Financial Reporting Standards (IFRS) but has also adopted the body of standards issued by its predecessor the International Accounting Standards Committee (IASC) and their standards continue to be designated as International Accounting Standards (IAS). Publicly listed companies in the UK (and in the European Union as a whole) must publish consolidated financial statements that conform to IFRS but, at the moment, private companies in the UK can elect to adopt UK Generally Agreed Accounting Procedures (GAAP) instead of IFRS. As a consequence, UK VS1 of the Red Book (RICS, 2012) states that valuations for financial statements shall be in

Property Valuation, Second Edition. Peter Wyatt.

accordance with IFRS but if a valuation is required to comply with UK GAAP then the Financial Reporting Standards (FRS) and Statements of Standard Accounting Practice (SSAP) published by the Accounting Standards Board (ASB) take precedence.

The accounting standards set out rules and regulations for financial reporting and there are a number of circumstances when property valuations are required. These can be summarised as:

- expensing share options (IFRS 2);
- establishing the value of assets acquired in takeover (IFRS 3);
- treatment of surplus assets (IFRS 5);
- reporting the carrying amount of property assets on balance sheet (IAS 16 and 40);
- measuring lease assets and liabilities (IAS 17);
- calculating depreciation charges and Impairment Reviews (IAS 36);
- measuring embedded derivatives (IAS 39).

12.1.1 Financial reporting standards and valuation bases

12.1.1.1 UK guidance

UK FRS require an entity's balance sheet to report a true and fair view of the capital **value to the business** of tangible fixed assets which include land and buildings, plant and machinery, fixtures, fittings, tools and equipment, payments on account, assets in the course of construction and investments. A rational business would purchase such assets if they believed that the economic benefit (value-in-use) was going to be greater than the economic cost. It is not appropriate for company accounts to record the value-in-use of an asset as this would reflect future economic benefits that have not yet been realised. Instead the net replacement cost of the asset is recorded. This is the economic loss that would be suffered by the business if deprived of the asset, in other words its deprival value. However, if the asset is impaired in some way[2] so that its recoverable amount is actually less than the replacement cost then the company accounts should record the remaining economic benefit that can be derived from the asset either from its continued use (value-in-use) or from its sale (net realisable value). This logic is presented diagrammatically in *FRS 15: Tangible Fixed Assets* (ASB, 1999) and is reproduced in Figure 12.1.

As far as property assets are concerned, in the great majority of cases there will be no need to provide for impairment and the replacement cost of property assets will be reported. In undertaking replacement cost valuations the 'going concern' assumption is key and it is essential to ensure the valuation can be supported by the potential profitability of the company. If the valuation is for a public body the assumption is that it is subject to the prospect and viability of the current occupation and use. As is the case with international financial reporting standards, companies generally have the freedom to choose whether to report replacement cost as the historic cost (i.e. purchase price, historic valuation or cost) or to regularly revalue them.

If an entity opts to revalue, the requirement is for a full valuation of each asset every five years and an interim valuation in year three, plus additional interim

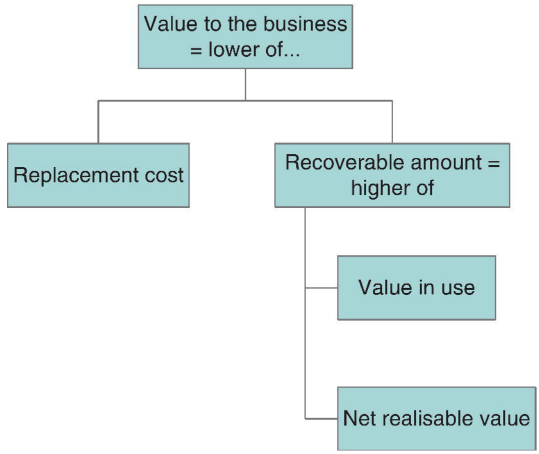

Figure 12.1 Reporting the value of tangible fixed assets.

valuations in intervening years where there has been a material change in value. Alternatively there are provisions for rolling valuations. The basis on which net current replacement cost is assessed varies depending on the purpose of the property asset. If the entity plans to use the asset, its value will be **existing use value** in the case of **non-specialised** owner-occupied properties and **depreciated replacement cost** in the case of **specialised** owner-occupied properties. If the property is surplus to requirements or held as an investment, the basis is **market value.** If the valuer believes that there is a significant difference between the market value and existing use value of a surplus property then both should be reported together with an explanation of the difference. If the difference does not impact materially on the value of the entity's property portfolio then the valuer need only indicate that there is a difference rather than provide a market valuation. If a property used for the purposes of the business has been adapted the valuer should provide an estimate of existing use value in its post-adaptation state or in its pre-adaptation state plus the depreciated replacement cost of the adaptation works.

This brings us to a UK-specific basis of value known as existing use value, defined as:

> The estimated amount for which a property should exchange on the *date of valuation* between a willing buyer and a willing seller in an arm's-length transaction after proper marketing wherein the parties had acted knowledgeably, prudently and without compulsion, assuming that the buyer is granted vacant possession of all parts of the property required by the business, and disregarding potential alternative uses and any other characteristics of the property that would cause its *Market Value* to differ from that needed to replace the remaining service potential at least cost (RICS, 2012: 133).

This is the same as the market value definition with one additional assumption and a further requirement to disregard certain matters. The additional assumption is that the buyer is granted vacant possession. In other words, physical and legal possession would pass upon completion. Any parts of the property occupied by third parties should be valued subject to those occupations. Properties occupied by employees, ex-employees, or their dependants should be valued with regard to the circumstances of their occupation, including any statutory protection. If parts of the property are unused and are surplus to the operational requirements of the business they should be valued on the basis of market value. If separate occupation is not possible any surplus parts would have no more than a nominal existing use value, as they would contribute nothing to the service potential of the property and would not feature in a replacement at least cost. The first value factor that must be disregarded when valuing on the basis of existing use value is any hope value for alternative uses, but the valuation may take account of '…any value attributable to the possibility of extensions or further buildings on undeveloped land, or redevelopment or refurbishment of existing buildings, providing that these would be required and occupied by the entity, and that such construction could be undertaken without major interruption to the current operation' (RICS, 2012, 134). The second is a rather general disregard of any other characteristics of the property that would cause its market value to differ from existing use value. The Red Book (RICS, 2012) gives the following examples:

- an occupier operating with a personal planning consent that could restrict the market should the owner vacate or holding the property under a lease and there are restrictions on assignment or alternative uses;
- the property is in an unusual location, or oversized for its location, with the result that it would have a low market value, but where the cost of replacing the service potential would be significantly greater;
- the presence of contamination that does not affect the current use but would depress the value for an alternative use;
- the existing buildings are old and of limited value if vacant but the replacement cost of the remaining service potential to the occupier would be significantly higher;
- an industrial complex is overdeveloped and the extra buildings have either a limited market value or detract from the market value but would need to be replaced to fulfil the service potential to the business.

Any value attributable to goodwill should normally be ignored (RICS, 2012: 135). If the property assets are held leasehold at market rent or with short periods to expiry the valuer must discuss with the client as to whether they should be included or not.

12.1.1.2 International guidance

Under IFRS, *IAS 16: Property, Plant and Equipment* prescribes the accounting treatment for operational property assets. Initially they are to be reported at cost in the balance sheet but subsequently they can be reported either at cost (less accumulated depreciation and any accumulated impairment losses) or at a revalued amount (less subsequent accumulated depreciation and any accumulated impairment losses). The revalued amount is the **fair value** at the date of revaluation. The choice of reporting measurement must be applied consistently to an entire class of property. Fair Value is defined as 'the amount for which an asset could be exchanged or liability settled between knowledgeable willing parties in an arm's length transaction' and, according to international valuation standards (IVSC, 2011 – IVA 1), where a business entity adopts the fair value revaluation option, valuations of property assets should be undertaken on a market value basis. This would be carried out using market evidence for non-specialised property or using a depreciated replacement cost method for specialised property. In fact, IAS 16 states that if the property is specialised and there is no market evidence, fair value may be estimated using either an income or DRC approach. If the latter approach is used then this should be disclosed in the financial statement. FRS 15 does not require such a disclosure and also does not mention use of the income approach as an option. In addition to standard report content, under IAS16, the valuer should also report the extent to which the value was determined by reference to observable prices in an active market or recent transactions on arm's length terms or was estimated using other techniques (Cherry, 2006).

IAS 2: Inventories states that the Net Realisable Value (NRV) of properties held for sale in the ordinary course of business should be reported, where NRV is the market value less sale costs. Under *IFRS 5: Non-Current Assets Held for Sale and Discontinued Operations* surplus property assets must be identified and accounted for individually or as a group to be disposed of together. IVA 1 (IVSC, 2005) states that either the individual market values of surplus property assets or the market value of the group as a whole to be disposed of in a single transaction should be reported and separately noted if different.

12.1.1.3 Accounting for depreciation

All companies (except property investment companies) are required to depreciate the value of fixed assets that have a limited economic life over the life of those assets (property investment companies are required to value their fixed assets annually) and the annual profit and loss account contains a charge in respect of the amount of depreciation suffered in any one accounting year. The figure on which this depreciation charge is based is known as the **depreciable amount**. Freehold land is not normally liable to depreciation unless it has a limited economic life such as mineral-bearing land or land subject to a time-limited planning permission, but buildings that are sited on freehold land and leasehold property interests are wasting assets and liable to depreciation. To arrive at the depreciable amount, the reported value of the property asset must be apportioned between its wasting and non-wasting elements – between the building(s) and the land respectively – so that the depreciable amount can be allocated to the wasting element. Depreciation is applied on a component basis. That is to say, each part of a property with a cost that is significant in relation to the total cost of the item is depreciated separately. Surplus or investment property is not depreciated.

To calculate the depreciation charge it is necessary to estimate the future useful life of the building. Because of the difficulty in doing this it is common to adopt bandings of say 10–30 years and 30–50 years. Then the residual value of the property is estimated. This is value of the asset, net of disposal costs, assuming it was already of the age and in the condition expected at the end of its useful life. The residual value is deducted from the fair value or the cost of the asset, depending upon the option taken by the entity, and the result is the depreciable amount. To estimate the annual depreciation charge the depreciable amount is spread, usually on a straight line basis, over the useful life of the asset. For example, an entity estimates the remaining useful life of its property asset to be 20 years whilst a valuer estimates its remaining economic life to be 40 years. The property has a market value of £500,000, £200,000 of which is regarded as land value. The depreciable amount is estimated as follows:

Market value:		500,000
Less: value of land (£)		**200,000**
Value of building (£)		300,000
Useful life – as determined by entity	20 years	
Future economic life – estimated by valuer	40 years	
Residual Value:		
Valuer's estimate of current value of building assuming it was 20 years older with a remaining life of 40 years (£)		**100,000**
Depreciable Amount of building (£)		200,000

The entity must allocate the £200,000 over 20 years and the resulting annual amount is charged to the profit and loss statement in the annual accounts.

12.1.1.4 Investment property

In the case of investment properties the current value, and changes in current value, are of prime importance. *SSAP 19: Accounting for Investment Properties* therefore requires investment properties to be included in the balance sheet at their open market value (equivalent to MV), but without an allowance for depreciation.

Internationally, if properties are held as investments[3] then *IAS 40: Investment Property* prescribes the appropriate accounting treatment. As with operational property, investment properties are initially recognised at cost but subsequently they can be reported either at cost (less accumulated depreciation and any accumulated impairment losses, as prescribed by IAS 16) or at fair value (but this time without any deduction for subsequent accumulated depreciation and any accumulated impairment losses). Once selected, the measurement model (cost or fair value) must be applied consistently to all investment property. According to IVA 1 (IVSC, 2005) valuations of investment property under IAS 40 should be conducted on a market value basis, regardless of whether the entity chooses the cost or fair value model and the report should indicate whether the value was supported by market evidence or was heavily based on other factors because of the nature of the property and lack of comparable market data (Cherry, 2006). Investment properties reported at fair values will have their revaluation gains and losses transferred directly to the profit and loss account (unless they reverse previous losses that have been shown against equity). Under present UK GAAP these are shown in the Statement of Total Recognised Gains and Losses (STRGL) but not in the profit and loss account. Property assets held as an investment but still under development should be valued by estimating their end values (indicating whether this is market value on practical completion with the sales income deferred or not) and deducting development costs, including fees and finance.

12.1.1.5 Leases

Leased assets are generally treated as belonging to the lessor, and therefore do not appear on the balance sheet of the lessee. Under UK GAAP, if an entity elects to revalue assets rather than carry at historic cost, long leasehold property can be accounted for under FRS 15, or SSAP 19 if classified as investment property. The carrying amount will be market value. The only requirement is to separately classify leasehold and freehold property assets.

Under IFRS, *IAS 17: Leases* requires the valuer to classify a leasehold interest as an operating lease or a finance lease. **Operating leases** are time-limited arrangements where the rent is essentially a hire charge for the right to use the asset. The leased assets are accounted for on the balance sheet of the lessor and the lessee reports the periodic (annual) rental payments in the profit and loss statement, with future rent liabilities that are due over the contractual term of the lease disclosed in the notes to the accounts. A **finance lease** is one that transfers substantially all of the risks and rewards of ownership of an asset to the lessee despite not being the legal owner. An example would be where the rent is a set of instalments which comprises a hire charge and interest payments so that the ownership of the leased asset transfers to the lessee at the end of the term. Its capital value thus appears on the balance sheet of the lessee as an asset net of any depreciation and impairment with the corresponding rent payments due over the remaining term of the lease capitalised[4] and shown as a liability (Brett, 2004).

The classification of the lease affects the way in which it is reported in the lessor's and lessee's financial statements. If it is an operating lease the lessor's balance sheet will usually show the asset as an investment property. Rental income receivable will be shown in the income statement over the lease term and depreciation may be charged against the asset. Nothing will be shown on the lessee's balance sheet and lease payments will be reported in the income statement over the lease term. If it is a finance lease the lessor's balance sheet recognises it as a financial asset with a right to receive rent payments over the lease term plus residual value thereafter. The rent payments are allocated between repayment of the financial asset and interest payments, with the latter reported in the income statement. The lessee's balance sheet initially reports a finance lease as an asset (at the lower of its fair value or the present value of the minimum lease payments) and as a liability to make future payments (again at the lower of the fair value of the asset or present value of the minimum lease payments). The asset will be depreciated and interest expense is recognised in the income statement.

IAS 17 sets out a number of examples that will indicate a finance lease but the overriding test is that if it is not clear that substantially all the risks and rewards of ownership have been transferred to the lessee, the lease is an operating lease. Most leasehold property interests will be classified as operating leases but it is conceivable that, since land is permanent and improvements to (i.e. development of) land for economic benefit can be considered temporary, land might be classified as an operating lease (unless the lessee is likely to acquire the land because of a purchase option for example) and buildings as a finance lease, particularly in circumstances where the lease term is a major part of the asset's economic life or the value of leasehold interest is a substantial part of the freehold value of the asset. In cases where the land value is insignificant, apportionment between land

and buildings is not necessary. Paragraphs 10 and 11 of IAS 17 provide examples of situations that would normally indicate that a lease is a finance lease:

- The lease transfers ownership of the asset to the lessee by the end of the lease term.
- The lessee has the option to purchase the asset at a price that is expected to be sufficiently lower than the fair value at the date the option becomes exercisable and for it to be reasonably certain, at the inception of the lease, that the option will be exercised.
- The lease term is for the major part of the asset's economic life even if title is not transferred.
- At the inception of the lease the present value of the minimum lease payments amounts to at least substantially all of the fair value of the leased asset.
- The leased assets are of such a specialised nature that only the lessee can use them without major modifications.

If an owner holds a leasehold property for investment purposes – a development lease for example – because risks and rewards have not been substantially transferred to the tenant (the landlord benefits from income and capital growth), it should be classified as an operating lease. However, IAS 40 states that it can be treated as though it were a finance lease under IAS 17 and therefore capitalised and included on the balance sheet. However, a consequence of this is that the current value of both the asset and the liability has to be reported. On the liabilities side of the balance sheet the total present value of the rent payments that the tenant is committed to make over the term of the lease is reported. But, as Brett (2004) points out, this raises a valuation problem: the liability to pay rent has already been allowed for in the valuation of the leasehold interest as a balance sheet asset. So, to avoid double-counting this liability, the present value of rents due under the lease should be added to the valuation figure for the leasehold that appears on the assets side of the balance sheet in order to arrive at the reporting amount. For example a property investment company owns a long leasehold interest with 40 years remaining on the lease. A fixed ground rent of £10,000 per annum is payable. The leasehold interest is valued at £2 m but this value reflects a liability to pay the ground rent. The present value of the remaining ground rent payments is £133,000 assuming a discount rate of 7%. The company must report this liability but, on the assets side, it must report the value of the leasehold interest (£2 m) plus the present value of the remaining ground rent payments (£133,000). So the carrying amount (balance sheet asset value) of £2,133,000 is not the market value of the leasehold interest but an accounting value that might correspond more closely to what the property would be worth if it were a freehold with vacant possession, i.e. the leasehold interest had been merged with the freehold (Brett, 2004).

12.1.1.6 UK-specific financial reporting

When a UK listed property company seeks to raise capital via a share issue, the prospectus must include a valuation of its property assets. Also, acquisition and disposal of assets that exceed 25% of the value of the company as a whole, requires shareholder approval. The resulting circular to shareholders must include a valuation by an independent expert, usually an external valuer who has disclosed any potential conflicts of interest such as share ownership, former employment, membership of any of the entity's bodies or any connection with intermediaries involved in the transaction.

IFRS 3: Business Combinations prescribes the financial reporting treatment when one company merges with or acquires another. Market value is regarded as the appropriate basis on which to value all property assets. In the UK the City Code on Takeovers and Mergers is relevant in cases involving UK listed companies. Under the Code the valuer is regarded as an 'Associate'; this means that the valuer's shareholdings and those of his/her immediate family members must be reported and dealings relating to the subject entity are forbidden before or during any offer. The valuation must be undertaken by a named independent valuer who meets the definition of an External Valuer in the Red Book. Not all the properties need to be valued; a restricted valuation of a representative sample is permissible in some circumstances, subject to conditions. Break-up value or marriage value resulting from a special purchaser should be reported if they are considered to be significantly different from the standing portfolio value.

The property assets of pension funds should be valued annually by an internal or external valuer and at least every three years by an independent valuer. The requirements are less stringent when the property portfolio is a small proportion of total assets but more stringent if significant development properties are involved. The valuation report should include summaries of values by property type, any related-party transactions and an estimate of any reversionary rent but at current rental levels. Guidance on valuations involving Collective Investment Schemes, which include authorised unit trusts and investment companies with variable capital, can be found in UK Appendix 2.3 of the Red Book. A distinction is made between valuations at the time of an acquisition of a property, which must be by an 'appropriate valuer', and regular (annual) valuations plus monthly reviews of valuations for all assets by 'standing independent valuers'. Unregulated property unit trusts hold assets in trust for participants who do not have management involvement. As they are not marketed to the public there is no regulatory requirement for an independent valuer, although most trust deeds provide for one. Valuations assist the pricing of units and are usually reviewed frequently.

12.2 Methods of valuing property assets for financial reporting purposes

The methods of valuation described earlier in Part B of this book are used to value property assets for financial statements. The existing use value or market value of a non-specialised office property may be estimated using the investment method, a chain of hotels (specialised trading properties) may be valued using the profits method and specialised properties for which there is no market are valued using the replacement cost method but on a *depreciated* replacement cost basis.

Existing use value is essentially net replacement cost, 'the least cost of purchasing the remaining service potential of the asset at the date of valuation' (ASB, 1999). It is assumed that a replacement property would be identical to the subject property in terms of location, size, specification, configuration, age, state of repair and so on. So a good starting point will be the market value of the actual property

(RICS, 2003). The key differences between market value and existing use value are that the latter disregards potential alternative uses, the buyer is granted vacant possession of parts occupied by the business, all parts of the property are required by the business, and any parts occupied by third parties are valued subject to that occupation (Cherry, 2006).

Depreciated Replacement Cost (DRC) is an application of the replacement cost method of valuation used to assess the market value of specialised property assets for financial reporting purposes where market evidence is limited. The approach is described in International and UK valuation standards. It is the current gross reproduction or replacement cost (GRC) of the building(s) less an allowance for depreciation plus the market value of the land in its existing use taking into account the constraints, if any, on use imposed by the existing buildings and other improvements made to the land. The RICS Red Book adds supplementary guidance (RICS, 2011 GN 6) suggesting that the extent of land to be included in a DRC valuation should be agreed in advance as some might be surplus or retained for future expansion. It also suggests that planning permission for existing use or relevant range of uses prevailing in the locality should be assumed if the existing use is highly specialised. Land value should be assessed by reference to the cost of purchasing a notional replacement site that would be equally suited to the existing use. In terms of building costs the Red Book advises that they should include everything necessary to complete the construction fit for existing use as at the valuation date. If the buildings are of architectural or historic interest and protected by legislation then the cost of actual reinstatement should be included in the GRC. If the buildings are not legally protected then the valuer must decide where the property falls along a spectrum between simple modern alternative and reinstatement of existing.

If the subject building is not new then its replacement cost is usually based on the cost of a replacement new building but with a reduction for depreciation. Depreciation in value can result from physical deterioration of the building and the onset of obsolescence. For accounting purposes, physical deterioration is usually allowed for by applying a 'depreciation factor' to the estimated cost of a replacement new building. The depreciation factor is the ratio between the estimated remaining life of the existing building and the full economic life of a new equivalent building (RICS, 2003). This is shown in Equation 12.1.

$$\frac{\text{Remaining economic life}}{\text{Full economic life}} \times \text{Replacement cost} = \text{Depreciated amount} \qquad (12.1)$$

For financial reporting purposes most buildings are assumed to have an economic life of 50 years but a valuer may regard the depreciation factor to be higher or lower (and hence the lifespan of a building to be shorter or longer) after taking into account its type and construction, its use, specification, degree of specialisation and whether any capital investment has extended the life of the building. For leasehold interests the remaining economic life should be the lower of the unexpired term of the lease and the remaining economic life of the asset (RICS, 2003). The valuer should also consider the impact of legislation on the use of the building, including Health & Safety Regulations, Fire Regulations and access for the disabled. The impact of obsolescence on property value is an altogether much harder thing to quantify because it refers to the effect on value caused by buildings becoming outdated or outmoded rather than simply wearing out. The RICS (2003) suggests that *functional* obsolescence (where a building is no longer wholly fit for purpose) should be considered in two parts of the valuation. First, in terms of replacement building cost: have the size, type and design of the existing building become obsolete? If so the cost of a replacement building may be quite different and would help quantify the impact of obsolescence at the scale of the entire building. Second, at the scale of the internal layout, have the specification and configuration of the building become obsolete. Structural columns and internal walls that restrict the movement of goods within an industrial building or the layout of an office floor or retail unit might affect value and would be effectively handled by adjusting the depreciation factor applied to the replacement cost of the existing building. Great care is needed to avoid double-counting the financial impact of obsolescence and the valuer should determine the extent to which the buildings' disabilities affect the efficient use of the building by the company.

If there is a material difference between the existing use value or depreciated replacement cost of a property asset and its market value (which can include alternative use) then the valuer must report market value if it is clearly identifiable and likely to produce a higher value. Where a potentially more valuable alternative use is uncertain, or is speculative, the valuer should indicate that the market value may be higher without necessarily providing a figure.

12.2.1 Example valuations

12.2.1.1 A: The valuation of a non-specialised owner-occupied property asset

A single-storey factory with a gross internal area (GIA) of 1,000 square metres is owned and occupied for industrial use. The premises were built 17 years ago when it was estimated that their economic life would be 50 years. The market rent of the factory is estimated to be £25,000 per annum on FRI terms. Planning permission has been granted to redevelop the whole site as 2,000 square metres GIA of new industrial floor-space for which there is a ready leasehold market. It is estimated that the works, which could commence immediately, would be completed within one year and that the finished scheme would let at approximately £40 per square metre on FRI terms. Costs, including building, financing and fees, are estimated to be £220 per square metre. Analysis of recent freehold investment transactions suggests a 9.5 % initial yield. Value these premises for inclusion in the occupier's company accounts.

Estimated Market Rent (£)	25,000	
YP perpetuity @ 9.5%	10.5263	
Existing Use Value (£)		263,158

This figure will appear in the balance sheet. The depreciable amount in respect of the wasting element of the existing use value is calculated by estimating the gross replacement cost of the building and then depreciating this cost to arrive at a net replacement cost. The impact of depreciation can be estimated in several ways; straight line depreciation, declining balance (fixed percentage) and sinking fund replacement. By far the most common approach (and the one that is used here) is the straight line method where the future economic life of the building will be divided by the total life expectancy of a modern equivalent.

Gross Replacement Cost (1000 m² × £220/m²) (£)		220,000	
Estimated Economic Life (years)	50		
Age (years)	17		
So remaining life (years)	33		
And depreciation factor	33/50	0.66	
Net Replacement Cost (NRC) (£)			145,200*

*used to calculate depreciation charge

The market value, which will include alternative use value (also known as 'hope' or redevelopment value) is estimated by looking at the figures relating to the redevelopment of the site. It was suggested that a pre-let could be obtained at £40 per square metre on a building twice as large as the current one. This is likely to mean that the market value of the property is considerably different to its existing use value, so it needs to be reported. A simple residual valuation would suffice. Because the property is industrial, both building costs and rental value are estimated on a GIA basis. Assuming a one year building period the valuation might be as follows.

Estimated market rent on 2000 m² @ £40 per m² (£)	80,000	
YP perpetuity @ 8.5%	11.7647	
Gross development value (£)		941,176
Less:		
Estimated demolition costs (£)	−10,000	
Building costs on 2,000 m² @ £220 per m² (£)	−440,000	
Agent and legal fees @ 1.25% GDV (£)	−11,750	
Developer's profit @ 20% of demolition and building costs and fees costs (£)	−92,350	
		−554,100
Residual balance (£)		387,076
Less:		
– Interest on land and acquisition costs @ 8.5% pa (£)		−32,901
– Acquisition costs @ 4% residual balance (£)		−15,483
Residual value (£)		338,692

This figure would be included in the valuer's report since it is significantly different from existing use value.

12.2.1.2 B: The valuation of a specialised owner-occupied property asset

The property is a fully utilised sports centre, held by the current occupier on a leasehold interest with 32 years remaining on the lease. The majority of the buildings that comprise the sports centre were constructed in 1979 but in 1990 a swimming pool was added to the centre. Because of the age of the premises and its piecemeal expansion, configuration is poor and it is expensive to maintain. The flat roofs on the 1979 buildings need renewing at an estimated cost of £169,000.

The 1.2 hectare site is surrounded by good quality owner-occupied residential property and current residential land values are estimated to be in the order of £1,200,000 per hectare but for the existing use they are estimated to be in the region of £250,000 per hectare. Demolition and site clearance costs are currently estimated to be £900,000.

Because of the specialised nature of the premises a DRC valuation is appropriate. The depreciation factor is, once again, estimated using the straight line method.

Description	Date built	Life expectancy of a modern equivalent	Life expectancy of existing building as at 2006	Estimated gross replacement cost (£)	Depreciation factor	Net replacement cost (£)
Main Sports Centre Building	1979	50	23	8,000,000	23/50	3,680,000
Less replacement of flat roofs						–169,000
Swimming Pool Extension	1990	40	24	2,000,000	24/40	1,200,000
DRC of buildings (£)						4,711,000
Plus Value of land: 1.2 ha @ £250,000 per ha						300,000
Valuation						5,011,000

The alternative use value of £540,000 should also be brought to the attention of the finance director. This value is based on a residential land value of £1,200,000 per hectare less demolition and site clearance costs of £900,000.

12.2.1.3 C: Lease accounting

To reiterate, a lease of premises would be considered to be a finance lease if the reversionary value of the *buildings element* is not important to the lessee. In such cases an apportionment of rent between land and buildings and between lease value and reversion value will be required, first to determine whether the lease is an operating or finance lease and second to be used in the reporting amounts.[5] To provide this information, valuers may be asked to estimate:

- the market value of the freehold interest in the leased asset, split between the land and buildings;
- the value attributable to the lease, split between land and buildings;
- the allocation of minimum lease payments under the lease between land and buildings;
- the interest rate implicit in the lease.

According to RICS (2006), all calculations are carried out as at the lease inception date and might proceed as follows:

a) Assess the freehold market value of land and buildings. This would be undertaken in the usual way.
b) Apportion (a) between the value within the lease and the reversion. The reversion value can be estimated by determining the freehold value of the property in the

condition expected at lease end but in a market prevalent at lease inception, and then deferring this value over the term certain (lease term or period to first break). This can be done by capitalising the current rent and then deducting this from the freehold value, leaving the value of the freehold reversion.

c) Apportion (a) between land and buildings by either: (i) valuing the buildings (usually via a DRC approach) and treating the land as the residual, or (ii) valuing the land and treating the building value as a residual.

d) Apportion the buildings element of value from (c) between the value within the lease and the reversion that was estimated in (b). This apportionment could be done in one of two ways: (i) by applying the ratio between remaining economic life of the building at lease end and the estimated economic life of the building, and then applying this ratio to the current DRC, or (ii) by estimating the building value as if it was already of an age and in the condition anticipated at lease end but under the market conditions of the lease inception date. So, if the lease of a new property was for 20 years, estimate the current market value of a comparable 20-year-old building, and estimate the redevelopment value? Any margin between the two would be the reversion value of the building.

e) Apportion the values within the lease, i.e. deduct the value of the buildings within the lease from the total lease value to determine a notional value of land under the lease.

f) Apportion the minimum lease payments[6] between land and buildings. Paragraph 16 of IAS 17 states that 'the minimum lease payments are allocated between the land and the buildings elements in proportion to the relative fair values of the leasehold interests in the land element and the buildings element'. For property this causes a problem: land has a perpetual economic life and therefore maintains its value beyond the lease term whereas buildings depreciate. Therefore, the lease payments relating to building should provide a return *on* capital invested and a return *of* the capital used up during the lease term. The solution to this problem of how to weight the allocation of minimum lease payments suggested by the RICS (2006c) is to apportion the rent by the ratio of the values within the lease. As the buildings reversion value has been reduced by applying a depreciation factor before discounting it, the buildings element in the lease is increased, thus producing a realistic weighting to reflect the depreciating nature of the buildings.

g) Calculate the discount rate implicit in the lease. The discount rate needs to be applied to the minimum lease payments allocated to the buildings and to the buildings reversion value, such that the NPV of both elements equals the freehold value of the buildings at the inception of the lease.

Once the above values have been estimated, the lease must be classified and, if a finance lease, the rent must be allocated between interest charge in the profit and loss account and a payment for the use of the leased asset.

To summarise, the lessor of a finance lease of buildings will need to report its value in the balance sheet. The value will be the net investment in the lease and comprise the discounted value of lease payments plus reversion value. The land component of the reversion value will appear separately and is required to calculate the interest rate implicit in the lease for the buildings element. The approach is best illustrated using an example. Office premises have just been let on a 50-year lease at a rent of £100,000 per annum. The investment yield is estimated to be 8%. The DRC of the building is estimated to be £1.5 m with an economic life of 50 years.

a)	**Value of freehold interest**			
	Rent passing		100,000	
	YP perpetuity @	8.00%	12.5000	
	Value of freehold interest			1,250,000
b)	**Apportionment of (a) between lease and reversion**[7]			
	Rent passing		100,000	
	YP for lease term @	8.00%	12.1084	
	Freehold value within lease			1,210,840
	Residual freehold value (i.e. value not attributable to lease contract):			39,160
c)	**Apportionment of (a) between building and land value**			
i	FH value of building (based on DRC)			1,000,000
	(Residual) value of land (value of FH interest less DRC of building)			250,000
d)	**Apportionment of buildings element of value between the lease and residue**			
i	*Ratio of remaining economic life at lease end*:			
	estimated remaining economic life (yrs)	50		
	less lease term (yrs)	45		
	remaining economic life at lease end (yrs)	5		
	Building residual value as at end of lease[8]		100,000	
	x PV £1 for lease term @	8.00%	0.0313	
	Building residual value today			3,133
	So, value of buildings within lease (£1,000,000 – £3,133)			996,867
e)	**Apportion the values within the lease**			
	Freehold value within lease	1,210,840		
	less value of buildings within lease	996,867		
	Value of land within lease	213,973		
f)	**Apportionment of lease payments between land and buildings**[9]			
		Value within lease	%	*Apportion-ment within rent payment*
	Buildings	996,867	82.33%	82,329
	Land	213,973	17.67%	17,671
		1,210,840	100.00%	100,000
g)	**Calculation of implicit interest rate (buildings lease)**			
	PV of min lease payments			
	Rent allocation to building(s) element	82,329		
	YP for lease term at implicit interest rate	12.1084		
			996,867	
	PV of residual building value			
	Building(s) residual value	100,000		
	PV £1 for lease term @ implicit interest rate	0.0313		
			3,133	
			1,000,000	
	Interest rate implicit within the lease		8.00%	

Looking at the returns from the buildings element of rent, this is 8.23% (£82,329/£1,000,000) which would indicate that this is a finance lease. The return on the land element is 7.07% (£17,671/£250,000).

An alternative way to apportion the buildings element of value between the lease and the residue (section (d) above) is to use evidence of value of older buildings. For example, assume that the market rent at the end of the lease is £75,000 per annum and that the yield is 9%.

Diminution in value as at lease end (assumed to be buildings)				
Estimated market rent at lease end		75,000		
YP perp @	9.00%*	11.1111		
Value of old asset today			833,333	
Diminution in value (FH value – value of old asset today): £1,250,000 – £833,333				416,667
Residual value of building as at end of lease (DRC – diminution in value): £1,000,000 – £416,667				583,333
Deferred (PV'd) over lease term @	8.00%			0.0313
Building residual value today				18,275
Value of building within lease (DRC of building – building residual value today)				981,725

The calculations would then continue as from (e) onwards.

Finally, rather than estimate the DRC of the building it is equally possible to apportion the freehold value between building and land value by obtaining evidence of current land values. Assume land values in the locality are £10 m per hectare and the site area is 0.02 ha.

Land area (ha)	0.02	
Land value (£)	10,000,000	
Value of land within FH		200,000
Value of buildings today within FH		1,050,000
Then proceed from (c) above		

12.3 Valuations for lending purposes where the loan is secured against commercial property

One of the underlying principles of valuation for financial reporting is the assumption of continuation of the business; such an assumption does not apply to valuations of properties that are going to be used as security for a loan (IVSC, 2005). Loan security valuations might be required for property that is owner-occupied, held as an investment or going to be redeveloped or refurbished and, in the UK, such valuations are regulated by the RICS (2012), specifically, Appendix 5: Valuations for commercial secured lending. This is a protocol that has been agreed between the RICS and the British Bankers Association and which must be followed unless the client requests departure. The protocol deals with instructions and disclosures, objectivity and conflicts of interest, valuation basis and special assumptions, and reporting requirements.

If the instruction is received from a party other than the lender, the borrower or a broker for example, and the identity of the lender is not known, then the valuer must state in the terms of engagement that the valuation may not be acceptable to the lender. The valuer must enquire as to whether the property was recently sold or if a price has been agreed pending a sale. If it has, then the valuer must investigate the price paid (or agreed), the extent of marketing and the nature of any incentives.

Conflicts of interest must be disclosed. If the valuer or the potential client consider that the disclosed involvement does create a conflict then the instruction should be declined. Essentially, does the valuer have a current or recent fee-earning involvement with the property to be valued, with the borrower, prospective borrower or any party connected to the transaction for which the lending is required. If the valuer or potential client can agree arrangements to avoid the conflict, these should be recorded in writing, set out in the terms of engagement and referred to in the report.

In the overwhelming majority of cases valuations of commercial property for secured lending purposes will be conducted on the basis of market value or, in some cases, market value with special assumptions. The valuation should also include comment on potential demand for alternative uses. Examples of special assumptions include (RICS, 2012: 68):

- planning consent has been granted for development;
- there has been a physical change to the property such as new construction or refurbishment;
- there has been a new letting or settlement of rent review at a specific rent;
- there is a special purchaser, which may include the borrower;
- a marketing constraint is to be ignored;
- contamination or other environmental hazard is to be ignored.

Existing use value is not a consideration here and owner-occupied properties should be valued on the basis of vacant possession. This does not preclude the owner as part of the market but does require that any special advantage of the owner's occupancy, which may be reflected in the value of the business, be separated from the value of the property. This is done because, in the event of default on the financial arrangements, security for the loan can be realised only by a change in occupancy (IVSC, 2005). Partly as a result of this, specialised properties, which by definition have limited marketability and derive value from being part of a business, may not be suitable as separate security for loans. If they are offered as security individually or collectively they should be valued assuming vacant possession (IVSC, 2005). Because specialised trading properties are valued with regard to the maintainable profit of an operational business, when valuing them for lending purposes the valuer should notify the lender of any significant difference in value that may result if the business was to close, the inventory removed, licenses/certificates, franchises or permits were removed or placed in jeopardy, the property vandalised or there were other circumstances that may impair future operating performance (IVSC, 2005). The valuer may also wish to note any specific circumstances that might put the business's profitability at risk, given that the profits method relies on an assumption of adequate profitability.

Valuations that are based on replacement cost are used for specialised properties which are not bought or sold and are not often used for secured lending purposes, but use is made of this basis to calculate the cost of physical reinstatement for insurance purposes, which is a requirement of commercial mortgages. Development properties can be valued using the residual method under the assumption that the construction work is complete but it is important to consider market movements between the valuation date and estimated completion date (IVSC, 2005). Cherry (2006) also notes that the valuation should be based on current estimates of costs and value rather than projections to the likely end of the development period and that the following additional matters should be reported:

- a comment on costs and contract procurement;
- a comment on viability of the proposed project;
- an illustration of sensitivity to assumptions made;
- implications on value of any cost overruns or delays.

The valuer should also indicate whether plans and costs have been provided by an architect and quantity surveyor respectively.

As well as the usual matters that must be included in a valuation report, other matters relevant to a loan security valuation include the marketability of the property, potential demand for alternative uses, valuation methodology adopted, details of significant comparable transactions relied upon, suitability of the property as security for mortgage purposes and environmental or economic designation. There will be more specific matters depending on the type of property being valued; the valuation of an investment property for example would require consideration of the covenant strength of the tenant of tenants. For further information see RICS (2012): 68–71.

Sayce et al. (2006) argue that the substantial increase in the number of investors using a combination of equity and debt finance to fund the acquisition of property will lead to a shift away from the use of income capitalisation as a way of valuing property investments and towards more cash-flow based valuations. The latter allow the lender to calculate various ratios that are used to help make the lending decision, including loan-to-value and debt service ratios. Also, income capitalisation does not provide information on potential gearing in the debt and equity returns.

12.3.1 *Example*

You have been instructed to value, for loan security purposes, the freehold interest in a property located in the centre of Birmingham. The six-storey property is situated in a mixed office/retail location and is in a conservation area. It is situated in the middle of a Grade 2 listed Victorian terrace of similar properties and is in relatively good order; the stone-faced walls and slate roof are in good condition. A loan is being sought at an interest rate of 6% per annum over eight years with no repayment of capital before the expiry of the loan. A loan-to-value ratio of 65% is required. Details of the tenants currently occupying the property are shown in Table 12.1. The freehold interest is a reversionary investment: the appropriate valuation method is therefore the investment method and a unit-by-unit income capitalisation at ARY is considered the most effective, with term and reversion valuations for those units that are occupied and where the rent is below market levels. The basis of valuation is market value.

Table 12.1 Tenancy schedule.

Unit	Floor	Use	NIA (m^2)	Current Rent (£p.a.)	Lease	Tenant
1	Basement Ground	Storage Retail	75 80 (ITZA)	£105,000	Let seven years ago on 15 year lease (IRI terms) with five-year reviews	Telcom Ltd (assigned from PhonesRus Ltd)
2	Ground Basement	Retail (bank) Vault+storage	105 (ITZA) 38	£120,000	Let 6 years ago on a 20 year lease (FRI terms) with five-year reviews, with a break at the second review in favour of the tenant subject to six months rent penalty	RNS Bank plc
3	First	Office	150	£63,000	Recently let on a ten-year lease (IRI terms) with five-year reviews	Paperweight Ltd.
4	Second	Office	145	£59,000	Let 7 years ago on ten-year lease (FRI terms) with five- year review	Bean Traders Ltd
5	Third Fourth	Residential 2-bed apartment with small balcony	187	£39,000	Assured shorthold tenancy for one year. Fully furnished, no repairing obligations	Mrs Flint

Recent market evidence:

a) A comparable retail unit of 66 m^2 (ITZA) recently let on a 20-year lease with five-year reviews at a rent of £93,000 per annum (FRI terms) and subsequently sold for £1,860,000.
b) The freehold interest in comparable office premises recently sold for £1,500,000. The premises were recently let at a rent of £92,500 per annum on FRI terms.
c) The freehold interest in a similar mixed use property, but in relatively poorer condition and in a slightly less desirable location, recently sold for £4,550,000. The premises comprise three retail units on the ground floor plus three floors of offices and two self contained flats above. The gross total rental income is £345,000 per annum. One of the retail units is vacant.
d) The long leasehold interest in a comparable one-bed apartment flat recently sold for £450,000. The lease has 89 years unexpired and the ground rent is £125 per annum.

Collection and analysis of comparable evidence is crucially important to any valuation but is a process that is difficult to replicate in a textbook. Suffice it to say that good company files, a network of market contacts and experience all help to produce a reliable body of evidence that includes explanation and justification of calculations and assumptions. A more expurgated version is set out below:

a) Estimated rent value for retail units: £93,000 p.a. / 66 m^2=£1409/ m^2 ITZA (FRI terms). The initial yield achieved on the investment sale was 5%.
b) Based on the analysis of this investment transaction, the initial yield for office space is 6.17%.
c) This comparable provides some evidence of the yield that has been obtained on the sale of a mixed use investment property. It is £345,000/ £4,550,000=7.58%. It should be noted that one of the retail units is empty (thus reducing current rental income).
d) The (vacant possession) capital value of the long leasehold interest in a comparable (but one-bed) residential apartment is £450,000.
e) Not forgetting that the most comparable evidence can be found in the subject property itself, Unit 3 was recently let at a rent of £63,000 per annum, equating to £420 / m^2. The lease was on IRI terms.

Before proceeding with the valuation, some assumptions can be made. First, a lease that includes IRI terms would produce a net income to the landlord that is equivalent to the rent on FRI terms less 10% for both retail and office space. Also, at lease renewal, it is assumed that lease terms continue unaltered. Second, the rent applied to basement storage space is estimated as a percentage of retail rent (ITZA); in this case 10%. Finally, no void has been inserted to reflect break clause in Unit 2's lease but the yield has been adjusted slightly instead, noting that the tenant must pay six months' rent as a penalty for exercising the break.

Unit 1:					
	Term rent			105,000	
	YP 3 yrs @ 4.5%			2.7490	
					288,645
	Reversion to MR (IRI)				
	Retail space	80 m2 × £1409/m2	112,720		
	Storage	75 m2 × £141/m2	10,575		
				123,295	
	Less external repairs at 10% MR			(12,330)	
				110,695	
	YP perp @ 5%			20.0000	
	PV £1 3 yrs @ 5%			0.8638	
					1,912,367
					2,201,012
Unit 2:					
	Term rent			120,000	
	YP 4 years @ 4.5%			3.5875	
					430,500
	Reversion to MR (FRI)				
	Retail space	105 m2 × £1409/m2	147,945		
	Storage	38 m2 × £141/m2	5,358		
				153,303	
	YP perp @ 5.5%			18.1818	
	PV £1 4 yrs @ 5.5%			0.8072	
					2,249,928
					2,680,428
Unit 3:					
	MR (IRI)			63,000	
	YP perp @ 6.5% [1]			15.3846	
					969,230

[1] Yield adjusted upwards to reflect IRI terms

Unit 4:				
	Term rent		59,000	
	YP 3 yrs @ 5.75%		2.6854	
				158,439
	Reversion to MR (FRI)			
	145 m2 × £420/m2	60,900		
	Plus external repairs @ 10%	6,090		
			66,990	
	YP perp @ 6.17%		16.2075	
	PV £1 3 yrs @ 6.17%		0.8356	
				907,245
				1,065,684
Unit 5:	Capital value, say			475,000
Valuation				£7,391,354

As well as the valuation figure the report is likely to make reference to issues considered relevant to the purpose of the valuation, namely loan security. The loan-to-value ratio has been given so it is possible to calculate the maximum amount of loan that should be secured against this property. The valuer may comment on the suitability of the property as loan security given the terms of the loan, the location, condition and size of the property, nature of the tenants and lease terms, and so on. It is also possible to calculate simple loan risk ratios such as rent cover and interest cover (based on current rent level). Depending on the magnitude of these ratios it may be possible to offer comment on the risk profile of the property. The RICS Red Book contains guidance on the various issues that should be commented upon. The marketability of and demand for the property is important should the lender find itself saddled with it. In determining demand, consideration would be given to; existing and alternative uses, security of income over the duration of the loan (with particular regard to lease lengths, breaks and market activity), reversionary value (especially if in loan period) including potential for improvement or redevelopment.

Key points

- As far as international accounting standards are concerned, the IVSC advises that, in all cases, when valuing a property asset, market value is the appropriate basis. But the devil is in the detail.
- Slowly but surely there will be parity between UK and international financial reporting standards. In fact UK standards have provided companies with a choice between reporting property assets at cost or value for some time so the merger will not be too onerous. There will of course be implications for companies as international standards take effect and these are very well documented by Brett (2004).
- It is important that the valuer discusses the future use of a property asset with the entity before preparing a valuation for financial reporting purposes to ensure that appropriate valuation assumptions are made.
- Lenders are concerned with the financial security of their loans. If a property is being considered as security for a loan, then it is pretty standard practice for a valuation to be commissioned to determine whether it represents adequate collateral. Market value is the basis but there may be special assumptions in particular circumstances, especially with regard to loans made in respect of development activity.

Notes

1. Incorporated or un-incorporated organisations.
2. *FRS 11: Impairment of Fixed Assets and Goodwill* ensures that any impairment loss is handled correctly and the development of this standard shadowed the development of IAS 36.
3. Defined for accounting purposes as interests in land and/or buildings held for their investment potential (to earn rentals or for capital appreciation or both) rather than for consumption in business operations.
4. The rent is divided between an interest charge (shown in the profit and loss statement) and a charge for the repayment of capital. The lessee's accounts will also usually show an annual depreciation charge on the asset.

5. The lessor and lessee to a lease do not have to classify the lease the same way. If the lessor had the benefit of a guaranteed residual value from a party unrelated to the lessee, then this would affect the lessor's lease classification, but not the lessee's.
6. This is the effective rent at the inception of the lease. Any increase in rent following a review is a contingent element and not included. A lease with upwards or downwards rent reviews cannot be a finance lease because the lessor retains the risk of rental shifts. Minimum lease payments would not extend beyond a break option unless it was reasonably certain that it would not be exercised.
7. Typically a capitalisation of the rent passing in perpetuity, deferred over lease term or period to first break (assuming it is likely to be exercised). The condition of the property is assumed to be that which is anticipated at the end of the lease term but in market conditions as at the inception of the lease.
8. Assumes straight-line depreciation of DRC of building over its economic life.
9. Rent is apportioned in the same ratio as the land and buildings values under the lease.

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Chapter 13
Valuations for Taxation Purposes

Valuations for Capital Gains Tax (CGT) (including Corporation Tax (CT)), Inheritance Tax (IHT) and Stamp Duty Land Tax (SDLT) are based on statutory definitions of market value. Although the definitions are to be found in different statutes, they are broadly consistent with the IVSC definition of market value but subject to the following assumptions that have been laid down by case law over the years (RICS, 2012: *UKGN 3: Valuations for capital gains tax, inheritance tax and stamp duty land tax*):

- The sale is hypothetical.
- The vendor and purchaser are hypothetical, prudent and willing parties to the transaction.
- All preliminary arrangements necessary for the sale to take place have been carried out prior to the date of valuation and there is adequate publicity or advertisement before the sale takes place so that it is brought to the attention of all likely purchasers.
- The property is offered for sale on the open market by whichever method of sale will achieve the best price and the vendor would divide the property into whatever natural lots would achieve the best overall price (prudent lotting).
- The valuation should reflect the bid of any *special purchaser* in the market (provided that purchaser is willing and able to purchase).

13.1 Capital gains tax and corporation tax

Capital Gains Tax (CGT) was introduced in 1965 as a means of taxing capital gains made by individuals and trustees on the disposal of assets, after having set off any losses incurred within a tax year. Companies are subject to the same tax regime under the name of Corporation Tax. For CGT purposes 'assets' includes

Property Valuation, Second Edition. Peter Wyatt.

all forms of property unless exempt (and an individual's main residence is exempt). 'Disposal' (which includes disposal of part of an asset) can be the sale, gift, receipt of compensation for damage to an asset, insurance compensation or payment for surrender of rights. Tax is only paid on disposal of an asset if a 'chargeable gain' was made in the preceding financial year. This is calculated by taking the sale proceeds and deducting the original cost plus associated acquisition costs and fees, any enhancement expenditure, disposal fees and an allowance for inflation over the period for which the asset was held, known as an 'indexation allowance'. The first part of the chargeable gain is exempt for individuals (half for trustees), but the exact amount varies from year to year. Enhancement expenditure is permitted as an allowable deduction so long as it is reflected in the state or nature of the property at the time of disposal, thus excluding improvements which have worn out by the time the property is disposed of. Disposal costs are also allowable and these, like acquisition costs, include professional and legal fees and any other costs reasonably incurred in marketing the property, including the cost of a valuation and any apportionment for CGT purposes.

In most cases, where the disposal is by way of an open market sale, the disposal proceeds are the amount actually received from selling the asset but sometimes the market value may need to be estimated if the sale was not made at arm's length or was a gift. The Taxation of Chargeable Gains Act, 1992 (TCGA 1992) defines market value as the price for which those assets could be sold on the open market with no reduction for the fact that this may involve an assumption that several assets are to be sold at the same time. If the 'gain before indexation' is a negative this 'loss' may be offset against other gains made in the same or in future tax years. 'Roll-over relief' is available where proceeds from a disposal are used to acquire another asset for use in the same business and 'retirement relief' is available where the individual is 50 or over. Stock-in-trade is not regarded as capital for CGT purposes so property companies' developments are not subject to CGT (Hayward, 2009). Certain disposals are exempt including transfers between husband and wife and gifts to charity. Also, certain organisations are exempt from CGT including charities, local authorities, friendly societies, scientific research associations, pension funds and non-resident owners (Johnson et al., 2000).

Because the capital value of properties tends to appreciate over time, on 31 March 1982 special 'rebasing' rules were introduced to ensure that, for properties acquired on or before that date, only the increase in capital value after that date is taken into account when working out the chargeable gain. An election can be made to apply these rebasing rules so that the original acquisition costs of all properties held at 31 March 1982 is disregarded completely and, instead, the market values at that date can be used to calculate the chargeable gain. If no such election is made, the chargeable gain for each property held on 31 March 1982 must be calculated using both their market value at that date and their original acquisition cost. Then:

- if both calculations show a gain, the smaller of the gains is the chargeable gain;
- if both calculations show a loss, the smaller of the losses is the allowable loss;
- if one calculation shows a gain and the other shows a loss, there is neither a chargeable gain nor an allowable loss.

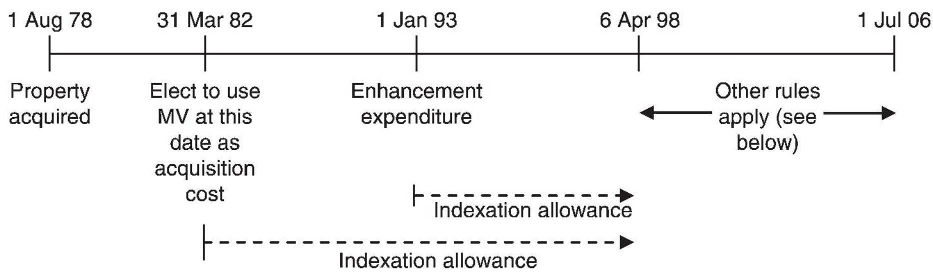

Figure 13.1 Events time-line.

Between 31 March 1982 and 6 April 1998 an 'indexation allowance' adjusts the chargeable gain to take account of the effects of inflation by giving an allowance equal to the amount by which the value of the property would have risen on a monthly basis if its value had kept pace with inflation, as measured by the increase in the Retail Prices Index (RPI). The indexation allowance is based on the increase in the RPI between the month in which the property was acquired or, for subsequent expenditure, the month in which the expenditure on the property was incurred, or March 1982 if that is later, and the month in which the property was disposed of, or April 1998 if that is earlier. For example a property was purchased in August 1978, refurbished in January 1993 and disposed of in July 2006. A time-line is presented in Figure 13.1.

To help calculate the indexation allowance, the Government provides a table of 'indexation factors' which can be used to calculate the rise in the RPI between the month in which expenditure was incurred on the property and April 1998. These indexation factors are shown in Table 13.1.

First of all it is necessary to determine which month the expenditure (either acquisition or enhancement) took place and locate the relevant indexation factor. This is then multiplied by the expenditure amount to give the indexation allowance which can be deducted from the chargeable gain. For example, a property was purchased in March 1992 for £100,000 and sold in June 1999 for £500,000. The indexation factor to be used for a property acquired in March 1992 is 0.189. Multiplying this by £100,000 gives an indexation allowance of £18,900 and the indexed capital gain is calculated as follows:

Proceeds (£)	500,000
Less cost (£)	–100,000
Gain before indexation (£)	400,000
Less indexation allowance (£)	–18,900
Indexed gain (£)	381,100

If the property was owned at 31 March 1982 and no election has been made to rebase, the indexation allowance is calculated on the greater of either the total cost incurred up to 31 March 1982 on that property (including its initial acquisition price) or the value of the property at 31 March 1982. If an election has been made for rebasing, the indexation allowance is calculated on the value of the property at 31 March 1982. If part of a property is disposed of then only part of the costs of the property can be deducted when working out the gain or loss.

Table 13.1 Indexation factors.

	Month											
Year	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
1982			1.047	1.006	0.992	0.987	0.986	0.985	0.987	0.977	0.967	0.971
1983	0.968	0.960	0.956	0.929	0.921	0.917	0.906	0.898	0.889	0.883	0.876	0.871
1984	0.872	0.965	0.859	0.834	0.828	0.823	0.825	0.808	0.804	0.793	0.788	0.789
1985	0.783	0.769	0.752	0.716	0.708	0.704	0.707	0.703	0.704	0.701	0.695	0.693
1986	0.689	0.683	0.681	0.665	0.662	0.663	0.667	0.662	0.654	0.652	0.638	0.632
1987	0.626	0.620	0.616	0.597	0.596	0.596	0.597	0.593	0.588	0.580	0.573	0.574
1988	0.574	0.568	0.562	0.537	0.531	0.525	0.524	0.507	0.500	0.485	0.478	0.474
1989	0.465	0.454	0.448	0.423	0.414	0.409	0.408	0.404	0.395	0.384	0.372	0.369
1990	0.361	0.353	0.339	0.300	0.288	0.283	0.282	0.269	0.258	0.248	0.251	0.252
1991	0.249	0.242	0.237	0.222	0.218	0.213	0.215	0.213	0.208	0.204	0.199	0.198
1992	0.199	0.193	0.189	0.171	0.167	0.167	0.171	0.171	0.166	0.162	0.164	0.168
1993	0.179	0.171	0.167	0.156	0.152	0.153	0.156	0.151	0.146	0.147	0.148	0.146
1994	0.151	0.144	0.141	0.128	0.124	0.124	0.129	0.124	0.121	0.120	0.119	0.114
1995	0.114	0.107	0.102	0.091	0.087	0.085	0.091	0.085	0.080	0.085	0.085	0.079
1996	0.083	0.078	0.073	0.066	0.063	0.063	0.067	0.062	0.057	0.057	0.057	0.053
1997	0.053	0.049	0.046	0.040	0.036	0.032	0.032	0.026	0.021	0.019	0.019	0.016
1998	0.019	0.014	0.011									

The indexation factor is multiplied by the part of the cost that can be deducted, not by the whole of the cost of the property. It should also be noted that an indexation allowance can reduce or eliminate gains which are chargeable to tax, but for disposals on or after 30 November 1993, the indexation allowance cannot be used to turn a gain into a loss or to increase a loss.

On 6 April 1998 taper relief replaced the indexation allowance for individuals and trusts. Taper relief reduces the gain by a percentage that is dependent on whether the property is a business or non-business asset and the number of whole years for which it is held. The chargeable gain is reduced by the relevant taper reduction, shown in Table 13.2.

For example, a property was acquired on 1 June 1999 for £150,000 and sold on 1 July 2005 for £250,000. It was a non-business asset throughout the period of ownership and there are no allowable losses. The chargeable gain before taper relief is therefore £100,000 (disposal proceeds of £250,000 less allowable costs of £150,000). The property was held for six whole years so the amount of the chargeable gain that remains chargeable after taper relief is £80,000 (£100,000×80%). Where a non-business asset was acquired before 17 March 1998 and is owned on 5 April 1998 then a bonus year is added to the period of ownership after the 5 April 1998. Where property interests have merged or been divided and the property disposed of derives part of its value from an earlier asset the qualifying holding period may be extended. For example, a leasehold interest is acquired on 8 January 1995 and the freehold interest of the same (physical) property is acquired on 4 February 2000; the lease being extinguished by merger with the freehold. The freehold is then disposed of on 31 March 2006. As the value of the freehold is derived to some extent from the extinguished lease the qualifying holding period begins on 6 April 1998 and there are seven whole years between that date and the date of disposal. In addition, as this is a non-business asset, the property is treated as having been acquired before 17 March 1998 and qualifies for the bonus year.

For business assets acquired before 6 April 1998 and disposed of after that date there will be an indexation allowance up to 6 April 1998 and then taper relief thereafter up to the disposal date. For example, a property was acquired on 10 July 1985 for £100,000 and sold on 8 September 2002 for £1,000,000. It was a business asset and there are no allowable losses. The chargeable gain before taper relief is £829,300 (disposal proceeds of £1,000,000 less allowable costs of £100,000 and an indexation allowance to April 1998 of £70,700). From 6 April 1998 the property was held for four whole years (there is no bonus year for business assets disposed of on or after 6 April 2000). Therefore, the amount of the chargeable gain that remains chargeable is £207,325 (£829,300×25%).

Indexation was abolished (along with rebasing election) for individuals and trustees in 2008. The process of calculating the amount chargeable to CGT is illustrated in Table 13.3.

If a disposal is made where only *part of the property* was used as a business asset during the relevant period of ownership, then the chargeable gain must be apportioned between the gain on the business asset and the gain on the non-business asset. The property will qualify for business asset taper relief on one part and non-business asset taper relief on the other and the amount of each relief is calculated using the full qualifying holding period. Consider the following

Table 13.2 Taper relief.

Business asset (used for the purpose of a trade, profession or vocation)		**Non-business asset (generally, let property is a non-business asset)**	
Number of whole years in the qualifying holding period	Gain remaining chargeable (%)	Number of whole years in the qualifying holding period	Gain remaining chargeable (%)
Less than 1	100	Less than 1	100
1	50	1	100
2 or more	25	2	100
		3	95
		4	90
		5	85
		6	80
		7	75
		8	70
		9	65
		10 or more	60

Table 13.3 Capital gains tax calculation.

Disposal proceeds or sum received from assets	After allowing for reliefs which reduce the figure to be treated as proceeds.Sometimes market value is used instead of the actual proceeds
Less Allowable costs	If this is a negative number, then you have made a loss, which may be an allowable loss
= **Gain before indexation**	
Less Indexation allowance	For inflation, up to April 1998, may not create or increase a loss
= **Indexed Gain**	
Less other reliefs	E.g. business asset roll-over relief, retirement relief
= **Chargeable gain**	For each asset individually
Sum Total chargeable gains	Total of all the chargeable gains in the tax year
Less Allowable losses	Losses in the tax year and unused losses carried forward from earlier years
= **Chargeable gains after losses**	
Less Taper relief	A relief that reduces a chargeable gain after losses according to how long you held the asset. Taper relief is applied separately to each chargeable gain.
= **Tapered chargeable gains**	
Less Annual exempt amount	£10,600 for the tax year 2012/13
= **Amount chargeable to CGT**	

example of a property acquired on 1 December 1994 and sold on 31 March 2006 making a gain of £20,000 on the sale. In the period of ownership falling after 5 April 1998, 80% of the property was used by the owner as a shop and the remaining 20% of the property was let as a furnished flat. There are seven whole years in the qualifying holding period for a business asset and eight years for a non-business asset (seven complete years and the bonus year). In calculating taper relief the overall gain needs to be apportioned between business and non-business use. For business use the gain is £16,000 (£20,000×80%) and the qualifying holding period is seven years so 25% of this part of the gain will be chargeable, i.e. £4,000. For the non-business use the gain is £4,000 (£20,000×20%) and the qualifying holding period is eight years, so 70% of this part of the gain will be chargeable, i.e. £2,800. The aggregate chargeable gain is therefore £6,800.

Now consider a property acquired on 16 March 1995, sold on 5 April 2006 making a gain of £20,000 on the sale and used only *part of the time* as a business asset. The property was a business asset until 5 April 2002 and then it was empty until the sale date with the gain during this latter period being treated as arising on the sale of a non-business asset. Again, the property will qualify for business asset taper relief on one part and non-business asset taper relief on the other and the amount of each relief is calculated using the full qualifying holding period. There are seven whole years in the qualifying holding period for a business asset and eight years for a non-business asset (seven whole years and the bonus year).

During the period of ownership between 6 April 1998 and 5 April 2006 the property was used for business purposes for 50% of the time (6 April 1998 to 5 April 2002 and for non-business use (empty) for the other half (6 April 2002 to 5 April 2006). Therefore the chargeable gain on the period while the property was a business asset is £10,000 (£20,000 x 50%) and on the period while the property was empty is also £10,000 (£20,000 x 50%). So £10,000 of the gain qualifies for the business asset taper relief appropriate to a qualifying holding period of seven years, meaning that 25% of this part of the gain will be chargeable, i.e. £2,500. £10,000 of the gain qualifies for the non-business asset taper relief appropriate to a qualifying holding period of eight years, meaning that 70% of this part of the gain will be chargeable, i.e. £7,000. The aggregated chargeable gain is therefore £9,500.

The grant of a lease is regarded as a part disposal of a property asset and is liable to CGT. The way that the liability is calculated depends on the duration of the lease, classified as:

- a long lease (more than 50 years duration remaining) granted out of a freehold or long leasehold interest;
- a short lease (50 years or less remaining) granted out of a freehold or long leasehold interest;
- a short lease granted out of a short leasehold interest.

The duration of a lease for CGT purposes will normally be the time remaining until expiry of the current lease term but can also be affected by any provision in the lease allowing the landlord or the tenant to give notice to terminate the lease or by a provision allowing the tenant to extend it. Once the statutory rules have been applied to a part disposal of a property, they also have to be applied to subsequent disposals.

13.1.1 Grant of a long lease out of a freehold or long leasehold interest

To calculate the gain arising from the grant of a long lease out of a freehold or long leasehold interest, any allowable expenditure (apart from the costs of disposal) is apportioned between the freehold reversion (or head-leasehold interest retained) and the lease granted. This is done by applying the fraction $A/(A+B)$ to the allowable expenditure where A is the premium or consideration received and B is the value of the interest retained plus the value of the right to receive the rent under the lease. For example, on 30 June 1988, the freehold interest in a property was purchased for £150,000. On 30 June 2005, the landlord granted a 75-year lease of the property for a premium of £200,000. A ground rent of £5,000 per annum was due under the lease. The landlord incurred legal fees of £3,000 on the grant of the lease. The value of the freehold reversion at 30 June 2005 was £30,000, and the value of the right to receive the rent was £70,000. The landlord's allowable expenditure is:

$$\text{£150,000 (cost of property)} \times A/(A+B) = \text{£150,000} \times \frac{200{,}000}{200{,}000+(30{,}000+70{,}000)}$$
$$= \text{£100,000}$$

The chargeable gain accruing to the landlord on granting the long lease is then calculated as follows:

Premium received (£)	200,000
Less apportioned cost, from above (£)	–100,000
Less legal fees (£)	–3,000
Unindexed gain (£)	97,000
Less indexation up to April 1998, £100,000×0.525 (£)	–52,500
Chargeable gain, subject to taper relief (£)	44,500

13.1.2 *Grant of a short lease out of a freehold or long leasehold interest*

The calculation is the same as for the grant of a long lease except that part of any premium received for the grant of a short lease is chargeable to income tax, calculated as 2% for each year of the term other than the first, so this taxed amount must not be subject to CGT too. This is achieved by leaving it out of the numerator A in the $A/(A+B)$ fraction but including it in A in the denominator. For example, on 6 April 1986 a freehold shop was acquired for £200,000. On 6 April 2005 the landlord granted a 15-year lease with five-year rent reviews for a premium of £50,000 and an initial rent of £9,000 per annum. The estimated market rent at the time of disposal was £12,000 per annum and yield was 6%. The calculation of chargeable gain can be broken down into several steps:

a) Part of premium subject to Income Tax:

2% of premium (50,000×2%)	1,000	
× (15–1) years	14	
		14,000

b) Part of premium subject to CGT:

Whole premium	50,000
Less amount chargeable to income tax	–14,000
	36,000

c) Calculation of value of retained interest plus value of right to receive rent under the lease:

Term rent (to first rent review)	9,000	
YP 5 years @ 6%	4.2124	
		37,912
Reversion to market rent	12,000	
YP in perpetuity @ 6%	16.6667	
PV £1 5 years @ 6%	0.7473	
		149,460
		187,372

d) Applying the part disposal formula $A/(A+B)$ to apportion the allowable expenditure:

$$£200{,}000 \times \frac{£36{,}000}{£50{,}000 + £187{,}372} = £30{,}332$$

e) Calculation of chargeable gain

Disposal proceeds (£)	36,000
Less allowable expenditure (£)	–30,332
Unindexed gain (£)	5,668
Less indexation allowance up to April 1998, £30,332×0.665 (£)	–20,171
Chargeable gain (loss), subject to taper relief (£)	–14,503

If a capital loss arises, as in this case, it may be restricted in some circumstances but this is generally where the services of an accountant rather than a valuer are called for!

13.1.3 Grant of a short lease out of a short leasehold interest

Where a premium is paid for a short sub-lease granted out of a short head-leasehold interest (i.e. a remaining term of less than 50 years) only that part of expenditure on the head-lease that will waste away over the period of the sub-lease can be set against the premium received (Johnson et al., 2000). Basically the short head-lease is treated as a wasting asset and the chargeable gain is reduced by a 'depreciation allowance' calculated as follows:

$$\text{Reduced gain (reduced acquisition price)} = \text{original acquisition cost} \times \frac{\text{YP 6\% for years remaining at disposal}}{\text{YP 6\% for years remaining at acquisition}}$$

During a lease, if a capital sum is received instead of rent in exchange for its assignment, surrender or for a variation or waiver of some of the lease terms, it is chargeable to CGT. An assignment or surrender of a lease may be treated as a complete disposal of that leasehold interest whereas a variation or waiver of lease terms may be treated as part disposal.

So it can be seen that where part of a property interest is disposed of it is necessary to apportion allowable expenditure on the property between the part sold and the part retained in order to calculate the gain or loss arising. The statutory rules for doing this require a valuation of the part retained. In order to avoid the need for doing this it is usually acceptable to treat the part disposed of as a separate asset from the part retained. Any fair and reasonable method of apportioning part of the allowable expenditure to the part disposed of will be accepted. To determine the value of the property retained the value of the part disposed of is deducted from the total value of the property interest. For example, part of a property which was acquired in 1975 is sold in 2005 for £50,000 and the costs of disposal were £2,000. The market value at 31 March 1982 of that part was £20,000. The gain before indexation using the alternative basis is:

Sale proceeds (£)	50,000
Less market value at 31 March 1982 (£)	(20,000)
Less costs of disposal (£)	(2,000)
Gain before indexation (£)	28,000

If the alternative basis is not used it would be necessary to value the whole property at 31 March 1982 and to value the whole of the property retained at the date of the sale.

If the part disposal is small and if certain conditions[1] are met it is possible to claim that it should not be regarded as a disposal and that the consideration received should instead be deducted from the allowable cost of the rest of the property. On a later disposal, or part disposal, of the remaining property, only the reduced expenditure is taken into account in calculating any subsequent gain or loss.

In summary, property valuations may be required to calculate the gain or loss arising when a property interest is disposed of. The main circumstances in which valuations are required are where the property was owned at 31 March 1982, the disposal was not an open market sale, or there has been a disposal of part of a property and the alternative basis for calculating the allowable cost is not being used.

13.2 Inheritance tax

The Inheritance Tax Act 1984 requires inheritance tax (IHT) to be paid at a rate of 40% on the transfer value (net of costs and CGT) of a person's estate held at death, on certain lifetime gifts and some transfers in and out of trusts. The value of these transfers is calculated by reference to the reduction in value of the remaining estate and in most cases this is the same as the value of the transferred estate. The reduction in value is estimated by valuing the transferor's estate before and after the transfer. For example, John owns two small prime shop units in Oxford Street, together they are worth £1 million, but individually each is worth £300,000. John leaves one of the units to his daughter. The gift for the purposes of inheritance tax is the 'loss to John's estate', in other words £1 million less £300,000. So a valuation is required to measure the loss in value of the transferor's estate and this will usually be the market value of the property assets transferred plus the inheritance tax due at the time of the transfer. The valuation date is the date of transfer and with regard to transfers on death the exact valuation moment is that immediately before death. No reduction is made to the valuation due to the sale of the estate 'flooding the market' but if a higher price is achievable by selling in smaller lots then this can be assumed (Johnson et al., 2000).

IHT is payable in cases where the transfer value is over the threshold of £325,000 (2009/10 tax year). Certain (generally low value) gifts are exempt, including those made between husband and wife, those not exceeding £3,000 in any tax year, maintenance payments, wedding gifts, small gifts to many people, and gifts out of income tax. Of more relevance to property are gifts to UK-based charities, registered housing associations, qualifying Parliamentary political parties, national museums, universities, The National Trust and certain other bodies.

If an outright gift is made to someone during the estate-owner's lifetime it is a 'potentially exempt transfer' and will only become chargeable to IHT if the transferor dies within seven years of making the gift. An outright gift is one in which the transferor does not retain any benefit or value. A gift with reservation of benefit is one that is not fully given away so that either the person getting the gift does so with conditions or restrictions attached, or the person making the gift retains some benefit. Where this happens to gifts made on or after 18 March 1986, the assets are included in the estate but there is no seven year limit as there is for outright gifts. To complicate matters even more a gift may begin as a gift with

Table 13.4 Taper relief on potentially exempt transfers.

Number of years between the gift and death	Tax charged reduced by
0 – 3	No relief
3 – 4	20%
4 – 5	40%
5 – 6	60%
6 – 7	80%

reservation but some time later the reservation may cease. For example, if an estate-owner gives a shop to his child but continues to run his business there rent-free, that would be a gift with reservation. If after two years the transferor starts to pay a market rent, the reservation ceases. The gift becomes outright at that point and the seven year period runs from the date the reservation ceased. Conversely a gift may start as an outright gift and then become a gift with reservation.

If, during an estate-owner's lifetime, a gift is made to a company or to certain types of trust (known as discretionary trusts) the gift is immediately taxable at a rate of 20%. If the transferor then dies within seven years of making an immediately taxable gift, tax will be due at 40% per cent of the amount exceeding the minimum threshold and a credit will be given for the tax previously paid at 20%.

So, when a transferor dies, all potentially exempt transfers made in the seven years before death become chargeable transfers but are subject to 'taper relief'. If the total chargeable value of all the gifts made between three and seven years before death is more than the taxable threshold at death, then taper relief will apply. The relief reduces the amount of tax payable on a gift - it does not reduce the chargeable value of the gift. The reductions are shown in Table 13.4. Any immediately chargeable gifts made in those seven years are also taken into account.

Consider the following example of Mr X who dies in July 2006 leaving an estate of £850,000 to D but who also made the following lifetime transfers:

Date	Value of gift (£)	Recipient
October 1999	200,000	A
September 2000	250,000	B
January 2005	100,000	C

The tax payable on the gifts, ignoring exemptions, is calculated as follows:

Date	Value of gift	Amount of threshold used	Taxable balance
October 1999	£200,000	£200,000	£0
September 2000	£250,000	£85,000	£165,000
January 2005	£100,000	Nil	£100,000
		£285,000	

There is no inheritance tax to pay on the gift to A as it is below the taxable threshold. Inheritance tax on the gift to B is £66,000 (£165,000 taxed at a rate of 40%). As Mr X died more than five but less than six years after the date of the gift, taper relief reduces the tax payable by B by 60% to £39,600. Inheritance tax on the gift to C is worked out as £100,000 at 40% = £40,000. As this gift is within three years of the death, no taper relief is due. The entire value of the estate left to D is taxed at 40% as the threshold has been used up.

13.3 Business rates

Business Rates or, more formally, National Non-Domestic Rates is the property-based tax system in England and Wales used to raise revenue for the provision of local services. Business Rates are levied annually on individually occupied non-domestic premises. These separately occupied units of business accommodation are legally defined as **hereditaments** and the amount of tax due from each occupier is based on an assessment of the annual 'rateable' value of the hereditament occupied. The rate payments are collected by Billing Authorities who, in general, are the local authorities. The amount of tax payable is calculated by multiplying the **rateable value** of the hereditament by the appropriate national Uniform Business Rate (UBR) multiplier set by the Government on 1 April each year. Under the current NNDR list or Rating List, which was effective from 1 April 2010, a hereditament is valued to its annual rateable value as at 1 April 2008. This date is known as the antecedent valuation date. The rateable values in the Rating List are reassessed every five years.

The Valuation Office Agency (VOA) is the Government agency charged with producing and maintaining the Rating List. A rateable value is assigned to each hereditament of which there are some 1.7 million in England and Wales. Market transactions provide evidence of rents actually being paid and these are analysed and adjusted into line with the definition of rateable value so that they provide a good indication of the level of values as at the antecedent valuation date. Then every hereditament will be assessed on the basis of the adjusted rental evidence and put into the rating list. There is also a central list which deals with hereditaments which, generally, are in the form of a network throughout the country such as property owned by the Water Companies and other Utilities, national oil pipelines and the like.

Rating legislation comprises the *Local Government Finance Act 1988* and *Local Government Act 1989* (as amended). The definition of Rateable Value under Paragraph 2(1) Schedule 6 of the Local Government Finance Act 1988 (as amended by the Rating (Valuation) Act, 1999) is:

> The rateable value of a non-domestic hereditament none of which consists of domestic property and none of which is exempt from local non-domestic rating, shall be taken to be an amount equal to the rent at which it is estimated the hereditament might reasonably be expected to let from year to year on these three assumptions-
>
> a) the first assumption is that the tenancy begins on the day by reference to which the determination is to be made;

b) the second assumption is that immediately before the tenancy begins the hereditament is in a state of reasonable repair, but excluding from this assumption any repairs which a reasonable landlord would consider uneconomic;
c) the third assumption is that the tenant undertakes to pay all usual tenant's rates and taxes and to bear the costs of the repairs and insurance and other expenses (if any) necessary to maintain the hereditament in a state to command the rent mentioned above.

The definition is based on the concept of a hypothetical property that is vacant and available to rent on an annual tenancy with a reasonable prospect of continuance. The valuation must account for all possible bids and it is assumed that the landlord and tenant are commercially prudent yet reasonably minded and the premises are in a reasonable state of repair for the type of property, location and tenant. As a consequence of this latter assumption, the impact on value of any disrepair is normally ignored because the tenant is assumed to maintain the hereditament.

The extent of the hereditament is determined by four rules: it must be:

a) capable of separate occupation;
b) a single geographical unit that is contiguous or otherwise functionally essential;
c) in single use;
d) in a single definable position.

The rateable occupier is not defined by statute, instead the meaning is deduced from case law but there are four essential ingredients. Occupation must:

a) be a*ctual*, and this includes an intention to occupy at some time in the future;
b) be *exclusive*, difficulties arise where several parties have rights of occupation, see, for example, *Westminster City Council v Southern Railway Co & Others, 1936* where shops, offices, kiosks, bookstalls and showcases on Victoria Station were held to be in separate, exclusive occupation of the traders;
c) be *beneficial*, in other words occupation must be of value or benefit. It is not necessarily the actual occupier who must pay a rent but the 'hypothetical tenant'. The rental value should reflect the actual use or an alternative use if, under the same mode of occupation, planning permission could be obtained and no structural alterations were required;
d) have a *degree of permanence*, builders' huts or caravans are not sufficiently permanent. Hereditaments that exist for at least a year are usually regarded as sufficiently permanent under the '12 month' rule.

To help the VOA value 1.7 million hereditaments it has the legal right to inspect premises and gather occupation details. In particular it can issue notices to all business occupiers in England and Wales requiring information for rating purposes which each recipient must supply within 21 days. This information includes a description of accommodation, details of any rent paid, whether outgoings are included in the rent, whether the rent includes other items such as fixtures, fittings and services, details of rent review provisions and so on. The information received is analysed, the rent adjusted to correspond with the definition of Rateable Value and used together with all other information obtained to keep the current Rating List up-to-date and assist in the compilation of the next one. The billing authorities help in the preparation of the list to the extent that they have a responsibility to inform the VOA of any changes occurring in their areas which require an amendment of the Rating List. Such things would involve the construction or alteration of property, or the change of use of property – in fact those changes which would normally be apparent from the granting of planning permissions or the approval of work by Building Control Officers. A new or altered property becomes rateable after the local authority serves a 'completion notice' and this can be served up to three months before the expected completion date. When new properties are constructed or when properties are amalgamated or split, this causes re-assessments and these will be based on values as at the antecedent valuation date. This continues to be the case for all new assessments until a new list comes into force. Creating a level of values at a particular historical date is known as 'having regard to the Tone of the List'. The publication of a new list triggers the ratepayer's right of appeal, should he or she disagree with either entry of the hereditament in the list, the extent of the hereditament assessed, the description of the hereditament or more particularly, the value ascribed to it.

The problem is, of course, that circumstances change through the years so that, although we might be attempting to value our shop at the antecedent date, when the location was a peaceful village, at the time of valuation the shop may be in the midst of an expensive suburb. Conversely, a particular shopping street might now be worth less in value due to physical changes in the neighbourhood – the building of a shopping centre for instance. Such problems are dealt with in Local Government Finance Act, 1988, Schedule 6, paragraphs 5, 6 & 7, whereby certain matters have to be taken into account when a property is valued as at a particular date for entry in the List. These are:

a) matters affecting the physical state or physical enjoyment of the hereditament;
b) the mode or category of the occupation of the hereditament;
c) the quantity of minerals or other substances in or extracted from the hereditament;
d) matters affecting the physical state of the locality in which the hereditament is situated or which, though not affecting the physical state of the locality, are nonetheless physically manifest there;
e) the use or occupation of other premises situated in the locality of the hereditament.

Occupation of part of a hereditament is deemed to be the same as occupation of the whole but if the occupier can establish that there is no intention to reoccupy the vacant part it may be separately assessed. Separate provision is made to apportion the rateable value where part of the hereditament is vacant for only a short period.

Rateable hereditaments include most shops, offices, factories, warehouses, workshops, schools, hospitals, universities, places of entertainment, hotels, pubs, town halls, sewage farms, swimming pools, etc. but there might be rating relief for certain occupiers such as charities. Some properties are used for both domestic and non-domestic used and these 'composite' hereditaments require an apportionment of tax liability between business rates and council tax; each element is valued having regard to the benefit of the other. Certain premises are exempt from business rates and these include agricultural premises, fish farms and fisheries, places of religious worship, parks and property used for the disabled. Methods of assessment are synonymous with valuation methods described in Chapter 3, namely rental comparison, profits and replacement cost (usually referred to as the contractors' method in the context of business rates) with the addition of either statutory or nationally agreed formulae for the valuation of certain specialised properties such as hospitals. The focus as far as rating is concerned is on rental value (as a basis for the assessment of rateable value) rather than capital value.

13.3.1 *Rental comparison*

The most widely used valuation method for business rates purposes is rental comparison, where schedules of contract rents are prepared, based on rents devalued on a zoned basis for shops or in terms of a main space for office and industrial space. Evidence of contract rents can be obtained from a number of sources, the best being market rental transaction evidence close to the antecedent valuation date. Evidence may also be derived from rent reviews and lease renewals but such evidence is considered secondary to market transactions. The comparison method can be difficult to apply when there is a lack of market evidence or where the transaction involved specific arrangements including rent-free periods, stepped or turnover rents, premiums, break options, capital contributions, non-standard repairing and insuring obligations or other incentives. The rent may also include the use of other facilities or may be below normal market levels if it is for a unit in a new development such as an anchor tenant. A typical rental valuation for a retail property which, in this case, is zoned on the basis of normal 6.1 metre (20 feet) zones, is as follows:

Description	Area (m^2)	Fraction of Zone A	Unit value (£/m^2)	Value (£)
Ground Floor:				
• Zone A	26.5	A	900	23,850
• Zone B	25.4	A/2	450	11,430
• Zone C	15.6	A/4	225	3,510
• Storage	10.3	A/10	90	927
First Floor:				
• Storage	60.7	A/20	45	2,732
Site:				
• Parking spaces	3 no.		£400 per space	1,200
Rateable Value (£)				43,649

It is possible for a range of factors to add value (in the form of an end allowance) to the basic assessment including return frontages to shops, air conditioning or car-parking spaces. The valuer may also consider that a quantum allowance should be applied where a property is exceptionally large compared to comparable evidence and a prospective tenant bidding on the property would reduce the rental bid on the basis of the large amount of space being taken. A reverse quantum allowance is the opposite, where a particularly small property has an addition in value added to its basic assessment. This is known as the 'kiosk' effect. Disability allowances can apply where, for example, a property suffers from some form of geographical or functional factor which would reduce the likely rental bid from a prospective tenant. Temporary allowances are applied, as their name suggests, to situations where a temporary change in the property or its physical location warrants (usually) a reduction in the rateable value. Once the factor causing the temporary allowance has been removed, then the assessment will be reinstated to its full value (but not necessarily the same value!).

Most properties have a rental market upon which evidence can be drawn and therefore it is possible to use this information to arrive at an assessment of rateable value. However there are hereditaments which do not have ready letting market and these need to be valued using alternative methods.

13.3.2 Profits method

There are various types of specialised trading property which we have discussed in Chapter 3, such as public houses, bowling alleys, night clubs, cinemas and hotels, for which comparable evidence of rents can be very hard to find. In such cases, the trading figures will give some idea as to how much profit the hereditament makes and hence what it can afford to pay in rent (and thus rates). The method requires the valuer to make adjustments to the accounts to bring them into line with the definition of rateable value. The turnover is adjusted to reflect the cost of purchases and working expenses. This yields the net profit which is referred to as the 'divisible balance' for rating purposes and is apportioned between the profit or return to the occupier and rent to the owner, just like dual capitalisation. The division between the two will vary according to the perceived risk of the business; the higher the risk, the higher the operator's required return (Marshall & Williamson, 1996). An example of a profits method valuation of a hotel for rating purposes is given below. The trading figures are those that pertain to the hereditament at the antecedent valuation date and are exclusive of VAT.

Turnover (gross receipts from rooms, bar, restaurant) (£)	1,600,000
Less purchases (£)	–300,000
Gross profit (£)	1,300,000
Less working expenses (wages, utilities, stationery, marketing, insurance, vehicles, rates, etc., repair and maintenance of property, repair and renewal of furniture, fixtures, fittings and equipment,) (£)	–700,000
Net (trading or operating) profit	600,000
Less interest on tenant's capital (FFFE, stock, cash) (£)	–40,000
Divisible balance (£)	560,000
Split between:	
■ Return (normal or residual profit) to operator / tenant (£) [a]	–260,000
■ Rent to landlord (on which the rateable value is based) (£)	300,000

[a] percentage based on comparable evidence, in this case 46%

As discussed in Chapter 3, care is required when deriving information from the accounts. Usually, valuers will consider the accounts figures drawn from the three previous years to the valuation date and arrive at a fair maintainable trade (the expected trade that the reasonably minded operator would derive from the property and business). Therefore abnormally large amounts of expenditure in any one year may be written down over a number of years to arrive at a figure for the fair maintainable trade. The rent to the landlord is equivalent to the rateable value. Actual rates paid should be deducted as part of the working expenses so that the bottom line is equivalent to the rent only (see *Thomason v Rowland (VO) (1995) RA 255)*.

In place of a full profits method valuation as noted above, it is possible to draw up relationships between other figures in the accounts, between gross receipts (turnover) and rent (as a proxy for rateable value) for example. Thus, a reasonably run hotel might expect that the percentage of gross receipts paid as rent to be in the region of 20%. This short-cut technique is known as the 'shortened profits method'. A formula based on some other method may also be used to value certain hereditaments, such as hotel rent per bedroom or bed-space. When the profits method is used to value a hereditament the valuation will include all plant and machinery used in the business operation. For instance if a fuel storage depot is valued on a profits basis any rateable plant in the hereditament simply goes to make up the profit – tanks, security fencing, fire protection equipment and the like all help to produce the profit – if they were not there the enterprise would either not operate or not be so profitable.

13.3.3 Contractor's method

Any hereditament that cannot be valued by rental comparison and not, in itself, showing a profit will be dealt with using the contractor's method. It is regarded as the method of last resort and is applied to properties which do not usually let in the open market such as schools, universities, petrol chemical works, hospitals, light-houses, clinics, town halls and fire stations. The assessment is derived from cost information rather than rents or profits.

In the case of new buildings the method is fairly easy to employ because building costs close to the antecedent valuation date can be examined. But when valuing older buildings an adjustment needs to be made to reflect probable depreciation in value as a result of deterioration and obsolescence. In such cases, the method starts to become unreliable as there is no ready market information to help ascertain what reductions should apply.

The contractors' basis involves estimating the current cost of replacing the hereditament with a functionally equivalent building at the antecedent valuation date (including any rateable plant and machinery) and then deducting an allowance for age and obsolescence. The value of the site, cleared but with all services available for the existing use, will then be added to the replacement building cost. An adjustment may then be made, usually by applying a percentage reduction, to allow for general difficulties with the hereditament such as a confined site or poor access. The capital value thus produced will then be brought to an annual equivalent by applying a de-capitalisation rate appropriate to the Rating List in question. These rates may be set by Government and usually vary depending on type of property. The final stage is to 'stand back and look' at the valuation, to take account of any items or matters not already considered such as the economic health of an industry, business or organisation.

Consider a large county hospital built in the 1970s and valued using the contractor's method:

Cost of new buildings totalling 15,487 m² @ £1,150 per m² (£)	17,810,050	
Less 23% depreciation allowance for age and obsolescence (£)	–4,096,312	
Plus value of land totalling 5 hectares for existing use @ £250,000 / hectare (£)	1,250,000	
Capital Value (£)	14,963,739	
De-capitalise (multiply) capital value at rate of say 3.67%	× 0.0367	
		549,169
Stand back and look; reflect buildings in poor run down area, say, RV (£)		500,000

Wherever possible it is useful to use more than one method to assess rateable value: the contractor's method for an 'awkward' building with rental comparison applied to those buildings within the hereditament that could be let at market rents. A seaside pier might be valued using the profits method for the fairground element, contractor's method on the non-profit making elements and rental comparison for the kiosks.

Key points

- As far as capital gains tax is concerned, for most properties, the gain on disposal will usually be restricted to the gain since 31 March 1982 for properties acquired before that date or the date of acquisition for properties acquired afterwards. Generally, a valuation is required to estimate the market value of the asset on the disposal date if the disposal was not at arms length. A valuation might also be required to estimate the market value on 31 March 1982 for rebasing the gain and calculating the indexation allowance. For part disposals, property valuations may be required of the part disposed of (A) and the part retained (B).
- Market valuations are required for inheritance tax purposes when there is no evidence of an open market sale of the transferred estate. This might be because the transfer was by way of a gift or some other means that does not fit the description of an 'arm's length' transaction.
- The maintenance of the rating list by the VOA is a monumental task. Every rateable hereditament in England and Wales must be assessed every five years and, in between these valuations, appeals and changes to the list are constantly taking place. The rateable values are, essentially, market valuations with some specific assumptions so there is plenty to keep the valuer busy here.
- For detailed examples of property valuations for capital gains tax and inheritance tax purposes see Chapter 8 of Hayward (2009). Refer to Bond and Brown (2006) for detailed discussion of rating valuation.

Note

1. The value of the disposal does not exceed 20% of the market value of the holding, the total value of all disposals made in the year does not exceed £20,000 and the property interest is not a wasting asset (e.g. a lease with 50 years or less to run).

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Chapter 14
Valuations for Compulsory Purchase and Compensation

The Government and organisations responsible for the utility networks in the UK have the legal power to compulsorily acquire property for specific purposes. This might be to build a new road, a wind farm or a nuclear power station. Freehold, leasehold and equitable interests (such as a mortgagee) in property can be compulsorily purchased by these 'acquiring authorities'. Should a property owner be affected by such an acquisition, compensation can be claimed for any land taken, for injurious affection (severance) caused and for disturbance. The legal basis of the right to claim compensation in these respects can be found in the *Land Compensation Act 1961* (LCA61), the *Compulsory Purchase Act 1965* (CPA65) and the *Land Compensation Act 1973* (LCA73), as amended by the *Planning and Compensation Act 1991* (PCA91) and the *Planning and Compulsory Purchase Act 2004* (PCPA04). A substantial body of case law provides legal interpretation of these statutes.

Valuers are often appointed to estimate the value of the property compulsorily acquired and to estimate any diminution in value of land resulting from either construction activity or use of the finished development (smell from sewage works for example). The statutes mentioned above refer to their own definition of market value so, when valuing for compulsory purchase and compensation, valuers need to depart from the Red Book definition of market value and follow statutory regulations instead. The guiding principle of the legislation in respect of property owners who have been affected by compulsory purchase is to ensure, financially at least, that they are restored to the position before acquisition took place. Denyer-Green (2009) provides a detailed discourse of the statutory framework and case law that has built up around compulsory purchase and compensation; here we investigate the material from the valuer's perspective.

The owner of an interest being compulsorily acquired is entitled to compensation equivalent to the value of the land being acquired. Where the owner retains some

Property Valuation, Second Edition. Peter Wyatt.

land and its value drops, he is entitled to be compensated for this drop whether it is caused by severance of the two parts of land or by injurious affection to the retained land. An owner will also be entitled to losses that are a consequence of being compelled to vacate the land, known as disturbance (Denyer-Green, 2005). The following sections consider these various situations in which compensation will be payable, known as 'heads of claim', but, in many cases, owners of property interests will be entitled to more than one 'head of claim'. It should also be noted that although it is common practice to talk about *land* being acquired or the value of *land* being affected by compulsory acquisition and public works, the legislation and therefore valuation rules apply to property interests in general.

14.1 Compensation for land taken (compulsorily acquired)

The acquiring authority sets out the nature and extent of the property interest to be acquired in a 'notice to treat', which may be served on owners of all property interests except holders of periodic tenancies of one year or less. There are other methods of obtaining possession too: by agreement or via a General Vesting Declaration (this is similar to a notice to treat but title in the property interest is conveyed to the acquitting authority as well as the right to enter and take possession. Where a tenant has a contractual or statutory right to renew a lease, that right will form part of the value of his leasehold interest (Johnson et al., 2000) but the leasehold interest should be valued on the basis of the earliest termination date (Denyer-Green, 2009). The appropriate date for assessing the value of the interest to be acquired is the earlier of the date when the acquiring authority takes possession of the land or the date when the values are agreed. When compensation is assessed by the Lands Tribunal the valuation date is the last day of the hearing if possession has not already been taken by then.

Section 5 of the LCA61 (as amended) sets out six valuation rules governing compensation for land that has been compulsorily acquired, with further qualifications in other sections of the Act.

Rule 1 *No allowance shall be made on account of the acquisition being compulsory* (but there are 'loss' payments to mitigate this rather obvious reality)

Rule 2 *The value of the land…if sold in the open market by a willing seller might be expected to realise*

Rule 3 *The special suitability or adaptability of the land for any purpose shall not be taken into account if that purpose is a purpose to which it could be applied only in pursuance of statutory powers, or for which there is no market apart from the requirements of an authority possessing compulsory purchase powers*

Rule 4 *No increase in value is to be taken into account if it is contrary to law* (for example, an illegal user in breach of planning consent)

Rule 5 *Where land is…, devoted to a purpose of such nature that there is no general demand or market …, the compensation may … be assessed on the basis of … equivalent reinstatement*

Rule 6 *The provision of Rule 2 shall not affect the assessment of compensation for disturbance or any other matter not directly based on the value of land* (because the acquisition is compulsory the owner has the right to disturbance compensation and certain other payments in addition to the value of the land acquired)

As far as valuation is concerned, Rule 2 is the key instruction and means that the property owner is entitled to compensation equivalent to the price that the land would sell for in the open market assuming there had been no compulsory acquisition. The valuation should therefore be to market value and incorporates the assumption that the seller is willing to sell despite the rather obvious fact that this is not the case. Rule 3 states that MV does not include enhanced value attributable solely to the particular use proposed to be made of the land under a scheme of which compulsory acquisition of the subject land is an integral part. This element of value is not part of MV because it is not an element the owner could have realised in the market. The MV would normally be the higher of EUV or development value; the latter may include marriage value or ransom value provided they would have existed in the 'no scheme world'.[1] It can be difficult to obtain evidence of market values if the compulsory purchase order (CPO) has been around for a while because the impending CPO development may have influenced values in the area over some period of time.

Rule 6 states that if there is no market on which to base an estimate of existing use value then the basis of valuation is 'equivalent reinstatement' unless development value is higher. Equivalent reinstatement is difficult to justify if the interest is a short lease and is uncommon in relation to business premises. There are four general tests: land must be used for a purpose that would continue; there is no market for that use; there is a *bona fide* intention to reinstate; and if the reinstatement cost is disproportionate then it may not be allowed. Regardless of whether MV or reinstatement cost basis is adopted, if additional development is permitted within ten years of acquisition, the owner is entitled to any uplift.

Development value may be considered alongside existing use value but, in many compulsory purchase cases, an impending acquisition will mean no planning permission for development will be forthcoming (Denyer-Green, 2009). Therefore it is necessary to make certain planning assumptions so that an accurate assessment of development value can be made. The legal extent of these assumptions is set out Ss 14-17 of the LCA61 (as amended, most recently by S232 of the Localism Act 2011):

a) Existing planning permission on the relevant land or other land. Planning permission may also be assumed for the acquiring authority's scheme but remember that Rule 3 (*op cit*) precludes any purpose that could only be possible in pursuance of statutory powers. The extent of the scheme that can be considered is that which is included in the CPO. A wider scheme can be argued in some circumstances or with the agreement of the Lands Tribunal, but only if the CPO (or documents published with it) identifies a wider scheme.
b) Planning permission for development specified in a Certificate of Appropriate Alternative Development (a hypothetical planning permission) as at the valuation date.
c) Prospective planning permission on relevant or other land on or after the development date in the absence of the scheme and which is not included in the Certificate of Appropriate Alternative Development.

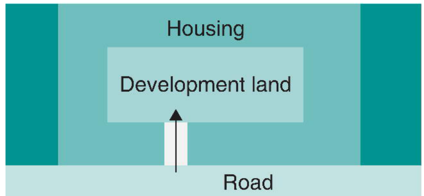

Figure 14.1 Development value.

Two points are worth noting here. First, the use of the phrase 'relevant land or other land' means that planning permission on land not being acquired can be taken into account. Second, 'on or after the development date' means that the valuer must account for hope value; in other words, the prospect of development value having regard to the forward planning context to the extent that it is reflected in market transactions.

Although planning permission for the scheme can be assumed, the effect of the scheme itself must be disregarded when assessing development value. This is set out as four 'cancellation' assumptions in S14 of the LCA61 (as amended):

- The scheme underlying the compulsory acquisition was cancelled on the launch date.
- No action has been taken by the acquiring authority for the purposes of the scheme.
- There is no prospect of the same scheme, or any other project to meet the same or substantially the same need, being carried out in the exercise of a statutory function or by the exercise of compulsory purchase powers.
- If the scheme was for highway construction, that no highway will be constructed to meet the same or substantially the same need.

PCA91 provides for compensation where permission for additional development is granted after acquisition of land but within ten years of the acquisition completion date, the amount being the difference between the compensation paid and the amount which would have been paid assuming the permission was in force at the time (Denyer-Green, 2005).

Synergistic or Marriage Value can also be taken into account when estimating market value. For example, if the light shaded area in Figure 14.1 is being compulsorily acquired in order to provide access to the development land, the owner gets a proportion of the value of the development land. This principle was laid down in the landmark case of *Stokes* v *Cambridge Corporation (1961)* in which the proportion was one third. If the development land is being acquired too but can only be developed if satisfactory access can be provided, the market value will be the full development value less the estimated cost of acquiring the necessary additional land (Denyer-Green, 2005).

The effect on value of the scheme underlying the acquisition is disregarded by the operation of the following statutory (a) and (b) and judicial (c) rules (Denyer-Green, 2009):

a) Section 6 and Schedule 1 of the LCA61 for certain 'defined' schemes; no account should be taken of any increase or decrease in value due only to development under the acquiring authority's scheme – the 'no scheme' world. Ignoring the effect of the scheme is difficult in cases where there is more than one CPO or where there is an evolving programme of CPOs across a large area.

b) Section 9 of the LCA61; any loss in value due to the threat of acquisition (blight) must be ignored.
c) The 'Pointe Gourde Principle'; compensation cannot include an increase in value which is entirely due to the 'scheme' underlying the acquisition. Problems arise when there is more than one CPO and when there is an evolving large-scale development such as a new town. (Johnson et al., 2000) provide a good example of the difficulty valuers face here; when valuing land which is to become part of a new town and which is surrounded by new town development, the valuer must decide what would have happened had there been no new town scheme. He may assume, for example, that permission would have been granted for out-of-town offices but cannot assume infrastructure built as part of the new town development unless he can prove that such infrastructure would have been developed even without the new town. This would normally be very difficult to show.

Section 7 of the LCA61 states that any increase in the value of contiguous land of the same owner shall be offset against the compensation payable for the land taken.

There are limited rights to compensation for occupation agreements that are less formal than a lease, such as tenancies at will, tenancies on sufferance and licences. These rights include compensation for relocation costs and any loss of goodwill. Regard is paid to amount of time the land occupied would have been likely to have remained available for the purposes of the business and to the availability of other suitable land. If a tenant is holding over under LTA54 security of tenure provisions, disturbance compensation under those provisions can be chosen as the basis for compensation if it is more than the CPO disturbance payment.

Johnson et al. (2000) suggest that the methods employed to estimate the value of the property that is compulsorily acquired are no different from those adopted in other market valuations, just subject to the above rules. In most cases the valuation is likely to be on an existing use basis using the comparison or investment method. Care must be exercised when selecting comparable evidence because transactions would have taken place in the 'scheme' world. If the valuer feels that the scheme has influenced the evidence obtained from these comparables then they may need to be adjusted to give a value in the 'no scheme' world. Marshall and Williamson (1996) note that the basic thrust of the legislation is to ensure that the acquiring authority is not required to pay for any benefit which its own scheme creates whilst ensuring that the claimant does not lose out if the scheme causes a drop in value of the interest acquired.

14.2 Compensation for severance and injurious affection

14.2.1 Compensation where part of an owner's land is acquired

Where only part of an owner's property is taken the CPA65 allows compensation for severance of and injurious affection to the part retained. Severance is where retained land loses value because it has been severed from the acquired land. Compensation for severance is based on the reduction in value of the retained land, which need not be contiguous but must be in the same ownership and functionally related. While a drop in value due to severance is fairly easy to explain, injurious affection to the retained land is slightly harder to envisage. Essentially it is injury or damage caused by construction works, including disturbance for having to vacate premises. But it also covers any diminution in value caused by subsequent use the works. It is difficult to separately quantify diminutions in value resulting from severance and injurious affection. Therefore, to estimate these figures a valuer would value the land as it was before the CPO, then value the same land on completion of the works. The difference between the before and after valuations represents the drop in value. If the value of the land taken is then deducted from difference between the before and after valuations, this gives the compensation for severance and injurious affection. For example, the market value of a property before the acquiring authority's scheme was £250,000 and afterwards it is £200,000, compensation is therefore £50,000. If the market value of the land taken is £30,000 then the loss in value of retained land due to severance and injurious affection is £20,000.

Now consider a more detailed case. A local authority wishes to substantially redesign access to an industrial estate in preparation for its expansion. To enable this it has served a CPO on the industrial unit at the entrance to the estate giving notice of the planned acquisition of part of its land. Once the redesigned access is complete in three years' time the unit will benefit from improved access arrangements plus additional storage land. The tenant of the unit has eight years remaining on a 15-year FRI lease with five-year upward-only rent reviews. The current rent is £100,000 per annum, the (no scheme) market rent for the whole unit is estimated to be £120,000 per annum and for the retained part after severance it is £80,000 per annum. Injurious affection caused by carrying out of works will reduce the market rent of the retained land to £70,000 per annum but it is estimated that its market rent will rise to £90,000 per annum once the works are complete. The local authority has stated that it will pay for the new access and storage land. Compensation for the landlord and tenant are assessed as follows:

14.2.1.1 Landlord's interest

'Before' valuation:

Term rent received (£)	100,000	
YP 3 years @ 8%	2.5771	
		257,710
Reversion to market rent (£)	120,000	
YP perpetuity @ 8%	12.5	
PV £1 3 years @ 8%	0.7938	
		1,190,700
'Before' capital value (£)		1,448,410

'After' valuation:

Term rent (100,000 × 80,000/120,000) [a] (£)	66,667	
YP 3 years @ 8%	2.5771	
		171,808

Reversion to market rent (£)	90,000	
YP perpetuity @ 8%	12.5	
PV £1 3 years @ 8%	0.7938	
		893,025
'After' capital value (£)		1,064,833

[a] This calculation determines the *current* rent for the retained part using the evidence of *market* rents for the retained part and the whole.

Therefore the drop in value resulting from part of the land being acquired and from injurious affection is the difference between the before and after valuations, £1,448,410 – £1,064,833=£383,577. The following calculation determines the value of land taken only:

Term rent lost (100,000 – 66,667) (£)	33,333	
YP 3 years @ 8%	2.5771	
		85,902
Reversion to market rent lost (120,000 – 80,000) (£)	40,000	
YP perpetuity @ 8%	12.5	
PV £1 3 years @ 8%	0.7938	
		396,900
Capital value of land taken (£)		482,802

Therefore, compensation for severance and injurious affection (betterment in this case) is £383,577 – £482,802=–£99,225. In other words the value of the land taken (£482,802) is reduced by the capital value of the enhancement to the unit resulting from the works, i.e. an increase in market rent from £80,000 to £90,000 per annum on reversion, when capitalised into perpetuity at 8% deferred two years, produces a betterment (or improvement in capital value) of £99,225.

14.2.1.2 Tenant's interest

'Before' valuation:

Market rent of whole unit (£)	120,000	
Less contract rent (£)	–100,000	
Profit rent (£)	20,000	
YP 3 years @ 10%	2.4869	
Valuation (£)		49,738

'After' valuation:

Market rent of retained part (£)	70,000	
Less contract rent for retained part (100,000 x 80,000/120,000) [a] (£)	–66,667	
Profit rent (£)	3,333	
YP 3 years @ 10%	2.4869	
Valuation (£)		8,290

[a] Calculated as above

Therefore the value of the land taken plus injurious affection is £49,738 – £8,290=£41,448. Separating these two amounts can be undertaken as follows:

Value of land taken:

Profit rent (20,000 – (20,000 x 80,000/120,000)	6,667	
YP 3 years @ 10%	2.4869	
Valuation (£)		16,580

Therefore, compensation for severance and injurious affection is £41,448 – £16,580 = £24,868.

In cases like the one above, where part of a property subject to a lease is taken, the rent needs to be apportioned between the part taken and the part left and this was done in the ratio of rental value of the part retained to the rental value of the whole. In cases where only a small part of a property is taken, a nominal apportionment of, say, £1 per annum on land taken may be agreed. The tenant then continues to pay full rent under the lease for the remainder of the term but receives full compensation for loss of rental value from the acquiring body while the landlord is compensated for injury to his reversion (Johnson et al., 2000).

The CPA65 provides the owner with an option to require the acquiring authority to purchase the whole property and the success of such a request depends on whether there has been a material detriment to the retained part. LCA73 requires whole proposed works to be taken into account (including those off-site) when assessing detriment.

14.2.2 Compensation where no land is taken

Property owners can also claim compensation where none of their land is taken. There are two ways that this can be done: under Section 10 of the CPA65 compensation can be claimed for *execution* of works and under Part 1 of the LCA73 compensation can be claimed for *use* of public works.

Section 10 of the CPA65 provides for compensation where rights of access, light and support are taken. To successfully claim compensation for injurious affection caused by execution of works, four rules must be satisfied. These are known as the 'McCarthy Rules' because they resulted from a House of Lords decision in the case of *Metropolitan Board of Works* v *McCarthy (1874)*:

a) The works must be authorised by statute.
b) If the works were not authorised by statute the injury caused would be actionable at law (as a nuisance).
c) The injury arises from a physical interference with some right which is attached to the land and which has a market value. In cases where the interference is temporary a decrease in rental value is sufficient to sustain a claim even where the capital value, after conclusion of the works, is unaffected (Denyer-Green, 2003).
d) The injury must be caused by execution of works, not subsequent use.

The usual measure of compensation is the reduction in value of the affected land attributable to the injury that gave rise to the claim (Marshall & Williamson, 1996).

Part 1 of the LCA73 provides a code for compensation for use of public works such as roads, airports, and so on. Owners of affected land have a right to claim compensation (referred to as making a 'Part 1 Claim') for the reduction in value of their interest caused by certain physical factors, namely noise, vibration, smell, fumes, smoke, artificial lighting or the discharge of any substance (Johnson et al., 2000). The claimant must own the freehold or leasehold interest in a property, the latter having at least three years remaining, and a rateable value of £34,800 or more (2010 Rating List). The basis of compensation is the diminution in the existing use value of the interest and, in most cases, the practical approach to the valuation is to estimate a 'no scheme world' value of the affected property and then make a judgement as to the percentage depreciation that can be attributed to the physical factors (Denyer-Green, 2009). Compensation can be reduced if the compensating authority mitigates the effects. For a detailed analysis of compensation where no land is taken, see Chapter 4 of Askham (2003).

14.3 Disturbance compensation

The owner of a compulsorily acquired property has the expense of finding new accommodation and moving. As we have seen compensation for land taken is based on a definition of market value that assumes the seller is a 'willing' seller but this is clearly not the case and loss is suffered as a result of being dispossessed and having to find new business premises. The compulsory purchase legislation recognises this and a business occupier can claim either the costs of relocation (including removal costs, loss of stock, new stationery and loss of goodwill) or the cost of winding up the business, known as 'total extinguishment'. In most cases the business occupier will only be granted relocation costs but a sole trader aged 60 or over in a property with a rateable value of £29,200 or more (as at the 2005 rating list) has a statutory right to opt for total extinguishment. Disturbance compensation is usually payable in respect of any item that is not too remote and is a natural and reasonable consequence of the acquisition of the owner's interest. The amount of disturbance compensation is normally calculated by valuing existing fixtures from the perspective of an incoming tenant in the same line of business plus, if the business is to be extinguished, the loss on forced sale (the difference between value to an incoming tenant and the price achieved on sale) (Johnson et al., 2000). Typical relocation costs that can be claimed for include:

- removal;
- legal, surveyor's and architect's fees and Stamp Duty relating to acquisition of new premises;
- special adaptations to replacement premises;
- loss of profits during move;
- diminution of goodwill following move (reflected in gross profits);
- depreciation in value of stock;
- notification of new address to customers and new stocks of stationery due to change of address.

Typical extinguishment costs would be value of business goodwill, loss on forced sale of stock, vehicles and plant and machinery, redundancy costs and administration costs of winding up the business.

Additional payments for owners of business property were introduced by the PCPA04: a 'basic loss payment' is payable to all owners and an 'occupier's loss payment'[2] is payable to owners who have been in occupation for a year or more. Also, an investor landlord who has had an interest acquired can claim for the costs of reinvestment in another UK property within one year of the date of entry. Finally, the LCA73 authorises disturbance *payments* to claimants in cases where disturbance *compensation* is not payable because the claimant has not had an interest compulsorily acquired but has been dispossessed. This situation would arise if the acquiring authority compulsorily acquired a freehold interest subject to a short lease. The authority is unlikely to renew the lease so a disturbance payment is made to cover reasonable removal expenses and, where relevant, loss sustained by the tenant for the business having to quit the land (Johnson et al., 2000).

14.3.1 Case study

Mrs Brown is the tenant of a shop (ground and upper floors) which is to be compulsorily acquired by a local authority for use as a public open space. Mr Brown has lived in the upper part and run a bakery on the ground floor for the past five years. He pays a rent of £70,000 per annum for the whole property on an internally repairing and insuring (IRI) lease with ten years unexpired. The market rent of the property is £100,000 per annum, of which £60,000 per annum can be attributable to the shop part. The rateable value of the shop is £40,000. The net profit for the last financial year was £180,000 after deducting rent of £70,000, mortgage interest of £10,000, repairs of £5,000 and rates of £20,000, all relating to the whole building. The previous two years unadjusted net profits have been £160,000 and £170,000 but remuneration to the owner (who works full-time for the business) and her husband (who works half-time) has not been deducted. Mrs Brown is 62 years old and does not wish to buy another business. Prepare a full claim for compensation.

Land taken (Rule 2, Section 5, LCA61):

Market Rent (£)	100,000	
Plus landlord's expenses;		
– External repairs (£)	5,000	
– Insurance (£)	5,000	
IRI rental value (£)	110,000	
Less rent paid (£)	–70,000	
Profit rent (£)	40,000	
YP 10 years @ 8%	6.7101	
Valuation (£)		268,404

Disturbance (Rule 6, Section 5, LCA61):

The claimant is over 60 years old so a claim for total extinguishment under S46 of the LCA73 stands. The average of the last three years' earnings is taken as the best evidence of profitability.

Net profit (£)		170,000	
Mortgage interest (£)		10,000	
Repairs for upper part, say (£)		1,000	
Less (hypothetical) part-time assistant (£)		–40,000	
Less profit rent in respect of shop part, say (£)		–30,000	
Less interest on capital:			
▪ fittings (£)	15,000		
▪ stock (£)	5,000		
▪ cash (£)	3,000		
Total capital	23,000		
Amortised at 8%	x 0.08		
		–1,840	
Adjusted net profit (£)		109,160	
Capitalised in perpetuity at a target rate return of 20%		5	
Value of goodwill (£)			545,800
Additional items [a]:			
▪ Sale of fittings to acquiring authority (£)			10,000
▪ Notification to suppliers (£)			1,000
▪ Loss on stationery (£)			1,000
▪ Disconnection of services (£)			500
▪ Removal costs (£)			3,000
▪ Finding new living accommodation (£)			4,000
▪ Home loss (£)			5,000
Disturbance compensation (based on total extinguishment) (£)			570,300

[a] Business is a bakery so there is no forced sale of stock

In the case of short tenancies there is no requirement to serve a notice to treat but compensation arrangements are similar to those that apply to other interests. For land taken, compensation is payable in respect of MV of the leasehold interest and should reflect any renewal rights. If only part of the land is to be acquired there is a right to compensation for the diminution in the value of retained land even if it is held under a separate lease, provided it is adjoining or adjacent. For disturbance, only losses relating to the period between date of entry and expiry of term are recoverable. If the tenant has security of tenure under LTA54, disturbance compensation can be claimed under CPO legislation or LTA54.

14.4 Planning compensation

Compensation may also be paid to property owners when certain planning decisions are made and these adversely affect property value. The overriding objective of the valuer in such cases is to estimate the reduction in value, usually by adopting a before-and-after valuation approach. A brief outline of the main types of planning decision that may give rise to compensation claims is given here. For more detail and example valuations, see Hayward (2009).

14.4.1 Revocation, modification and discontinuance orders

The Town and Country Planning Act, 1990 (TCPA90) provides for compensation if a planning permission that was previously granted is revoked, modified or discontinued by a local planning authority. The order must be made before building or other work is completed or before a change of use has taken effect (Johnson et al., 2000). Compensation covers abortive expenditure and for loss or damage directly attributable to the order, including a drop in property value, calculated in accordance with Section 5 of the LCA61 (i.e. a before-and-after valuation to reveal the difference between the market value of land with the benefit of the planning permission and with the permission revoked or modified (Johnson et al., 2000)). The Planning (Listed Buildings and Conservation Areas) Act 1990 provides for compensation on the same basis as the TCPA 1990 but in respect of loss caused by the refusal, revocation, modification or the grant of conditional listed building consent or by the issue of a Building Preservation Notice.

14.4.2 Purchase notices and blight notices

Under the TCPA90, where planning permission is refused or granted subject to conditions or where a local planning authority serves a revocation, modification or discontinuance order or refuses, modifies or grants a conditional listed building consent, this may entitle the owner to serve a **Purchase Notice** as an alternative to a compensation claim as described above (Johnson et al., 2000). The property owner must serve the notice on the local authority within one year of the planning decision with proof that the property is incapable of reasonable beneficial use and requiring it to purchase the property. Once the purchase notice is confirmed, the acquiring authority is deemed to have served a notice to treat and normal compulsory purchase rules apply (Marshall and Williamson, 1996).

Similarly, planning proposals which could eventually involve compulsory acquisition may well depreciate the value of affected property or even render it valueless. As a result, under certain circumstances (for business property, where the rateable value is £29,200 or less, based on 2005 rateable values), the owner-occupier can compel the acquiring authority to purchase the property by serving a **Blight Notice**. An owner-occupier must be a freeholder or lessee with three or more years unexpired lease term who has occupied for the last six months or six months in the previous 12 months and the property has been unoccupied since vacated. Investor-owners are not entitled to serve blight notices. The owner must be able to show that reasonable efforts to sell the property were unsuccessful except at a price substantially lower than might reasonably be expected in a market without the threat of compulsory acquisition. If the acquiring authority accepts the blight notice then a notice to treat is deemed to have been served and the valuation principles and assessment of compensation are the same as those that apply to the compulsory acquisition of land. Alternatively the acquiring authority may reject the notice or propose to acquire only part of any land.

14.5 A note on CGT and compensation for compulsory acquisition

If a property is compulsorily acquired the compensation is subject to Capital Gains Tax in the normal way, but there are some special rules. These determine the date of disposal, provide for some small disposals not to be treated as a disposal, allow for any gain arising to be rolled-over against the acquisition of a new property in certain circumstances and provide for an apportionment of the compensation between its constituent factors.

Where land is compulsorily acquired the disposal date is the time at which the compensation for the acquisition is agreed or otherwise determined. Where the compulsorily acquired land is part of a larger holding and the following conditions are satisfied it is possible to claim that the compensation received should not be regarded as a disposal, but that it should instead be deducted from the allowable expenditure on the entire holding. On a later disposal, or part disposal, of the remainder of the holding only the reduced expenditure is taken into account in calculating any subsequent gain or loss. The conditions are:

- the holding is not a wasting asset (i.e. a lease with 50 years or less to run);
- the market value of the land is small compared to the value of the entire holding;
- no steps were taken to sell any part of the holding.

For example, the freehold of a property was purchased for £200,000 in 1989. A small strip of the land is acquired by compulsory purchase for £8,000 in 1993. A claim is made for the disposal to be disregarded for CGT purposes. The remaining property is sold for £250,000 in 2005. There is no gain or loss on receipt of the compensation, and the gain before indexation on the sale in 2005 is:

Sale proceeds (£)	250,000
Less original cost (£)	–200,000
Plus compensation (£)	8,000
Gain before indexation and taper relief (£)	58,000

If a new property is purchased the gain made on receipt of compensation can be rolled over and deducted from the cost of the new property, subject to two main conditions:

- no steps have been taken to sell any part of the holding; and
- the new land cannot include a dwelling-house that is or may become the owner's sole or main residence.

For example, land purchased for £50,000 in April 1991 was compulsorily acquired for £80,000 in May 2005. The compensation is used to buy more land costing £100,000 and the owner claims that the gain should be rolled-over. The gain is:

Compensation (£)	80,000
Less cost (£)	–50,000
Less indexation to April 1998 (£)	–11,100
Gain (£)	18,900

The allowable cost of the new land thus reduces by £18,900 from £100,000 to £81,100. If the new land becomes a wasting asset within 10 years (typically a lease which on acquisition has 60 years or less to run), the rules are modified. They are also modified where only part of the compensation is used to acquire new land.

In law, compensation for compulsory purchase is a single sum but for tax purposes it is apportioned between its constituent factors and is taxable accordingly. The categories for which compensation may be received are; for the land itself, for disturbance and for severance or injurious affection. Compensation for disturbance may include several items and the tax treatment varies accordingly. The most common elements are: compensation for losses on stock and loss of profits (taxed as income), compensation for loss of goodwill (chargeable to CGT), compensation for expenses (set against those expenses) and any remaining amounts are chargeable to CGT if they derive from chargeable assets. Compensation for severance or injurious affection is calculated by reference to the fall in the value of land retained caused and this is treated as giving rise to a part disposal of that retained land. Any resulting gain or loss is calculated in the normal way, subject to the rules for small disposals referred to above.

Key points

- Valuation for compulsory purchase is a complex area of valuation work where valuation economics is considerably influenced by the large body of statutes and case law. Valuers working in the private sector on behalf of property owners and valuers representing the Government and other acquiring authorities may be requested to provide opinions of market value or, with sufficient knowledge and experience, to negotiate compensation claims on behalf of either party.
- Although the law is complex, two fundamental points are worth reiterating. First, market value is central to the assessment of compensation for land taken and diminution in market value is central to the assessment of compensation for severance and injurious affection. Second, market valuations must be undertaken in the ‘no scheme world’ – a concept that lends itself more to theoretical understanding than practical application!

Notes

1. In *Fletcher Estates (Harlescott) Ltd v Secretary of State for the Environment (2000) 1 EGLR 13* the concept of a ‘no scheme world’ was interpreted as assuming the underlying scheme was ‘cancelled’ at the relevant date, i.e. planning policies and development, including the underlying scheme, evolve as in the real world as up to the relevant date. The scheme to be disregarded for planning purposes is the extent of the CPO.
2. Occupier’s Loss Payment is the greater of (to a max of £25 k):
   - 2.5% of value of interest
   - Land amount (greater of £2,500 or £2.50/m^2 (or part of a m^2) of area of land. If only part of land is acquired then £300 is substituted for £2,500)
   - Buildings amount (£25/m^2 (or part m^2) of gross floor-space measured externally for any building on the land)

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Chapter 15
Specialist Valuations

15.1 Operational entities or 'trade-related' properties

Trade-related properties are usually valued by capitalising estimated stabilised annual maintainable profit and the method was described in Chapter 7. The profit is estimated with reference to past performance and the key source of information is the accounts. The capitalisation rate (or yield) should reflect the risk, growth and income security associated with the business and its estimation is reliant upon good comparable evidence. Such evidence is also important in determining whether gross profit margins, wages levels and other costs and revenues are in line with market expectations. The examples below illustrate the application of the profits method to various types of trade-related premises.

15.1.1 Hotels, guest houses, bed & breakfast and self-catering accommodation

Whenever possible, valuers would seek to use the comparison method of valuation, perhaps using metrics such as price per 'double-bed unit' for small hotels, guest houses and bed-and-breakfast accommodation (based on individual properties and dependent upon size, type and location). Price per double-bed unit (which includes double or twin room with en suite facilities) is usually calculated by looking at annual rents but can be based on capital values too, and this might be the case for trophy or privately owned lifestyle hotels. The value of rooms that are not double-bed units is adjusted using a formula based on size and en suite facilities. Value of common areas of guest houses and smaller hotels is reflected in overall valuations of letting rooms. The value of bar / restaurant facilities open to non-residents is assessed separately. In the absence of suitable comparable evidence, normally in the case of large hotels, it is necessary to capitalise an estimate of fair

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maintainable trade (FMT) and use the profits method. The capitalisation rate should reflect risk, growth and income security and is heavily reliant on comparables (which are also important in judging gross profit levels, wages and other costs). Most three-star and some four-star hotels are valued using this method. A discounted cash-flow method might be used to value four-star and five-star hotels where purchasers may include investors: in which case it is necessary to consider holding period, exit yield, target rate of return and whether to inflate figures in cash-flow over holding period.

The profits method and discounted cash-flow method require analysis of several years' trading performance plus projections until trading has stabilised. Changes in supply and demand, as well as changes in the legislative and regulatory environment may affect trading performance and these factors should be reflected in the cap rate and adjusted net profit in the case of the profits method and in the target rate of return and cash-flow in the case of a discounted cash-flow (RICS, 2004).

The valuation of self-catering holiday accommodation is based on the number of single bed spaces, in other words price per bed space in each property based on size, type and location. Price per single bed space is estimated by looking at the profitability levels of a range of self-catering holiday properties. The level of profit is estimated by looking at the total income (excluding VAT) and deducting maintenance, water rates, TV licences and depreciation of fixtures. The estimation does not include the cost of any loan or mortgage used to buy the property.

You are required to value a modern purpose-built four star provincial hotel, having 125 double bedrooms with well-planned, flexible accommodation including a restaurant, bar, conference rooms and leisure club with 200 members. The hotel is easily accessible, just off a motorway junction and with good car-parking facilities. It is reliant on corporate business and conference trade during the week with some leisure-based trade at weekends. The advertised tariff is £95 per night for a double and £75 per night for a single (including VAT). Overall room occupancy averages 75%, comprising 35% double occupancy and 65% single occupancy. The average achieved room rate was 70% of the advertised tariff. Other sources of income (and expenditure) include:

Item	Revenue	Expenditure
Rooms	See above...	£470,000
Food	£1,260,000	£850,000
Beverages	£468,000	£200,000
Phone	£72,000	£30,000
Other	£179,500	£80,000

Other operating expenses include:

Administration	£340,000
Marketing	£90,000
Property management	£130,000
Energy	£120,000
Business rates	£135,000
Insurance	£50,000
Renewals fund (£10,000 per room @ 10% per annum)	£125,000

Valuation:

Total rooms available per annum: 125 rooms × 365 days		= 45,625 lettable rooms
75% room occupancy		= 34,219 let rooms
▪ double occupancy @ 35%		= 11,977 let rooms
▪ single occupancy @ 65%		= 22,242 let rooms
Averaged achieved room rates:		
▪ double room @ £95.00 @ 70% = £66.50		= £55.42 net of 20% VAT
▪ single room @ £75.00 @ 70% = £52.50		= £43.75 net of 20% VAT
Total room revenue:		
▪ 11,977 doubles @ £55.42		= £663,765
▪ 22,242 singles @ £43.75		= £973,088
		£1,636,853
Say £1,637,000		
Revenue		
	Rooms (figure from above)	£1,637,000
	Food	£1,260,000
	Beverages	£468,000
	Phones	£72,000
	Other	£179,500
	Total	£3,616,500
Less	Running expenses:	
	Expenditure (from above)	(£1,630,000)
	Other operating expenses (from above)	(£990,000)
Net adjusted profit		996,500
YP perpetuity @ 10%		10
Valuation		£9,965,000

15.1.2 Restaurants, public houses and nightclubs

The valuation of restaurants, pubs and clubs involves a similar approach to that described above for hotels and detailed guidance is published by the RICS (2006). Capital valuations of freehold premises are a capitalisation of the estimated fair maintainable operating profit whereas, for leasehold premises, the rent is capitalised, which might involve a term and reversion approach. Rental valuations involve a couple more steps. The aim is to derive an adjusted net profit, as outlined in Chapter 7. This 'divisible balance' is then split into a rent portion and a residual profit portion, the former can be capitalised if an investment valuation is required. Normally, company accounts are used to derive the adjusted net profit. If the net profit figure from the accounts includes a deduction for depreciation or interest on the operator's capital then this should be added back. The reason for this is that the figures may not be representative of the sector as a whole. Also, if the net profit included a deduction for rent then this should be added back too as this is a component of the divisible balance being calculated. Once an adjusted net profit is estimated, a 'market-derived' interest on tenant's capital in the business can be deducted.

Public houses are labour intensive, intricate businesses and subject to the demands of a changeable clientele. There are several types of purchaser including breweries, caterers / retailers, investors and owner-occupiers and variations of the profits method are often used to value pubs depending on the type of likely purchaser. For a pub that is owned by an investor (a brewery for example) and operated by a tenant publican, income is typically generated by three revenue streams; wholesale (beer, liquor and maybe food), retail (food and other sales) and the 'tied' rent. For a freehold pub (a freehouse) profits are derived from essentially two sources; retail sales (beer, liquor and food) and machine income. By analysing the income and expenditure streams a net adjusted profit can be determined which is then divided between remuneration for the tenant and rent to the landlord. The rent can then be capitalised to determine a capital value. A pub may also be valued by reference to 'barrelage' and this enables the valuer to estimate likely turnover and profit without recourse to a full accounts approach. If a pub lease is terminating in the short-term it may be worth considering the reversion to capital value rather than a revised lease rent.

The profits method is also used to value nightclubs and the approach is similar to pubs but with an additional risk premium on the required rate of return due to the threat of licence revocation and the fickle nature of the market. If the pub, club or other licensed premises is leased to a tenant with a strong covenant it may be possible to value the property as an investment by capitalising the market rent. The difficultly is in establishing the appropriate yield at which to do so. The term rent may be regarded as relatively secure but the reversion may require a little more thought in terms of alternative use value, flexibility of the space, quality of the building and location. For some types of licensed premises in certain locations an investment market is firmly established but the profits method remains primary valuation method.

Valuations of licensed properties should report (RICS, 2006):

- market activity at the national, regional and local scale as relevant;
- the size and layout of the premises, noting any internal areas incapable of efficient use and any outside areas that may enhance value (seating, etc.);
- availability of services, refuse collection information;
- means of escape;
- ownership arrangements (owned, leased, hired) and age of plant, fittings, furnishings and equipment;
- existence and duration of licences, and planning details (consents, conservation areas, listed buildings, etc.);
- competition (which may, it should be noted, also serve as comparable evidence);
- proximity of transport and other entertainment facilities;
- proximity to sensitive neighbours;
- lease details;
- contamination.

The following two examples illustrate the application of the profits method to the valuation of a restaurant and a pub.

You have been asked to estimate the capital value of the freehold interest in a town centre restaurant. The business is currently leasehold, and also has a pavement eating area held on an annually renewable licence at £525 per annum from the local authority. The business is operated on a full time basis by one owner, who is also the chef. The most recent accounting information is shown below.

Revenue		
Sales		550,000
Interest received on capital		1,075
Expenditure		
Purchases		–121,000
Opening stock value	10,000	
Closing stock value	7,500	
Change in value of stock		–2,500
Operating costs		
Wages and Salaries	–150,000	
Director's emoluments	–35,000	
Director's pension	–10,000	
Rent	–41,025	
Rates, water, environmental charges	–13,500	
Heating and lighting	–10,500	
Telephone	–3,000	
Insurance	–5,250	
Repairs and maintenance	–6,000	
Printing, postage, stationery	–2,500	
Promotion	–3,000	
Accountancy and professional fees	–3,500	
Transport	–2,000	
Amortisation of goodwill	–2,410	
Laundry, cleaning, linen hire	–1,500	
Depreciation	–5,035	
Entertainment	–1,250	
Hire purchase, leasing and rental agreements	–5250	
Credit and charge card commissions	–3,000	
Sundries (including licence fees)	–1,268	
Profit/loss on sale of asset	–3,012	
		–308,000
Net Profit/Loss		119,575

For valuation purposes interest received from capital employed in the business is ignored as it is not a trade-related revenue stream. You consider the business to be one most suited to a sole proprietor and therefore you have adjusted the net profit figure so that director's emoluments and pension costs are not deducted and the salaries amount has also been adjusted. The rent paid under the lease is ignored because this forms the basis of the adjusted net profit which is capitalised. Amortisation of goodwill is also ignored as it is assumed that it is non-transferable. Depreciation and the cost of hire purchase, leasing and other rental agreements are also ignored, as is the profit realised on the sale of an asset. The valuation would therefore proceed as follows.

Fair maintainable trade (FMT)	550,000
Less purchases	–121,000
Depreciation in value of stock	–2,500
Gross profit	426,500

Less running expenses:		
■ Wages and salaries	–135,000	
■ Licence fee	–525	
■ Rates, Water, Environmental Charges	–13,500	
■ Heating and Lighting	–10,500	
■ Telephone	–3,000	
■ Insurance	–5,250	
■ Repairs and Maintenance	–6,000	
■ Printing, Postage, Stationery	–2,500	
■ Promotion	–3,000	
■ Accountancy and Professional Fees	–3,500	
■ Transport	–2,000	
■ Laundry, Cleaning, Linen Hire	–1,500	
■ Entertainment	–1,250	
■ Credit and Charge Card Commissions	–3,000	
■ Sundries	–1,268	
TOTAL		191,793
Adjusted net annual profit		234,707
YP in perpetuity at a yield of 12.5%		8.0000
Capital Value		1,877,656

It is also useful to consider some of the figures as percentages of turnover. Gross profit is 78%, wages and salaries (before adjustment) is 27% and adjusted net profit is 43%. These metrics are helpful when comparing the trade figures of the subject property to comparable businesses.

You have been asked to estimate the capital value of the leasehold interest in a public house. The landlord is a brewery which granted a new 30-year lease last year on FRI terms with five-year upward-only rent reviews. The lease is assignable, subject to landlord's approval. There is a 'tie' for beers, wines and spirits.

Revenue			
Sales receipts		364,082	
Net machine receipts		4,312	
Less Costs			
Purchases		–150,108	
Opening stock value	6,671		
Closing stock value	7,953		
Increase / Reduction in stock value		1,282	
		–148,826	
Gross Profit		219,568	
Less Operating Expenses			
Wages and salaries	–73,210		(20% sales)
Postage, stationery and advertising	–1,508		
Telephone	–837		
Accountancy and book-keeping	–1,362		
Cleaning	–4,115		
Sundry	–6,367		
Motor expenses	–3,706		
Tied rent[1]	–42,000		(11.5% sales)
Rates and Water	–11,637		
Insurance	–2,165		

Light and heat	−6,753			
Repairs and renewals	−9,268			(2.5% sales)
		−162,928		
Finance costs				
Depreciation	−6,094			
Bank charges and interest	−2,750			
Hire purchase interest	−699			
		−9,543		
Total Overheads (£)		−172,471		
Adjusted Net Profit (£)			47,915	

The adjusted net profit can then be capitalized in the normal way at an appropriate market yield.

15.1.3 Care homes

Care homes are registered to provide personal care and possibly nursing care. The profits method is also used to value care homes (see Sidwell, 1991 for example) with the comparison method (recent sales or per registered bed multiplier in the locality) as a check. The main revenue stream is the occupancy fees and the main costs are staff. Comparison metrics are helpful in determining whether occupancy levels, fee rates, staff and non-staff costs are reasonable for the sector and locality. An adjusted net profit of around 25–38% of revenue for a nursing home and 38-41% for a less staff intensive residential or personal care home would be expected (Hayward, 2009). The selection of yield at which the adjusted net profit is capitalised is a matter of judgement based on experience in the sector and evidence from previous sales. The yield will depend on the location and quality of the home and it is particularly important to look at the quality of the catering facilities, staff costs, agency fees and medical charges.

For example, you have been asked to value a 24 registration residential care home built 12 years ago. You have limited accounting information. The home is located in a town with a higher than average proportion of residents aged 75 or over. Total day-space extends to 96 m^2. Residents are located on GF and FF levels and there is a lift (shared by residents and staff) between the two floors. There are 20 single and two twin rooms. 16 have en-suite provision. All single rooms exceed 10 m^2 and the twin rooms exceed 16 m^2. (So the proportion of total space allocated to single rooms is 83%) There are four bathrooms (a ratio of 1:3). At the time of the last inspection there are 22 residents in occupation and both twin rooms were being used as singles. There were no requirements following this inspection. The 22 residents exclude two beds contracted for respite care to the local authority. Including these, the average fee is £379.91 per resident per week. The home is run under management with the manager supernumerary to the staffing rota. The manager receives £23,500 per annum. Senior carers are paid £6.35 per hour and care assistants £5.65. The cook is paid £5.85 per hour, as is the activities organiser, whilst the housekeeper receives £5.35 per hour. The home operates the following rota:

Hours	Staff designation	Number
07:00 – 13:30	senior care assistant	1
	care assistant	1
13:30 – 20:00	senior care assistant	1
	care assistant	2
20:00 – 07:00	care assistant	2

Domestic staff contribute 101 hours per week whilst the activities organiser works 15 hours per week. The management accounts for the 121 day period to 31 December record a total gross wage bill of £65,450. The management figures show fee income for the 121 day period to 31 December of £158,023. Before analysing the figures, the following assumptions are made: that the number of registrations is maintained at 24, the average weekly fee is £379.91 and the overall occupancy rate is 98.5%.

Calculation of wages and salaries

Staff	No. Staff	Hours	Days per week	Rate per hour	Total per week
Senior care assistant	1	13	7	6.35	577.85
Care assistant	2	13	7	5.65	1028.30
Care assistant	2	11	7	5.65	870.10
Activities organiser	1	15	1	5.85	87.75
Cook	1	40	1	5.85	234.00
Housekeeper	1	61	1	5.85	326.35

Sub-total		3124.35	
Number of weeks per year plus holiday weeks		56	
NI (part-time) inflation factor	x	1.07	
			187,211
Plus manager's salary		23,500	
13/12 to reflect holiday cover		1.0833	
NI (full-time) inflation factor	x	1.09	
			27,750
			214,961

Income (£379.91 x 52 weeks x 24 rooms x 98.5%)		465,000	
Less operating costs			
Wages and salaries, say		215,000*	(46.23% of income)
Provisions (est.)	20,000		
Heating and lighting (est.)	10,000		
Repairs and maintenance (est.)	10,000		
Insurance (est.)	3,500		
Telephone (est.)	2,000		
Printing and advertising (est.)	1,000		
Professional fees (est.)	3,000		
Transport (est.)	1,500		
Laundry and cleaning (est.)	4,000		
Residents' welfare (est.)	2,000		
Staff training (est.)	2,000		
Water and environmental charges	3,750		
Sundries (inc. reg. Fees)	7,250		
		285,000	
Adjusted net profit		180,000	(38.7% of income)

This adjusted net profit can, as in the examples above, be capitalized in the normal way at an appropriate yield.

15.1.4 Petrol filling stations

Petrol filling stations may be attached to car dealers and motorway services, found on supermarket sites, along main trunk roads and in other urban and suburban locations. They can be broadly classified as those with large throughput (of *acquisition* interest to oil companies) and those with less throughput (of *supply* interest to oil companies). Outlets tend to be owned and operated by major oil companies, owned and operated by a dealer or retailer or owned by a major oil company (who also supplies fuel) and operated by a tenant (who pays a 'tied' or low rent to the oil company). A valuer should therefore first classify the petrol station by throughput and tenure, and then analyse the capital values and throughput figures of comparable outlets to determine a scale of capital values per litre of throughput, effectively a comparative sales approach. Table 15.1 provides an example.

According to RICS guidance, valuations of petrol filling stations should consider the following (RICS, 2003):

- accessibility;
- services offered and their revenue streams;
- extent of ownership (owned, leased, hired) and age of plant, fittings, furnishings and equipment, in particular the age and construction of the storage tanks;
- lease details and duration and terms of the fuel supply agreement;
- competition;
- planning matters;
- any contamination issues.

If the valuer believes the petrol station is one that an oil company might be interested in acquiring, the valuer will capitalise the throughput at a standard rate using a scale such as the one in Table 15.1 and capitalise the additional facilities, such as shop, car-wash and so on separately. If the throughput is such that an oil company would only be interested in supplying fuel then the calculations will differ. A detailed examination of factors that influence the ability to trade can be undertaken, such as the volume of passing traffic, average 'turn-in', size of average petrol purchase and so on. Great care must be exercised in adjusting throughputs of comparable petrol stations when reconciling them with the subject property. The

Table 15.1 Variation in capital values of petrol stations depending on throughput.

Annual throughput (litres)	Capital value per litre (pence)
2,273,000	16.50
2,727,600	19.80
3,182,200	24.20
3,636,800	26.40
4,091,400	26.40
4,546,000	26.40
5,682,500	27.50
13,638,000	29.70

trading potential of a specific station may depend upon many factors in addition to petrol sales and it is important that these are taken into account. The retail element of the petrol station sales can be substantial on many sites and opening hours and range of sales are being extended to meet growing consumer demand in this respect.

For example, consider a petrol station that is currently owned and occupied by an independent retailer and fuel is supplied by an oil company. The property is an owner-occupied, self service petrol station located on a busy trunk road to the north west of Bristol. The road has good visibility, a 40 mph speed limit and average traffic volumes of 30,000 vehicles per day. The station has a turn-in rate of 4% from the near-side average of 16,000 vehicles per day plus 120 vehicles per day cross over from the other side of the road. This produces an average of 640 customers from the nearside plus 120 'crossovers'. Estimating an average purchase of 20 litres, this equates to 15,200 litres per day or approximately 5,138,000 litres per annum on a 6.5 day week basis. Other facilities include a forecourt shop and a car wash. The petrol station is one that would, therefore, attract acquisition interest from the oil companies and is valued as if this class of purchaser would be in the market.

Forecourt (£):		1,387,260
5,138,000 litres pa @ capital value of say 27 pence per litre (see table 000)		
Shop (£):	6,500	
50 m² @ £130 per m² [a]		
Car Wash (£): @ one third of net profit [b]	13,000	
	19,500	
YP in perpetuity @ 10% [c]	10	
		195,000
Valuation (£)		1,582,260

[a] Shops and car washes are usually valued with the forecourt throughput. In this example, comparable shop sales have been analysed on a capital value per square metre basis. £1 per 40,000 litres has been applied to produce the figure of approximately £130 per square metre. Alternatively, the retail element might be valued using a profits basis, taking the shop rent to be say 15–20% of net profit, but, as shop size increases, the profit per unit of floor area decreases as the good range is extended to include items with lower profit margins (Hayward, 2009).

[b] A fully equipped car wash is estimated to cost £75,000 to build and, with a gross return of £50,000 per annum and running costs of £10,000 per annum, this leaves a net return of £40,000 per annum. It is assumed here that an oil company landlord would probably estimate one third of the net profit as rent, equating to approximately £13,000 per annum.

[c] Oil companies are not institutional property investors so a 'common' yield, typically between 7% and 10%, is used to capitalise annual (non-fuel) income. Analysis of capital sales has shown the relationship between annual values and capital values to be pretty consistent.

15.1.5 Student accommodation

Now an established property investment sector, student accommodation is valued using a combination of profits method and DCF. It demonstrates that the profits method is no more than an adaptation of the investment method described in Chapter 6. Thus far it has been presented as an income capitalisation, albeit with the investible income taking the form of an adjusted net profit rather than a net rental income. In the case of student accommodation the link between the profits and investment methods is extended to a cash-flow.

There are various forms of student accommodation. Direct let units are where the developer or investor takes all risk, but has flexibility over rent and lease terms; a yield of between 7% and 8% would be typical. Then there are university halls and houses in multiple occupation. Income is typically received from rent which may or may not include; heating and lighting (if not then these should be added as an expenditure), non-returnable deposits, sale of insurance and vending machines (inc. laundry). Expenditure includes services, maintenance, sinking fund, direct costs and wages. Inspection checklist:

- headline rent;
- room sizes;
- accommodation type (traditional corridors or modern clusters);
- number of bathrooms and toilet facilities per bed;
- ratio between ensuite and non-ensuite rooms;
- ratio between standard and luxury accommodation;
- typical length of tenancy and availability of longer lets;
- occupancy data;
- expenditure data;
- revenue data (inc. rent, vending, holiday lets, etc.);
- health and safety.

The discounted cash-flow valuation would proceed as follows. First a cash-flow is constructed to estimate the gross income and expenditure and a growth rate may be applied to the resulting net income. The net income is then discounted to present value. The output net present value can be analysed by calculating capital value per bed type and per square foot. An example is shown below.

15.1.6 Serviced offices

Serviced offices provide instant fully equipped office space plus access to support staff via a licence agreement. There are three main advantages of serviced offices; flexibility, speed of set-up and all-inclusive cost. There is no lease liability but occupation terms are usually standard. The speed of set-up is particularly helpful for new starts and gives access to technology and staff at an all-inclusive cost, but the cost can be expensive. The price charged for serviced office accommodation is usually quoted on a per workstation basis. Most operators of serviced office quote a range of prices to reflect different rents dependant on level of natural light and the size of office. The typical space allocated per person is 70–100 square feet excluding all common parts, toilets and meeting rooms. Prices are per person per month and this is usually inclusive of rent, business rates, service charge, furniture, electricity, lighting, heating and use of reception facilities.

McAllister (2001) explores the issues relating to the valuation of properties where income is derived from the provision of services as well as floor-space. He argues that, because serviced offices comprise a property and a business asset, the valuer should consider the derivation and risk profile of each income flow. In practice, serviced offices are valued using the profits method or investment method depending on whether or not the assets are owned by the operator. If the operator

Valuation of Student Accommodation

Assumptions

A growth of 3% per annum is assumed for all income and costs.
A TRR of 10.25%

Rental Income Term Time	Number	Rent Per Week (incl)	Letting (weeks)	Occupancy Rate	Income
Standard en suite 4 bed flats	**180**	£78.00	50	97%	£680,940
Standard en suite 5 bed flats	**10**	£76.00	50	97%	£36,860
Studio	**8**	£95.00	50	97%	£36,860
Total	**198**				**£754,660**

Holiday / Longer Letting Income	Number	Rent Per Week (incl)	Letting (weeks)	Occupancy Rate	Income
Standard en suite 4 bed flats	180	£78.00	0	20%	£0
Standard en suite 5 bed flats	10	£76.00	0	20%	£0
Studio	8	£95.00	0	20%	£0
Total					**£0**

Income Summary	Number		Income Per Bed Per Annum	Income
Term Time	198	Bedrooms	£3,811	£754,660
Holiday / Longer Letting Periods	198	Bedrooms	£0	£0
Car Parking	0	Car Spaces	£0	£0
Sundry Income	198	Bedrooms	£50	£9,900
Initial Payment (New tenants only)	149	75% of Available Beds	£0	£0
			£3,861	**£764,560**

Expenditure	Number		Cost Per Bed Per Annum	Expenditure
Services	198	beds @ say	£200	£39,600
Maintenance & Sinking Fund	198	beds @ say	£300	£59,400
Direct Costs	198	beds @ say	£100	£19,800
Labour	198	beds @ say	£225	£44,550
		Total	**£825**	**£163,350**

Cash-flow (100 years…) Income	1	2	3	4	5	6	7	8	9	10…	…100
Term	£754,660	£777,300	£800,619	£824,637	£849,376	£874,858	£901,104	£928,137	£955,981	£984,660	£14,081,100
Holiday	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0
Car Parking	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0
Sundry	£9,900	£10,197	£10,503	£10,818	£11,143	£11,477	£11,821	£12,176	£12,541	£12,917	£184,723
Room Deposit	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0
Total Gross Income	**£764,560**	**£787,497**	**£811,122**	**£835,455**	**£860,519**	**£886,335**	**£912,925**	**£940,312**	**£968,522**	**£997,577**	**£14,265,823**
Expenditure											
Services	£39,600	£40,788	£42,012	£43,272	£44,570	£45,907	£47,284	£48,703	£50,164	£51,669	£738,891
Maintenance & Sinking Fund	£59,400	£61,182	£63,017	£64,908	£66,855	£68,861	£70,927	£73,055	£75,246	£77,504	£1,108,337
Direct Costs	£19,800	£20,394	£21,006	£21,636	£22,285	£22,954	£23,642	£24,352	£25,082	£25,835	£369,446
Labour	£44,550	£45,887	£47,263	£48,681	£50,141	£51,646	£53,195	£54,791	£56,435	£58,128	£831,252
Total Expenditure	**£163,350**	**£168,251**	**£173,298**	**£178,497**	**£183,852**	**£189,367**	**£195,048**	**£200,900**	**£206,927**	**£213,135**	**£3,047,926**
Net income	**£601,210**	**£619,246**	**£637,824**	**£656,958**	**£676,667**	**£696,967**	**£717,876**	**£739,412**	**£761,595**	**£784,443**	**£11,217,897**

NPV @ 10.25%	£8,283,336
Capital value per bed	£41,835
Initial yield	£601,210 / 8,283,336 = 7.3%

has no property assets, using the profits method, the value would typically be 2.5–4x EBITDA, in other words a 25-40% return. An investment method can also be used because serviced office businesses occupy standard office accommodation. Where a landlord is more directly involved with the business, the distinction between property value and business revenue blurs (payments for service provision can act as a substitute for rent for example). If the operator owns property assets, the value derived from a combination of business profitability and property value. The profits method can be used to value the business, having regard to trading potential, on an existing use basis and including plant and machinery, fixtures, fittings, furniture and equipment and assuming the business is competently managed, properly staffed, stocked and capitalised. Capital value would typically be 8-12.5x EBITDA (net of MR), an 8-12.5% return. The investment method can be used to value property assets. The valuation may exceed conventional investment valuation because the business derives profit from its services and charges rents which may diverge from the market due to more regular reviews, but extra profitability needs to be weighed against lower security from very short leases. An alternative approach is using market value based on existing use with vacant possession. Essentially, the approach is similar to that used to value student accommodation.

15.1.7 Data centres

Data centres are highly specified and configured buildings which integrate infrastructure to provide a secure, controlled environment to house and operate IT equipment. Occupational structures are divided into two main groups: conventional real estate leases (and licences) and leases with managed services. They are specialised assets that produce investment income and so should be appraised as investment rather than occupational assets, despite an absence of significant market trading (McAllister and Loizou, 2007). Table 15.2 summarises the value significant characteristics of data centres.

15.2 Valuation of contaminated land

Some sites may be contaminated as a result of their previous use. These are referred to as ‘brownfield’ sites and valuers have mandatory responsibility to report on contamination impact where suspected. International valuation standards, in the form of *IVS GN 7 – Consideration of Hazardous and Toxic Substances in Valuation* (IVSC, 2005) states that the existence of such deleterious materials must be reported, together with the way they have been dealt with. The RICS Red Book obliges the valuer to investigate, consider and report on any material features that affect a property or its surroundings that could impact on value unless stated otherwise in the terms of engagement. A valuer is expected to investigate previous land use of the subject property and neighbours and should report possible or actual contamination if spotted. Types of environmental matters / contamination that valuers should look out for include building materials that are

Table 15.2 Value attributes of data cantres.

Characteristic	Conventional Asset	Technical Real Estate
Tenant base	variable covenant strength	
Typical contract length	10 years	5 years
Rental change	Rent reviews	Annual CPI linked
Non-performance penalty payments	None	Potential for substantial payments
Construction cost	1x	2–6x
Building infrastructure cost (relative to shell and core)	Low	High
Site value (relative to construction cost)	High	Low
Depreciation risk	Low	High
– Capex on infrastructure	High	Low
– Capex on building	Low	Low
– Locational	High	Low
– Aesthetic	Low	High
– Technological		
Market characteristics	High	Low-ish
– Liquidity	High	Low
– Maturity	High	Low
– Transparency	Major	Major
– D/S shocks		

known to cause problems (such as asbestos), disused mines and quarries, flood risk, coastal erosion and other abnormal ground conditions, waste and high voltage equipment. Information might be obtained from local authority sources such as building control, planning and environmental health. Also, the Environment Agency and utility companies, and historic maps and aerial photography may provide valuable insight. UKGN 4 states that 'where expert reports have been obtained, the valuer is to consider the effects of these reports on the valuation. It is important that the valuer does not offer any explanation or interpretation of such reports in the absence of any personal expertise in the subject' (275). The valuer has three options: accept conclusions of any expert report, adopt an appropriate caveat, or decline the work.

The valuation of contaminated sites adds a level of volatility to the valuation. Perhaps unsurprisingly, it is very difficult to find comparable evidence to help value a contaminated site because the variability of location-specific contaminants and resultant severity and extent of contamination will often lead to wildly different estimates of impaired value. The accepted approach, in the likely absence of comparable evidence, seems to be the 'cost to correct' approach. Indeed, IVS GN 7 states that where impairment is present the valuer should value as if it had been removed and identify the cost of remediation where possible. So the value of the site is equal to its value in good condition (unimpaired) less the cost of rectifying the impediment less a deduction for stigma. The cost of remediation would be based on the quantification of factors identified in an environmental impact assessment (EIA) or a land quality statement (LQS).[2] It is important to note that valuers must understand what an EIA entails in order to give meaningful advice, including an interpretation of cost implications. Some sites that are heavily contaminated may require remediation that costs more than the site is worth and in these cases the property is a liability rather than an asset. The relevant costs include:

- cost of further investigation;
- cost of clean-up;
- cost of temporary measures to avoid further contamination pending clean-up;
- ongoing monitoring and management costs;
- effect of any redesign or change of end use on value and cost;
- possible contingent liabilities;
- insurance / contingency fund.

No matter how well sites are treated, problems of stigma may remain. Stigma is the value impact of potential risk and uncertainty surrounding the future use of a contaminated site, even though the contamination may have been removed. Developers might seek discounts to reflect stigma or may decline development altogether. The initial perception of any problem may induce a substantial drop in value (dread factors) but as understanding improves so value may increase to the point where it relates to logical factors such as clean-up costs, control measures, delay and contingent liabilities. Not all purchasers will be equally risk sensitive – local developers may be prepared to outbid institutional investors. Attitude of lenders is also important; if the proposed use is residential lenders may not be prepared to offer mortgages on the dwellings. The cost-to-correct approach provides a degree of objectivity to the valuation of a contaminated site but it may not properly reflect market value because it does not take account of the financial impact on existing and alternative uses. These impacts centre on the issue of blight (market perception) which may, in turn, depend on future regulations and liability regimes in relation to the contamination. In practice the valuation impact of stigma is accounted for by either adjusting the yield or making an end allowance but attempting to quantify the 'unquantifiable' carries significant risks!

By way of example, a valuation is required of a freehold factory situated on contaminated land. The current freeholder has legal responsibility for the contamination. The current rent is £800,000 per annum and the 15-year lease has two years remaining. The current tenant does not intend to renew the lease and remediation is deemed necessary. An EIA suggests a £2,000,000 remediation cost and a period of one year in which to complete the work. The all-risks yield for uncontaminated comparable property investments is 9.5%. The current market rent is £850,000 per annum.

Term rent (£)	800,000	
YP 2 yrs @ 9.5% [a]	1.7473	
		1,397,840
Reversion to MR (£)	850,000	
YP perpetuity @ 10.5% [b]	9.5238	
PV £1 for 3 yrs @ 10.5% [c]	0.7412	
		6,000,184
		7,398,024

Less remediation Costs:		
■ clean-up costs	−2,000,000	
■ finance @ 8% for 6 months [d]	−78,461	
■ cost of EIA, say	−9,000	
■ cost of LQS, say	−5,000	
Total	−2,092,461	
PV £1 for 2 yrs @ 8% [e]	0.8573	
		−1,793,867
Valuation (£)		5,604,157

[a] Although the security of a term rent below market rent would normally attract a reduction from the all-risks yield, in this case, because of the contaminated state of the site, the yield has not been reduced

[b] The all-risks yield has been increased by 1% to reflect stigma

[c] Discounting the reversionary value over three years builds in the one year clean-up period

[d] It is assumed the clean-up costs are debt-financed at 8% per annum but the costs are spread evenly over the year (i.e. interest only paid on total cost over 6 months)

[e] Costs are deferred until the end of the current lease at the finance rate of 8% (it is assumed money can be invested at the same rate that it can be borrowed)

The adjustment to the all-risks yield to account for uncertainty at re-letting due to possible residual contamination and stigma is very subjective and it might be argued that an explicit end allowance would be more accurate. This is because the effect of a unit adjustment to the all-risks yield will have a greater effect on property investments that are valued at lower yields than those valued at higher yields. For example, take two investment opportunities; a factory in the north of England and a shop in the West End of London, both valued at £500,000 and both requiring the same expenditure on remediation:

	Factory		Shop	
Unimpaired Valuation:				
Income (£)	500,000		250,000	
YP perpetuity @ 10% (factory) / 5% (shop)	10		20	
Valuation (£)		5,000,000		5,000,000
Impaired Valuation:				
Income (£)	500,000		250,000	
YP perpetuity @ 11% (factory) / 6% (shop)	9.0909		16.6667	
		4,545,455		4,166,667
Less Remediation Costs, say		−1,000,000		−1,000,000
Valuation (£)		3,545,455		3,166,667
Reduction in value		29%		37%

Ceteris paribus the shop suffers a much greater depreciation in value. One solution is to adjust the yield proportionately, say an increase of 10%, would mean an impaired yield for the factory of 11% and 5.5% for the shop, thus producing the same diminution in value for the shop and factory.

For more information on the valuation of contaminated land see Chapter 6 of Askham (2003) and Chapter 2 of Syms (2004) and for a comparative review of valuation practice in relation to contaminated land in the United States, the United Kingdom and New Zealand see Kinnard et al. (2002).

15.3 Synergistic value

Synergistic value or **marriage value** can occur where the combined value of two or more property interests is greater than the simple addition of their separate values. The interests might be adjacent land parcels on a development site or they might be the freehold and leasehold interests in the same property. In essence the value of the whole is greater than the sum of the parts. The marriage value is the difference between the value of the merged interest and the sum of the values of the separate interests. Break-up or 'divorce' value is the opposite of marriage value and refers to the division of property interests, leading to the value of the resultant separate interests being greater than the whole. For explanatory purposes let's consider separately an example of a merger of physically distinct properties and an example of a merger of distinct legal interests in the same property.

15.3.1 Physical merger

You have been asked to value two adjacent shop units, both with narrow frontages. You realise that if they were combined they could form a single standard-sized shop unit. The value of each shop in its existing state is £200,000 but if combined the merged value would be £500,000, giving a marriage value of £100,000. All other things being equal you would expect half of this gain to go to each shop owner, assuming they are in the same negotiating position and neither can hold the other to 'ransom'.

15.3.2 Legal merger

The freeholder of commercial development land let it to a head-lessee on a 125-year ground lease which has 24 years remaining at a ground rent of £5,000 per annum with no provision for rent reviews. The head-lessee developed the site as offices and sub-let on a typical FRI occupational lease with five-year rent reviews. The current market rent for the offices is £500,000 per annum and a rent review has just taken place. With just 24 years remaining the head-tenant is considering purchasing the freehold interest and wishes to know how much should be offered assuming a freehold all-risks yield of 6%, a leasehold all-risks yield of 8% (single rate) and a ground lease all-risks yield of 10%. The valuation of the freehold interest is:

Term rent (£)	5,000	
YP 24 years @ 10%	8.9847	
		44,924
Reversion to MR (£)	500,000	
YP perpetuity @ 6%	16.6667	
PV £1 24 years @ 6%	0.2470	
		2,058,337
Valuation (£)		2,103,261

The valuation of the head-leasehold interest is:

Market rent (£)	500,000	
Less ground rent (£)	-5,000	
Profit rent (£)	495,000	
YP 24 years @ 8%	10.5288	
Valuation (£)		5,211,756

So the aggregate value of the separate freehold and head-leasehold interests is:

$$£2,013,261 + £5,211,756 = £7,315,017$$

If the two legal interests were combined the valuation of the freehold in possession would be:

Market rent (£)	500,000	
YP perpetuity @ 6%	16.6667	
Valuation (£)		8,333,350

And so the marriage value would be:

$$£8,333,350 - £7,315,017 = £1,018,333$$

In which case, to purchase the freehold interest, the head-tenant could offer an amount equating to the existing value of freehold interest (£2,103,261) plus some proportion of the marriage value. A simple 50:50 split is one solution but it might be more equitable to apportion it in proportion to the value of the exiting separate interests. So the freehold proportion of the marriage value would be:

$$\frac{£2,103,261}{£7,315,017 \times £1,018,333} = £292,798 \text{ or } (29\%)$$

This leaves 71% or £725,535 for the head-tenant.

15.4 Special Purpose Valuations

15.4.1 Charitable Valuations

The Charities Commission requires charity trustees to obtain a ‘Section 36 Valuation’ when seeking to buy or sell a property interest with a remaining term greater than seven years. The report must be by a qualified surveyor who must confirm that his or her professional opinion conforms to the legislation (Charities (Qualified Surveyors’ Reports) Regulations 1992 (SI 1992 (2980)) and the Red Book (RICS, 2012: UK GN7 Valuations for charities). For acquisitions the report should consider specific requirements of the charity such as whether any repairs or alterations are required and the estimated costs of doing them. It may also advise on whether it is economically sensible for the charity to acquire given prevailing market conditions, the state of the property, any lease terms and the asking price. For disposals the valuer should consider whether the property has been adequately marketed, whether it might benefit from alterations or adaptation prior to marketing. If the property is to be auctioned the report must consider the reserve price, scrutinise the auctioneer's reasoning, be conversant with the planning position and aware of offers received before the auction. Charities may face tax implications if disposal is subject to an overage clause (regularly used when planning is uncertain).

15.4.2 Local authority disposals of land for less than best consideration

Local authorities in England and Wales are required to seek consent from Central Government if they sell land at a price below market value but only where the discount is more than £2 m. A valuer may be asked to advise on whether an application for consent is necessary or to support a request for consent. The RICS provides guidance in relation to the valuations that may be required (RICS, 2012: UKGN 5 Local authority disposal of land for less than best consideration). There are three bases of value that are relevant:

a) Unrestricted value: this is market value but taking into account any additional value that might be due to a purchaser with a special interest, and ignoring any reduction in value caused by the local authority imposing any conditions on the sale. The valuer should assume the land is offered for sale on terms that maximise its value.
b) Restricted value: again, market value but this time having regard to the terms of the transaction. In this way it should take account of any conditions imposed by the local authority. If tenders are invited for purchase of the land, restricted value will normally be the bid from the preferred bidder. Otherwise it is the proposed purchase price.
c) Value of local authority conditions: these are the conditions that may be imposed by local authorities. They must be capable of being quantified in monetary terms and might include operational savings and income.

The discount is: Unrestricted value – (restricted value* + value of conditions)
*or value of consideration if different from restricted value

When reporting the valuation, the valuer should: include a description of the land and buildings, location and surroundings, summarise the proposed transaction, provide details of the tenure, attaching a copy of the lease (or at least the heads of terms) if the transfer is leasehold. If the land is a development site then reasonable assumptions can be made regarding the proposed scheme, including planning assumptions. The valuer should note existing uses, current planning consents and likely permitted uses in line with the development plan. The date of the valuation must be within six months of the application submission date.

Notes

1. The beer tie is relevant in that without it the adjusted net profit would be higher.
2. Valuer would be expected to inform environmental surveyor what HABU is for site.

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Chapter 16
Investment Valuations – Further Considerations

The case has been made for using a discounted cash-flow (DCF) technique to value properties with particular investment characteristics that render the all-risks yield (ARY) technique inadequate (see Appendix to Chapter 6). These characteristics include properties that are over-rented, let on short leases or on leases that contain options to terminate or break the lease contract before the full term has expired. A DCF technique might also be employed to analyse transactions where properties have not been let at market rent (perhaps because an incentive such as a rent-free period or capital inducement was offered) so that they can be used as comparable evidence. In all of these cases the overriding concern to the landlord is that the financial position is adequate for the option or incentive granted. This section looks at how ARY and DCF valuation techniques can be used to value property investments subject to flexible lease terms and over-rented property investments.

16.1 Short leases and leases with break clauses

Short leases and leases with options to break early mean greater diversity of lease contracts and increased uncertainty for investors. Will the tenant renew the short lease? If not will there be a rent void and how long might it be? What will the lease terms be? and what will be the quality of the new tenant? Will a break option be exercised? All this uncertainty creates an income risk that an investor will wish to be compensated for in terms of price paid and the expected return. McAllister (2001) argues that the capital value of a contemporary property investment is dependent upon the cost and probability of the tenant vacating, a rent void occurring or the rent dropping and the impact on value will depend on the length of the short lease, the structure of the break clause (specifically the terms of any

Property Valuation, Second Edition. Peter Wyatt.

penalty payment), the tenant's business plan and market factors (such as rental growth prospects and the state of the lettings market).

Before such flexible lease terms became commonplace homogeneity of lease contracts meant that, for property investment valuation, adjustments to initial yields of comparables to reflect geographical and physical differences could be justified. But now it is much harder to find comparables and justify small but often cumulative adjustments to the ARY because of the greater variety of possible differences between the subject property and each comparable. ARY adjustment is, therefore, an over-simplification and it is difficult to quantify and support; a more explicit approach is required to illustrate the reasoning behind the assumptions (Crosby et al., 1998). The DCF technique allows assumptions to be made more clearly; the financial costs (and possible benefits) associated with the exercise of a break option or non-renewal of a lease and the possible void period that may follow for example. Research has revealed errors and a lack of consistency amongst valuers when valuing flexi-leases (see McAllister and O'Roarty, 1999, Ward and French, 1997). Valuers tend to focus on the worse-case scenario and assume there will be a rent void at the end of the (short) lease or that a break option will be exercised. This is despite the fact that if the out-going tenant had to pay a penalty fee (equivalent to several months' rent) and a new tenant was found in the meantime the landlord may actually receive an income bonus. This conservative approach tends to undervalue flexible leases and reduce their attractiveness to investors.

Consider the following example: a modern office property has just been let on a 15-year FRI lease at a market rent of £50,000 per annum. There is a break option in the tenant's favour in year five, just before the rent review (to prevent the tenant from using it as a bargaining tool). Comparable evidence suggests that rack-rented office investments let on 15-year FRI leases with five-year rent reviews to market rent sell at prices that generate initial yields of around 7%. Long-term gilts currently yield 8% and a typical property risk premium is 2%. The inclusion of a break option clearly adds a degree of uncertainty to the income that the investor would receive after year five. Indeed, an early break will have a greater impact on capital value than a later one due to the time value of money (Havard, 2000). Possible outcomes at the break are; the tenant exercises the break and a rent void follows, the break is exercised but there is no void, or the tenant continues in occupation. Faced with such uncertainty the valuer might increase the ARY slightly on the assumption that the break will definitely be exercised (French, 2001). Here the ARY has been increased from 7% to 8%.

Market rent (£)	50,000	
YP perpetuity @ 8%	12.5	
Valuation (£)		625,000

If the lease had no break option and was valued using a 7% yield the capital value would be £714,286, so the yield adjustment leads to a 12.5% reduction in value. This approach is simple and benefits from a direct relationship with comparable evidence, assuming there is a sufficient amount available, but it hides a lot of assumptions (Havard, 2000). Another approach might be a modified term and reversion valuation where the ARY is adjusted by a lesser amount and a rent void is incorporated in the cash-flow after the break. The valuer needs to be sure (via market evidence) that the void duration is realistic and an advantage of this approach is that different yields can be used for the existing and new leases (Havard, 2000) but, again, only if justified by market evidence. The valuation below incorporates a void period of one year after the break option in year five and, in order to avoid double-counting, the yield has only been adjusted upwards to 7.5%. This results in a more optimistic valuation.

Market rent – first lease (£)	50,000	
YP 5 years @ 7.5%	4.0459	
		202,950
Market rent – new lease (£)	50,000	
YP perpetuity @ 7.5%	13.33	
PV 6 years @ 7.5%	0.6480	
		432,000
Valuation (£)		634,950

It is useful to look at the level of rental growth as a guide to the likelihood of the rent dropping at the time a break option might be exercised. The short-cut DCF valuation is explicit about the target rate and the growth rate and accurately values each part of the income flow in a reversionary investment. Havard (2000) argues that the target rate would probably need to be increased to reflect the additional risk associated with investing in a short lease. The problem is that there are now a lot of assumptions to make and this could lead to increased valuation variance. A full (year-by-year) DCF valuation is even more explicit about assumptions and therefore may lead to even greater valuation variance; changes to each key variable (growth rate, exit yield, target rate, void period, holding period) in isolation have little impact on the valuation but taken together they do (Havard, 2000). Assuming a target rate of return of 10% and an ARY of 7.5%, this implies a growth rate of 2.88% per annum. A full DCF valuation of a short lease with a break clause is shown below. On a standard lease a rent of £50,000 per annum and a yield of 7.5% would produce a valuation of £666,667.

Year	Net cash-flow (£)	Implied growth rate of 2.88%	Estimated cash flow (£)	PV £1 @ target rate of 10%	Discounted income (£)
1	50,000	1.0000	50,000	0.9091	45,455
2	50,000	1.0000	50,000	0.8264	41,322
3	50,000	1.0000	50,000	0.7513	37,566
4	50,000	1.0000	50,000	0.6830	34,151
5	50,000	1.0000	50,000	0.6209	31,046
6	0	0.0000	0	0.0000	0
7	50,000	1.1857	59,286	0.5132	30,423
8	50,000	1.1857	59,286	0.4665	27,658
9	50,000	1.1857	59,286	0.4241	25,143
10	50,000	1.1857	59,286	0.3855	22,858
11	50,000	1.1857	59,286	0.3505	20,780
11-perp	50,000	1.3666	911,065[a]	0.3505	319,323
Valuation (£)		13.3333			635,723

[a] *projected rent capitalised into perpetuity at exit yield of 7.5%*

A difficulty with these modified ARY and DCF approaches is their inability to handle the possibility that the break option is not exercised (or if it is and there is no rent void). Under this assumption, in terms of the cash-flow, the flexi-lease is no different from a standard lease but because of the yield adjustment and void assumption the landlord will receive a financial bonus in comparison to a standard lease. The problem is uncertainty; the cash-flow has been made more uncertain by the flexi-lease and this uncertainty has a price. The dilemma for the valuer is trying to estimate that price. One solution to this problem is to produce a range of valuations under different scenarios; the break clause is/is not exercised, the rent void does/does not occur, a void lasts for six months, one year, etc. This leads to a lot of valuations and, as a way of summarising the various outcomes, probabilities could be assigned to them and a weighted average 'expected' valuation calculated (French, 2001). It is possible to extend this simple 'discrete' probability analysis into a continuous probability analysis using simulation or option pricing and we will look at these approaches in section 16.3.

16.2 Over-rented property investments

Over-renting occurs when the rent payable under a lease with upward-only rent reviews exceeds the market rent. Some valuers value **over-rented properties** as perpetual cash-flows at the passing rent when the lease is long, provides for upward-only rent reviews and there is no break clause. Because of the higher risk associated with the element of rent that exceeds the market rent, known as the **overage** or froth, other valuers use a layer (core and top-slice) approach, using an ARY based on rack-rented freehold comparables to capitalise the core rent (which is taken to be the market rent at the time of the valuation) and a fixed income yield that reflects the covenant strength of the tenant to capitalise the top-slice or 'overage'.

For example, value a property let four years ago at a rent of £250,000 per annum on a 15-year lease with five-year upward-only rent reviews. The current market rent is £200,000 per annum. Comparable properties have recently sold for yields averaging 6%. Medium-dated gilts are yielding 5% and the investor's target rate of return for this property is 11%. The ARY (core and top-slice) valuation is as follows:

Core (market) rent (£)	200,000	
YP in perpetuity @ 6%	16.6667	
		3,333,340
Top-slice (overage) (£)	50,000	
YP 11 years @ 7% [a]	7.4987	
		374,935
Valuation (£)		3,708,275

[a] *Gilt yield plus a 2% risk premium*

However, there are problems with this approach: first, the core rent is capitalised at an ARY that assumes five years to the next review but the property is reversionary and the growth potential is closer – consequently the approach over-values the bottom layer; second, there is a lack of evidence on which to

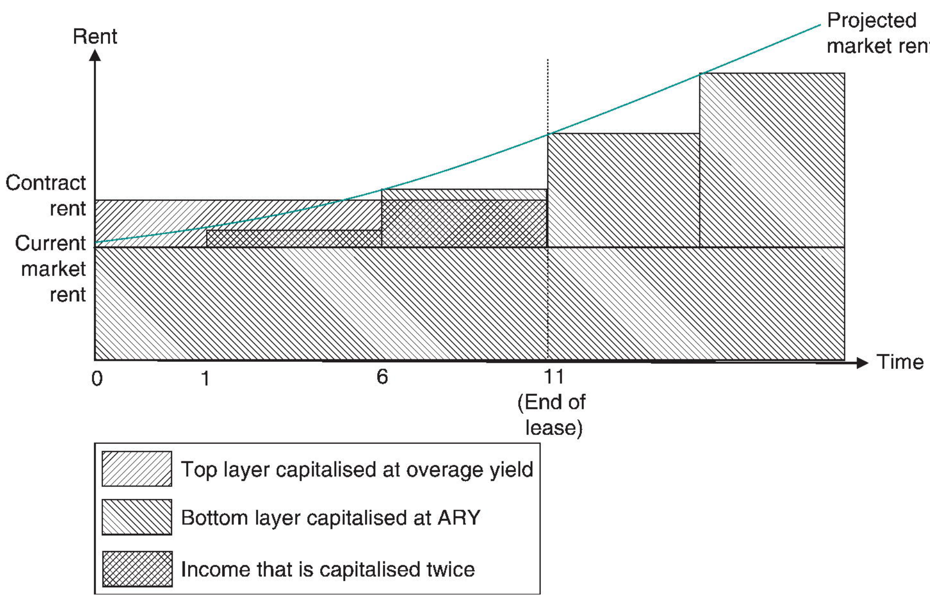

Figure 16.1 Over-rented property.

base the overage yield; and third, no attempt has been made to estimate the length of time that the property will remain over-rented. To resolve the last problem many valuers capitalise the overage for the whole period that the tenant is contracted to pay it (Crosby and Goodchild, 1992). But if, as Martin (1991) points out, the market rent grows each year and the overage reduces, the market rent may overtake the contract rent before the end of the lease and part of the overage is capitalised twice – the property will be over-valued. This is illustrated in Figure 16.1.

Even if the overage is capitalised until the first rent review after the market rent overtakes the contract rent a (smaller) amount of double-counting still occurs. The layer approach is unable to calculate the corresponding reduction in the overage necessary to avoid this double-counting. One way to resolve this problem is to be explicit about growth in the rental income and project the market rent at a growth rate to determine when it will overtake the contract rent. This growth rate can be implied from the relationship between the chosen ARY and target rate or it can be explicitly forecast. A DCF approach can then be used to capitalise the contract rent up to this cross-over point (or the next review thereafter) at the target rate and the uplifted market rent is capitalised at an ARY from the cross-over point into perpetuity, discounted for the period of waiting, at the target rate – just like a short-cut DCF.

Continuing the example above, using a growth rate of 5.57% per annum, implied from the ARY of 6% and the target rate of 11%, the market rent will grow to the following amounts at the next two rent reviews:

$$£200,000 \times (1+0.0557)^1 = £211,140$$

$$£200,000 \times (1+0.0557)^6 = £278,868$$

So the market rent overtakes the contract rent between the first and second rent reviews and the growth-explicit short-cut DCF valuation is as follows:

Term (contract rent) (£)	250,000	
YP 6 years @ 11%	4.2305	
		1,057,625
Reversion to market rent (£)	200,000	
FV 6 years @ 5.57%	1.3843	
YP in perpetuity @ 6%	16.6667	
PV 6 years @ 11%	0.5346	
		2,466,828
Valuation (£)		3,524,453

The valuation is lower than the layer approach above because the double-counting has not occurred and the use of a target rate to capitalise the term rent means that the problem of using a rack-rented ARY to value a bottom layer where the reversion is closer does not arise. A drawback of the growth-explicit DCF approach is the lack of comparable evidence to support the choice of rental growth rate and target rate of return, the latter of which may need to be adjusted to reflect the covenant strength of the tenant, the length of the remaining lease term and the extent of the overage (Crosby, 1991). In between rent reviews rent is only subject to tenant (default) risk and if the contract rent is very high in comparison to market rent for long periods (e.g. beyond the first rent review) then it is exposed to a greater degree of tenant risk. As such it may be more characteristic of a corporate bond-type investment issued by the tenant (Brown and Matysiak, 2000).

A property let at a headline rent is, in effect, over-rented and should, arguably, be valued as such. Revisiting the property described in section 4.2.1 on rent-free periods in Chapter 4, let's assume that the write-off period of 15 years (the lease term) is appropriate. This equates to a growth rate of 2.62% per annum which we can insert as an explicit growth rate into the capital valuation. If we also assume an ARY of 7% and a target rate of 10% the valuation of the freehold investment interest using a short-cut DCF technique might be as follows:

Headline rent (£)	200,000	
YP 13.5 years @ 10%	7.2382	
PV £1 1.5 years @ 10%	0.8668	
		1,254,814
Reversion to market rent (£)	175,721	
FV £1 15 years @ 2.62% pa	1.4739	
YP perpetuity @ 7%	14.2857	
PV £1 15 years @ 10%	0.2394	
		885,763
Valuation (£)		2,140,577

To investigate the impact that the rent-free period has on capital value, assume the property has no rent-free period (apart from the normal fitting out period of six months), it is let at the effective rent of £175,721 per annum (calculated in Chapter 4) and the ARY is 7%:

Market rent (£)	175,721	
YP perpetuity @ 7%	14.2857	
PV 0.5 years @ 7%	0.9667	
Valuation (£)		2,426,705

For the valuation of the property let at market rent to equate to the DCF valuation of the property let with the rent-free period, the market rent would have to reduce from £175,721 to £155,002 per annum. So, because of the yield impact on capital value, incentives such as rent-free periods are preferable to reductions in the headline rent (Crosby and Murdoch, 1994).

16.3 Valuation accuracy, variance and uncertainty

Because of the market imperfections and inefficiencies in the property market referred to in Chapter 1, the expertise and experience of a valuer is required to form an opinion of value based on an assessment of value-significant influences. These influences may change and therefore a valuation is not a permanent part of the property. Analysis of market data only suggests what happened in the past and it is for the valuer to interpret these data to assess current market value. Valuers do not operate with perfect market knowledge, they must follow client instructions, make judgements, analyse information and respond to different pressures when preparing a valuation and all these factors influence the final valuation figure. Values can be difficult to assess due to the heterogeneity of property and the number of transactions that occur at prices that do not represent market values. Although the profession has sought to enforce more rigorous mandatory standards and practice statements, backed by detailed guidance notes, valuations of the same property conducted by different valuers will not always be the same and the valuation(s) may not necessarily equate to the agreed exchange price. The disparity in valuations of the same property is referred to as valuation variance and the discrepancy between a valuation figure and the exchange price is referred to as valuation inaccuracy. Valuation uncertainty is a recently coined phrase used to acknowledge the fact that valuation variance and valuation inaccuracy are inevitable consequences of the valuation process and recent research has attempted to quantify the degree of uncertainty that surrounds valuation. Market conditions and the type and location of property investments will influence the degree of uncertainty. There have been a number of studies that have investigated the degree of valuation inaccuracy and extent of valuation variance that occurs in typical property investment valuations (Gallimore, 2002) and the RICS has considered ways of reporting valuation uncertainty when it is deemed appropriate.

16.3.1 Valuation accuracy

Brown (1985) examined the accuracy of valuations by regressing valuations on exchange prices for 29 properties where the sale price and preceding valuation were known and found a high correlation between valuations and prices. In 1988 similar regression techniques[1] were applied to a much larger sample of 1,442 valuations and sale prices taken from the Investment Property Databank (IPD/Drivers Jonas, 1988). This study and its update (IPD/Drivers Jonas, 1990) both found that valuations and prices were highly correlated. There have, however, been criticisms of the statistical validity of the regression analysis in these studies, particularly in relation to the problem of heteroskedasticity[2] (Lizieri and Venmore-Rowland, 1991). A longitudinal study of the accuracy of valuations is now funded by the RICS and conducted using IPD data. In 2004 RICS and IPD conducted an analysis of 984 valuations and subsequent sale prices of properties in the IPD databank.[3] The overall average price-value difference was 9.5% and 79% of valuations were within 15% of sale prices (RICS, 2005). These results were similar to those achieved in the preceding two years of the study and it may be tempting to suggest that valuation accuracy has reached its ceiling, but the results could also be explained by the rapidly rising market conditions over the past two to three years and valuations, which are backward-looking, failing to keep pace. It should also be noted that the IPD databank typically contains prime assets for which market evidence might be expected to be more readily available and of a more consistent nature than for lower grade property investments where incentives might be prevalent. Force is added to this argument when the valuations are weighted by value; the variation was smaller, producing an average difference of 8.1% instead of 9.5%, suggesting that valuations of higher value properties have been closer to sale prices. Regression analysis was used to detect any bias in the data, such as a tendency to over- or under-value. According to the regression analysis of the IPD data over the past five years, valuers consistently under-value and there may be several explanations for this: the market value assumptions preclude bids by special purchasers, vendors may selectively dispose of properties when bids are received above the valuation figure, vendors actively ‘present’ properties for sale to enhance bids, the growth assumptions used in the analysis may not pick up rapid market movements, or valuers may be inherently conservative and backward-looking.

16.3.2 Valuation variance

Hagar and Lord (1985) conducted a small experiment on 10 valuers to investigate how much their valuations of a sample of two properties varied and to test their hypothesis that the range would be +/−5% around the average valuation. Actually Hagar and Lord did not calculate an average but asked a valuer with experience of valuing the two properties to perform ‘control’ valuations instead. Their results showed valuation variance much greater than +/−5% but, due to the sample size, the results cannot be regarded as conclusive. Brown (1985) examined valuation variance by taking a sample of 26 properties which had been valued by two different firms of valuers over a four-year period. It was found that the valuations from one firm were a good proxy for the valuations of the other and that there was no significant bias between the two firms’ valuations. Hutchison et al. (1996) undertook research into variance in property valuation, involving a survey of major national and local firms. The average overall variation was found to be 9.53% from the mean valuation of each property. They also found evidence to suggest that valuation variation may be a function of the type of company that employs the valuer and, specifically, whether it is a national or local firm. The study revealed that national practices produced a lower level of variation (8.63%) compared with local firms (11.86%) perhaps due to the level of organisational support, especially in terms of availability of transactional information.

There has been a significant amount of research into the causes of valuation variance. Kinnard et al. (1997) found that valuers conducting valuations for lending purposes experienced significant pressure from certain types of client, especially mortgage brokers and bankers. Gallimore and Wolverton (1997) found evidence of bias in valuations resulting from knowledge of the asking price or pending sale price. Gallimore (1994) found evidence of confirmation bias where valuers make an initial valuation, 'anchor' to this estimate of value and then find evidence to support it. The initial opinion of value or asking price was found to significantly influence the valuation outcome. In a survey of 100 lenders, finance brokers, valuers and investors Bretten and Wyatt (2001) found that the majority of factors believed to cause variance related to the individual 'behavioural characteristics' of the valuer. Variance can enter the valuation process at any stage from the issuing of instruction letters and negotiation of fees through to external pressure being exerted on the valuer when finalising the valuation figure. Following the Carsberg Report (RICS, 2002) the RICS Red Book now contains stricter guidelines to reduce the likelihood of external pressure and the adoption of quality assurance systems in the workplace can help maintain acceptable standards. For example, terms of engagement must include a statement of the firm's policy on the rotation of valuers responsible and a statement of the quality control procedures in place. If a property has been acquired within the year preceding the valuation and the valuer or firm has received an introductory fee or negotiated the purchase for the client, the valuer/firm shall not value the property unless another firm has provided a valuation in the intervening period.

The courts have adopted the **margin of error** concept (the legal manifestation of valuation variance) as a means of establishing whether a valuer has been negligent. It has been established in UK courts since the first case on this point (*Singer & Friedlander* v *John D Wood and Company, 1977*) that a margin of +/−10% around the subsequent transaction price (or some other notion of 'correct' market value) would be permissible. Crosby et al. (1998) is the recognised authority on the findings that link valuation variance, margin of error and the legal position adopted by UK courts. Thirty-eight High Court valuation negligence cases between 1977 and 1998 in which the margin of error had been an issue were investigated and the authors found the majority of judgements on the size of the bracket lie at 10% (26.1%) and between 10% and 14.99% (30.4%). Three causes for this variation were suggested. First, expert witnesses are unfit to present themselves as 'experts'. Second, the margin of error principle and the 'brackets' applied are too onerous a test for negligence, indicating that the margin should be increased. Third and regarded as the most likely, is because expert witnesses are being 'influenced' to produce a valuation to suit their client's particular need. Crosby et al. (1998), noted that

> …judges sometimes reach a finding as to the true value of the property in question which agrees entirely with the opinion expressed by one of the expert witnesses. On other occasions, the judge's ruling may fall somewhere between the figures which the opposing expert witnesses have proposed.

The 'correct' valuation is therefore arbitrarily chosen and raises concerns over the reliability of the margin of error principle as a test of negligence. It also confirms the occurrence of variance by virtue of the imprecision displayed by experts and the subsequent judgement deemed necessary by the court. The continuing adoption of the margin of error principle provides formal recognition of the inevitability of valuation variance. Crosby et al. (1998) concluded that

> the margin of error principle, as it is presently applied by the English courts, is lacking in any empirical basis and indeed runs counter to the available evidence. Its use as a means of establishing negligence by a valuer is fundamentally flawed.

The standard of conduct expected of a professional valuer is not onerous but the courts continually fail to examine the processes involved in the calculation of the valuation and focus instead on the outcome. The authors suggest that the margin of error should be used as an early warning rather than a test of negligence.

16.3.3 Valuation uncertainty

Valuation uncertainty can arise because of the inherent features of the property, the market place or the information available to the valuer. The following are examples of where valuation uncertainty is likely to arise:

- If the location or the physical characteristics of the property are unusual
- The property is of a type for which there is little or no comparable evidence
- Because of the number of input variables, valuations of properties undertaken using the profits or residual methods are very sensitive to the underlying assumptions

Other reasons why there might be a lesser degree of certainty include the qualification, experience and independence of the valuer, restricted access to information (perhaps as a result of the specialised nature of the property being valued or market inactivity) and market volatility.

Despite acknowledging these causes of uncertainty, the RICS does not see the need for a quantitative measure of the degree of valuation uncertainty that a valuer might ascribe to a valuation, such as a confidence statistic, a range, or a mean and standard deviation (RICS, 2012: Guidance Note 1 (GN1) Valuation certainty). Instead, the RICS considers that the single estimate valuation could be accompanied by a qualitative comment in cases where uncertainty is thought to materially affect the valuation. The comment would indicate the cause of the uncertainty and the degree to which it is reflected in the reported valuation. The valuer might also comment on the robustness of the valuation, perhaps noting the availability and relevance of comparable market evidence, so that the client can judge the degree of confidence that the valuer has in the reported figure. Only for some properties does the RICS consider it appropriate to express the valuation as a range between upper and lower limits but, if a valuer can reasonably foresee that different values may arise under different circumstances, a preferable approach would be to provide alternative valuations on the basis of **special assumptions** reflecting those different circumstances, but only if they are realistic, relevant and valid in connection with the circumstances of the valuation (RICS, 2012: VS 2.2). On other occasions where uncertain market conditions or other variable factors could have a material impact on the valuation, it may be prudent to provide a sensitivity analysis to illustrate the effect that changes to these variables could have on the reported valuation. This will be particularly appropriate where a residual method has been used.

Rather than express valuation uncertainty qualitatively, Lizieri and Venmore-Rowland (1991) argued that a valuation should not be regarded as a single value but rather as a point estimate within a range of values. Lavers et al. (1996), on the other hand, found that, with regard to commercial property valuations for lending purposes, the majority of lenders wanted the valuation expressed as a single figure. French and Mallinson (2000) suggested that, as well as reporting abnormal uncertainty, being explicit about uncertainty under normal valuation conditions is also potentially very useful to clients and valuers and they list six items of information which should be conveyed when reporting uncertainty: the valuation figure, the range and probability of most likely observation, range of higher probability and 100% probability and any skewness of probabilities. This suggestion and the view of Lizieri and Venmore-Rowland was confirmed by the findings of Bretten and Wyatt (2001) who found support amongst valuers and their clients for the reporting of a valuation figure in the context of a range rather than a point estimate.

It is to these quantitative measures of valuation uncertainty that we now turn. The range of enhancements to property investment valuation approaches discussed so far presume that the future or, more accurately, valuers' expectations of the future, can be predicted with a high level of confidence. Yields, market rents, the exercising of break options and the lengths of void periods thereafter are all input as single estimates. If the future were that predictable life would be pretty boring. Fortunately it is not and we need to consider ways to reflect this in our valuation models – more so now than ever before because of the greater diversity of lease arrangements flexi-leases produce. The first thing to point out is that input variables in a valuation cannot always be selected as absolutes. We have already thought about this when considering what might happen at the end of a short lease or at a break option in a lease – something that happens more and more frequently nowadays, but there are other ways too. Some of the techniques described in the sub-sections below will be considered in greater detail in Chapter 6 when we look at development appraisal but we need to have a look at them here too because those same techniques are being applied to the valuation of existing property investments (standing investments) as well as to new developments.

16.3.4 Sensitivity analysis

Sensitivity analysis investigates the impact of uncertainty on key input variables such as rent, target rate, ARY and rental growth rate by examining the degree of change in the valuation caused by a pre-determined change in one or more of the key input variables. Usually a margin of 10% to 20% either side of the expected values of the key variables is tested to measure the effect on value. A more sophisticated analysis may apply more realistic variations to the key variables; for example, more upside variation in rent in a rising market. Or different positive

Box 16.1 Key variables

Market information	
■ All risks yield (ARY)	8.00%
■ Market rent (£)	250,000
■ Explicit growth rate	2%
Property information	
■ Years to reversion (term)	4
■ Term (contract) rent (£)	200,000
■ Rent review period	5
Term & Reversion method	
■ Term yield	7.00%
■ Reversion yield	8.00%
Equivalent Yield method	
■ Equivalent yield	7.96%
Core & Top-slice method	
■ Core yield	8.00%
■ Top-slice yield	8.50%
DCF method (short-cut and full)	
■ Target rate of return	10.00%
■ Implied growth rate	2.33%
■ Exit yield	8.00%

and negative percentage changes may be applied depending on the variable; for example, plus or minus 10% for rental value and plus or minus 2% for rental growth. Sensitivity analysis does not consider the likelihood of particular outcomes and the input variables are usually altered one at a time. The technique tends to confirm what we already know; that, because the ARY is an *all-risks* yield, small movements in it lead to large shifts in the valuation, but the process does require the valuer to think about the realistic limits on shifts in the input variables and does produce a range of valuations within which the actual price would be expected to fall.

To help demonstrate how sensitivity analysis works, let's just recap on where we have got to in terms of valuing freehold rack-rented and reversionary property investments because we will use these as a basis for what follows. Box 16.1 provides initial input values for key variables relating to ARY and DCF valuation techniques. The valuations below use the information provided in Table 5.11 to produce a series of single point estimate valuations. The first valuation is of a rack-rented freehold property investment.

Market rent (£)	250,000	
YP in perpetuity @ 8%	12.5000	
Valuation (£)		3,125,000

The next valuation uses the term and reversion approach to value a reversionary freehold property investment.

Term (contract) rent (£)	200,000	
YP for initial term of 4 years @ 7%	3.3872	
		677,442
Reversion to estimated MR (£)	250,000	
YP in perpetuity @ 8%	12.5000	
PV £1 4 years @ 8%	0.7350	
		2,296,968
Valuation (£)		2,974,411

The equivalent yield is then determined using spreadsheet interpolation ('Goal Seek' in Excel). The result is an equivalent yield of 7.96% and this yield can be fed back in to the valuation as a check.

Term (contract) rent (£)	200,000	
YP for initial term of 4 years @ 7.96%	3.3150	
		662,995
Reversion to estimated MR (£)	250,000	
YP in perpetuity deferred 4 years @ 7.96%	9.2457	
		2,311,416
Valuation (£)		2,974,411

For the sake of completeness this reversionary freehold is also valued using a core and top-slice approach.

Core rent (£)	200,000	
YP in perpetuity @ 8%	12.5000	
		2,500,000
Top-slice: uplift to estimated MR (£)	50,000	
YP in perpetuity @ 8.5%	11.7647	
PV £1 4 years @ 8.5%	0.7216	
		424,455
Valuation (£)		2,924,455

Then, moving from the ARY approaches to the DCF technique, the reversionary freehold is valued using the short-cut DCF approach.

Term (contract) rent (£)	200,000	
YP for initial term of 4 years @ 10%	3.1699	
		633,973
Reversion to estimated MR (£)	250,000	
Compounded over 4 years @ 2.33% pa	1.0965	
PV £1 4 years @ 10%	0.6830	
YP in perpetuity @ 8%	12.5000	
		2,340,481
Valuation (£)		2,974,454

And lastly the rack-rented freehold is valued using a full DCF.

Year	Net cash-flow (£)	Growth rate of 2.33%	Estimated cash flow (£)	PV £1 @ target rate of 10%	Discounted income
1	250,000	1.0000	250,000	0.9091	227,273
2	250,000	1.0000	250,000	0.8264	206,612
3	250,000	1.0000	250,000	0.7513	187,829
4	250,000	1.0000	250,000	0.6830	170,753
5	250,000	1.0000	250,000	0.6209	155,230
6	250,000	1.1221	280,526	0.5645	158,349
7	250,000	1.1221	280,526	0.5132	143,954
8	250,000	1.1221	280,526	0.4665	130,867
9	250,000	1.1221	280,526	0.4241	118,970
10	250,000	1.1221	280,526	0.3855	108,155
10-perp	250,000	1.2591	3,934,728 [a]	0.3855	1,517,008
Valuation (£)					3,125,000

[a] This is the projected rent capitalised in perpetuity at an exit yield of 8%, i.e. (250,000×1.2591)/0.08

We are going to concentrate on the reversionary investment first and look at the impact on the valuation of plus and minus 5% and 10% shifts in the market rent estimate and the all-risks yield estimate in the ARY equivalent yield model. We will then look at the same magnitude shifts in the target rate, market rent and growth rate estimates in the short-cut DCF model. This sort of analysis can be set up on a spreadsheet and Table 16.1 shows the results of the downside or pessimistic shifts in the key variables using the ARY (equivalent yield model) and Table 16.2 shows the results using a short-cut DCF.

So we can see how sensitive the valuations are to changes in these input variables. The ARY valuation is very sensitive to movements in the ARY whereas the DCF valuation is much less sensitive to changes in the target rate.

16.3.5 Scenario testing and discrete probability modelling

Scenario testing extends sensitivity analysis by taking a range of possible values for the key variables and combining them to produce a range of possible valuations. The difference between sensitivity analysis and scenario testing is that the latter examines the impact on value of simultaneous changes to several variables and therefore begins to give a more realistic representation of how the key variables might respond to economic changes. It creates specific pictures (scenarios) of the future as a means of reflecting uncertainty. It is usual to test optimistic, realistic and pessimistic scenarios but special attention is paid by investors and lenders to the pessimistic scenario because, for obvious reasons, they are particularly concerned with the 'downside potential' of the investment. They are therefore known as 'risk averse'.

Let's look at the rack-rented freehold investment that has been valued using a full DCF model shown above. The rack rent is £250,000 per annum, the target rate is 10%, the ARY (and exit yield) is 8% and the implied rental growth rate is 2.33% per annum. The valuation is £3,125,000. Now consider some discrete

Table 16.1 Sensitivity analysis of reversionary freehold valuation (ARY equivalent yield).

Variable	% change	Value change	Valuation	% change in valuation
MR	−5%	237,500	2,858,840	−3.89%
	–	–	2,974,411	–
	−10%	225,000	2,743,269	−7.77%
ARY	+5%	8.36%	2,826,143	−4.98%
	-	–	2,974,411	–
	+10%	8.76%	2,691,038	−9.53%

Table 16.2 Sensitivity analysis of reversionary freehold valuation (short-cut TRR).

Variable	% change	Value change	Valuation	% change in valuation
TRR	+5%	9.50%	2,970,854	−0.12%
	+10%	9.00%	2,967,146	−0.25%
MR	−5%	237,500	2,857,430	−3.93%
	−10%	225,000	2,740,406	−7.87%
Rental	−5%	2.21%	2,963,420	−0.37%
Growth	−10%	2.10%	2,953,408	−0.71%

scenarios where the shifts in estimated market rent, growth rate, ARY and exit yield shown in Table 16.3 are assumed.

This is an improvement on sensitivity analysis and allows the valuer to ‘bookend’ the valuation but it still does not give any idea of the likelihood that any of these discrete outcomes might actually occur. To do that, we need to assign some measure of probability or likelihood to each scenario. Take the three valuations in the scenario summary above, round them and add two more scenarios that fall in between the two extremes, as shown in Table 16.4. Note that neither the distribution of valuations nor the probabilities themselves have to be symmetrical about the middle or realistic valuation – in fact here we have a distribution of valuations that is skewed towards pessimism and a counter-balancing set of probabilities that are skewed towards optimism. This highlights the main drawback with this type of analysis – a lack of objective market evidence on which to base selection of probabilities, even if the scenarios have been very carefully constructed, but the process does focus the mind on the likelihood of achieving predicted returns. For example, a prime shop property and an old factory may yield the same return but how likely is the latter to be achieved relative to the former? In other words, how risky is the return? Discrete probability modelling does not properly reflect the uncertainty or risk that might be associated with the expected cash-flows – it calculates an expected value rather than a measure of variation or uncertainty. To illustrate what this means, consider the property investment in Table 5.15 alongside another, these are Property 1 and Property 2 in Table 16.5.

Table 16.3 Scenario summary.

	Realistic	Optimistic	Pessimistic
Changing Variables:			
ARY	8.00%	7.80%	8.20%
MR	250,000	260,000	240,000
Growth Rate	2.33%	3.00%	1.50%
Exit Yield	8.00%	8.00%	9.00%
Valuation (£)	3,125,000	3,291,995	2,803,269

Table 16.4 Discrete scenarios with probabilities.

Scenario	Valuation (£)	Probability (Σ100%)	Weighted valuation (valuation x probability)
Pessimistic	2,800,000	2%	2,800,000 x 0.02
Slightly pessimistic	3,000,000	18%	3,000,000 x 0.18
Realistic	3,125,000	60%	3,125,000 x 0.60
Quite optimistic	3,200,000	15%	3,200,000 x 0.15
Optimistic	3,300,000	5%	3,300,000 x 0.05
Weighted average valuation (£)	(Σ weighted valuations)		3,116,000

Table 16.5 Risk and discrete probability modelling.

Property 1			Property 2		
Valuation (£)	**Probability**	**Weighted valuation**	**Valuation (£)**	**Probability**	**Weighted valuation**
2,800,000	2%	56,000	-80,000	5%	-4,000
3,000,000	18%	540,000	2,000,000	20%	400,000
3,125,000	60%	1,875,000	3,500,000	50%	1,750,000
3,200,000	15%	480,000	3,700,000	20%	740,000
3,300,000	5%	165,000	4,600,000	5%	230,000
Weighted average valuation (£)		3,116,000	Weighted average valuation (£)		3,116,000

The weighted average valuations are identical and, at first glance, the most probable outcome for Property 2 is £3,500,000 compared to £3,125,000 for Property 1, but closer inspection reveals that the range (volatility) of valuations for Property 1 is £500,000 and for Property 2 it is £4,680,000 and with a 5% probability of making a loss! Clearly Property 1 is more attractive to the risk-averse investor. Such an extreme would rarely occur but it serves to make the point about the limitation of calculating a weighted average from a set of discrete outcomes.

16.3.6 Continuous probability modelling and simulation

It is unrealistic to assume a small number of discrete possible valuation outcomes. In reality there would be a range of outcomes best represented by a probability curve. If the frequency distributions or probability curves for predicted valuation outcomes for Properties 1 and 2 above are assumed to be 'normally distributed' around the mean, Property 1 would have a narrower, more peaked curve indicating lower volatility whereas Property 2 would have a flatter, wider curve indicating higher volatility. Standard deviation measures this volatility; the smaller the standard deviation of a distribution the less volatile it is.

Let's assume that we have asked 50 valuers to value Properties 1 and 2 from section 5.4.3 above and the mean valuation for Property 1 was £3,200,000 with a standard deviation of £500,000 and for Property 2 the mean valuation was £3,500,000 but with a much higher standard deviation of £1,000,000. The 'coefficient of variation' is a useful measure of volatility because it gives a percentage variance for one standard deviation either side of the mean and is useful for comparing projects whose expected values (means) are not equal. It measures dispersion relative to the mean. The coefficient of variation for Property 1 is 15.63% and for Property 2 it is 28.57%. Property 1 is less volatile by both standard deviation and coefficient of variation measures.

So far we have looked at assigning probabilities to the valuation outcomes but what about the values chosen for the key input variables? At the moment they are point estimates too but could they not take one of a possible range of values with some more likely than others (Sayce et al., 2006)? Would they not be better modelled as probability distributions? Now we enter a whole universe of concurrent probability distributions of variables that might be correlated and we need computer power to help in the form of a simulation program. Simulation enables valuers to assign probabilities to input variables in the valuation and run simulations of most likely combinations of values of these input variables in order to produce a probability distribution and associated confidence range for the output valuation. Statistics that quantitatively summarise the uncertainty surrounding the valuation output can then be calculated. Most notably these would include a mean valuation and a measure of dispersion, usually the standard deviation.

Simulation involves a series of steps:

a) Build a valuation model and identify key variables
The valuation might be constructed using an ARY or DCF technique and the best estimates of the input variables are likely to be used when constructing the model. These input variables can be classified as either deterministic variables, which can be predicted with a high degree of certainty, or stochastic variables, which cannot be predicted with a high degree of certainty. Generally the stochastic variables that have a significant impact on the valuation are the ones on which simulation is likely to be run. Deterministic variables might include the rent review period, purchase and management costs. Key stochastic variables will include the ARY, market rent, rental growth rate and exit yield. The target rate of return is unlikely to vary. When looking at flexi-leases in particular it may be wise to simulate different void periods and associated costs too.

b) Ascribe a range of probable values or probability distribution for each key input variable
Each key variable needs to be represented as a probability distribution rather than a point estimate. A probability distribution is a device for presenting the quantified risk for the variable. Ideally the estimation of probability distributions for key variables would be based on empirical evidence but often the data are not available in a sufficient quantity to allow this. A pragmatic alternative is to gather opinions of possible values of each variable, along with their probability of occurrence, from experts. These expert opinions could then be used to select an appropriate probability function, of which there are many. The probability functions that are typically chosen are the continuous 'normal' distribution (in which case a mean and standard deviation would need to be specified) and the closed 'triangular' distribution (in which case the mode, minimum and maximum values would need to be specified). A useful characteristic of the triangular distribution is that, unlike the normal distribution, symmetry does not have to be assumed; the maximum and minimum values do not have to be equally spaced each side of the mode. In this way the triangular distribution might offer a more realistic representation than the normal distribution if more upside or downside risk is expected.
The input variables may also be independent or dependent. An independent variable is unaffected by any other variable in the model whereas a dependent variable is determined in full or in part by one or more other variables in the model. Different degrees of interdependence can significantly affect the simulation result. It is therefore necessary to specify the extent to which the input variables are correlated. Sayce et al. (2006) note that significant research is needed in this area to establish an empirical base for correlation assumptions, particularly, as Byrne (1996) points out, correlations may be non-linear. This is especially pertinent in the case of development valuation which we will look at in the next chapter because, unlike the valuation of standing property investments, which typically involves a small number of key variables, development valuation can incorporate a large number of correlated input variables. McAllister (2001) points out that, in general, as correlation reduces, the mean and standard deviation increase, but this is not proportionate since the covariance also increases.

c) Run simulation
Having selected the key variables and their probability distributions the simulation can begin. Simulation refers to the method whereby the distribution of valuation outcomes is generated by recalculating the valuation model many times, each time using different randomly sampled combinations of values from within the parameters of the probability distributions of the key stochastic variables.[4] In other words, because some values of key variables will have a greater probability of being achieved than others, the sample selection procedure ensures that they appear more frequently. This simulation process determines the range and probability of the valuation outcome.

d) Output
When setting up the simulation program the uncertain output variable in the valuation model would have been specified; invariably, this will be the

valuation figure. The simulation results will provide information about the distribution of the output variable, including its central tendency (mean, median, mode), spread (range, standard deviation) and measures of symmetry (skewness) and peakedness (kurtosis). Regression analysis is also undertaken to rank the input variables in terms of their impact on the output valuation.

Let's look at two examples using the @RISK simulation software add-in to Microsoft Excel. The first example is a short-cut DCF valuation of a rack-rented freehold property investment recently let on conventional lease terms. Our best estimates of the key variables are an ARY / exit yield of 8%, a market rent of £50,000 per annum and a rental growth rate of 2.5% per annum. An ARY valuation would produce a capital value of £625,000 and, assuming a target rate of return of 10%, a point estimate DCF valuation would generate a figure of £631,149 (shown below) – a higher figure because the explicit growth rate of 2.5% was used instead of the rate of 2.33% implied by an ARY of 8% and a target rate of 10%.

Market rent (£)		50,000	
YP 5 years @ 10%		3.7908	
			189,539
Reversion to market rent (£)	50,000		
Growth rate over 5 years @ 2.5%	1.1314		
		56,570	
YP in perpetuity @ 8%		12.5000	
PV £1 for initial term @ 10%		0.6209	
			439,072
Valuation (£)			628,612

We are now going to introduce some uncertainty into three key variables in the above valuation. The exit yield has a triangular distribution with a mode of 8%, a minimum value of 6.5% and a maximum of 9%. Both the market rent and rental growth rate are normally distributed with a mean of £50,000 and standard deviation of £5,000 in the case of the former and 2.5% and 1% respectively for the latter. Correlations between these variables are subjectively chosen and specified in Table 16.6.

The second example is an identical property but this time recently let on flexible lease terms that incorporate a break option at the end of year five. If we value this

Table 16.6 Correlation matrix.

	All risks yield / Exit yield	Market rent (£)	Growth rate (explicit)
All risks yield / Exit yield	1		
Market rent (£)	−0.5	1	
Growth rate (explicit)	−0.5	0.5	1

property using a short-cut DCF and assume a void of one year at the end of year five but keeping the values of all other variables the same, the valuation would be as follows:

Market rent (£)		50,000	
YP 5 years @ 10%		3.7908	
			189,539
Void for 1 year			
Reversion to market rent (£)	50,000		
Growth rate over 6 years @ 2.5%	1.1597		
		57,985	
YP in perpetuity @ 8%		12.5000	
PV £1 for initial term plus void @ 10%		0.5645	
			409,135
Valuation (£)			598,675

Clearly, uncertainty surrounds the exercise of the break option and so simulation will allow this uncertainty to be quantified by representing the length of any void period that may occur after the end of year five as a probability distribution based on the inverse Gaussian function with a mean of one year and a standard deviation of one year.

Ten thousand iterations were run and the valuation outputs from the conventional and flexi-leased properties are shown below. The optimistic skew of the exit yield distribution has increased the mean valuation of both properties approximately £15,000 above the original point estimates. In both cases the standard deviation around the mean was just under £100,000. Figure 16.2 and the skewness value in Table 16.7 reveal that both output distributions are positively skewed, the property let under standard lease terms slightly more so. This is because the exit yield, which is itself positively skewed, explains more of the variation in value of the standard let investment, as shown in Table 16.8.

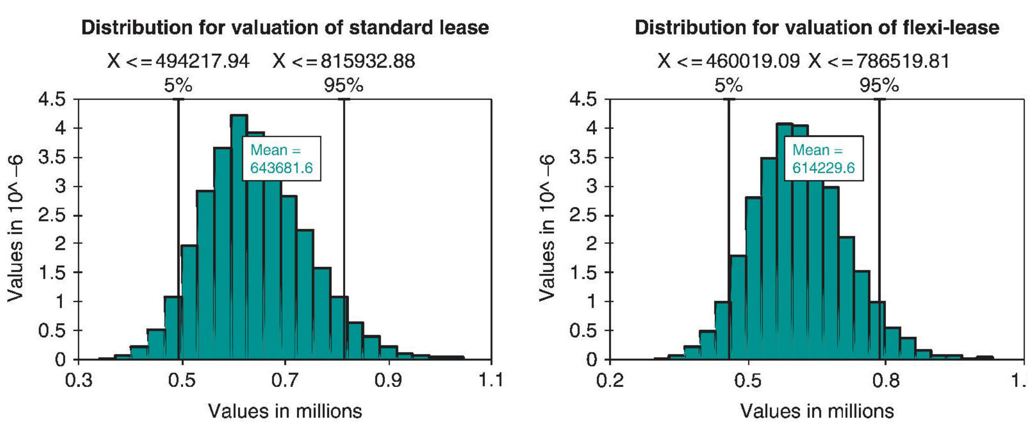

Figure 16.2 Valuation probability distributions.

Table 16.7 Summary statistics.

	Standard lease	Flexi-lease
Mean (£)	643,682	614,230
Std Dev (£)	98,214	99,581
Skewness	0.3573	0.3134
Kurtosis	3.1323	3.1511

Table 16.8 Sensitivity.

	Standard lease		Flexi-lease	
	Regression	Correlation	Regression	Correlation
Market rent	0.651	0.918	0.612	0.875
Exit yield	−0.314	−0.737	−0.290	−0.710
Growth rate (explicit)	0.224	0.686	−0.265	−0.220
Void period	–	–	0.247	0.681

The 'regression' column in Table 5.19 reports standardised regression (beta) coefficients for the input variables. A coefficient of 0 indicated no significant relationship between the input and the valuation while a coefficient of +1 or −1 indicates a+1 or −1 change in the standard deviation of the valuation for a+1 or −1 change in the standard deviation of the input. The 'correlation' column reports Spearman's rank-order correlation coefficient[5] which can vary between −1 and +1. These two extremes would indicate a perfectly negative and a perfectly positive correlation respectively whereas a coefficient of 0 indicates no correlation at all. It is important to examine the signs of the coefficients to be sure that the correlation is in the right direction. If the R-squared value reported by the regression results is high the relationship between the input and output variables is linear. If the R-squared value is low the relationship is non-linear and Rank-order correlation should be analysed to determine the sensitivity of the model. Remember, though, that this is an illustration and, because of the lack of evidence to support the correlations between the input variables, it should not be regarded as a practical application.

16.3.7 Arbitrage (tenant yield approach)

Simulation techniques allow the impact of uncertainty surrounding key input variables to be examined. One variable was not considered to be uncertain, however, and this was the target rate of return. The assumption was that the investor would know what this was and would stick to it. But what if the target rate is not set in stone over the holding period for the investment? Different portions of forecast cash-flows – the rent agreed for the first five years and the rent agreed at the first rent review for example – may have different levels of risk and therefore different target rates (Appraisal Institute, 2001). To consider the valuation implications of this we can use an option pricing technique known as **arbitrage.**[6]

The arbitrage valuation technique was first applied to property investment by French and Ward (1995) and is based on the premise that each part of a cash-flow from any investment should be valued by comparing it with other assets with similar risk characteristics (Havard, 2000): think of how you might 'lay off' a bet. Like the short-cut DCF valuation technique, when applied to property, the arbitrage valuation technique adopts a term and reversion approach. But, instead of using a yield based on property risk factors to capitalise the term income, the arbitrage approach uses a low discount rate that is based on tenant risk factors. In other words the term income is regarded as comparable to income from an illiquid bond based on the tenant's default risk. The value at reversion is based upon the capitalisation of the rent at an ARY, representing a notional sale at this point. The arbitrage technique differs from the short-cut DCF technique in its approach to the deferral of this notional sale value and the rental value on which it is determined.

The short-cut DCF technique uses a constant (average) growth rate to project the market rent at the review date and a single target rate to discount all cash-flows, and this can distort the risk profile into the future by putting less relative weight on distant cash-flows (Crosby, 1996). The arbitrage approach questions the appropriateness of using a single target rate and suggests that it should be based on debt and equity components of the financing package used to purchase the investment. French and Ward (1995) derive two target rates that can be used to discount the term and reversion components of a reversionary property investment. Two rates are justified on the basis that the term income is known and therefore certain whereas future reversions must be estimated. From the tenant's viewpoint the term rent is certain over the initial term and so the financial liability is equivalent to interest payments on any fixed income loan and can therefore be valued using a discount rate appropriate for such payments. From the landlord's viewpoint an additional risk premium might be appropriate to reflect illiquidity and tenant default risk.

Consider a rack-rented freehold property investment let at £100,000 per annum and for which the ARY is 8%. From the tenant's perspective there is a contractual obligation to pay £100,000 per annum rent for the first five years. If the bank lending rate is 10% per annum, then

$$£100{,}000 \times \text{YP 5 years @ } 10\% = £379{,}079$$

In valuing the second term the tenant is not certain of the rent in five years' time but needs to estimate the amount that should be invested now to provide funds to offset the rental liability when known. Arbitrage principles suggest the tenant should find an asset with the same risk characteristics as the rent liability and then value the second term by investing in that asset at today's price. The arbitrage investment is to invest in a similar freehold and, to match the liability of the second five-year term, the tenant would notionally invest in the proportion of the freehold which would provide the first five years of rent, i.e. £379,079/£1,250,000[7] or 30.326% of the value of the freehold. This notional investment is 'held' for five years and then 'sold'. Whatever the value of the freehold the sum realised will, assuming constant yields and rates, be sufficient to offset the financial liability of the second term. So if the tenant owns 30.326% of the freehold he would receive 30.326% of the rent each year, i.e. £30,326 per annum which, when capitalised for five years at 10%, equals £114,961. The total cost of the investment is therefore £379,079 – £114,961 = £264,118. This process can be repeated to value subsequent terms but if, as French and Ward (1996) suggest, we assume that the arbitrage valuation must equal a more conventional valuation then we can use the following formula to derive a reversion rate known as the 'deferred capital yield' (DCY) either by iteration or by formula.

a) *By iteration*
A conventional ARY valuation of the property, assuming an ARY of 8% and a market rent of £100,000 per annum, would produce a capital value of £1,250,000. This valuation needs to be broken down to differentiate the target rates used to capitalise the known and unknown cash-flows. As before, assume a discount rate of 10% for the known rent over the first five years. Knowing the capital value of the cash-flow over the first five years (£379,080), the overall valuation (£1,250,000) and that the rent on reversion will be capitalised into perpetuity at ARY of 8%, it is possible to calculate the appropriate DCY by iteration (Havard, 2000).

Term (£)	100,000	
YP 5 years @ 10%	3.7908	
		379,080
Reversion (£)	100,000	
YP perpetuity @ 8%	12.5000	
PV £1 5 years @ 7.49% [a]	0.6967	
		870,920
Valuation (£)		1,250,000

[a] *Rate obtained by iteration*

b) *By formula*

$$1 + DCY = Term\sqrt{\frac{1}{1-(r_a.YPterm, r_f)}} \qquad [16.1]$$

Where Term = period to revision
r_a = all risks yield
r_f = low-risk TRR

Substituting the values as above into Equation 5.11 the DCY is 7.49% (French and Ward, 1996).

To recap, the arbitrage valuation technique is based on the assumption that the value of the whole is equal to the sum of the term and reversion components. The capital value of the unknown rent after the first review is calculated by capitalising the term rent using a low-risk yield and deducting this from the total capital value of the subject property or a comparable. The resultant reversionary value can be analysed for the DCY. An arbitrage valuation thus proceeds as follows:

$$PV = (CR \times YP \text{ for term}) + (MR \times YP \text{ in perpetuity} \times PV \text{ for term})$$

$$= \left[CR \times \left(\frac{1-(1+r_t)^{-n}}{r_t}\right)\right] + \left[\frac{MR}{r_a(1+DCY)^n}\right] \qquad [16.2]$$

Where CR = Contract rent for term
MR = Market rent
r_t = target rate of return
n = period to next rent revision

French and Ward (1996) show how the arbitrage method can also be applied to the valuation of reversionary property investments. A comparable (but this time reversionary) freehold property investment let one year ago at £80,000 per annum has been valued using a short-cut DCF technique. The target rate is 12% and the ARY is 8%, giving an implied rental growth rate of 4.63% per annum.

Term rent (£)	80,000	
YP 4 years @ 12%	3.0373	
		242,984
Reversion to MR	100,000	
Growth @ $(1.0463)^4$	1.1985	
PV 4 years @ 12%	0.6355	
YP perpetuity @ 8%	12.5	
		952,058
Valuation (£)		1,195,042

However, the DCF approach still fails to recognise the different risk profiles of the known and unknown cash-flows. Using the DCY calculated above for the rack-rented comparable, the arbitrage valuation is:

Term rent (£)	80,000	
YP 4 years @ 10%	3.169	
		253,590
Reversion to MR	100,000	
PV 4 years @ 7.494%	0.748	
YP perpetuity @ 8%	12.5	
		936,190
Valuation (£)		1,189,780

This is a growth-implicit arbitrage valuation. A growth-explicit arbitrage valuation can be produced by inflating the DCY at the implied rental growth rate g (4.63%) to produce a capital yield (CY) as follows:

$$(1+\mathrm{CY}) = (1+\mathrm{DCY}) * (1+g) \quad [16.3]$$

$$(1+\mathrm{CY}) = 1.07494 * 1.0463$$

$$\mathrm{CY} = 12.47\%$$

And the valuation would be as follows:

Term (£)	80,000	
YP 4 years @ 10%	3.169	
		253,590
Reversion (£)	100,000	
Growth @ 4.63% pa	1.1985	
YP perpetuity @ 8%	12.5000	
PV £1 4 years @ 12.47%	0.6250	
		936,328
Valuation (£)		1,189,918

Table 16.9 (*Source: French and Ward*, 1995).

		(a) Arbitrage		(b) DCF	
Years	**Rent (£) [1]**	**YP**	**PV (£)**	**YP @ 12%**	**PV (£)**
0–3	80,000	4 years @ 10%=3.1699	253,589	4 years @ 12%=3.0373	242,987
4–8	119,859	5 years @ 10%, discounted @ 12.47% for 4 years=2.3687	283,912	5 years @ 12%, discounted @ 12% for 4 years=2.2909	274,584
9–13	150,316	5 years @ 10%, discounted @ 12.47% for 9 years=1.3159	197,812	5 years @ 12%, discounted @ 12% for 9 years=1.300	195,399
14–18	188,514	5 years @ 10%, discounted @ 12.47% for 14 years=0.7310	137,823	5 years @ 12%, discounted @ 12% for 14 years=0.7376	139,049
19–23	236,418	5 years @ 10%, discounted @ 12.47% for 19 years=0.4061	96,026	5 years @ 12%, discounted @ 12% for 19 years=0.4185	98,950
24–perp	296,495	Perp @ 8%, discounted @ 12.47% for 24 years=0.7441	220,629	Perp @ 12%, discounted @ 12% for 24 years=0.8235	244,163
Valuation (£)			1,189,791		1,195,132

[1]Growing at 4.63% per annum

Table 16.9 compares full growth-explicit DCF valuations of the reversionary property investment assuming (a) target rates based upon arbitrage principles and (b) a constant target rate of return.

Although the valuations are roughly the same, the values of each term differ. The arbitrage value for the first term is higher because the income is discounted at the low-risk yield of 10% rather than the uniform target rate of 12%. Then, in the arbitrage approach, subsequent terms are discounted at 12.47% rather than 12%. It could be argued that if the rent passing was significantly below market rent the discount rate applied to the term could be even lower to reflect the reduced risk of tenant default. The arbitrage approach thus requires consideration of the risk profile of the term and reversion incomes. When valuing rack-rented freeholds both approaches will produce the same answers.

The arbitrage method of property valuation has not been widely adopted in practice. The selection of an appropriate target rate for the known initial term rent is subjective (French and Ward, 1996) and the technique still requires good comparable evidence, although not so much if the period to reversion is long and therefore a significant part of the rental value is capitalised at a bond rate (Havard, 2000). Simulation and arbitrage valuation techniques push the boundaries of market data analysis to the limits. That is no reason to dismiss them; rather it should act as a spur to the continued improvement of property data so that these techniques may be developed and refined.

Part C

Key points

- Structural changes in the economy during the 1990s brought about by low inflation, increased uncertainty, changing business structure, developments in ICT and globalisation led to a decrease in lease lengths, increased use of break clauses and other options, plus increased use of incentives. All of this leads to more complex valuations. Investors may now be faced with two options; investing in much shorter leases with break clauses or investing in sale and leasebacks to corporate occupiers. The latter may be 25 to 35-year leases and on inflation-linked rent reviews.
- In terms of valuation there are problems with the ARY technique when valuing properties let on flexi-leases, over-rented property and properties not let at market rent due to inducements. A short-cut DCF technique solves many of the problems associated with the ARY technique, is mathematically consistent and explicit regarding the target rate and growth assumptions at least until the first review. Its inputs are also largely derived from market evidence and should therefore produce a market valuation (Havard, 2000).
- With a full DCF, more assumptions have to be made and reliance on simple market ratios and other information is reduced – the valuation starts to become an appraisal. Such a method may produce a wider variation of answers depending on the assumptions made. Consequently a full DCF may be appropriate when valuing complex properties with few comparables.
- Valuation variance has been identified in empirical studies of valuation practice. The courts accept that a degree of variance is inevitable through the adoption of the margin of error principle. To an extent, because of the expert witness process in the courts, it is axiomatic that valuers also accept the existence of valuation variance. Indeed, Crosby et al. (1998) state that the margin of error principle was conceived by expert witnesses who are, by definition, experienced valuers.
- 100% valuation accuracy is an unattainable goal. Annual research funded by the RICS helps quantify the extent of valuation inaccuracy and demonstrated a degree of openness that is to be applauded. Only by learning more about the nature and extent of valuation inaccuracy can methods to deal with valuation uncertainty be developed.
- Simulation is a logical extension of sensitivity analysis, scenario testing and discrete probability modelling that adds a quantitative measure of risk to a single point estimate of value. It does this by assigning probability distributions to key input variables. The drawback with this type of analysis at the moment is the lack of evidence on which to base these distributions and any correlations between them. Nevertheless, the discipline of building a 'risk aware' simulation model can lead to a deeper understanding of the nature of the property investment under consideration.
- Short-cut DCF and arbitrage approaches go some way to assigning the correct value of various parts of the cash-flow but do not address the issue of volatility of future cash-flows.

Notes

1. Ordinary least squares but this time regressing price on value, normalising for size by using price or value per unit area as last time but, unlike Brown, using these in their untransformed state rather than taking logs.
2. When using statistical techniques such as ordinary least squares regression a number of assumptions are typically made. One of these is that the error term has a constant

variance. This will be true if the observations of the error term are assumed to be drawn from identical distributions. Heteroskedasticity is a violation of this assumption.

3. The valuations were adjusted for market movement between the valuation date and sale agreement date by increasing or decreasing the valuation according to movements in the IPD capital growth index for the relevant market sector. Percentage difference between valuation and sale price was found by applying the following formula: Difference=(price – adjusted valuation) / price.
4. Havard (2000) provides a useful illustration of how this process works in the case of two variables; annual rental growth rate and exit yield to which discrete probabilities have been assigned, as shown below:

Annual rental growth rate			Exit yield		
%	Probability	Cumulative probability	%	Probability	Cumulative probability
0	2	1–2	7.75	1	1
1	5	3–7	8.00	4	2–5
2	7	8–15	8.25	7	6–12
3	10	16–25	8.50	10	13–22
4	15	26–40	8.75	15	23–37
5	21	41–61	9.00	21	38–58
6	15	62–76	9.25	15	59–73
7	10	77–86	9.50	10	74–83
8	7	87–93	9.75	7	84–90
9	5	94–98	10.00	5	91–95
10	2	99–100	10.25	5	96–100

The simulation program randomly selects from the cumulative probability distribution for each variable. If we assume 22 was randomly selected for rental growth and 67 for the exit yield. This would equate to 3% rental growth rate and an exit yield of 9.25%. These sample values are then input into an iteration of the valuation model.

5. Rank-order correlation calculates the relationship between two data sets by comparing the rank of each value in a data set. To calculate rank, the data are sorted from lowest to highest and assigned numbers (ranks) that correspond to their position in the order.
6. Arbitrage refers to the activity of market traders who compare the prices of similar assets, selling or buying to realise profits if the prices are out of line with one another. The principle is best known in foreign exchange markets.
7. Market rent of £100,000 per annum capitalised at an assumed freehold ARY of 8%.

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Part D
Appraisal

It is easy to become confused by the terms that are used to describe various concepts surrounding price, value and worth. One important distinction to draw at the beginning of this Section is between a market valuation and an appraisal of worth. You may remember that, in Chapter 1, we made a distinction between value-in-exchange and value-in-use. In economic terms market value is equivalent to value-in-exchange and worth is equivalent to value-in-use. Furthermore, a market *valuation* is an estimation of exchange price that relies on the interpretation of market information, which is usually available in the form of comparable evidence. An appraisal of worth, or *appraisal* for short, is an estimation of worth to a specific individual at a certain time and usually involves an assessment of personal circumstances, together with wider property and market factors, to consider the risk and return characteristics of some property-related decision that is being made. These personal circumstances might encompass:

- the financial resources available for a property acquisition, including the split between debt and equity finance
- the timescale for holding a property asset, referred to as a holding period by investors (as encountered in Chapter 6) or a write-off period by business occupiers
- the tax position, personal tastes and specific requirements of the decision-maker

These specific requirements may relate to the way in which the property is to be managed if it is to be held as an investment (a small-scale niche investor may wish

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to manage the property much more actively than a large institutional investor) or the way in which the property might be used by an occupying business. Wider considerations relating to the investment portfolio of an investor or the property estate of an occupier will also need to be considered. Moreover, all of these issues must be considered in the light of the macro-economy.

In a perfect market, where buyers and sellers have instant access to market information, their economic requirements are identical and properties are homogeneous, we could assume that market participants would arrive at similar decisions and thus individual appraisals of worth might converge on a market value. In other words there would be no difference between exchange prices, market valuations and appraisals of worth for each homogeneous property. However, the property market and its primary sectors (development, occupation and investment) are not perfect; the product is heterogeneous, as are buyers and sellers, and there are many typologically and geographically distinct sub-markets, as we know from Chapter 1. These last two chapters shift the focus from market valuations to appraisals of worth for real estate investments. Chapter 17 considers appraisals of standing investments and Chapter 18 considers development opportunities.

Chapter 17
Investment Appraisal

17.1 Introduction

Methodologically, appraisals of worth have tended to ignore the simple comparison-based techniques that have been used in valuation for many years. These essentially backward-looking techniques focus on the analysis of past transactions in order to support an estimate of current market value, as illustrated in Figure 17.1.

Instead cash-flow techniques and other sophisticated approaches that have been adapted from other financial markets are used. In recent years the economic basis of market value – supply, demand and equilibrium price – has been extended to include a more analytical treatment of the pricing decision and the distinction between valuation and appraisal has blurred. Cash-flow modelling seeks to quantify not only the price at which a property might exchange in a market situation but also the criteria on which such pricing decisions are made; for example the required rate of return, the holding period for the property and risk factors. These concepts were considered in detail in Chapter 5 and will be revisited here from the perspective of an appraisal rather than a valuation. An appraisal is usually performed by determining the risk and return characteristics associated with holding the property and often includes a valuation, forecasting of key variables and some form of performance analysis. For an investor the future income stream, quality of the tenant and property are important. For a business property appraisal undertaken on behalf of an occupier, the cost of the property as a factor of production or its contribution to profit as well as its future sale price or write-off cost will need to be considered. An appraisal of worth can be undertaken for different clients for different reasons. For example, a pension fund may need to know how an asset might contribute to portfolio performance whereas a property company might be more interested in a building's redevelopment potential. An occupier will

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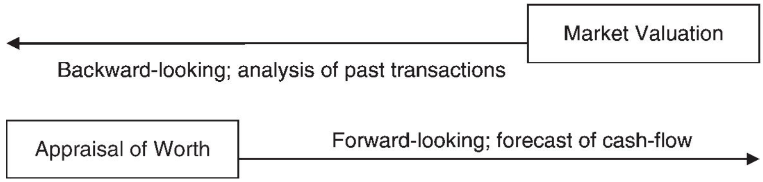

Figure 17.1 Valuation and appraisal.

evaluate the business requirements and the cost of debt and equity capital amongst other things. The aspirations and therefore the appraisal assumptions (such as discount rate, holding period, and so on) will undoubtedly vary to some degree. Having said this, groups of similar types of investors and occupiers will behave in a similar way, such as institutional investors, and so certain assumptions can be made.

It is therefore normal for a range of appraisals of worth to exist for a property but only one exchange price. Differences between price or value of a property and its worth to an individual emerge because of different perceptions about either the utility to a business or potential return to an investor that the property may offer. Perceptions may vary in terms of the how the utility or return will vary over time (its volatility) and how long that utility or return will last for. So worth and value can be different and provide evidence of mis-pricing from the perspective of certain decision-makers. This leads on to the debate concerning market efficiency and the fact that the property market offers opportunities for buyers to exploit pricing inefficiencies, mainly due to informational gaps and inaccuracies. Also, market correction is likely to be slower than is the case for other more liquid investment markets such as equities and bonds.

Ball et al. (1998) claim that 'the influence of valuations on price and the focus on price estimation, rather than worth, can lead to systematic mispricing.' What is being suggested is that because property is a thinly traded and heterogeneous investment asset or factor of production, valuers are not only *interpreting* market prices when attempting to estimate the market value of a property, they are also *influencing* them. Not only that, what is being suggested is that valuers' methods have erroneously focused on price estimation rather than worth appraisal – looking too much at market price data rather than the fundamental requirements of clients. These criticisms are harsh but not unfounded: conventional valuation techniques are increasingly being supplemented and in some cases replaced by contemporary approaches that place more reliance on client fundamentals than market signals. But it should be remembered that valuation must always have interpretation of market activity at its heart and market-generated price signals will always provide a very reliable source of intelligence. It is important to distinguish, then, between market value and worth; the latter is worth to a particular buyer, which may coincide with market value if the buyer's decision criteria are typical of other buyers in the market. Apart from the latter stages of Chapter 6, this book has been about property valuation. In Chapter 6 we did move into the world of appraisal by attempting to estimate and evaluate developer's profit as well as market exchange price. This chapter extends the consideration of appraisal to cover not only development but also investment and business appraisal too.

Much of the research effort and practical development of worth appraisals to date has concentrated on appraisals of investment worth. In simple terms, an investor considering the purchase of a property investment needs to compare its asking price with his or her own assessment of worth. Similarly, a holder of a property investment would periodically compare its worth to its market value. This helps the investor decide whether to hold, refurbish, redevelop or dispose of the property. Property investment appraisals are also required to help choose between different investment opportunities, to assess the viability of redevelopment or refurbishment projects and as a decision tool for financing arrangements.

17.2 Appraisal information and assumptions

Investment appraisal involves making explicit judgements (based on evidence) about depreciation, risk, expenditure, exit value, any rental growth, taxation, financing and all costs.

Information needs range from the property-specific to the macro-economic. Box 17.1 is an attempt to classify the information typically sought prior to conducting an appraisal of worth.

This is a lot of information to assimilate and many of these factors can be grouped together and handled by adjusting either the cash-flow or the target rate of return. Nevertheless it is important to concentrate on those factors considered to affect the assessment of worth to the greatest extent, in other words the most important or value significant factors. This concept of focusing analysis on key variables was introduced in Chapters 5 and 6 when we looked at sensitivity analysis and simulation. In fact an investment appraisal may be less volatile than a development appraisal (which we looked at in Chapter 6) because there are fewer key variables and changes in these variables are often less pronounced. This results in a more stable cash-flow. In an investment appraisal the key factors are rent, target rate of return, holding period and exit yield. These have been discussed in Chapter 5 and we will expand on that discussion here in the context of appraisal.

17.2.1 Rent and rental growth

The rental value and rental growth must be identified. Associated variables include timing of rent reviews, the length of the lease, the existence of any break options and the level of management costs, taxation and inflation. Investors are interested in income from all real estate revenue streams less all expenditures and the calculation may proceed as follows:

Net operating income (NOI):
Area x rent per unit area
Plus any turnover rent
Plus any ancillary income
Less vacancy costs
Less non-reimbursable expenses such as insurance, utilities, management, etc
Less voids (e.g. 1–2% of ERV) to reflect non-payment of rent and other revenue

Box 17.1 Typical appraisal information

Information	Example
Economic indicators	Economic output (GDP, GNP) Employment and unemployment statistics Movements in corporate profits (by sector), money supply, public sector borrowing, inflation, and interest rates
Market indicators	Current market rents Rental growth and depreciation rates Future redevelopment or refurbishment costs Current yields and forecasts of exit yields Purchase and sale costs Movements in market indices
Portfolio information	Asset returns and correlations (to aid diversification) Sales and purchases Risk indicators
Property information	Physical attributes (areas, building specification, quality, improvements, ancillary space, parking, access to public transport) Financial details (yield, rent passing, rental growth, market rent and capital value) Legal terms (title and lease details, number of tenants, expiry dates, review dates and terms, break clauses, voids, future leases) Outgoings and capital expenditure (vacancies, voids, unrecoverable service and management costs, letting, re-letting and rent review costs, purchase and sale costs) Depreciation, costs and timing of redevelopment and refurbishment, cost inflation Planning Taxation (income and capital gains taxes, business rates, VAT, capital allowances) Occupancy / holding costs (management, review, purchase & sale costs) Dilapidations, service charge and other payments for repairs and insurance if leasehold
Client specific information	Target or discount rate Individual tax position (capital allowances, IHT, loan / finance tax on income and on capital gain in the form of Income Tax / CGT and Corporation Tax) Holding period Loan facilities Risk profile

Capital and leasing costs:
Capital contributions
Leasing costs
Capital expenditure/depreciation allowance

NOI – capital and leasing costs=NOI after normal reserves (i.e. unlevered cash-flow)

Deduct interest payments to get before tax cash-flow
Adjust for tax
Include acquisition cost and exit value (after tax and financing and other costs to get net sale proceeds)
Final row=total cash-flow
Calculate IRR and NPV

There have been a number of empirical studies of the impact of depreciation on rental growth and these are summarised in Crosby et al. (2012). Using a longitudinal approach Crosby et al. (2012) found that standard retail units depreciated at 0.3% per annum on average over the period 1993–2009, offices at 0.8% per annum and industrial premises at 0.5% per annum. These rates are net of annual capital expenditure rates of 0.3%, 0.5% and 0.2% per annum. The authors note considerable variation in depreciation rates for retail units when they are categorised by type.

Forecasts of market rents and rental growth are available and typically relate to prime business space in the locality concerned because the thorny issue of how rents may depreciate as premises age can be avoided. Forecasts of rents are normally undertaken in real terms and then inflation-adjusted to give nominal rental value change. These forecasts are produced at a national, regional or local level and are usually based on econometric models of the economy and the property market. Forecasts of rent and rental growth at the town level may be misleading if they are applied at individual property level. Little is known about the way that rents depreciate over time, either due to physical deterioration of the property itself or due to some form of obsolescence. There is a clear need for appraisal to allow for such items as obsolescence and deterioration but particular care is needed when considering how these phenomena affect value and it is important to ensure that double-counting does not occur. This is a frequent problem when trying to be explicit about all value influences in an appraisal. For example, if refurbishment expenditure is included in the cash-flow then any enhanced value should be reflected either in the estimated rental value, the rental growth rate or in the exit yield.

It is important to consider the potential impact of gaps or voids on the receipt of rent particularly as lease lengths shorten and break clauses become more prevalent. Of key concern is the likelihood that a tenant operates a break clause or vacates the premises at the end of a lease. Other matters then follow including the costs of holding a vacant property, the length of time to re-let and any works that need to be done to enable a new letting.

17.2.2 Target rate of return

The target rate of return from an investment must adequately compensate an investor for the risk taken. It is typically derived by adding a risk premium to a ‘benchmark’ risk-free rate of return. The risk-free rate is a baseline rate defined by reference to the return from a low-risk or risk-free asset and was conventionally derived from an examination of the income yields on medium / long dated (15–25 year) gilts. The rationale for basing the risk-free rate on this benchmark was because the term coincided with typical lease lengths. As lease lengths shorten it may be more appropriate to base this risk-free rate on short-dated gilts or five to ten year swap rates. A risk premium is added to the risk-free rate to compensate for holding a property asset. This risk premium is difficult to estimate for property as each asset is unique. Investment characteristics that are best handled by adjusting the target rate are generally market-related and include liquidity, rental growth prospects, possible yield movements and depreciation. Property-related risks include the quality of tenant, potential for letting voids, cost of ownership and management and lease structure. The financial impact of these factors can be built into the cash-flow. But determining a risk premium for each factor is difficult given paucity of data, complexity of the market and confidentiality of client data. Also the significant overlapping influence of these risk factors complicates this sort of analysis. Consequently attempting to derive risk premiums for individual property assets is not easy and not recommended. It may be more helpful to group similar types of property in order to determine a property risk premium for each group. A market risk premium can then be adjusted up or down to reflect risk associated with the sub-sector being analysed. Market and property risk premiums are added to the risk-free rate. So, for example;

risk-free rate
\+ *market risks* (sub-sector risk of market failure, such as illiquidity, poor rent or yield performance, allowance for sub-sector depreciation)
\+ *property risks* (including property-specific risks such as adjustments for tenant quality, and grouped property risks such as adjustments for sub-sector lease structures)
= *risk-adjusted discount rate*
Remaining costs (fees, management, dilapidation, etc.) are incorporated in the cash-flow

This 'risk-adjusted discount rate' approach to deriving a target rate of return is frequently used by property analysts and investors but, according to Sayce et al. (2006) there are two main limitations. First, only one discount rate is applied to all cash-flows and it therefore fails to distinguish those parts of the cash-flow that are risky and those that are not. For example, rental income return might be regarded as fairly secure whereas capital return might be considered to be more volatile over the holding period. It is possible to discount different parts of cash-flow at different rates using a 'sliced income approach' (Baum and Crosby, 1995) or an arbitrage approach (French and Ward, 1995) but such methods are not frequently used in property investment appraisal. In property valuations a core and top-slice approach is used when the risk profile of a rent changes significantly at some future date. The second limitation is that the target rate heavily discounts distant cash-flows regardless of whether they are actually more risky. It is unlikely that the growth in risk is going to be at exactly the same exponential rate as the growth inherent in the risk premium. Furthermore, cash-flow after a refurbishment or redevelopment programme is likely to be more uncertain.

There are other ways of deriving a TRR and two are explored below.

17.2.2.1 Capital Asset Pricing Model (CAPM)

An investment's expected return is assumed to be a positive linear function of risk (measured in terms of SD & variance). CAPM enables the estimation of the TRR in the light of returns available from 'risk-free' investments and market-related risk factors of the investment under scrutiny. It recognises that each investment has a different market risk which will influence its expected return. Market risk is a special type of risk related to the contribution that the asset makes to a well-diversified portfolio. The formula is:

$$E(r_n) = r_f + \beta_p \left[E(r_m) - r_f\right] \quad [17.1]$$

Where: $E(r_n)$ = expected return for a specific asset
r_f = risk-free rate
b = amount of systematic risk (indicator of the investment's sensitivity to market movements)
$E(r_m)$ = expected market return (the reward for bearing systematic risk)

$E(r_n)$ depends on the risk-free rate, reward for bearing systematic risk (market risk) and the amount of systematic risk (beta) a specific asset has relative to an average one. $E(r_m)$ can be derived from either regression analysis of a suitable market index or a scenario approach; the latter requires an estimate of expected outcomes for market and for the property over defined time horizon under different economic conditions. For example, assume the following *market* returns, $E(r_m)$, and variance, $var(r_m)$, under three scenarios.

Scenario	Prob (p)	r_m	$p(r_m)$	$(r_m - E(r_m))$	$(r_m - E(r_m))^2$	$p(r_m - E(r_m))^2$
Recession	0.3	−0.2	−0.06	−0.23	0.0529	0.01587
Steady	0.5	0.1	0.05	0.07	0.0049	0.00245
Recovery	0.2	0.2	0.04	0.17	0.0289	0.00578
		$E(r_m)$ =	0.03		$var(r_m)$=	0.0241

Next assume the property asset is expected to behave slightly differently so that its expected return, $E(r_a)$, and covariance with the market, $covar(r_a, r_m)$, is as follows.

Scenario	Prob (p)	r_a	$p(r_a)$	$(r_a - E(r_a))$	$(r_m - E(r_m))$	$p(r_a - E(r_a))(r_m - E(r_m))$
Recession	0.3	−0.1	−0.03	−0.15	−0.23	0.01035
Steady	0.5	0.1	0.05	0.05	0.07	0.00175
Recovery	0.2	0.15	0.03	0.10	0.17	0.0034
		$E(r_a)$=	0.05		$covar(r_a, r_m)$=	0.0155

The property asset's beta is: $\beta_a = \dfrac{cov(r_a, r_m)}{var(r_m)} = 0.0155 / 0.0241 = 0.64$

So the asset has a low beta coefficient indicating low volatility (36% lower risk than the market). Using the CAPM equation and assuming a RFR of 4%, we can now calculate the expected target rate of return, $E(r_n)$.

$$E(r_n) = 0.04 + (0.64)(0.16 - 0.04) = 0.1171 \text{ or } 11.71\%$$

17.2.2.2 Weighted Average Cost of Capital (WACC)

This approach assumes that the TRR of an investment is the 'cost of capital'; it represents how much the company should earn to break even. WACC takes the cost of equity and after-tax cost of debt and calculates an average, weighted according to the market values of debt and equity. The debt weighting, w, is calculated by dividing the market value of debt by the aggregate market value of debt. The equity weighting, e, is $1-w$. If we assume that, for a particular investor, the debt weight is 70% and therefore the equity weight is 30%, WACC is calculated using the following formula:

$$\text{WACC} = (1-w)r_e + w.r_d(1-t)$$

Where w is the market value weight of debt, r_d is the cost of debt, t is the corporate tax rate and r_e is the geared cost of equity. r_e can be estimated from CAPM. For example, if the b of the company is 1.25, r_f is 4%* and $E(r_m)$ is 10%, then

$$E(r_n) = r_f + \beta_p\left[E(r_m) - r_f\right] = 0.04 + 1.25(0.06) = 11.50\%$$

WACC must be applied to an after-tax cash-flow. If the geared cost of equity is 11.5%, gross interest on debt is 7%, corporate tax is 40%, and with market value weights for equity (w_e) of 40% and debt (w_d) of 60%, WACC can be calculated as follows.

$$\begin{aligned} \text{WACC} &= [0.4 \times 0.115] + [0.6(0.07(1-0.4))] \\ &= 0.04852 \\ &\text{Say } 4.85\% \end{aligned}$$

Although WACC is intuitive, it is based on figures derived from the investor so should only be used on projects with same financial structure as the company.

17.2.3 Holding period

The holding period is normally specified by the client and is usually between three and five or 10 to 15 years depending on the type of investor. As a rule of thumb, large institutional investors might be considered to have longer holding periods than niche investors and investor-developers who may be more interested in the capital growth opportunities afforded by redevelopment potential than long-term income growth. The duration of the holding period can also be influenced by lease terms; particularly the dates of any break clauses and lease expiry, or by the physical nature of property itself; particularly depreciation factors and redevelopment potential. A longer holding period will mean that it is more difficult to predict the values of key variables in the medium to long-term (a problem that is usually hidden by using an exit yield or exit value at the end of a shorter holding period). So a long holding period is associated with greater risk of fluctuation from predictions of long-term trends and a greater chance of error in selecting exit variables. An additional consideration is whether the market is assumed to be stable over the holding period.

17.2.4 Exit value

Exit value refers to the value of the property at the end of the holding period. The usual method of calculating exit value is to capitalise the rent forecast at the end of the holding period. In selecting an appropriate exit yield at which to capitalise the rent we are asking what yield a purchaser would require for the property at the point of (notional) sale. The exit yield is usually based on fairly stable prime yields and is normally derived by comparison with similar investments. It is important to consider the impact of depreciation but care should be taken so as not to double-count the effect on value by, say, reducing the forecast rent and raising the exit yield. The choice of exit yield is central to the appraisal when the holding period is less than 20 years as the resulting exit value forms a substantial element of the overall worth of the investment. The exit value may reflect land values if demolition is anticipated.

17.3 Appraisal methodology

Investment appraisal requires a rational basis for comparing different investment propositions and some of the methods for doing so are considered below.

17.3.1 Payback method

Payback measures the time taken to recoup expenditure and is a widely used investment appraisal method, mainly because it is simple to perform and interpret. The method favours investments where the greater cash-flow is received in the early years. It does this because any income received after payback has been attained is simply ignored. The method therefore tends to view investments in the short term, only focusing on cash-flows within the payback period; the shorter the payback the more attractive the investment. The method fails to measure long-term profitability, beyond the payback period. Some types of investment may yield low returns in the short-term but benefit from substantial increases in income and capital value in the medium to long-term: a reversionary freehold property investment or a shopping centre where units are let on periodic tenancies while redevelopment is planned are examples of this type of cash-flow. The payback method would not adequately reflect the potential worth of these types of investment. The method also ignores the time value of money, the total return that

Table 17.1 Cash-flows of two investment opportunities.

Year	Property A	Property B
0	−100,000	−100,000
1	60,000	20,000
2	40,000	60,000
3	20,000	60,000
4	20,000	70,000
Total net cash-flow	40,000	110,000

can be expected from the investment and volatility of that return. For example, consider the cash-flows of the two investment opportunities in Table 17.1. Property A would be chosen because the payback is in two years despite the total net cash-flow for B being much greater. The only justification for this method can be that as one projects further into the future the more volatile returns are expected to be, so it is better to have returns sooner.

Discounted payback is a variation of the payback method that considers the time value of money by calculating how quickly a project recoups initial expenditure in discounted (present value) terms. It is really a version of the Net Present Value method (see below) truncated to the payback year so cash-flows beyond this point are, once again, ignored. The payback method should be used as an initial screening device prior to more sophisticated methods.

17.3.2 Yield

A key measure of investment quality is the ratio of net annual income to capital outlay. In property investment this ratio is known as the yield (see Chapter 2). For example, assume a small pension fund wishes to invest £5,000,000 but insists on a 9% return. A shop comes on to the market for £5,000,000 which has been let at £400,000 per annum. Should the pension fund purchase this investment?

$$\begin{aligned}\text{Yield} &= \text{income / capital value}\\ &= £400{,}000 / £5{,}000{,}000\\ &= 0.08 \text{ or } 8\%\end{aligned}$$

The shop investment does not produce a sufficient return. The yield is simple to calculate and can be compared to a 'hurdle' or target rate of return set by the investor, as illustrated in the example above or it can be compared to the investor's overall return on capital or weighted average cost of capital. Of course, the shop investment has only been analysed in terms of its initial return and the simple relationship between initial income and price paid reveals nothing about future income and capital growth prospects. To do this a slightly more sophisticated measure is required. Assume an analysis of recently achieved yields in the local prime office property market has revealed that they average 6.40%. Typically, properties are let on leases incorporating five-yearly rent reviews. Your client requires an annual rate of return of 11% from this type of asset. The IPD office property index indicates that, recently, rents have been growing at an average rate of 4% per annum. Does office property currently look attractive? An initial yield of 6.40%, together with a target rate of 11%, implies rental growth of 5.17% per annum. This is the growth rate that would need to be achieved if the client's target rate of return is to be realised. If past performance of rental growth reported by the IPD index is indicative of future performance then this level of growth appears to be unsustainable. In other words offices look unattractive unless the client is willing to accept a return of less than 11% or rental growth prospects look set to improve.

Like the payback method, the yield is simple to calculate and easy to understand. But the method cannot account for financial magnitude of the investments under consideration because it is a percentage measure. The fact that a yield, like payback, ignores the time value of money and ignores the concept of cash-flows, means that it should only be used to screen investments prior to more detailed appraisal.

17.3.3 DCF methods of investment appraisal

The way in which the appraisal methods described so far have handled the relationship between money invested, future cash-flows and time ignores the time value of money. This crucial investment concept must be reflected in any serious appraisal method and the most popular way of doing so is to construct a discounted cash-flow or DCF. A DCF is a summation of the present values of all revenue, including rent, premiums and sale price, and expenditure, such as the purchase price and any periodic expenditure. The present value of a future sum, whether it is revenue or expenditure, is dependent on the discount rate and the length of time over which it is discounted: the higher the discount rate and / or the longer the discount period, the lower the present value. The main advantage of a DCF approach over payback and yield methods is that it can adjust the cash-flow in each period to account for changes in inflation, rental growth, tax and so on. DCF also allows direct comparison of investments because the cash-flows are converted to a common denominator – present value. We have already looked at the application of DCF to property valuation. Because DCF can be expanded to incorporate explicit assumptions about rental growth, holding period, depreciation, refurbishment, redevelopment, management and transfer costs, tax and financing costs, it is used as a worth appraisal technique as well as a market valuation technique. In fact DCF techniques are often used to test the estimate of market value rather than derive it; in other words they are more frequently used in appraisal than valuation.

There are two commonly used approaches to investment appraisal using a DCF: Net Present Value and the Internal Rate of Return.

17.3.3.1 Net Present Value (NPV)

NPV calculates a money amount by summing known or projected cash-flows over a holding period discounted at an appropriate discount rate, usually the target rate of the investor but it could equally reflect the cost of borrowing, the return required from alternative investments or the rate on government stock. Earlier income is deemed more valuable as the effect of discounting diminishes the value of more distant cash-flow. Any investment with a positive NPV is viable at the specified discount rate. If we ignore periodic expenditure for the moment and assume the purchase price is the only cost, mathematically, NPV is simply the total present value *TPV* less the purchase price *P*. The *TPV* of an income stream of £1 per annum was derived in Chapter 2 (Equation 2.15) and takes the form of a geometric progression, repeated below for convenience:

$$TPV = \frac{1}{(1+r)} + \frac{1}{(1+r)^2} + \frac{1}{(1+r)^3} + \ldots + \frac{1}{(1+r)^n} = \sum_{i=1}^{n} \frac{1}{(1+r)^i} \qquad [17.2]$$

And, for any other income *A*:

$$TPV = \sum_{i=1}^{n} \frac{1}{(1+r)^i} \cdot A = \sum_{i=1}^{n} \frac{A}{(1+r)^i} \qquad [17.3]$$

Net present value is *TPV* less purchase price *P*:

$$NPV = \sum_{i=1}^{n} \frac{A}{(1+r)^i} - P \qquad [17.4]$$

For example, calculate the NPV of a property investment on the market for £880,000 and which generates the cash flow shown in Table 17.2. Assuming a target rate of return or discount rate of 10%, the NPV is positive which means that the target rate of return required by the investor has been exceeded by this investment opportunity.

If the NPV approach is used to compare a number of investment opportunities then the one with the highest NPV will be the best, provided the capital outlay on each is the same. For example, a restaurateur can install a new bar for £140,000 (project A) or have alterations done to increase the seating capacity for the same amount (project B). The following returns in Table 17.4 are anticipated. Assuming the target rate of return for both projects is 10% and they are mutually exclusive. Advise the restaurateur which should be undertaken. Table 17.5 shows that Project B has the greater NPV.

Table 17.2 Calculation of NPV.

Year	Cash-flow (£)	PV £1 @ 10%	DCF (£)
0	−880,000	1.0000	−880,000
1	200,000	0.9091	181,820
2	400,000	0.8264	330,560
3	440,000	0.7513	330,572
4	220,000	0.6830	150,260
NPV			113,212

Table 17.3 Cash-flows of two investments with the same outlay.

Year	Cash flow from Project A	Cash flow from Project B
1	60,000	20,000
2	40,000	40,000
3	20,000	40,000
4	40,000	60,000
5	40,000	60,000

Table 17.4 Resultant NPVs.

Year	Cash flow Project A	PV £1 @ 10%	DCF	Cash flow Project B	PV £1 @ 10%	DCF
1	60,000	0.9091	54,546	20,000	0.9091	18,182
2	40,000	0.8264	33,056	40,000	0.8264	33,056
3	20,000	0.7513	15,026	40,000	0.7513	30,052
4	40,000	0.6830	27,320	60,000	0.6830	40,980
5	40,000	0.6209	24,836	60,000	0.6209	37,254
		TPV	154,784		TPV	159,524
		less outlay	−140,000		less outlay	−140,000
		NPV	14,784		NPV	19,524

Table 17.5 The effect of timing of investment return on NPV.

Year	Property A	Property B
0	−750,000	−750,000
1	90,000	−500,000
2	90,000	70,000
3	90,000	70,000
4	90,000	90,000
5	70,000	90,000
6	70,000	90,000
7	−500,000	90,000
8	2,000,000	2,000,000
Net Total	1,250,000	1,250,000
NPV (10% discount rate)	294,701	53,254

Now compare two property investments where each involves the same initial outlay and produces identical net total cash-flows. However, the timing of payments is different; Property A yields a higher income in the early years and then requires refurbishment in year seven, whereas Property B is in need of refurbishment in year one. The NPV will be higher if the majority of the cash flows are received early on as illustrated in Table 17.5.

Table 17.6 Comparing two investment with different outlays using NPV.

Year	Income from Investment A	PV£1 @ 10%	DCF	Income from Investment B	PV£1 @ 10%	DCF
1	£30,000	0.9091	£27,273	£40,000	0.9091	£36,364
2	£20,000	0.8264	£16,528	£30,000	0.8264	£24,792
3	£15,000	0.7513	£11,270	£20,000	0.7513	£15,026
		total	£55,071		Total	£76,182
		less outlay	−£50,000		less outlay	−£70,000
		NPV	£5,071		NPV	£6,182
		NPV	£5,071		NPV	£6,182
		PV total costs	£50,000		PV total costs	£70,000
		Benefit:cost ratio	10.14%		Benefit:cost ratio	8.83%

Table 17.7 The effect of inflation on a cash-flow.

Year	Cash-flow	Discount / Inflation Rate (4%)	DCF
0	−200,000	1.0000	−200,000
1	15,000	0.9615	14,423
2	20,000	0.9246	18,492
3	200,000	0.8890	177,800
Net	35,000	NPV	10,715

If the capital outlays are different, the *Benefit-to-Cost Ratio* can be calculated as follows and the project with the highest ratio should be chosen:

$$\text{Benefit} - \text{to} - \text{Cost Ratio} = \frac{\text{NPV}}{\text{PV of Total Costs}} \qquad [17.5]$$

For example, which of the two mutually exclusive investments in Table 17.6 would you recommend, assuming a target rate of return of 10%?

Despite a lower NPV, because of its magnitude in relation to the outlay, Project A would be chosen.

If the rate of inflation is used as the discount rate then it is possible to determine whether an investment meets the minimum requirement of transferring purchasing power through time. If we assume an inflation rate of 4% per annum and a cash-flow as shown in Table 17.7.

The NPV is a lot less than the net cash flow in nominal terms because the bulk of the value of the cash-flow is received at the end of the holding period in year 3. The nominal increase in value is £35,000 and the real increase is £10,713 after a loss of purchasing power to inflation at a rate of 4% per annum. This shows the relationship between nominal and real present value. A loss to inflation is the first barrier to investing and is a financial cost just like operating expenses and taxes.

Table 17.8 Appraisal of a rack-rented freehold property investment.

Period	Income (£)	Net Cash Flow (£)	Growth rate	Real Cash Flow (£)	YP 5 yrs @ target rate	PV £1 @ target rate	Discounted income (£)
Initial outlay							−£100,000
0–4	12,000	12,000	1.0000	12,000	3.2743	1.0000	39,292
5–9	12,000	12,000	1.2763	15,315	3.2743	0.4761	23,876
10–14	12,000	12,000	1.6289	19,547	3.2743	0.2267	14,508
15–19	12,000	12,000	2.0789	24,947	3.2743	0.1079	8,816
20–Perp	12,000	12,000	2.6533	31,840	9.0909*	0.0514	14,874
Net Present Value (NPV)							£1,365

*YP perpetuity at exit yield of 11%

But inflation is only one component of the discount rate; others include a return for risk taken and possibly adjustments to reflect depreciation.

The calculations for these cash-flows can be undertaken on a spreadsheet. In fact, there is an NPV function on Excel. Consider a conventional rack-rented freehold property investment opportunity which is on the market for £100,000. An appraisal is required to determine whether this opportunity is one that your client, who has a target rate of 16%, should pursue. The rent is £12,000 per annum, rent reviews are every five years, the assumed holding period is 20 years, over which time you expect rent to grow at an average rate of 5% per annum. At the end of the holding period you assume a sale at an exit yield of 11%.

In Table 17.8 the cash-flows from this particular investment have been concatenated into five-yearly income blocks because the annual rental income between each rent review is identical. The exit yield may well be higher than current initial yields because the property will be 20 years older, so it is important to use comparable evidence of similar but 20 year older properties than the subject property. Also, the rate of rental growth will probably decline, become static or even negative, so a spreadsheet can be used to model various outcomes.

Consider another example but this time where a year-by-year cash-flow is constructed. One of your investment clients is thinking of purchasing the freehold interest in an office refurbishment opportunity in the centre of Cardiff. The property was constructed in the 1960s and is ripe for refurbishment upon expiry of the existing lease in seven years' time. The current lease is on full repairing and insuring (FRI) terms, the present rent is £100,000 per annum and the final review is in two years' time. The asking price is £1,200,000. Your client plans to hold the property until lease expiry, refurbish and then sell the freehold interest. The current cost of refurbishment is £1,000,000 and will take one year to complete. The current market rent of the property in its existing state is £120,000 per annum and £200,000 per annum when refurbished. The freehold all-risks yield after refurbishment is 7%. Rental growth for the existing property is estimated to be 4% per annum and for the refurbished property 7% per annum. Building cost inflation is running at an average of 6% per annum. Assuming your client's target rate of return is 15% advise your client as to whether this is a good investment opportunity at the asking price stated. With a year-by-year cash-flow, shown in

Table 17.9 Appraisal of a reversionary freehold property investment with refurbishment potential.

Year	Description	Cash Flow (£)	PV @ 15%	DCF (£)
0	Purchase Price	−1,200,000	1.0000	−1,200,000
1	Rental Income	100,000	0.8696	86,957
2	Rental Income	100,000	0.7561	75,614
3	Rental Income	129,792[a]	0.6575	85,341
4	Rental Income	129,792	0.5718	74,209
5	Rental Income	129,792	0.4972	64,530
6	Rental Income	129,792	0.4323	56,113
7	Rental Income	129,792	0.3759	48,794
8	Sale Proceeds	4,909,138[b]	0.3269	1,604,797
	Refurb Costs	−1,593,800[c]	0.3269	−521,013
Net Present Value (NPV)				375,343

[a]MR of £120,000 compounded over two years at 4% pa rental growth rate
[b]£200,000 pa compounded over 8 years at 7% pa rental growth rate and capitalised at 7% ARY
[c]£1,000,000 build cost compounded over 8 years at 6% build cost inflation rate

Table 17.9, the YP column is dispensed with. If the investment is purchased for £1,200,000 then, as the NPV is positive, a target rate of 15% will be achieved.

17.3.3.2 Internal Rate of Return (IRR)

NPV is a means of assessing whether an investment reaches a target rate but it does not tell you exactly what the rate of return (the internal rate of return or IRR) of the investment is. The IRR is the rate at which the discounted cash-flow of income equates to the discounted cash flow of all expenditure, in other words where NPV equals zero. But the relationship between NPV and the discount rate is non-linear. This means that if a cash-flow is discounted at various rates and the resultant NPVs are plotted on a graph a curved line results. This can be illustrated with an example. A rack-rented freehold property investment is currently let at a rent of £17,500 per annum on a lease with five-year upward-only rent reviews. Rent is forecast to grow at 3% per annum compounded at each review. The holding period is 20 years and the exit yield is 8%. Using a range of discount rates between 1% and 20% the NPVs are plotted in Figure 17.2.

The IRR is found where the curve cuts the *y* axis, where the NPV is 0. Using the IRR to appraise an investment avoids having to select an appropriate discount rate for a particular investment. Instead the IRR of an investment can be compared with the investor's generic target rate of return or the cost of borrowing capital. Also, the IRR of a property investment can be compared with IRRs of non-property investments. The IRR can also be monitored throughout the life of an investment, if it drops below market rates it may be time to sell.

The IRR can be estimated by linear interpolation on paper or, more usually, derived by iteration (trial and error) on a computer. Looking at linear interpolation first, consider the cash-flow from Table 17.3 once again. When we discounted this cash-flow at 10% the NPV was positive so we know that the IRR (which

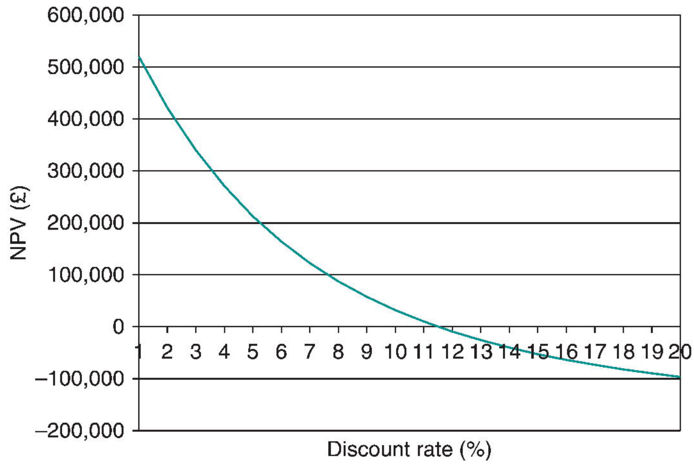

Figure 17.2 Relationship between NPV and discount rate.

Table 17.10 Interpolating the IRR.

Year	Cash-flow	PV £1 @ 15% (TR_1)	Present value	PV £1 @ 16% (TR_2)	Present Value
0	−880,000	1.0000	−880,000	1.0000	−880,000
1	200,000	0.8696	173,920	0.8621	172,420
2	400,000	0.7561	302,440	0.7432	297,280
3	440,000	0.6575	289,300	0.6407	281,908
4	220,000	0.5718	125,796	0.5523	121,506
		NPV_1	+11,456	NPV_2	−6,886

produces an NPV of zero) must be higher than 10%. So let's take two trial IRRs of 15% (TR_1) and 16% (TR_2) and discount the cash-flow as shown in Table 17.10.

Because we get a positive NPV when the discount rate is 15% and a negative one when it is 16% we know the IRR lies somewhere between 15% and 16%. We also know that the true relationship between discount rate and NPV is curvilinear, but because our two trial rates are pretty close to the IRR we could assume that, between them, the relationship is linear. Figure 17.3 shows how this might look.

Using similar triangles, we can interpolate a linear estimate of the IRR between the two trial rates as follows:

$$x = (TR_2 - TR_1) \times \frac{NPV_1}{NPV_1 + NPV_2} \qquad \text{(ignoring + and − signs)} \qquad [17.6]$$

$$x = (1\%) \times \frac{11{,}546}{18{,}432} = 0.63\%$$

Therefore the estimate of the IRR is $15\% + 0.63\% = 15.63\%$.

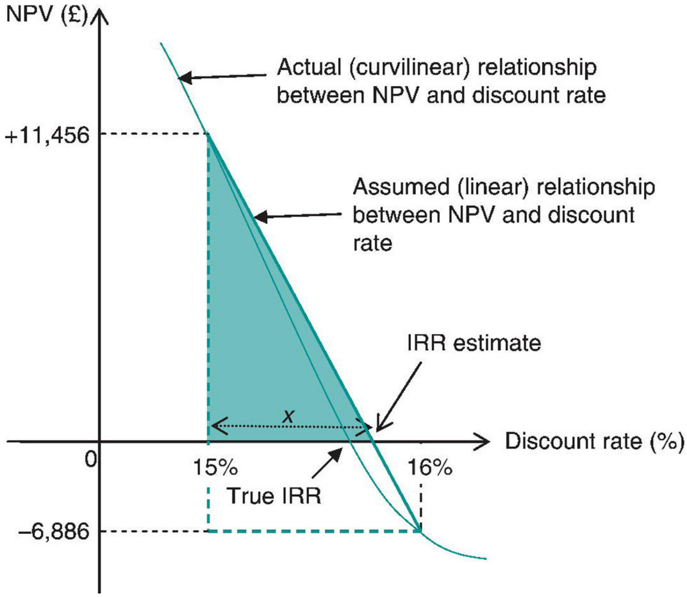

Figure 17.3 Linear interpolation of the IRR using similar triangles.

This method can be applied to a property investment. For example, a freehold office investment totalling 400 square metres NIA is advertised for sale at an asking price of £800,000. The rent is currently under review and 20 years remain on the lease, which is on FRI terms with rent reviews every five years. A comparable property measuring 500 square metres NIA was recently let at a market rent of £75,000 and subsequently sold for £937,500, revealing an initial yield of 8%. Advise your client whether the investment opportunity offers an acceptable return when compared to the client's target rate of return of 12%.

Analysis of the comparable property reveals a market rent of £150 per square metre and when this is applied to the subject property a market rent of £60,000 per annum is estimated. The growth rate implied by a target rate of 12% and an initial yield of 8% is 4.63%. Assuming trial IRRs of 10% and 14% the NPVs are calculated as shown in Table 17.11.

$$IRR = 10\% + \left[(14\% - 10\%) \times \frac{125{,}752}{125{,}752 + 180{,}599}\right] = 10\% + \left[4\% \times \frac{125{,}752}{306{,}351}\right] = 11.64\%$$

This does not meet the target rate of the client.

The other way of deriving the IRR of an investment is by iteration using a spreadsheet. Consider the following cash-flow of a rack-rented freehold property investment. The rent is £17,500 per annum and rent reviews are five yearly. The all risks yield is 8% and rental growth is estimated to be 3% per annum.

Table 17.11 Estimating an IRR from two trial discount rates.

Years	FV £1@ 4.63%	Projected rent	PV £1@10%	YP 5yrs@ 10%	PV	PV £1@14%	YP 5yrs@ 14%	PV
0–4	1.0000	60,000	1.0000	3.7908	227,880	1.0000	3.4331	205,986
5–9	1.2540	75,237	0.6209	3.7908	177,085	0.5194	3.4331	134,163
10–14	1.5724	94,344	0.3855	3.7908	137,874	0.2697	3.4331	87,353
15–19	1.9717	118,303	0.2394	3.7908	107,360	0.1401	3.4331	56,904
20–perp	2.4724	148,346	0.1486	12.5	275,553	0.0728	12.5	134,995
Total PV					925,752			619,401
less outlay					–800,000			–800,000
NPV					125,752			–180,599

Part D

Table 17.12 Finding the IRR by iteration using a spreadsheet.

Year	Income	Growth rate (3% pa)	Projected cash-flow (£)
0			−200,000
1	17,500	1.0000	17,500
2	17,500	1.0000	17,500
3	17,500	1.0000	17,500
4	17,500	1.0000	17,500
5	17,500	1.0000	17,500
6	17,500	1.1593	20,287
7	17,500	1.1593	20,287
8	17,500	1.1593	20,287
9	17,500	1.1593	20,287
10	17,500	1.1593	20,287
11	17,500	1.3439	23,519
12	17,500	1.3439	23,519
13	17,500	1.3439	23,519
14	17,500	1.3439	23,519
15	17,500	1.3439	23,519
16	17,500	1.5580	27,264
17	17,500	1.5580	27,264
18	17,500	1.5580	27,264
19	17,500	1.5580	27,264
20	17,500	1.5580	27,264
20-perp	17,500	1.8061	395,087[a]
IRR			**11.25**%

[a]This is the projected rent (£17,500 x 1.8061) capitalised in perpetuity at a yield of 8%

The asking price for the property is £200,000. The cash-flow is set up in Excel, as shown in Table 17.12 and, using the IRR function, the IRR of this investment is found to be 11.25%.

17.3.3.3 NPV or IRR

By using a discount rate based on the investor's target rate of return, the NPV method makes a relative comparison with the opportunity cost of capital or the capital market. IRR, on the other hand, cannot be reliably used to judge between alternative investments because it assumes cash-flows from an investment are reinvested at a rate equal to the IRR of the investment generating those cash-flows. So, rather than compare each investment against the capital market as the NPV method does, the IRR method compares investments relative to one another under a scenario of unequal reinvestment rates. One solution to this problem is to use a *modified* IRR where the reinvestment can be specified, typically as the target rate or weighted average cost of capital.

Sometimes, when comparing two investments of different sizes, the NPVs may suggest one and the IRRs the other. A workaround is to calculate the IRR of the differential cash flow between the two investments being compared and if this is greater than the target rate accept the investment with the smallest IRR. If this 'incremental' IRR is less than the target rate, accept the project with the highest IRR. Clearly, if more than two investments are being compared this process of calculating incremental IRRs will become lengthy, whilst all that is needed to make the investment decision using the NPV method is the calculation of each investment's NPV. It is argued that IRR is an inferior method for two further reasons: first, when appraising investments with cash-flows that fluctuate between positive and negative (a large, phased property development project for example), more than one IRR may result or there may be none at all in the time frame being considered. IRR is therefore more likely to be used by investors who wish to retain the scheme after completion and measure its IRR against other investments in the portfolio or against a target rate of return. Second, the IRR cannot be calculated directly, only by interpolation or by iteration on a spreadsheet.

So NPV is mathematically superior but still leaves the problem of selecting the appropriate discount rate. Using the IRR it is simpler to appraise a standalone opportunity against its own benchmark. But an IRR overlooks the rate at which finance is available and assumes income is reinvested at the same rate as the model, and this may be an unrealistic assumption. Peculiar cash-flow patterns frustrate the IRR as a measure of investment worth: an investment project could break even at a high IRR but give no profit. Furthermore the highest IRR does not necessarily mean the highest NPV and therefore the highest profit. However, IRR is by far the most commonly used appraisal method in commercial property investment, particularly amongst institutional investors.

17.3.4 Example

A property investment is on the market for £1 m. The current rent passing is £85,000 per annum and there are two years to run until the next rent review. The lease provides for five yearly rent reviews, typical for UK commercial real estate. To appraise this investment opportunity the following assumptions are made:

Assumptions:	Annually
Holding period (yrs) [must end at a rent review / lease renewal]	20
Discount rate (%)	9.00%
Growth rate on prime property (%)	3.00%
Depreciation rate of existing property (% rent)	1.00%
Depreciation-adjusted rental growth rate (%)	1.98%
Exit yield on sale (refurb/redeveloped) (%)	6.00%
Current rental value of existing building (£pa)	100,000

Two approaches to the appraisal are shown below; the first is an annual or year-by-year cash-flow and the second concatenates the static rental income flows between each rent review.

17.3.4.1 Year-by-year cash-flow

	Year	Cash-flow	PV @ 9.00%	PV
	0	−1,000,000	1.0000	−1,000,000
	1	85,000	0.9174	77,982
	2	85,000	0.8417	71,543
	3	104,000	0.7722	80,307
	4	104,000	0.7084	73,676
	5	104,000	0.6499	67,593
	6	104,000	0.5963	62,012
	7	104,000	0.5470	56,891
	8	114,713	0.5019	57,570
	9	114,713	0.4604	52,817
	10	114,713	0.4224	48,456
	11	114,713	0.3875	44,455
	12	114,713	0.3555	40,784
	13	126,529	0.3262	41,271
	14	126,529	0.2992	37,863
	15	126,529	0.2745	34,737
	16	126,529	0.2519	31,869
	17	126,529	0.2311	29,237
	18	139,563	0.2120	29,586
	19	139,563	0.1945	27,144
	20	139,563	0.1784	24,902
Present value of rental cash flow				−9,305
Plus exit value				
Post rent review rental value in year		20	148,019	
YP perp @		6.00%	16.6667	
PV @		9.00%	0.1784	
Total present value				440,186
Net Present Value				**430,881**

17.3.4.2 Blocked income cash-flow

Years		Income (£)	YP @ 9.00%	PV @ 9.00%	PV (£)
	0	−1,000,000			−1,000,000
	1–2	85,000	1.7591	1.0000	149,524
	3–7	104,000	3.8897	0.8417	340,478
	8–12	114,713	3.8897	0.5470	244,082
	13–17	126,529	3.8897	0.3555	174,978
	18–20	139,563	2.5313	0.2311	81,632
Present value of rental cash flow					**−9,305**
PLUS exit value					
Rental value in year			20	148,019	
YP perp @			6.00%	16.6667	

PV @	9.00%	0.1784	
Total present value			440,186
Net Present Value			**430,881**

The above appraisals are rather simplified and it is possible to add further detail and more realistic assumptions regarding costs and revenues as the interest in the opportunity grows. For example, the following costs typically associated with transacting and holding real estate investments in the UK might be assumed:

Acquisition costs (% acquisition price)	5.75%
Sale costs (% sale price)	5.75%
Review costs (% new rent)	5.00%
Management costs (% income)	5.00%

The appraisal might then be adapted as follows:

Years From	To	Voids (%)	Gross Income (£)	Purchase, Man Costs (£)	Net income After Voids (£)	YP @ 9.00%	Review Costs (£)	PV @ 9.00%	PV (£)
	0		−1,000,000	−57,500	−1,057,500				−1,057,500
1	2	0	85,000	−4,250	80,750	1.7591	0	1.0000	142,048
3	7	0	104,000	−5,200	98,800	3.8897	−5,200	0.8417	319,078
8	12	0	114,713	−5,736	108,977	3.8897	−5,736	0.5470	228,741
13	17	0	126,529	−6,326	120,203	3.8897	−6,326	0.3555	163,980
18	20	0	139,563	−6,978	132,585	2.5313	−6,978	0.2311	75,938
Present value of rental cash flow									**−127,716**
PLUS exit value:									
			Rental value in year			20	148,019		
			YP perp @			6.00%	16.6667		
			PV @			9.00%	0.1784		
			Total present value					440,186	
			Net after sale costs						**414,875**
Net Present Value									**287,159**

17.4 Risk analysis in property investment appraisal

An appraisal of worth must consider both return and risk. In the investment appraisal methods discussed so far risk is quantified by making adjustments to the required rate of return or by making adjustments to the investment cash-flow. In this section we are going to look at how risk can be examined in a little more detail. According to Hutchison et al. (2005) risk analysis is now a chief concern of property lenders. This is because of proposed revisions to international standards for measuring the adequacy of a bank's capital.[1] The proposed regulatory requirements mean that banks must be more explicit about the risks of lending. As property is a major destination for debt finance, the identification, analysis and communication of the risks involved are becoming more central to the lending decision. But how is risk handled in the appraisal process?

Because most investors are risk averse they are concerned with the probability of making a loss, estimating the most likely return and the variability or volatility of that return. In the case of the property investor, a property asset is likely to form part of a portfolio of assets. As such, it will either exacerbate or help to reduce the year-on-year volatility of income (or 'risk') within that portfolio. An investor for whom a property reduces portfolio risk should, in theory, be willing to pay more for an asset than an investor for whom the same property increases risk. An appraisal needs to reflect both the intrinsic value of the asset and the contribution to risk control within the portfolio. Clearly, the former is likely to dominate but fund managers need to keep an eye on the latter.

In investment terms there are two types of risk: systematic risk arises from market conditions and affects all investments. It is caused by inflation, economic cycles, interest rate movements, tax and cannot be diversified away in a portfolio of investments. Non-systematic risk affects particular investments and is caused by business, financial or liquidity risks. It can, theoretically at least, be diversified away by constructing a portfolio of property investments and actively managing that portfolio. Choosing good quality tenants, delaying the onset of depreciation by implementing a regular maintenance and refurbishment programme, and arranging staggered lease renewals to avoid simultaneous voids are all recognised methods of reducing the impact of non-systematic property investment risk. Sources of risk can be categorised as:

- Tenant risk: including non-payment of rent or non-performance of other contractual obligations.
- Sector and geographical risk: refer to the IPD index of total return to see the different return characteristics of various property sectors and regions. The 'lumpiness' of property investment accentuates this type of risk and international diversification can ameliorate some of this type of risk.
- Physical risk: this is quantified by estimating the magnitude of likely future expenditure. Prime city centre retail property investments are much less prone to this type of risk.
- Legal risk: including the effect of legislation, fiscal policy, planning, ownership.

Unlike portfolio-level risk analysis, empirical tests of property-specific risk have not been developed to a point that enables risk-return analysis to be widely practised in the property industry. There is a lack of reported data on the risk associated with investing in property assets. Traditionally, in valuation, the all-risks yield takes account of the risks at the individual property level. As we have seen, in DCF-based valuation and appraisal, the discount rate used to calculate a NPV can be derived by building risk premiums on top of a risk-free rate to reflect different elements of systematic and non-systematic risk (RICS, 1997). In this way, a 'risk adjusted discount rate' is constructed. Similarly, when using the IRR investment appraisal technique, the setting of a high hurdle rate will allow potentially more risky investments to be excluded from further consideration. Issues of inflation, interest rate and tax changes can be handled within the cash-flow itself regardless of whether NPV or IRR method is used to appraise the investment. But these are rather simple approaches to risk analysis. Hutchison et al. (2005) point out that:

> Whereas in the equities market, pricing models have been developed to identify the required rate of return from risky investments; a risk premium of around 2% is usually suggested for property. While this figure may apply to the market as a whole, at the individual property level the premium will vary. In the absence of a robust pricing model and data limitations, it is likely that target rates for property will continue to be estimated subjectively. Consequently, errors in the estimation of discount rates tend to exacerbate the error in the worth calculation especially when longer holding periods are used.

Increasingly investors are seeking to quantify risk and allow for it separately through the use of more sophisticated techniques that have long been used in the analysis of non-property investments. These include sensitivity analysis, scenario modelling, probability analysis and simulation and they were described in Chapters 5 and 6 in the context of property investment valuation and property development appraisal. These techniques may be applied with some variation. For example, as a means of reflecting the risk adversity of a typical investor, 'Domesday analysis' looks at the continuity of guaranteed income flow and the risk of loss is exaggerated by assuming rent will fall to zero at every opportunity such as lease expiry and breaks and will not grow at rent reviews. Nevertheless the underlying risk analysis techniques used in the appraisal are the same.

Baum (2003) discusses how some of these modelling techniques are being extended in relation to the analysis of risk relating to rent in particular. An investor investing in a property let on a flexi-lease (see Chapter 4) may regard the rental income as more uncertain or volatile and would wish to analyse possible risk. A cash-flow model might therefore incorporate adjustments to the rent to reflect the probability of and costs associated with tenant vacation as well as the more typical cash-flow variables of expected rental growth and rent review times. Simulations may be carried out that look at the effect of moving from a standard lease (with a 15-year term and five-year upward-only rent reviews) to a flexi-lease (with a 10-year term and a break option in year five). Assumptions can be made about the probability of the tenant renewing the lease, exercising a break option, how long a rent void might be expected to last for and the probability of it varying from this expected void period. Anticipated empty property costs and re-letting costs can also be incorporated and modelled if necessary, alongside the more conventional key variables of rent and rental growth. Using this sort of analysis the investor can look at the impact of agreeing flexi-lease terms as opposed to more conventional terms. The investor could focus on how much the initial rent should alter to put him in a similar risk/return situation. A more qualitative approach to risk analysis is suggested by Hutchison et al. (2005) and Adair and Hutchison (2005): investment quality risk may be scored in a way similar to that employed by credit rating agencies. The technique uses an Analytic Hierarchy Process (AHP), a multi-criteria decision making tool, to rank and quantify various the various sources of risk described above. The risk score would be reported to the client, enabling a more detailed understanding of the property investment.

17.5 Financing property investment

Property investments, particularly landmark buildings in prime locations, are expensive and property investment is, therefore, capital intensive and many investors usually look to raise debt finance (borrow money) to help fund the acquisition of property investments. Debt finance refers to the amount that is borrowed to fund the acquisition of a property investment and can remain fixed throughout the loan period (an interest-only loan) or it can be gradually paid off over the term alongside the interest payments (a repayment loan). If capital and interest repayment are deferred for a period of time this is known as a 'balloon payment' loan and is the preferred method of financing a property development where there will be no return until the scheme is let and/or sold. The interest payable on a loan may be fixed or variable. For short and medium-term fixed rate loans the interest rate will relate to the prevailing swap[2] rate plus a risk premium. For long-term fixed rate loans of ten or more years the rate may relate to the gross redemption yield on long-dated gilts that have a comparable life but with the addition of a suitable risk premium. If it is a variable rate loan the rate may be linked to the Bank of England Base Rate[3] or, more usually, the three to six month LIBOR.[4]

Funding the acquisition of a property investment through the use of debt and equity finance allows the investor to increase returns through gearing (at the expense of higher risk) and also allows the investor to invest in a greater number of properties, thus reducing risk through portfolio diversification. Gearing enhances return on equity when the internal rate of return (IRR) of the investment is greater than the rate of interest payable on the debt (loan). Equally, gearing erodes return when the loan interest rate is higher than the investment IRR. Whenever the return component is higher in the underlying property than in the loan, there will be positive leverage in that return component. This can be seen in the LR version of the WACC equation:

$$r_E = r_D + LR(r_P - r_D) \text{ where } LR = V/E$$

But gearing up property returns increases the riskiness of equity returns. As an investor accepts a higher level of gearing to finance an investment acquisition the potential volatility of the return from that investment increases. In other words, the return on equity becomes more sensitive to the underlying IRR of the investment itself. The extra volatility of equity return that occurs as the gearing level increases is proportionate to the **income gearing** (or interest cover) **ratio** and there are various other ratios that are used to benchmark project performance including gearing (or leverage) ratio, loan-to-value (LTC) and loan-to-cost (LTC) ratios. These ratios are calculated as follows:

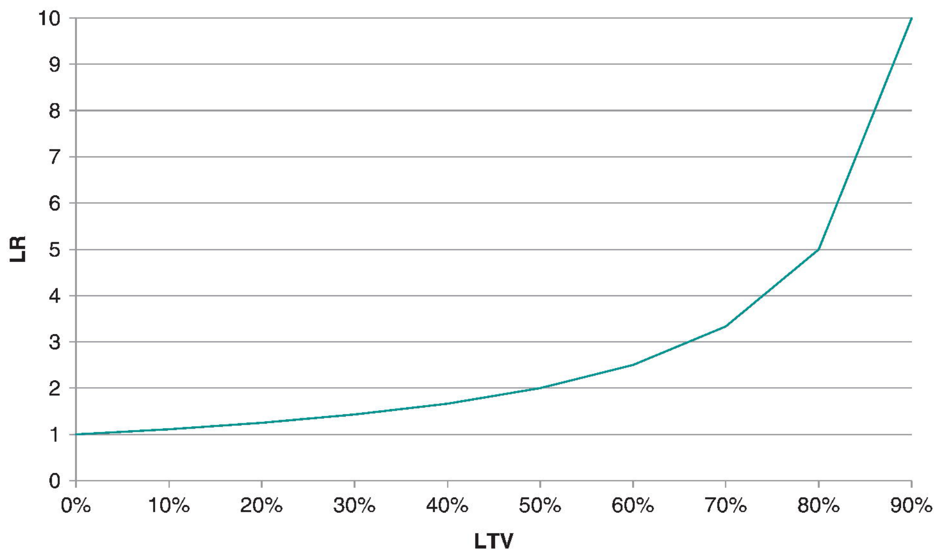

Figure 17.4 The relationship between leverage ratio and loan-to-value ratio.

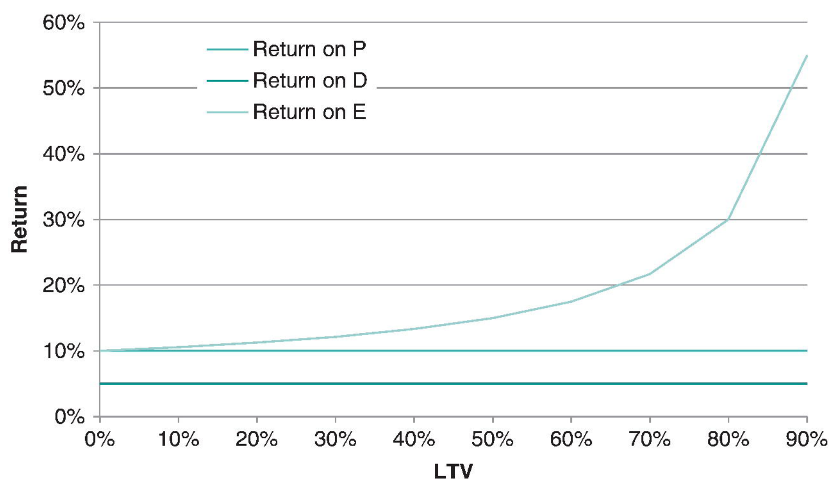

Figure 17.5 Return on project (P), debt (D) and equity (E).

Let: $V = E + L$

Where: V = value of project
E = equity input and
L = loan amount

Then: $\text{Leverage ratio}(LR) = V/E = V/(V-L) = 1/(1-L/V)$
$\text{Loan-to-value}(LTV)\text{ ratio} = L/V$

Also: $LR = 1/(1-LTV)$ and $LTV = 1-(1/LR)$

The relationship between LR and LTV is illustrated in Figure 17.4. Zero LTV equates to a LR of 1 whereas 100% LTV would produce an infinite LR since the denominator (equity input) is zero.

If it is assumed that the expected return from a project is 10% and the finance rate is 5%, Figure 17.5 shows the returns on value (V), equity (E) and debt (D) at different loan-to-value ratios. The project return and the finance rate are constant but the geared return on equity increases exponentially as the debt proportion approaches 100%. However, at the higher end, with the lender supplying the majority of funds, the required return on that loan would tend towards the return on the project as the lender takes on most of the project risk.

Key points

- Valuation is a market-based concept; an appraisal of worth is an individual-based concept and represents a means of assessing whether a price/valuation represents 'good value' to a particular individual.
- A different information set is used to conduct appraisals of worth, using more information specific to the individual. An appraisal of worth may vary more than a market valuation as the financial estimation moves away from being based on an analysis of market information to greater consideration of personal investor or occupier requirements, using more sophisticated techniques.
- In this chapter appraisal is considered from the point of view of the investor and the occupier. The developer, who was the focus of attention in Chapter 6, is considered to be a particular type of property investor for the purposes of this chapter.
- There is widespread use of DCF for property investment appraisal. Discounting is the popular method of investment comparison because cash-flows are converted to a common denominator, present value.
- Any mismatch between the market value or price of a property investment and its worth to a particular investor should be investigated. A rational investor will buy an asset if its price is equal to or below his assessment of worth and vice versa. The range of worth estimates is typically wider in the property market than in the equities market where a great deal more trading takes place on the more marginal differences between price and worth.
- Investment appraisal should include a detailed analysis of risk and return culminating in a judgement as to the worth of the investment. Investors are primarily concerned with return performance, typically measured against a portfolio benchmark. This is because investors are remunerated on the basis of total return performance rather than risk. Consequently they are less concerned with assessing volatility of returns. In the property investment market, when risk measurement is undertaken, risk is pragmatically regarded rather simplistically as the chance of not achieving a benchmark return. The main measure of risk is standard deviation and the focus is always on downside potential. More sophisticated measures of risk in terms of volatility are not in general use in the property investment market yet.

- Having said this there are competition, globalisation and securitisation pressures on property, an essentially deal-driven business, to align with other investment classes. There is, therefore, demand for greater market transparency and more research at the market and asset level that will lead to explicit pricing of risk. Perhaps too much attention has been paid to sector and region portfolio weightings rather than examining the income, tenant quality and lease terms of individual assets. Consideration of specific risk at this level is warranted because it might impact on the property portfolio more than would be the case with other asset classes.
- Whereas investors look at upside and downside potential risk, lenders focus on downside.
- When introducing finance into a real estate cash-flow, perhaps start with a market valuation of the before-tax cash-flow using a market-derived TRR. Then construct an after-tax cash-flow to be discounted at an after-tax (geared) TRR to calculate the present value of the equity.

Notes

1. International Convergence of Capital Measurement and Capital Standards – A Revised Framework, also known as Basel II or The New Accord
2. A swap is a method whereby borrowers can swap a LIBOR (floating) rate of interest for a fixed rate over a given period. Swap rates are the borrowing rates between financial institutions, usually with high credit ratings. Interest rate swaps are normally 'fixed against floating', but can also be 'fixed against fixed' or 'floating against floating' rate swaps. Interest rate swaps are often used by companies to alter their exposure to interest-rate fluctuations, by swapping fixed-rate obligations for floating rate obligations, or swapping floating rate obligations to fixed-rate obligations. By swapping interest rates, a company is able to synthetically alter its interest rate exposure.
3. The Base Rate is the rate at which prime banks can borrow from the Bank of England. They use this as a base rate for general loans. The Bank of England Base Rate is reviewed by the Monetary Policy Committee, which announces its decision at midday on the first Thursday of each month.
4. LIBOR (London Inter Bank Offer Rate) is the rate at which banks are prepared to lend to each other for different periods of time. Loans for property are normally linked to this rate and expressed as a margin over LIBOR, e.g. 50 basis points over LIBOR (one basis point equals one hundredth of a percentage point).

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Chapter 18
Development Appraisal

18.1 Introduction

This final chapter develops the residual method of valuation introduced in Chapter 9. Section 18.2 uses the same approach from that chapter, but this time, rather than estimating land value, it is used to estimate developer's profit. By doing so, the purpose of the residual method shifts from valuation to appraisal. However, as an appraisal technique, the residual method suffers from a number of shortcomings and these are discussed. A cash-flow alternative is described in section 18.3. These first two sections focus on the estimation of return from development projects; section 18.4 considers the risk side of the equation. If there is a risk spectrum for real estate investment then development projects would prominently feature at the 'very risky' end. Various ways of analysing and managing risks are discussed but there is no definitive approach to either quantifying or controlling for risk – it is an inherent part of the process, a part for which developers are, hopefully, rewarded in the long run if not on a project-by-project basis. Development risk is compounded by the use of debt to finance real estate development. The final section of the chapter therefore examines sources of development finance and takes a brief look at how finance might be structured to fund what are often large and lengthy development projects.

18.2 Conventional residual profit appraisal

The basic equation for the residual land valuation can be transposed to determine the level of profit achieved given construction and site costs. Referring back to the simple example introduced in at the beginning of Chapter 9, the equation would look like this:

Property Valuation, Second Edition. Peter Wyatt.

Value of completed development – land cost – development costs = developer's profit

And the calculation would be as follows:

Development value			
Total constructed area (m^2)	5,000		
Estimated market rent (£/m^2)	130		
Estimated annual market rent (£)		650,000	
YP in perpetuity @ 8%		12.5	
			8,125,000
Development costs			
Site		–2,100,000	
Construction costs (5,000 m^2 @ £800/m^2)		–4,000,000	
Interest on half construction costs over one year (4,000,000 × [(1+0.10)^1–1]		–400,000	
			–6,500,000
Profit			1,625,000

If we now consider a more detailed example based on the inputs used in Chapter 9, the estimation of developer's profit would proceed as follows.

Conventional residual valuation to calculate developer's profit

Development value:					
Gross internal area (GIA)		2,000			
Net internal area (NIA)		1,700			
Estimated rent / sqm (ERV)		£200			
			£340,000		
YP in perp @	7.00%		14.29		
Gross Development Value				£4,857,143	
less purchaser's costs @ %					
NDV	5.75%			£264,100	
Net Development Value					£4,593,043
Site Costs:					
Site price			£711,492		
Acquisition costs @ % site price	5.75%		£40,911		
Total Site Costs:				£752,403	
Construction Costs:					
Site Preparation		£25,000			
Building Costs (£'s/m2 x GIA)	£969	£1,938,000			
External works		£120,000			
Professional fees: (% building costs and ext. works)	13.00%	£267,540			
Misc costs		£80,000			
Contingency @ % above construction costs:	3.00%	£72,166			
			£2,502,706		

Conventional residual valuation to calculate developer's profit					
Regulatory fees:					
Planning		£5,000			
Building Regs		£20,000			
S106		£0			
Other		£95,238			
			£120,238		
Total Costs and Fees:				£2,622,944	
Interest:					
on site costs for entire development **period** @	10.00%		£158,005		
on **half** total construction costs and fees for **whole building period** @	10.00%		£165,934		
on construction **costs, fees and interest to date** for **void period:**	10.00%		£67,250		
Total Interest Payable (£'s):				£391,189	
Letting & Sale Costs:					
Letting agent's fee (% ERV)	10.00%		£34,000		
Letting legal fee (% ERV)	5.00%		£17,000		
Marketing (£'s)			£10,000		
Sale agent's fee (% NDV)	0.00%		£0		
Sale legal fee			£0		
				£61,000	
Total development costs:					£3,827,536
Developer's profit on completion					**£765,507**

The site price is assumed or is known and can therefore be inserted. Costs associated with site acquisition (typically agent and legal fees) must be added to the costs. Assuming the site was acquired at the very start, interest will accrue on this cost over the whole development period. Here the site costs will incur interest for two years at an annual interest rate of 10%.

$$\text{Interest on site costs} = £752{,}403 \times \left[(1+0.10)^2 - 1\right]$$
$$= £158{,}005$$

The estimated developer's profit can be expressed in a number of ways in order to assess the viability of the development and to compare it to other development opportunities. The following are simple methods of expressing development viability:

18.2.1 Profit as a percentage of cost

This measure expresses profit as a percentage of development costs. It is useful for **merchant developers,** who need to sell the completed development in order to raise capital for future projects. Some developers, particularly house-builders, prefer to express profit as a percentage of value. As has already been explained, the two ratios are related.

$$\begin{aligned}\text{Return on capital} &= \text{developer's profit at end of scheme} \div \text{total development costs}\\ &= £765,507 \div £3,827,536\\ &= 20.00\%\end{aligned}$$

$$\begin{aligned}\text{Return on NDV} &= \text{developer's profit at end of scheme} \div \text{NDV}\\ &= £765,507 \div £4,593,043\\ &= 16.67\%\end{aligned}$$

18.2.2 *Development yield*

Rent is expressed as a percentage of development costs and the measure is useful for **investor developers** who, in contrast to trader developers, retain the development as an investment. Just as the difference between total costs and total capital value represents capital profit, so the difference between the investment yield and development yield represents the developer's annual profit margin over standing investments.

$$\begin{aligned}\text{Development yield} &= \text{Estimated annual rent} \div \text{total development costs}\\ &= £340,000 \div £3,827,536\\ &= 8.88\%\ \text{per annum}\end{aligned}$$

18.2.3 *Criticisms*

18.2.3.1 *Model structure and scale*

Byrne et al. (2011) investigated the effect of choices of model structure and scale in development viability appraisal. The paper addressed two questions concerning the application of development appraisal techniques to viability modelling within the UK planning system. The first related to the extent to which, given intrinsic input uncertainty, the choice of model structure significantly affects model outputs. The second concerned the extent to which, given intrinsic input uncertainty, the level of model complexity significantly affected model outputs. Monte Carlo simulation procedures were applied to a hypothetical development scheme in order to measure the effects of model aggregation and structure on model output variance. It was concluded that, given the particular scheme modelled and unavoidably subjective assumptions of input variance, that simple and simplistic models may produce similar outputs to more robust and disaggregated models. Evidence was found of equi-finality in the outputs of a simple, aggregated model of development viability relative to more complex, disaggregated models.

18.2.3.2 *Inclusion / expression of profit*

Whilst project or investment appraisal is at the core of capital budgeting theory, fundamental tenets of this body of knowledge are not embedded in the appraisal of property development opportunities. Rather than a target rate of return that reflects the opportunity cost of capital and risk premium, it is usual practice to estimate a required profit in terms of a cash sum. The profit margin is usually expressed as a simple ratio, for example, a proportion of total costs or development value. These ratios are not sensitive to time. For instance, all else being equal, the profit level (if expressed as a ratio of development costs or value) would be the same for a one or 10-year scheme whereas the internal rates of return would be different. The application of an absolute (in cash terms) profit margin invariant with the timeframe of a development implies an assumption that developers are indifferent to whether £1 is received next year or in 10 years.

But what is an acceptable risk-adjusted market return for development activity? There is no single answer; it depends on the type of developer, type and location of the development and the state of the market. Geltner et al. (2007, Chapter 29) stress that, although difficult – deriving IRRs from development project cash-flows is risky because they vary depending on construction period cash-flow and exit value assumptions – estimating a required rate of return is an unavoidable element of all project evaluations and inherent to the process. They suggest a number of possible approaches, contingent upon the stage in the development process, that draw upon real option pricing, the use of a 'reinterpreted' weighted average cost of capital (WACC) or historic return data from 'pure play' real estate development companies. Brown and Matysiak (2000) discuss risk grouping, risk ratios, capital asset pricing model, arbitrage pricing theory and WACC. It is clear that estimating a required rate of return for development opportunities requires data that typically do not exist or assumptions that are difficult to verify but, whilst problematic, it is important to acknowledge that required rates of return are implicit in all conventional development appraisal techniques when applying simple profit on GDV and profit-on-cost ratios.

18.2.3.3 Handling of financing

In conventional residual and cash-flow development appraisals, it is common textbook practice to assume all-debt financing whereas, in practice, a range of gearing levels may be used. Mainstream project appraisal usually separates the investment decision from the financing decision. Brealey, Myers and Allen (2008) identify a project's value as a function of the forecasted after-tax cash flows assuming all-equity financing discounted at the opportunity cost of capital. They specifically address the potential confusion between the use of cost of debt and the opportunity cost of capital in the cash-flow appraisal, emphasising that the discount rate should be based upon the return available from similar alternative investments rather than the cost of borrowing. There is little direct connection between the rate at which the company can borrow and the appropriate discount rate to be applied to a particular project. This is particularly so when the cash-flows are subject to a high degree of risk as in many real estate developments. The mainstream approach to dealing with financing in project evaluation is to discount projects at the WACC or discount the equity at the cost of equity. There is a possibility that these weaknesses are being addressed in practice. It is possible that the combination of blending financing and investment decisions with an unrealistic premise of 100% borrowing in conventional development appraisal has meant that a number of mutations have emerged that attempt to rectify these problems. Some developers may perform appraisals assuming loan-to-cost ratios and produce geared cash-flows assuming only a proportion of development costs are borrowed. Since it requires an assumption of land costs in order to estimate the geared cash flow, this approach would probably not normally be used to assess land value. Instead it would be used to assess the NPV of a geared cash-flow including land costs. Furthermore, in an attempt to make an unrealistic model slightly more realistic, in some appraisals different finance rates for credits and debits could be applied in the cash-flow.

18.3 Cash-flow profit appraisal

The cash-flow model presented in Chapter 9 can be adapted so that profit is not input as a lump sum receivable at the end of the scheme. Instead, it is handled by using a target rate of return as the discount rate. This means that financing must be handled separately as before it was handled by using the interest rate as the discount rate. In this way the project appraisal is undertaken in two stages: before and after financing.

If it is assumed that the developer requires a return of 10% per annum and that financing can be secured at 10% per annum also, CF3 shows that with a 'going in' land price of £729,481, the NPV would be £589,755 and the IRR 25.98%. When 100% debt financing is assumed, the finance accounting shows the same thing but in a different way. The net cash-flow is compounded at 10% per annum finance rate and this leaves a profit at the end of the scheme of £713,604. This amount, when discounted at 10% per annum, equates to £589,755.[1] The two figures are derived from the same cash flow but are at different times.

More realistically, a TRR in line with the risk profile of the development scheme would be applied, say 15–25%. If 20% is assumed, the before-financing NPV reduces to £189,090 while the finance accounting calculations remain the same. But it might be possible to secure finance at a more favourable rate, say 7% per annum. If this is the case then the profit sum output from the finance accounting statement will change to £842,635, producing a profit on costs of 22.47%. The cash-flow is being examined in two ways; before and after finance and, depending on the values we select for discounting and compounding parameters (TRR and interest rate), different results will arise. The before-finance cash-flow is really a project appraisal tool, asking the question 'does the project (regardless of financing) meet the developer's aspirations?' In other words, is it viable? The after-finance cash-flow is a step on the way to an appraisal of return on equity.

One hundred per cent debt financing is an unrealistic assumption so instead consider a combination of debt and equity funding. If the loan is for, say, 60% of costs and the developer puts in the other 40%, the profit on costs increases to 26.45% because less interest is paid as less money is borrowed. But the return to the developer on the 40% equity input is 69.50%. This is a geared return, i.e. the IRR of the project is 25.98% and money can be borrowed at 7% per annum. The greater the difference between the IRR and the interest rate and/or the greater the proportion of debt used, the greater the gearing and the higher the return on equity. This does, of course, work both ways.

Conventional cash-flow residual (cost spread)										
Target rate of return (per annum)	10.00%									
Debt proportion (loan-to-cost)	100.00%									
REVENUE										*TOTALS*
Net Development Value - Commercial	0	0	0	0	0	0	0	0	4,593,043	*4,593,043*
EXPENDITURE										
Land price	–729,481	0	0	0	0	0	0	0	0	*–729,481*
Land acquisition costs	–41,945	0	0	0	0	0	0	0	0	*–41,945*
Site preparation costs	0	–25,000	0	0	0	0	0	0	0	*–25,000*
Building costs	0	0	–193,800	–387,600	–775,200	–387,600	–193,800	0	0	*–1,938,000*
External works	0	0	0	0	–120,000	0	0	0	0	*–120,000*
Professional Fees (% bldg costs & ext. works)	0	0	–26,754	–53,508	–107,016	–53,508	–26,754	0	0	*–267,540*
Misc costs	0	0	0	0	–80,000	0	0	0	0	*–80,000*
Contingency (% bldg costs)	0	0	–6,617	–13,233	–32,466	–13,233	–6,617	0	0	*–72,166*
Planning						–5,000				*–5,000*
Building Regs						–20,000				*–20,000*
Other						–95,238				*–95,238*
Marketing	0	0	0	0	0	0	0	0	–10,000	*–10,000*
Letting agent(s) fee	0	0	0	0	0	0	0	0	–34,000	*–34,000*
Letting legal fee	0	0	0	0	0	0	0	0	–17,000	*–17,000*
Net cash-flow	–771,426	–25,000	–227,171	–454,341	–1,114,682	–574,579	–227,171	0	4,532,043	*1,137,673*
PV £1 @ discount rate	1.0000	0.9765	0.9535	0.9310	0.9091	0.8877	0.8668	0.8464	0.8264	
PV of net cash flow	–771,426	–24,411	–216,599	–422,997	–1,013,348	–510,046	–196,908	0	3,745,490	*589,755*
NPV (£)	589,755									
IRR (per annum)	25.98%									

Conventional cash-flow residual (cost spread)										
Finance accounting										
Equity (input as a proportion of periodic cash-flow):										
	0	0	0	0	0	0	0	0	0	*0*
Loan (drawn down as a proportion of cash-flow):										
Opening balance	0	–771,426	–815,028	–1,061,852	–1,541,798	–2,693,659	–3,333,193	–3,640,739	–3,728,531	
Interest on opening balance	0	–18,602	–19,653	–25,605	–37,178	–64,954	–80,376	–87,792	–89,909	*–424,069*
Closing balance	–771,426	–815,028	–1,061,852	–1,541,798	–2,693,659	–3,333,193	–3,640,739	–3,728,531	**713,604**	
PV of closing balance	589,755									
Profit as a % all costs	**18.39%**									
Profit as a % NDV	**15.54%**									

Conventional cash-flow residual (cost spread)										
Target rate of return (per annum)	20.00%									
Debt proportion (loan-to-cost)	60.00%									
REVENUE										***TOTALS***
Net Development Value - Commercial	0	0	0	0	0	0	0	0	4,593,043	*4,593,043*
EXPENDITURE										
Land price	–729,481	0	0	0	0	0	0	0	0	*–729,481*
Land acquisition costs	–41,945	0	0	0	0	0	0	0	0	*–41,945*
Site preparation costs	0	–25,000	0	0	0	0	0	0	0	*–25,000*
Building costs	0	0	–193,800	–387,600	–775,200	–387,600	–193,800	0	0	*–1,938,000*
External works	0	0	0	0	–120,000	0	0	0	0	*–120,000*
Professional Fees (% bldg costs & external works)	0	0	–26,754	–53,508	–107,016	–53,508	–26,754	0	0	*–267,540*

Misc costs	0	0	0	0	–80,000	0	0	0	0	*–80,000*
Contingency (% bldg costs)	0	0	–6,617	–13,233	–32,466	–13,233	–6,617	0	0	*–72,166*
Planning						–5,000				*–5,000*
Building Regs						–20,000				*–20,000*
Other						–95,238				*–95,238*
Marketing	0	0	0	0	0	0	0	0	–10,000	*–10,000*
Letting agent(s) fee	0	0	0	0	0	0	0	0	–34,000	*–34,000*
Letting legal fee	0	0	0	0	0	0	0	0	–17,000	*–17,000*
Net cash-flow	–771,426	–25,000	–227,171	–454,341	–1,114,682	–574,579	–227,171	0	4,532,043	*1,137,673*
PV £1 @ discount rate	1.0000	0.9554	0.9129	0.8722	0.8333	0.7962	0.7607	0.7268	0.6944	
PV of net cash flow	–771,426	–23,886	–207,377	–396,275	–928,902	–457,481	–172,815	0	3,147,252	*189,090*
NPV (£)	**189,090**									
IRR (per annum)	**25.98%**									
Finance accounting										
Equity (input as a proportion of periodic cash-flow):										
	–308,570	–10,000	–90,868	–181,736	–445,873	–229,832	–90,868	0	–24,400	*–1,382,148*
Loan (drawn down as a proportion of cash-flow):										
Opening balance	0	–462,856	–485,751	–630,340	–913,697	–1,598,093	–1,970,102	–2,140,011	–2,176,517	
Interest on opening balance	0	–7,896	–8,286	–10,753	–15,586	–27,261	–33,607	–36,505	–37,128	*–177,023*
Closing balance	–462,856	–485,751	–630,340	–913,697	–1,598,093	–1,970,102	–2,140,011	–2,176,517	**960,650**	
PV of closing balance	667,118									
Profit as a % all costs	26.45%									
Profit as a % NDV	20.92%									
Profit as a % equity (return on equity)	69.50%									

It would be possible to build more detail into this sort of cash-flow by perhaps phasing the letting and sales of the commercial and residential premises. By adding more detail we move out of the realm of what can be squeezed on to the printed page of a book without the aid of a magnifying glass. Spreadsheet software would be used to construct such a valuation. Alternatively it is possible to purchase proprietary software that automates much of the calculation work.

18.3.1 Criticisms

It is common (although not universal) practice to input current values and current costs. The extent to which a development appraisal with forecasts will produce a different output relative to a model without forecasts depends upon the difference between cost and revenue inflation, the relative proportion of costs to revenues and the length of the development period. In many circumstances, estimated land value can be extremely sensitive to relatively small changes in forecasts of costs and revenues estimates. A further problem of ignoring cost and revenue inflation is that sites are appraised ignoring differences in expected changes in supply and demand. If it is the current level of most variables that is incorporated into appraisal models, the potential effects of differences in future demand and supply conditions are not addressed. For instance, two sites may have similar *current* cost and revenue conditions with one in a market characterised by extremely constrained supply and the other in an area where competing sites are numerous. The application of a residual model incorporating only current values will result in similar estimates of current value for both sites. In addition, a potential mistake when applying any discounted cash flow is to treat inflation improperly in the financial appraisal (see Drury and Tayles, 1997). Inflation directly influences future cash flows *and* the discount rate. In order to take account of inflation accurately, there are two alternatives. Either real cash flows can be discounted at a real discount rate or nominal cash flows can be discounted at a nominal discount rate. If a nominal discount rate is applied to current or real cash flows, the result is that Net Present Values are understated and under-valued where there is inflation. It is standard textbook practice for real estate development appraisal to use a nominal rate – the cost of bank debt. In the conventional residual method and in many cash-flow versions, this nominal discount rate is then applied to *current* costs and values which are arguably implied real cash-flows unless growth in costs and values is deemed to be zero over the development period.

With forecasting of rental growth, yield movement and construction costs, the residual model is as follows:

$$LV_0 = (1+i)^{-t}\left[\frac{R_0(1+r)^t/y_t}{(1+p)} - DC_0(1+c)^t - I\right] \quad [18.1]$$

Where R_0 = current estimate of rent
r = forecast of annual rental growth rate
y_t = forecast of initial yield at time t
c = forecast of annual construction cost inflation

When attempting to measure *ex poste* the return achieved on a development project, it is important to consider:

- the current (as opposed to book) value of the land;
- the exit value (specifically in relation to voids, lease incentives, discounted forward sale value, etc.);
- there is no comparison of *ex ante* development appraisals with *ex poste* return analysis; so it is difficult to determine the importance of including forecasts of costs and growth in a development appraisal.

Most importantly, though, is the way in which the return is measured. Two key issues arise: what to do about finance and what to do about the timescale of the development. Options include:

- return on total development costs (costs typically include finance);
- return on equity (also includes finance and therefore is a geared measure of return, albeit one that does not reflect the timescale of the project);
- ungeared IRR;
- IRR on equity (geared IRR).

It seems as though the industry has yet to form a unified view on which is best. There is a reluctance to adopt IRR and that is without considering its mathematical shortcomings, especially in relation to development projects.

18.4 Development risk

Uncertainty surrounding estimates of current levels of costs and revenues and future cost and price inflation introduces scope for justifiable variations in estimation of the key inputs into a development appraisal. This will, in turn, produce intrinsic uncertainty in the output. Rarely will development appraisals by different appraisers produce identical findings. Development appraisals are prone to uncertainty because there is uncertainty in assumptions about current levels of the inputs and about how these variables will change over the uncertain development period. Risk in development can be defined in terms of the extent to which the actual outcome diverges from expected outcomes. It can only be eliminated by fixing all of the input variables at the date of the valuation. As noted in Byrne et al. (2011), there are two key types of uncertainty; defensible disagreement between modellers about model composition and inputs, and unanticipated changes affecting revenues and costs.

Being able to judge the risk involved in a particular development opportunity goes hand-in-hand with the estimation of likely return. Remember the higher the risk of an investment the higher the required return. In this section we will consider ways in which various types of risk associated with property development might be managed and we will look at how development risk might be analysed and quantified. Before that, though, clarification of two key terms might be apposite. Byrne (1996) suggests that uncertainty is anything that is not known about the outcome of a venture at the time the decision is made. Fisher and Robson (2006) argue that uncertainty lies at the root of property development – a process which produces a product in anticipation of unknown future demand. On risk

Byrne suggests that this is the measurement of loss. Fisher and Robson point out that development is a complex stochastic process, the features of which vary with time and place and developers need to be aware of risks and approaches to risk management in the letting, investment, land, construction and finance markets. Development risk occurs because we are unable to forecast the outcome of future events with certainty.

Both the residual and cash-flow versions of a development valuation are built using a deterministic model that contains numerous point estimates of the input variables and mistakes can quite easily be compounded where these variables are brought together in additive, multiplicative and possibly interdependent relationships. For example there are several downside risks such as: increases in construction costs; delayed completion; reduced investor demand leading to an increase in the investment yield; reduced occupier demand leading to delays in letting or sale of the property, decreased rental and capital value; and increases in the cost of borrowing money. To make matters worse these do not happen in isolation. As explained in Chapter 3 a downturn in the economy will impact on investment and occupier markets. Reduced demand from investors will cause the investment yield to rise and reduced demand from tenants will cause rents to drop. The combined effect may lead to a substantial shift in the view of development viability. It is important therefore to mitigate the influence of the key downside risks as much as possible and potential ways of doing this are discussed later. Before that the next section considers various ways that risk might be analysed.

18.4.1 Risk analysis

Fisher and Robson (2006) suggest that the various risks associated with property development may be assessed qualitatively, by detailing and ranking them, perhaps using some sort of 'probability-impact matrix'. Or risks may be analysed quantitatively, by undertaking sensitivity analysis, probability simulations or other techniques that were introduced in Chapter 5.

As mentioned above there may be variation in anticipated construction costs during the development or movements in the level of rent obtained prior to completion. As a consequence the actual return received from a development will probably differ from the estimate made in the residual valuation at the start of the development. Techniques for analysing such risks vary from simple but intuitive relationships such as rent cover, interest cover and break-even rent through to deterministic simulation models such as sensitivity analysis and scenario modelling.

18.4.1.1 Simple ratios and thresholds

Rent cover is the number of years it would take to eliminate the profit assuming letting were delayed. The calculation determines the length of the void period before the project would generate a loss. This is relevant in pre-funded arrangements where the developer may guarantee the rent to an investor from the end of any pre-arranged void period until the scheme is fully let. Two schemes with the same return on value will have different rent covers if their investment yields are different; the higher the yield the lower the rent cover. So, using the information from the residual valuation of developer's profit in section 6.4:

$$\begin{aligned}\text{Rent cover} &= \text{developer's profit at end of scheme} \div \text{estimated annual rent}\\ &= £935{,}789 \div £562{,}500\\ &= 1.66 \text{ years}\end{aligned}$$

Interest cover is the number of years from the end of the void period before profit is eroded by interest payments to the bank. This is a useful measure for **speculative development** that has been financed through a bank loan and which is converted to a long-term loan (mortgage) at the end of the development period. Assume that in the valuation in section 6.4 the total costs that need to be paid back to the lender (£5,957,594) is converted to a mortgage secured against the property at a long-term interest rate of 6% per annum over 25 years. The annual mortgage repayments are calculated by adapting the Future Value £1 per annum formula. So, recalling Equation 2.11 from Chapter 2:

$$FV\,£1pa = A\left[\frac{(1+r)^n - 1}{r}\right]$$

Where A is the annual instalment and r is the rate of interest charged by the lender. But these instalments must accrue not just to £5,957,594 but to this amount compounded over the mortgage term at r rate of interest. So:

$$A\left[\frac{(1+r)^n - 1}{r}\right] = M \cdot (1+r)^n$$

Where M is the mortgage amount (£5,957,594) and $(1+r)^n$ is the formula for compound interest (FV £1). Rearranging this formula we can solve for A:

$$A = \frac{M(1+r)^n \cdot r}{(1+r)^n - 1} = \frac{5{,}957{,}594(1+0.06)^{25} \times 0.06}{(1+0.06)^{25} - 1} = £466{,}043$$

We can now calculate the interest cover ratio:

$$\begin{aligned}\text{Interest cover} &= \text{developer's profit at end of scheme} \div \text{annual interest payable}\\ &= £935{,}789 \div £466{,}043\\ &= 2.01 \text{ years}\end{aligned}$$

Break-even analysis or **profit erosion** is a recalculation of the valuation in which the developer's profit is set to zero. For example, break-even rent indicates the minimum rent required to ensure that no loss is incurred. This sort of analysis is very straightforward if the valuation is set up in a spreadsheet; the iteration function (called 'goal-seek' in Excel) can be used to set the cell containing the figure for the developer's profit to zero by altering one of the input variables such as rent, yield, interest rate, development period or building costs to identify break-even

Part D

Table 18.1 Break-even analysis.

Input variable	Original value	Break-even value	Change
Rent	£150.00	£128.91	a drop of 14.06%
Yield	8%	9.29%	a rise of 16.13%
Building cost	£800/m^2	£945/m^2	a rise of 18.13%
Interest	7%	17.25%	a rise of 146.43%
Void period	0.5 years	2.69 years	a rise of 438%

Table 18.2 Sensitivity matrix.

Variable	Original value	+10%	New profit	Change in profit	–10%	New profit	Change in profit	Range
Rent	£150/sqm	£165/sqm	£1,329,527	+71%	£135/sqm	£224,299	–71%	142%
Yield	8%	8.8%	£268,168	–65%	7.2%	£1,398,712	+80%	145%
Building Costs	£800/sqm	£880/sqm	£348,962	–55%	£720/sqm	£1,204,864	+55%	110%
Interest Rate	7%	7.7%	£713,187	–0.08%	6.3%	£842,485	+0.08%	1.6%

values for these variables. Using the residual valuation of developer's profit from earlier, Table 18.1 lists the break-even values of the key input variables.

This simple analysis shows which variables to keep a close eye on. It should be remembered that developers and investors are risk averse and will generally seek to determine the extent to which the most pessimistic case might impact profit.

18.4.1.2 Sensitivity analysis and scenario modelling

A conventional residual valuation does not give any indication of the uncertainty inherent in the development process. Cash-flow methods overcome some of the inaccuracies of the conventional approach but are still only snapshots of viability. **Sensitivity analysis** permits a better understanding of the dynamics of the development by quantifying risk in a very simplistic way. It forces the developer to think more carefully about how assumptions and point estimates of key input variables might vary. Univariate sensitivity analysis seeks to quantify the effect of changes in the values of certain input variables on the output variable one variable at a time. As an example the four key input variables from the now familiar developer's profit valuation in section 6.4 will be altered by a margin of 10% either side of the best estimate and the effect on developer's profit measured. The results are shown in Table 18.2.

This type of analysis indicates which inputs have the greatest impact on profit. Changes to the investment yield have the largest impact, followed by rent, building cost and then the finance rate. A developer may be prepared to pay a high price for a site if a small increase in rent would more than offset the increase in land cost. It is possible to set up a similar type of table using standard tools on a spreadsheet. Assume that examination of the results reported in Table 18.2

Table 18.3 Univariate sensitivity analysis using Excel.

RENT		
Change	**Rent**	**Profit**
+10%	£165.00	£1,329,527
+5%	£157.50	£1,053,220
Original value	£150.00	£776,913
–5%	£142.50	£500,606
–10%	£135.00	£224,299
YIELD		
Change	**Yield**	**Profit**
+10%	8.80%	£268,168
+5%	8.40%	£510,428
Original value	8.00%	£776,913
–5%	7.60%	£1,071,449
–10%	7.20%	£1,398,712

Table 18.4 Bivariate sensitivity matrix.

		Yield				
		7.20%	**7.60%**	**8.00%**	**8.40%**	**8.80%**
Rent	**£165.00**	£2,013,506	£1,653,517	£1,329,527	£1,036,393	£769,908
	£157.50	£1,706,109	£1,362,483	£1,053,220	£773,410	£519,038
	£150.00	£1,398,712	£1,071,449	£776,913	£510,428	£268,168
	£142.50	£1,091,315	£780,415	£500,606	£247,445	£17,298
	£135.00	£783,918	£489,382	£224,299	–£15,538	–£233,572

prompt you to focus on the impact on profit resulting from more refined changes in the estimates of rent and yield inputs. The Excel 'table' function produces the outputs shown in Table 18.3.

Bivariate sensitivity analysis extends univariate analysis by examining the impact of changes to two variables at the same time. A simple cross-tabulation can be used to report the results. Table 18.4 shows a simple bivariate sensitivity matrix that reports the effect on developer's profit as a result of combined changes in the rent and yield variables. Despite this being a bivariate analysis it does not take account of any possible correlation between the input variables, instead they are assumed to move independently. But logic tells us that as rents rise, yields should fall and vice versa of course. So the profit estimates highlighted in grey along the bottom left to top right diagonal are more likely to occur than the other combinations. Some of the output is repeated from the univariate sensitivity analysis but you can see that this bivariate analysis provides more information about what happens when changes coincide, such as an increase in yield and a drop in rent. A combination such as this would not be unusual in a market downturn.

By now you should be asking what you can do to model changes in several variables all happening at the same time, after all, that's what happens in the real world. If an increase in the rate of inflation is anticipated, this may cause the

Table 18.5 Scenario modelling.

Scenario	Realistic	Best	Worst
Input Variables:			
Rent (£/m^2)	150	152	148
Yield (%)	8.00	7.80	8.25
Building Costs (£/m^2)	800	790	820
Output Variable:			
Land Value (£)	776,913	1,049,494	428,923

developer to reconsider the level of some of the key input variables. The finance cost may increase if the Bank of England Monetary Policy Committee decides to raise the Base Rate as a means of releasing inflationary pressure. Such an action may simultaneously cause businesses to hold off relocating and renting new premises. This may, in turn, increase the void period at the end of a development scheme as the search for tenants takes longer or more substantial rent-free periods are offered. Moreover, developers may have to reduce rents to attract tenants and investors may increase their yields expectations. As Fraser (1993) notes a combination of small changes in several variables could reduce land value or profitability sufficiently to render the development economically unviable.

There are two ways of examining the impact on land value or profit resulting from simultaneous changes in multiple input variables, what may be termed a multivariate sensitivity analysis. The first is called **scenario modelling** and was devised in the days before spreadsheets. Scenario modelling extends sensitivity analysis by examining the residual land value or profit obtained when alterations are made to several input variables at the same time. It does this by calculating the output value given input values that correspond to best, worst and most likely scenarios. Extending our example to three variables: rent, yield and building costs, we can create different scenarios for different combinations of values of these variables. In theory we can construct numerous scenarios using different combinations of values of input variables but it is perhaps better to think carefully about practical combinations of values rather than try and input every permutation. Part of the value of doing this sort of thing is to force careful consideration on the input values. Table 18.5 reports the developer's profit under three scenarios: best, worst and realistic. The second way is using pivot tables. These are interactive cross-tabulations of data and utilise a spreadsheet's ability to perform 'what if' modelling to the full.

The main drawback with the simple ratios and thresholds, the sensitivity analyses and scenario modelling that we have looked at so far is that they do not consider the likelihood of various outcomes. As Byrne (1996) points out with regard to scenario modelling, the best and worst scenarios are in fact the two extremes and both may be pretty unlikely. This leads us to the consideration of probability in our analysis.

18.4.1.3 Simulation

Several academics and practitioners have argued for deterministic models to be replaced or at least supplemented with probabilistic modelling (see Evans, 1992, French and Gabrielli, 2004 and 2005, Atherton et al., 2008, Gimpelevich, 2011, Loizou and French, 2012). The thrust of the argument is that probabilistic modelling can reflect both the uncertainty of and correlation between input estimates. The standard approach here is to use simulation techniques. Simulation software can be 'added' to Excel to produce multiple estimates of an output rather than a single estimate. The distribution of possible outcomes is generated by the software which recalculates the result over and over again, each time using different randomly selected sets of values determined by specified probability distributions. In effect, simulation is trying all valid combinations of the values of input variables to simulate all possible outcomes. It then presents the outcomes and their probabilities. Simulation programmes require us to estimate:

- what our best estimate is of an input (the mean);
- how certain we are about that input (the standard deviation);
- the statistical distribution of this uncertainty;
- boundaries around this distribution if necessary; and
- how the inputs are correlated.

The simulation programme will draw numbers randomly from the distribution. Numbers that occur frequently in the distribution are more likely to be selected. In return, based on the inputs provided, the simulation programme provides us with its best guess of the actual outcome, the probability of achieving any specific outcome, the probability of being in a range of possible outcomes and the level of uncertainty around the estimated outcome.

However, there are many practical obstacles with measuring risk in a development scheme. In any risk analysis, a main consideration will be the form of the probability distributions that express the uncertainties in the system. This is a major difficulty in developing models of this kind. It is necessary to specify a considerable number of distributions in these models and, practically, the justification of the form of any or all of them is a problem that is common to all risk analyses. The literature tends to use easily managed distributions, e.g. Normal, Triangular, vrather than attempting any systematic understanding as to which distributions might be most appropriate.

Whilst it has been acknowledged above that uncertainty is inherent to development viability appraisal, there are clear difficulties in measuring and communicating this uncertainty. Although simulation methods provide a useful approach to estimating the range of outputs and the probability of different outputs, there is a major difficulty in developing simulation models of this kind. It is necessary to specify a considerable number of distributions in these models and, practically, the justification of the form of any or all of them is not easy. Put differently, there is uncertainty about the level and nature of uncertainty in the model inputs and, therefore, uncertainty about the level and nature of uncertainty in the model outputs (Byrne et al., 2011).

If a deterministic valuation model contains many uncertain inputs, predicting variables with a comfortable degree of confidence can become difficult. The valuation output (site value or developer's profit) might be better expressed as a range of values rather than a single value, but how big is the range and how is it distributed? The valuation of a property development opportunity, unlike the valuation of a standing property investment, typically involves the estimation of a larger number of input variables and the uncertainty that surrounds their

Table 18.6 Probability distributions of yield and rent input variables.

		Distribution parameters			
Variable	**Distribution Type**	**Mean**	**SD**	**Truncated minimum**	**Truncated maximum**
Office yield (%)	Normal	7.00	1.00	4.00	10.00
Retail yield (%)	Normal	6.00	0.50	3.00	9.00
Industrial yield (%)	Normal	9.00	2.00	5.00	13.00
Bank Base rate (%)	Normal	4.75	2.00	3.00	6.50

estimation is usually greater because the property exists only in the mind of the developer at this stage. Furthermore, the correlations between the variables can be very complicated. Sensitivity analysis and scenario modelling may therefore be of limited use in indicating the extent of risk. There are ways of reducing the level of uncertainty and these are explored in the next section. Before that though we should look at how the valuation model itself might be adapted to quantify the risk associated with this increased level of uncertainty.

A procedure known as simulation can be used to assign probability distributions to input variables in a valuation model as a way of reflecting the uncertainty that surrounds their estimation. The same technique can be applied to development valuation. We consider how this is done below but for a detailed exposition on development appraisal using probabilistic simulation models see Byrne (1996). Values of input variables that cannot be stated with a high degree of certainty can be input as probability distributions of some sort. Specifying these distributions and inputting the key parameters such as the mean and standard deviation or maximum, minimum and mode, is the key to using probabilistic modelling. When the simulation is run, a value for each variable is selected from the range of possible values in accordance with the given probability distribution, so values are more likely to be drawn from areas of the distribution which have higher probabilities of occurrence. These values are then fed into the residual valuation and, through a process of iteration, repeated many times; simulating a range of possible outcomes.

But, if we are not careful, the complexity can increase exponentially as we try to model uncertainty in a large number of input variables. To keep things simple let's model the effect of uncertain *key* input variables on developer's profit. The key variables are land price, rent, yield, building cost, interest rate and development period, and we shall begin by assuming that the land has been purchased so the price is fixed, the rent is fixed via a pre-let agreement and the building costs and construction period have been agreed under a fixed-price contract. The development period can also be predicted with a high degree of confidence because the building contractor has agreed to pay a penalty payment equivalent to the market rent for the duration of any over-run, and the pre-let ensures there is no rent void. That leaves uncertainty over the yield and the interest rate. The parameters for these variables have been input as shown in Table 18.6. Byrne (1996) notes that, generally, uncertainty increases over time (for example, the standard deviation of a normally distributed variable would increase) so it may be necessary to reassess

Table 18.7 Input variable correlation matrix.

	Office yield	Retail yield	Industrial yield	Bank base rate
Office yield	1			
Retail yield	0.8	1		
Industrial yield	0.7	0.7	1	
Bank base rate	–0.5	–0.5	–0.5	1

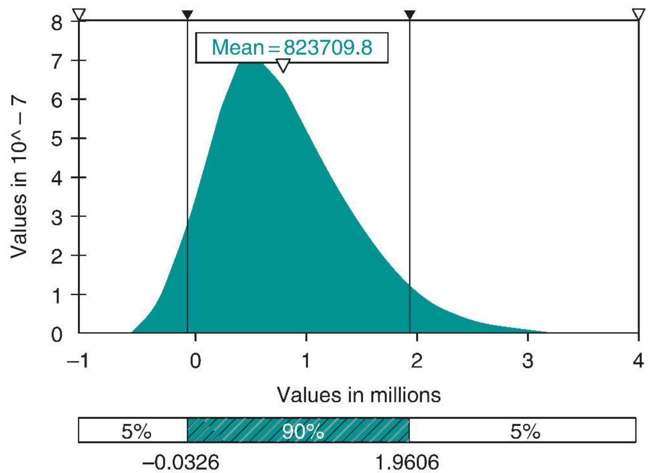

Figure 18.1 Probability distribution for developer's profit.

distribution of values of a variable at various intervals. In the following simulation, as with Byrne, it is assumed that all distributions are static throughout the development period.

It is also necessary to examine correlations between variables and these have been set up subjectively as shown in Table 18.7.

Using the @RISK simulation software add-in to Microsoft Excel, the cash-flow profit valuation of the mixed use development is simulated 10,000 times. There are four input variables (office, retail and industrial yields and the bank base rate) and one output variable (developer's profit). Values of the input variables for each iteration of the cash-flow were sampled from the probability distributions using the 'Latin Hypercube' sampling method.[2] Figure 18.1 shows the probability distribution for the output variable, developer's profit. It can be seen that there is roughly a 5% probability of making a loss. Table 18.8 reports the main descriptive statistics.

Another useful result produced by the software is a sensitivity matrix. This shows the sensitivity of the output variable to the input variable distributions. Two measures of sensitivity are reported; the first is calculated by regressing each output value with each input variable for each iteration. The overall fit of the regression analysis is measured by the R-squared of the model. The lower the R-squared, the less stable the reported sensitivity. The input variables are then ranked according to their influence on the volatility of the output variable.

Table 18.8 Descriptive statistics for developer's profit.

Statistic	Value	Percentile	Value
Minimum	–£558,157	5%	–£32,582
Maximum	£3,506,258	10%	£114,953
Mean	£823,710	15%	£219,501
Std Dev	£608,975	20%	£306,105
		25%	£381,119
Skewness	0.7088	30%	£454,995
Kurtosis	3.5165	35%	£525,681
Median	£739,269	40%	£595,763
Mode	£386,876	45%	£669,862
		50%	£739,269
		55%	£819,985
		60%	£899,535
		65%	£981,040
		70%	£1,082,331
		75%	£1,185,950
		80%	£1,307,929
		85%	£1,453,386
		90%	£1,651,971
		95%	£1,960,565

Table 18.9 Sensitivity matrix.

Rank	Input variable	Regression sensitivity	Correlation coefficient
1	Industrial yield	–0.444	–0.897
2	Office yield	–0.428	–0.914
3	Retail yield	–0.227	–0.870
4	Bank base rate	–0.021	0.529

Spearman's rank correlation coefficient is calculated between the output variable and the samples for each of the input distributions; the higher the coefficient, the more significant the input is in determining the output's value. The results for the developer's profit cash-flow simulation are shown in Table 18.9. Developer's profit is most sensitive to the level of industrial yield and the negative signs for all four input variables mean shifts in their standard deviations cause a shift of in the opposite direction for developer's profit, as expected. There is a positive rank correlation coefficient for the bank base rate and this is counter-intuitive; we would not expect a rise in the base rate to increase the developer's profit. This result may be caused by multicollinearity[3] between the input variables and would require further statistical investigation.

If we now add further uncertainty by varying the rents, void period and building costs, as shown in Table 18.10, let's see what happens. Table 18.11 shows that the correlation matrix can get really complicated. The subjectively chosen correlations

Table 18.10 Probability distributions of input variables.

Variable	Distribution type	Distribution parameters		
		Mode	Min	Max
Office rent	Triangular	95	92.50	97.50
Retail rent	Triangular	140	137.50	142.50
Industrial rent	Triangular	70	67.50	72.50
Office build cost	Triangular	600	580	650
Retail build cost	Triangular	500	480	550
Industrial build cost	Triangular	300	290	330
Void period	Normal	0	0	0.5

Table 18.11 Input variable correlation matrix.

	Office build costs	Retail Build costs	Industrial Build costs	Letting void	Office rent	Retail rent	Industrial rent	Office yield	Retail yield	Industrial yield	Bank Base rate
Office build costs	1										
Retail build costs	0	1									
Industrial build costs	0	0	1								
Letting void	0	0	0	1							
Office rent	0	0	0	0	1						
Retail rent	0	0	0	0	0	1					
Industrial rent	0	0	0	0	0	0	1				
Office yield	0	0	0	0	–0.5	0	0	1			
Retail yield	0	0	0	0	0	–0.5	0	0.77	1		
Industrial yield	0	0	0	0	0	0	–0.5	0.67	0.67	1	
Bank base rate	0	0	0	0.5	–0.5	–0.5	–0.5	0	0	0	1

between the 11 input variables have been kept as simple as possible in this example. Again, 10,000 iterations were undertaken using the Latin Hypercube sampling method. Figure 18.2 shows the probability distribution of developer's profit. The mean value has dropped to £808,552 but the probability of making a loss is still around 5%. Summary statistics are reported in Table 18.12 and they show that not much has changed apart from the measures of central tendency (the mean, median and mode) all show a reduced level of profit. Basically the distribution has shifted very slightly to the left. The sensitivity matrix in Table 18.13 shows that yields and rents have the most significant influence on developer's profit.

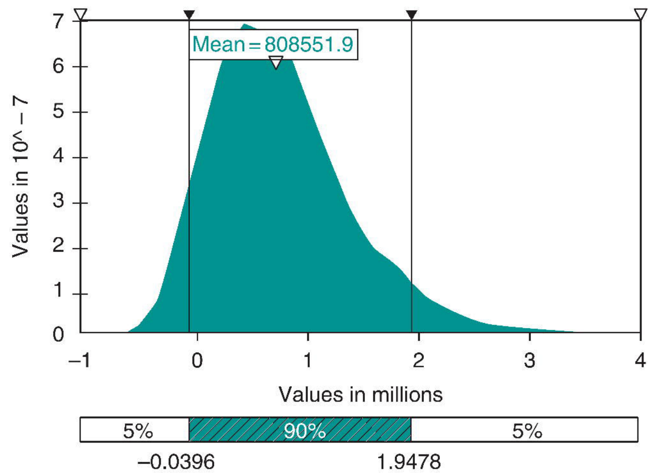

Figure 18.2 Probability distribution for developer's profit.

Table 18.12 Descriptive statistics for developer's profit.

Statistic	Value	% tile	Value
Minimum	–£576,389	5%	–£39,568
Maximum	£3,687,974	10%	£99,440
Mean	£808,552	15%	£203,913
Std Dev	£608,123	20%	£289,696
		25%	£366,529
Skewness	0.7495	30%	£439,362
Kurtosis	3.6274	35%	£510,404
Median	£729,154	40%	£583,389
Mode	£360,389	45%	£654,858
		50%	£729,154
		55%	£806,058
		60%	£874,454
		65%	£960,820
		70%	£1,052,842
		75%	£1,157,693
		80%	£1,284,008
		85%	£1,430,191
		90%	£1,644,644
		95%	£1,947,761

Simulation techniques can also be used to perform an advanced sensitivity analysis. Using @RISK, a full simulation is run at a range of values (typically the percentile values) of each input variable distribution, tracking the results at each value. The results are summarised in a 'tornado' sensitivity chart (Figure 18.3) which shows the extent of the change in developer's profit as the input value changes and thus shows the sensitivity of the output to the specified input.

Table 18.13 Sensitivity matrix.

Rank	Input variable	Regression sensitivity	Correlation coefficient
1	Industrial yield	–0.421	–0.889
2	Retail yield	–0.373	–0.851
3	Office yield	–0.268	–0.903
4	Office rent	0.112	0.251
5	Industrial rent	0.050	0.257
6	Retail rent	–0.044	0.141
7	Letting void	–0.038	–0.055
8	Office construction costs	0.000	–0.005
9	Retail construction costs	0.000	–0.021
10	Industrial construction costs	0.000	–0.008
11	Bank base rate	0.000	–0.095

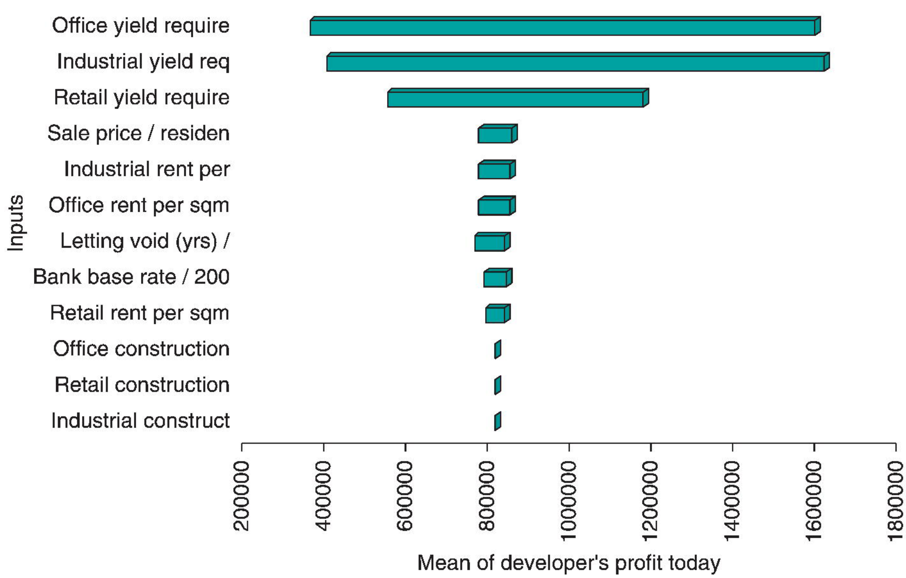

Figure 18.3 'Tornado' sensitivity chart.

French and Gabrielli (2006) note that simulation tests the robustness of single point estimates and produces a range of possible outcomes, the mean of which can be considered as the expected land value or developer's profit and the variance or standard deviation can be considered as measures of uncertainty. The problem with this sort of analysis is being unable to confidently predict distributions and correlations of input variables. Statistical confidence requires sample sizes that are significantly larger than the typical pool of comparable evidence available when valuing a property. A great deal more research is

Table 18.14 Risk responses in property development (Source: Fisher and Robson, 2006).

Issue	Avoidance	Reduction	Transfer	Retention
Planning constraints, conditions and obligations	location, site selection, land use mix, option to purchase	location, site selection, design		
Site assembly and purchase price	location, site selection, purchase price, option to purchase	location, site selection	Joint venture	Purchase price
Site or building condition, including contamination	location, site selection, purchase price, option to purchase, site investigation	location, site selection, remediation design, site investigation	Collateral warranties, insurance, contract terms	Purchase price, insurance, contract terms
Building procurement cost and overruns	Site investigation, land use mix	Site investigation, design, phasing	Collateral warranties, contract terms, joint venture	Contract terms, joint venture
Debt finance and interest rates	Equity only	Level of gearing, phasing	Rate cap, limited recourse debt	
Occupier (lettings) market, voids, rental value, incentives	Location, site selection	Market research, land use mix, design, phasing	Pre-letting, joint venture	Letting, joint venture
Investment market, yields	Location, site selection	Location, site selection, market research, land use mix, design, phasing	Advance sale, joint venture	Sale, joint venture

needed to confidently base the choice of probability distributions and selection of co-relationships between variables on empirical evidence.

18.4.2 *Risk management*

According to Fisher and Robson (2006) developers may respond to risks that they have been able to identify by avoidance, reduction, transfer or retention. Table 18.14, which is adapted from Fisher and Robson, allocates typical risk responses by UK office property developers to these four categories.

There are various ways of managing the various risks associated with property development. For example the developer may decide to set up a contingency fund, agree a pre-let by offering an incentive; or arrange a fixed-rate loan with a lender. Some of these strategies are described below but it is worth bearing in mind that the risk-return trade-off is pertinent here; the greater the perceived risk, the greater the potential return. Therefore the more risk is controlled the less profit/return should be expected from the development.

18.4.2.1 *Site acquisition*

Byrne (1996) notes that the period of time for which a site is held prior to development can be significantly reduced if it is purchased with planning permission in place. But a site with planning permission for the proposed development means that the developer faces much less site purchase risk so the price will be higher. This risk / return trade-off should be compared against the higher potential return (and higher risk) associated with acquisition of the site without the relevant planning permission.

As a means of reducing risks associated with site purchase and perhaps allowing an opportunity to investigate the condition of the site for the intended development, developers often try to delay acquisition of the site for as long as possible. This can be achieved by entering into a conditional contract with the landowner to purchase the site if permission is forthcoming. It is important to word the terms of such a contract carefully so conditions relating to planning permission, remediation of possible contamination, density of development, and so on are unambiguous. Alternatively the developer could pay an option fee for a 'right to purchase' the site. This usually lasts for a specified period at a specified price and can also be conditional. There are two types: short-term (fixed price or fixed price with index) and long-term (perhaps 75–80% of market value of the site with relevant planning permission). The option fee is probably the best choice for the developer and the conditional contract for the landowner. The developer can also agree a right of pre-emption or 'first refusal' should the landowner decide to sell. The pre-emption may confer a right to make the first offer or match the offer of another. In return the developer would pay a fee or obtain the necessary planning consent. This type of arrangement is not as straight forward as an option and only possible if the owner decides to sell. Using these strategies developers can assemble land banks, or virtual land banks, in which the land itself is not owned but some option, right or contract to purchase is held over the land.

With large sites in multiple ownerships it is particularly important to identify which land parcels are essential to the development. In town centres much development flows from the opening up of back land. Major acquisition programmes can be complicated and conditional contracts and options to purchase are common. The aim of the developer is to purchase each site at or near to existing use value so that, if necessary, it can be sold with minimum loss if the development scheme does not proceed. It is important to note that there are two levels of development value for such sites: the first is the value of the site if developed in isolation and the second includes a share of marriage value that is released when developed with neighbouring sites. The aim of the vendor is to maximise potential development value. Given the potential for conflict, partnerships can arise where risk and profits are shared in some way, often with a minimum guaranteed return to the landowner. This type of arrangement is described in Chapter 7.

18.4.2.2 Construction costs and professional fees

An obvious means of transferring risk associated with the construction phase of the development is to agree a fixed-price contract and, indeed, this was found to be the most common risk management technique among UK office developers (Fisher and Robson, 2006). Alternatively, prices of specific materials can be agreed in advance, perhaps with anticipated variation scales. The developer should also seek to control the labour cost. There may be circumstances where it is desirable for the developer to obtain bonds and warranties from contractors to guarantee work and cost. In doing so, the size and reputation of a contractor or consultant is an important consideration when attempting to ensure effective risk transfer (Fisher and Robson, 2006).

Various professionals such as architects, surveyors and engineers are commissioned to give advice throughout a typical commercial development. By doing so the developer is purchasing information about certain aspects of the development and transferring some risk. The fee paid to a professional depends on the extent of the advice given but also contributes to the indemnity insurance premium that professionals must pay to protect themselves against any losses arising from negligent advice and other legal liabilities. Professional fees should be agreed at the outset whenever possible. It may be possible to adopt a method of fee tendering. Diligence and professionalism within the professional team can be encouraged by instituting an agreed system of performance related fee scales and penalties for under-performance.

18.4.2.3 Finance

Lean and Goodall (1966) suggested that smaller businesses tend to rely on short-term finance and larger ones on long-term finance. The former tend to borrow from banks and liquidate debt by selling the property on completion of the development. A larger developer, although relying partly on bank credit, will make issues of stocks and shares or borrow on a long-term basis from insurance companies and pension funds. These fundamentals of development financing have remained intact for many decades but the details have become increasingly complex. There are many ways in which the financing of a development, particularly a large or complex scheme, can be arranged and some of these financing options are discussed in Chapter 7. Essentially the developer will be seeking to reduce exposure to finance costs as much as possible. This can be done by controlling the rate at which interest is charged on money borrowed by fixing it at an agreed rate or within a specified range. Alternatively it may be possible to reduce the length of time over which the money is borrowed. With large developments such as business parks or industrial estates this can be achieved by purchasing parts or plots on the site in stages; each stage might be developed, let and sold before remaining stages are complete. Finally it may be possible to enter into an arrangement or joint venture with a lender, site owner or investor in order to share risk, funding and profit and this is a particularly useful way of sharing the risk associated with large development schemes.

18.4.2.4 Rent, yield and sale price

Fisher and Robson (2006) found that letting was the greatest perceived risk at the development feasibility stage and, once it is fixed on satisfactory terms many other risks can be resolved. For most developers, letting the property to a good quality tenant was regarded as more important than the initial level of rent. If the development is to be let to several tenants, some units may let before others and the letting period would therefore be an average (Byrne, 1996). Some of the uncertainty surrounding the letting of a completed development and achieving the estimated level of rent can be removed by using a risk transfer technique known as a **pre-let**. This is where the developer seeks to secure a tenant at an agreed rent before the development is finished. The advantage to the developer is the removal of any possible void period. It also helps when negotiating a **forward sale** to an investor and when negotiating development finance with a lender as the risk of delayed loan repayment is reduced. The risk-reduction benefit of pre-let and forward sale arrangements must be weighed up against the potential increased return that might be achieved if the developer decides to wait until completion before letting and sale negotiations are finalised. The strategy will usually depend upon the strength of the market for the proposed development; if demand is weak then it is sound policy to seek a pre-let arrangement.

18.5 Development finance

Few developers are able or willing to bear the capital costs of assembling a site and erecting a building on it. For this reason, most developers have to raise funds from external sources and lenders therefore play a critical role in the development process and a residual valuation is often used to convince them that a project is viable and that they will receive an adequate return (given the risk profile) on their loan finance. This section looks in more detail at the role of finance in the development process. In particular, it examines recent trends in the funding of property development and the various types and sources of development finance.

18.5.1 Borrowers of development finance

The type of developer will influence the requirements for finance because of the differences in the ways in which various groups operate. The major difference between private sector developers relates to whether they are ‘trader’ or ‘investor’ developers. Trader or merchant developers exist in order to develop and sell on completed developments. In other words, these developers sell the properties to long-term holders of property whether they are pension funds or insurance companies. Such developers need to acquire both short-, and long-term finance. Investor developers, who tend to be the largest development companies, develop property and might hold the property over a long period of time. Such investors can generate development finance from pension funds and insurance companies, but they can also use the income from their investment properties or from the sale of their investment properties. The public sector is currently undertaking relatively little direct development. The main areas in which it is involved are in the provision of infrastructure and specialist buildings, whilst acting as catalysts for development in supplying and servicing land for development.

Development finance can be classified in various ways, primarily by type, duration and source.

18.5.2 Type of finance

Debt finance is simply a loan given to the borrower, normally by a bank. The lender receives interest on the loan but does not have any other financial interest in the project. Developers usually seek short-term debt finance for the development itself and the interest on the loan is usually 'rolled up' until the scheme is complete, let and sold. Consequently the loan finance rate is relatively high in order to reflect the risks associated with this type of lending; there is limited loan security during construction phase and void period. The ability to borrow money and the lending rate depend on the financial status, track record and experience of the developer and the quality of and risks associated with a particular scheme. A forward sale can attract short-term finance at a more favourable rate as the risk to the lender is reduced.

Syndicated project loans spread the risk among several lenders and can allow smaller lenders to participate in larger investment and development projects. The debt might be split evenly between the banks, all taking the same risk for same return. Alternatively, a bank or banks might take on senior (more recourse) debt, where loan is for say 65% of amount required, and junior or mezzanine finance (risk-wise, somewhere between senior debt and equity) from more risk-taking lenders might top up (to say 85%) but at a higher interest rate and may involve some sort of profit or equity sharing arrangement. A lead bank may syndicate the debt between up to several other banks. Depending on their complexity these types of loan facilities can take a while to arrange.

Private equity firms may top-up above mezzanine finance. Typically, lenders of this type of finance have less recourse than lenders of senior debt and therefore it is more risky; it is the first loss after equity. Consequently the required return to lenders of mezzanine finance will be higher and profit-sharing (equity-sharing) arrangements more likely.

Equity finance describes financial arrangements where the lender, who is actually an investor and not a lender at all in the true sense, provides finance but there is an arrangement where they share in the profit (and loss) in a project. Such equity schemes are very popular in commercial property. This type of finance tends to be high risk with the possibility that, if the scheme is not successful, the financier will not receive an adequate return on their investment or, indeed, will incur a loss. The main source of equity finance is the ordinary share capital of a development company.

The main difference between the two types of finance is the balance between risk and return. Equity finance, where the provider of the finance becomes entitled to a share of any profit, is risky but offers a high potential return. Loan finance, where money is provided in return for regular repayments, is less risky for the investor but offers a smaller potential return.

18.5.3 *Sources of development finance*

Sources of development funding can be categorised as corporate or project-specific. Property investors and developers (property companies) that are listed on a Stock Exchange will be able to raise corporate finance. This typically takes two forms: equity finance (new shares, rights issues and retained earnings to name but a few examples), and debt finance secured against the borrower rather than the property (such as bonds, debentures, loan stock, unit trusts and securitisation). An advantage of raising corporate finance is that there is no direct link between the investment itself and the debt finance. Consequently the acquisition of a specific property investment will not attract the attention of or intervention by a lender and interest payments (dividends) are covered by overall company performance rather than the performance of an individual scheme. The disadvantages are that a sale of new shares in a company may dilute its control over a long-term or even permanent basis – a period far in excess of the needs of a single investment acquisition. Also one unsuccessful investment may collapse an otherwise healthy company.

Project-specific loans are made by a lender to fund a specific property acquisition or development project. Project loans are often secured against the value of the scheme rather than the borrower and therefore provide an independent assessment of the viability of the investment or development opportunity. Consequently this method of funding is less reliant on credibility of borrower and more reliant on the quality of the project.

The financial institutions, i.e. pension funds and insurance companies, have, over the past 25 years, been the major providers of long-term development finance. Different types of insurance company vary in their motivations for investment. General insurance funds cover insurance for risks, such as car insurance and house insurance. The liabilities of these companies are often short-term as they involve payments that are unpredictable in their timing. For this reason, such companies seek to match their liabilities with fixed, regular and short-term investments. Such investments tend not to involve property development that is relatively risky and long-term. Life insurance companies, on the other hand, are concerned with life insurance policies. For these companies, the liability is long-term and there is greater certainty regarding the timing of the payments that the funds need to make. These types of companies seek long-term growth in their investments and it is for this reason that they tend to be more ready to invest in property than general insurance companies. Pension funds have similar liabilities to those of life insurance companies. These funds receive regular contributions and face long-term liabilities. Such funds, therefore, seek long-term investments and this has tended to be the rationale for becoming involved in property investment.

The large investment institutions are also keen to spread their funds over a range of investment opportunities, such as stocks, shares, government bonds and overseas markets. This is known as diversification of the investment portfolio. Property is viewed as one such investment opportunity. For example, if an institution invested heavily on the stock market, then it would be over-exposed to the risk of a fall in that particular investment market. By spreading investment among the stock, overseas, government bond and property markets, risk can be ‘diversified away’.

Other providers of such finance include banks, building societies, government and overseas investors. Banks and buildings societies typically lend between 60–70% of the total acquisition or development cost and do not usually require equity participation but an arrangement fee is usually payable. Borrowers who have a good track record or a particularly attractive investment opportunity (a very good tenant in occupation for example) may attract a higher loan-to-value ratio, thus allowing more to be borrowed, but the interest rate may be higher. Overseas investors may be prepared to take more risk than UK-based financial institutions and may become involved in long-term, more complex schemes. For some acquisitions and developments a single financier is not enough and some form of joint venture, where parties share risk and profit, is common for large, complex developments. Also, as far as development is concerned, certain sites may attract tax incentives or other financial help from the UK Government or from the European Union in the form of tax incentives, grants and simplified planning procedures.

18.5.4 Duration of funding

Figure 18.4 illustrates a classic development finance structure. Short-term finance, which is similar for both residential and commercial sectors, covers the costs of purchasing land and constructing buildings, professional fees and marketing costs. It is the developers’ working capital. Once the development is complete, the

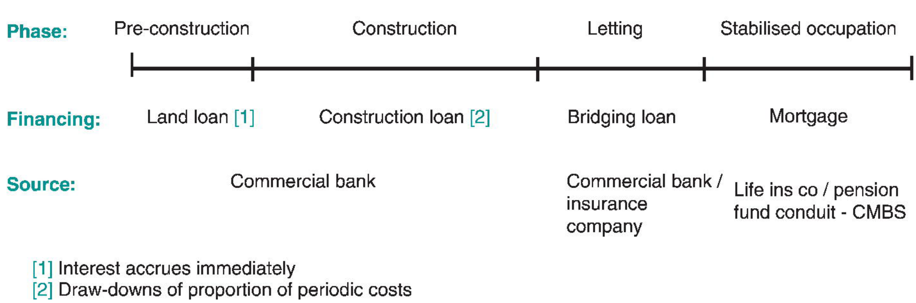

Figure 18.4 Typical development finance structure.

developer may sell the scheme and pay back the loan or re-finance the debt as a longer type of finance, which allows them to treat the project as a longer-term investment. This is where medium and long term finance come in.

There are important differences in the nature of long-term finance between the residential and commercial sectors. These differences relate to the ways the developer disposes of the property once the development is completed. In the case of residential development, the developer usually sells dwellings to owner occupiers who finance their purchases by taking out mortgages with banks and building societies. In the case of commercial and industrial development, although owner-occupiers do exist, often occupation and ownership are separated. In simple terms, the financing of such development often takes the following pattern:

- A commercial property developer will purchase land and construct buildings, using short-term finance borrowed from a bank.
- The developer will then let the accommodation to one or more tenants.
- The stream of expected income (rent) is then sold as an investment to an investor.

In effect, therefore, long-term finance pays off the loans taken out as short-term finance and provides a profit for the developer. The financial institutions, such as insurance companies and pension funds, are the traditional providers of long-term finance as they prefer long-term investments and are attracted by income streams receivable over 10–20 years.

18.5.5 Typical development finance structures

The distinction between the funding of the development project itself and investment in the completed scheme has become increasingly blurred as providers of debt finance for the development wish to participate in equity (in return for increased risk). Myriad partnership and equity sharing arrangements have sprung up as a consequence and deals may include both short-term development funding and long-term investment finance. The way in which any profit from the development is split usually depends on the level of risk that each party takes, the amount of equity put in and the relative bargaining position of the parties. In these types of equity sharing arrangements the first claim on the development profit would normally be by the landowner and related to the existing use value of the land, followed by a fixed return to the developer related to his financial investment and risk, with the surplus, if any, being shared on an agreed basis.

18.5.5.1 Forward sale

A forward sale occurs when the developer agrees to sell the completed scheme to a long-term fund before commencement. This reduces the developer's exposure to risk and provides the investor with greater potential return than a standing property development. It also enables the investor to become involved in the design and marketing of the scheme. In most instances, the developer retains some interest in the property, likely to be based on receiving a proportion of the rent from the completed building. It can take a variety of forms, depending on the relative negotiating strength of the developer and investor in agreeing terms. Usually, the scheme would need to be pre-let before a fund would be interested in this sort of arrangement. The investor might provide short-term funding as well. The arrangement locks the developer into a pre-agreed yield and rents, thus reducing risk but also return.

18.5.5.2 Project management fee

Straight fee calculated as a percentage of construction cost. Alternatively, the payment might relate in some way to the eventual profit generated by the scheme. Or a combination of the two, e.g. fixed base fee plus share of profit over an agreed threshold.

18.5.5.3 Rent-sharing

In order to help finance a development, spread risk and/or retain some degree of equity, a developer may enter into a partnership arrangement with another party. This may be the landowner, say a local authority, who does not wish to dispose of the freehold interest in the site. Alternatively the developer may have purchased the site and agrees to sell FH of completed scheme to investor who grants long lease back to developer (a sale and leaseback). Either way, the landowner / investor grants a long lease to the developer at a ground rent which is often geared to enable growth. The developer sublets accommodation, manages property, hopefully at a rent higher than the head-rent. There may also be an arrangement whereby the freeholder shares in the profit from the development. Developer obtains equity growth if rental growth in sub-leases is greater than in head-lease. The risk to the developer is that the development will not succeed in generating sufficient profit to cover the ground rent and equity sharing arrangement. Detailed explanations and examples of various arrangements for funding developments can be found in Darlow (1990).

Consider a developer who wishes to retain ownership of a completed development as an investment and receive an annual return. The cost of the development is estimated to be £5,000,000, the expected rent is £500,000 per annum and the long-term fixed rate of interest at which money can be borrowed to enable the property to be retained as an investment is 7% per annum. Once let the return from the completed scheme is calculated as follows:

$$\begin{aligned}\text{Development yield} &= \text{annual return (rent) / development cost}\\ &= 500{,}000 / 5{,}000{,}000\\ &= 10\%\end{aligned}$$

If money can be borrowed at 7% per annum then the return to the investor-developer is 3% per annum. If we now assume that, instead of selling the site outright to the developer, the landowner wishes to retain the freehold interest and let the land on a long lease at a ground rent to the landowner. Obviously the ways that this arrangement could be made is at the discretion of the parties involved but assume a ground rent of £50,000 per annum is required by the landowner. The developer now receives a profit rent of £450,000 per annum

(£500,000 per annum rent received less £50,000 per annum ground rent) and the return to the developer is calculated as follows:

$$\text{Development yield} = 450{,}000 / 5{,}000{,}000$$
$$= 9\%$$

The developer receives 90% (£450,000 / £500,000) of the rental income and the landowner receives 10% (£50,000 / £500,000) and any future growth in rent received may be split in the same proportions. For example, assume that, by the time the development is complete, the rent achieved on letting is actually £600,000 per annum rather than the initial estimate of £500,000 per annum, an increase of 20%. Moreover, the actual cost of the development increases by 10% from £5,000,000 to £5,500,000. It was agreed that the ground rent would be £50,000 per annum and any return in excess of initial estimates would be split 90% to the developer and 10% to the landowner. Therefore:

Actual income		£600,000
Actual cost	£5,500,000	
x development yield	0.09	
		£495,000
Residue		£105,000
Less agreed ground rent		£50,000
Therefore, excess		£55,000

Ten per cent of this excess goes to the landowner who therefore receives £50,000 ground rent plus £5,500, totalling £55,500 per annum. Any further growth in rent (equity) may be apportioned at the same ratio as that calculated on completion, i.e. £55,500/600,000 = 9.25% to landowner and 91.75% to the developer. Alternatively, the equity can be geared (recalculated at each review). The former is known as a proportional arrangement where future growth is apportioned proportionately at each review. The latter is known as an equity arrangement. For example assume a rent increase of 50% at the first rent review and a 50:50 split in excess rent between the investor-developer and the landowner:

Actual income	£900,000
development yield payment (from above)	£495,000
Residue	£405,000
Less ground rent	£50,000
excess	£355,000
50% excess to landowner	£177,500
plus original ground rent	£50,000
total income for landowner	£227,500

So the landowner's income is now 227,500/900,000 = 25.3%, resulting in a geared effect.

If the developer borrowed money to finance the long-term investment at 7% and this is paid out of the 90% share of rack rent then there is a gearing effect here too. Clearly there is a great deal of opportunity for the parties to negotiate subtle differences to each arrangement depending on their bargaining strength, risk profile, tax position, and so on. For example, assume a premium of £500,000 is paid to the landowner in lieu of £45,000 of ground rent. This would leave an annual ground rent payable to the landowner of £5,000 per annum. The developer's return would be:

$$\begin{aligned}\text{Development yield} &= 495{,}000 / 5{,}000{,}000\\ &= 9.9\%\end{aligned}$$

And this leaves a ground rent yield of just 0.1% (£5,000 / £5,000,000) to the landowner. Now the developer receives 99% of the rack rent and the landowner receives 1%. The landowner has traded off an equity share in the form of future rental growth potential for immediate capital payment in the form of a premium.

18.5.5.4 Sale and leaseback

Sale and leaseback arrangements vary but a typical example might be the developer buys a site, completes the scheme and sells the freehold interest to an investor below market value on condition that the investor then grants a long lease back to the developer below market rent. At rent reviews in the head lease any increase in rent (equity) can be apportioned at the same ratio as that calculated on completion or the equity can be geared so that the investor takes a share of the initial rent plus a small proportion of subsequent rent increases). The developer (now the head tenant) sublets to occupying subtenants at a rent above that paid to the investor, thus retaining an equity share in the completed development. Advantages to the investor are a share of equity and security of income and capital. Management obligations are the responsibility of the developer under the leaseback arrangement. A disadvantage to a developer is that it has disposed of the valuable freehold and retains only a profit rent which, if sold, is likely to be capitalised at a higher yield.

For example, a developer sells the freehold of a recently completed retail development to an investor for £750,000, who then agrees to lease back the completed development to the developer. The development has an estimated rental income of £100,000 per annum. The investor requires a 7.5% yield plus 50% of all rental income over £100,000 per annum.

If, on letting, the rent achieved is £120,000 per annum the ground rent will be:

Initial lease-back rent @ 7.5% of £750,000	£56,250	
Plus 50% of excess rent of £20,000	£10,000	
Initial ground rent		£66,250

Future rent reviews in the ground lease may be geared to the same percentage or a participation clause may be incorporated whereby the split between investor (freeholder) and developer (head-leaseholder) varies at an agreed percentage. In the above example the investor receives a ground rent of £66,250 per annum (55.2% of the actual rent received from occupying tenants) and the developer receives a profit rent of £53,750 per annum (44.8%). If these proportions are maintained at future rent reviews the developer would not increase his share of the income from the development. Such an arrangement would be ungeared. If the arrangement is left on the original (geared) basis and, at the first rent review, the rent increases to £150,000 per annum:

Leaseback initial rent 7.5% of £750,000	£56,250	
Plus excess rent 50% of £50,000	£25,000	
		£81,250

The developer now has a profit rent of £68,750 (57.3%) and so is slightly favoured by the geared arrangement.

As the developer's interest (a head-lease) is not particularly marketable, often the capital value of the interest is estimated by capitalising the developer's sub-rent at a suitable ARY. The developer's return would then typically comprise a project management fee plus the capital value of the sub-rent.

18.5.5.5 Profit sharing and profit erosion

Here, developer's profit is deposited in an interest-bearing account and the investor draws down a rent equivalent to ERV plus outgoings during a pre-specified period which the parties consider sufficient to let the accommodation. If the scheme is not let and the account runs out the developer makes no profit. If the scheme is let above ERV then some form of profit sharing would usually apply.

A particular type of profit-sharing arrangement between long-term investor and developer is described in Dubben and Williams (2009). A developer charges the investor / funder a fee (usually calculated as a percentage of development costs) for managing the development project. The parties also agree in advance the minimum rent that they expect from the scheme. This is calculated by amortising the estimated NDV at a 'priority' yield that represents the minimum return that the investor requires. If, on completion, the contract rent exceeds the minimum rent then the excess is capitalised and some portion of it is paid to the developer. The objective of such an arrangement is to incentivise the developer to obtain the highest rents. More complex arrangements are possible by which the excess is eroded over time, thus incentivising the developer to secure value fast. By way of example, a developer and institutional investor enter into a funding agreement; the investor agrees to purchase the site and provide development funding. The developer takes a project management fee and an incentive payment if the building is at least 75% let within one year of completion. The investor wants a 10% return on its funding of £33 m, i.e. £3.3 m per annum. The building measures 110,000 square feet NIA so the minimum rent for the funder to receive a 10% return is £30 per square foot. If, once the building is fully let, the developer achieves a rent that exceeds the investor's priority yield of 10% then the overage is capitalised and the profit erosion calculation is as follows:

- the first 5% of return on costs goes to the developer;
- between 5% and 20% is split 60:40 in favour of the investor;
- above 20% is split 50:50.

Another variation is a **rent guarantee**. At the end of a void period of, say, six months and the scheme is still not let, the investor agrees to pay the developer's

Table 18.15 Gearing.

	a) no loan			b) loan		c) ground rent			
Rent (£)	Costs (£)	Equity input	Return on equity	Equity input	Return on equity	Rent net of 10% ground rent (£)	Costs (£)	Equity input	Return on equity
500,000	5,000,000	100%	10.00%	30%	33.33%	450,000	5,000,000	30%	30.00%
550,000	5,000,000	100%	11.00%	30%	36.67%	495,000	5,000,000	30%	33.00%
605,000	5,000,000	100%	12.10%	30%	40.33%	544,500	5,000,000	30%	36.30%
665,500	5,000,000	100%	13.31%	30%	44.37%	598,950	5,000,000	30%	39.93%
732,050	5,000,000	100%	14.64%	30%	48.80%	658,845	5,000,000	30%	43.92%
805,255	5,000,000	100%	16.11%	30%	53.68%	724,730	5,000,000	30%	48.32%
885,781	5,000,000	100%	17.72%	30%	59.05%	797,202	5,000,000	30%	53.15%
974,359	5,000,000	100%	19.49%	30%	64.96%	876,923	5,000,000	30%	58.46%
1,071,794	5,000,000	100%	21.44%	30%	71.45%	964,615	5,000,000	30%	64.31%
1,178,974	5,000,000	100%	23.58%	30%	78.60%	1,061,076	5,000,000	30%	70.74%
1,296,871	5,000,000	100%	25.94%	30%	86.46%	1,167,184	5,000,000	30%	77.81%
1,426,558	5,000,000	100%	28.53%	30%	95.10%	1,283,903	5,000,000	30%	85.59%
1,569,214	5,000,000	100%	31.38%	30%	104.61%	1,412,293	5,000,000	30%	94.15%
1,726,136	5,000,000	100%	34.52%	30%	115.08%	1,553,522	5,000,000	30%	103.57%
1,898,749	5,000,000	100%	37.97%	30%	126.58%	1,708,874	5,000,000	30%	113.92%
2,088,624	5,000,000	100%	41.77%	30%	139.24%	1,879,762	5,000,000	30%	125.32%
2,297,486	5,000,000	100%	45.95%	30%	153.17%	2,067,738	5,000,000	30%	137.85%

profit and the developer agrees to pay ERV to the investor for a specified period of time. Obviously, the payments by the developer erode the profit. If a rent in excess of ERV is attained then some form of sharing of this 'overage' would probably be agreed.

18.5.5.6 Claw-back arrangement

A claw-back arrangement might be negotiated between a landowner and a developer. The landowner, when selling to a developer, receives a proportion of any increase in land value resulting from the development. So, in an extreme case, the landowner may sell without planning permission. The developer then receives planning consent and the value of the land increases accordingly. The landowner would be entitled to a proportion of the uplift.

18.5.6 Gearing

It is worth spending a few moments looking more closely at the effect of gearing on the return that a developer might receive. Gearing refers to the use of borrowed funds to exaggerate capital and income growth. If we consider three financing arrangements for a development:

a) No loan is taken out and the development is financed entirely by the developer (100% equity input) and, for the purposes of this example, assume no opportunity cost of capital.
b) A loan is secured to cover 70% of the development costs, the remaining 30% is equity input from the developer.
c) As (b) but a ground rent equating to 10% of the annual rental income is paid to the landowner.

Table 18.15 and Figure 18.5 illustrate how the return on equity increases at a faster rate on geared funding arrangements compared to 100% equity funding as progressively higher amounts of rental income are projected.

18.5.7 Risk management in property financing

As well as sharing risk and return through the use of various equity-sharing, partnership arrangements and joint ventures there are other ways to try to manage risk exposure when borrowing money to fund property investment and development activity. Risk management instruments offer risk protection, flexibility of funding arrangements, potentially lower borrowing costs over time and the ability to avoid unforeseen changes in interest costs.

Among the most popular risk management instruments are techniques designed to control the rate of interest on debt finance. There are many ways in which interest rates might be managed and a few of the more common ones are outlined below.

- Fixed Rate: the interest rate on a loan is fixed for all or part of the term. This removes the risk of interest rate movements but the rate is invariably higher

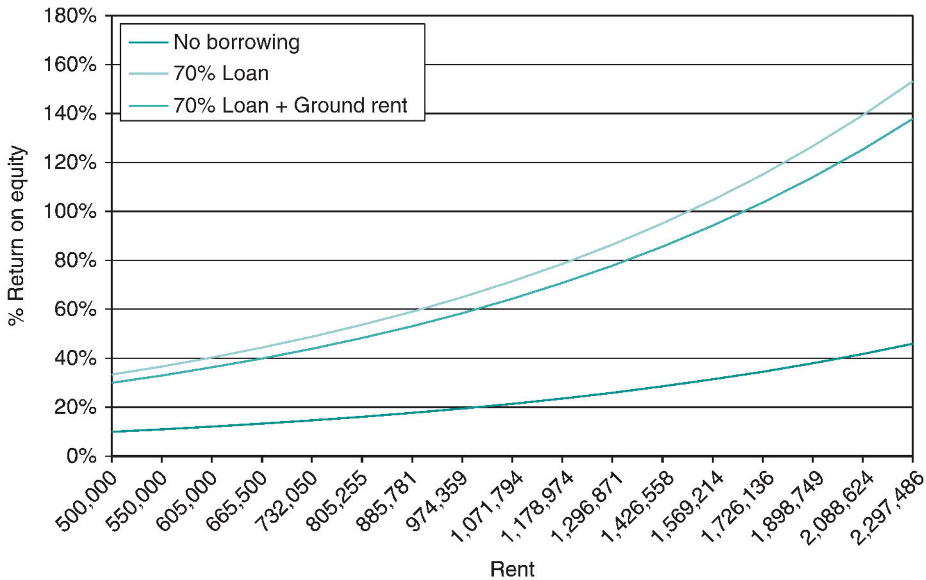

Figure 18.5 Gearing.

than a variable rate loan and can involve early redemption penalties and loss of profit if the interest rate falls.

- Interest Rate Cap: a variable interest rate is prevented from rising above a pre-determined ceiling rate. The instrument is essentially an insurance policy purchased by the borrower which literally puts a 'cap' or upper limit on the variable rate of interest on the loan and therefore is a hedging instrument. The cap rate is the price a borrower pays (in basis points) as a percentage of the capped loan amount in order to place an upper limit on a floating rate of interest. This cost is incurred up-front and the cost of the cap will vary according to the degree of protection required. If the interest rate expected to increase a capped rate is more expensive than when the interest rate is expected to remain stable or fall.
- Interest Rate Floor: a variable interest rate is prevented from falling below a pre-determined 'floor' rate. This type of product provides the lender with a minimum interest rate for the loan. The cost of a cap can be reduced by selling a floor.
- Interest Rate Collar: this is a combined cap and floor product and is useful to reduce the cost of a cap. A floor (which is clearly more attractive to the lender) might be used to lower the cost of a cap (which is more attractive to the borrower). It is possible to structure a 'no-cost collar' where the cost of the cap is fully offset by the price received for selling a floor.

Nothing remains static in the world of investment finance and each of these products may be traded, offset, insured against and so on. In fact a vast market in SWAP instruments exists and these allow, amongst other things, one party to exchange variable interest rate obligations with fixed interest ones. There are also property-specific risk management techniques such as letting to a good quality tenant, requiring a long lease term, arranging an unsecured loan (also known as non-recourse debt) where, on default, the lender is given access only to the property asset and not the assets of the company. For development finance to be forthcoming substantial pre-lets and in some cases forward sales are generally required by lenders. Ultimately, when lending money to finance the purchase of a standing property or the development of a property, the lender will wish to confirm that it provides adequate security for the amount lent. A valuation will therefore be a key piece of information on which the lending decision is based.

18.5.8 Finance accounting

Appraisals of real estate *development projects* (as opposed to *standing investments*) often involve multiple sources of finance. Therefore a post-finance cash-flow is an important component of the appraisal and is used to estimate a return on equity. Perusal of various development appraisals will reveal that there is no standard form that these post-finance cash-flows take but, in general, they follow a pattern. The following rows are often seen in the finance accounting section of a development project cash-flow.

a) Previous monthly balance (obviously zero in the first cash-flow period).
b) Income (sum of all income streams in the period).
c) Outgoings (sum of all expenditures).
d) Pre-finance cash-flow: (a)+(b)+(c).
e) Interest on debt balances, i.e. (d) multiplied by the debt finance rate if d <= 0).
f) Interest on credit balances, i.e. (d) multiplied by the credit finance rate if d > 0).
g) Balance: (d)+(e)+(f).
h) Balance that includes debit interest but not credit interest: (b)+(c)+(e).
i) (h) minus profit (adds back profit).
j) Free cash-flow before returns to financier and developer (this is the basis for the IRR): (h) minus (e) plus (f) minus profit.
k) Surplus/deficit on completion: in the last period, the value in (d) is inserted here and the cash-flow ends.

Perhaps the best way to explain how finance is incorporated into real estate development cash-flows is by example.

EXAMPLE 1

Your client has recently acquired a residential development site for £10 m. In order to finance the project two financing options are being considered:

a) A credit line of 65% of any negative cash-flow per quarter at an interest rate of 2% per quarter. Interest and principal are rolled up until the cash-flow turns positive and then the loan is paid off before any return on equity.
b) As (a) plus mezzanine finance for 15% of estimated gross development cost (excluding interest) at an interest rate of 4% per quarter. The mezzanine finance is second priority loan but receives a 50% share of any surplus above a 5% per quarter return on equity.

Quarter	0	1	2	3	4	5	6	7	8	IRR
A. Project cash flow: pre–finance										
Total Revenue					5,000,000	5,000,000	5,000,000	5,000,000	5,000,000	
Cash Outflows (Dev. Costs)	−10,000,000		−1,000,000	−2,000,000	−2,000,000	−1,000,000	−1,000,000	−2,000,000	−2,000,000	
Net Cash Flow (pre-Finance)	**−10,000,000**		**−1,000,000**	**−2,000,000**	**3,000,000**	**4,000,000**	**4,000,000**	**3,000,000**	**3,000,000**	22.38%
Available for Distribution					3,000,000	4,000,000	4,000,000	3,000,000	3,000,000	
B. Project cash flow: post senior debt contribution proportion @ 65% LTC, interest @ 2% per qtr										
Opening balance		−6,500,000	−6,630,000	−7,412,600	−8,860,852	−6,038,069	−2,158,830			
Quarterly Interest (in arrears)		−130,000	−132,600	−148,252	−177,217	−120,761	−43,177			
Contribution to current quarter's costs	−6,500,000		−650,000	−1,300,000						
Repayment					3,000,000	4,000,000	2,202,007			
Closing Balance	−6,500,000	−6,630,000	−7,412,600	−8,860,852	−6,038,069	−2,158,830				
Net Cash Flow to equity	−3,500,000		−350,000	−700,000			1,797,993	3,000,000	3,000,000	38.85%
C. Project cash flow: as above plus mezz debt contribution @ 15% LTC, interest @ 4% per qtr										
Opening balance		−1,500,000	−1,560,000	−1,622,400	−1,687,296	−1,754,788	−1,824,979	−99,986		
Quarterly Interest (in arrears)		−60,000	−62,400	−64,896	−67,492	−70,192	−72,999	−3,999		
Contribution to current quarter's costs	−1,500,000									
Repayment							1,797,993	103,985		
Closing Balance	−1,500,000	−1,560,000	−1,622,400	−1,687,296	−1,754,788	−1,824,979	−99,986			
Net Cash Flow to equity	−2,000,000		−200,000	−400,000				2,896,015	3,000,000	60.18%
D. Project cash flow: as above plus mezz debt provider receives 50% profit share above developer's 5% TRR										
Net Cash Flow to equity (from above)	−2,000,000		−200,000	−400,000				2,896,015	3,000,000	
Discounted at 5% per qtr (developer's TRR)	1.0000	0.9524	0.9070	0.8638	0.8227	0.7835	0.7462	0.7107	0.6768	
Discounted cash flow	−2,000,000		−181,406	−345,535				2,058,144	2,030,518	
less 50% surplus to mezz debt provider								−418,936	−484,741	
Net cash flow to equity	−2,000,000		−200,000	−400,000				2,477,079	2,515,259	45.68%

The project appraisal below begins with the pre-finance cash-flows. The IRR is 22% and when the net cash-flow is in credit there are funds available for distribution to lenders as and when necessary. The second stage of the appraisal calculates the return to equity following the debt finance arrangement described in (a) above. Sixty-five per cent of the costs are debt funded and interest is calculated on the balance carried forward from the previous quarter. The remaining 35% is funded by equity. Distribution funds are used to pay down the debt from the fourth quarter until the sixth quarter. In the sixth quarter the debt is paid off and there is a net cash-flow to equity which continues until the eighth and final quarter. The IRR on equity is 39%; the gearing has had a positive impact.

The third stage incorporates the mezzanine finance that is used to meet 15% of the costs in each quarter. The calculations work in the same way as the senior debt but, because the senior debt is serviced first, there are no funds available to pay down the mezzanine debt until the sixth quarter. The debt is paid off in full by the seventh quarter and the IRR on equity is 60% but this ignores the profit-sharing arrangement. The fourth stage introduces the profit share: a surplus occurs in the last two quarters and must be distributed evenly between the equity provider and mezzanine finance provider. This is done by taking the flow to equity in [C], discounting it at the equity provider's target rate of return (5% per quarter). This takes care of the 'normal' to the equity provider. Deducting the discounted equity cash-flow from the net equity cash-flow leaves the surplus, half of which goes to the equity provider and is therefore added to the discounted cash-flow. Having done this in quarters seven and eight, the resulting IRR on equity is 46%.

EXAMPLE 2
An industrial development site is being marketed for £6,350,000 and the appraisal below is designed to determine whether this is a realistic price. For the sake of simplicity, fees and costs associated with ongoing management of the completed and leased units have been ignored.

Acquisition costs

	Area (ft2) [1]	Purchase price (£)	Stamp duty (£) @ 4.00%	Total contract price	Other acquisition costs (£) [2]	Gross entry value (£)
Units 1–8	40,000	675,532	27,021	702,553	15,116	717,669
Units 9–10	80,000	1,351,064	54,043	1,405,107	30,232	1,435,339
Unit 11	200,000	3,377,660	135,106	3,512,766	75,580	3,588,346
Units 12–13	30,000	506,649	20,266	526,915	11,337	538,252
Units 14–15	26,000	439,096	17,564	456,660	9,825	466,485
TOTAL	376,000	6,350,000	254,000	6,604,001	142,090	6,746,091

[1] The areas are derived from the 'income' table below
[2] Other acquisition costs

Introductory Agents (% purchase price)	1.00%	63,500
Site Survey		5,000
Environmental Survey (£1,200 per estate)		1,200
Solicitors (% purchase price)	0.50%	31,750
Bank Fees (% purchase price)	0.30%	19,050
Bank Lawyers (% purchase price)	0.25%	15,875
Bank valuation fee [3]		5,715
Total		**142,090**

[3] Bank valuation fee

Property Value (From)	(To)	Fee Basis	Min Fee
£0	£1,500,000	0.175%	£2,250
£1,500,000	£2,000,000	0.150%	£2,500
£2,000,001	£2,500,000	0.137%	£2,750
£2,500,001	£5,000,000	0.100%	£3,000
£5,000,001		0.090%	£5,000

Acquisition costs are based on size and price paid for the site. The price paid has been apportioned on a floor-area basis between the unit groups (this is done in the 'purchase price' column. Stamp Duty is calculated at 4% of the principal price and added to give 'total contract price'. In the same way that purchase price was apportioned, other acquisition costs are allocated in proportion to the floor area of the units.

Some of the units are grouped together as they are to be built concurrently. The build period is estimated to be nine months and a void of nine months and a rent-free period of six months are also assumed.

18.5.9 Sales revenue

Here, data is taken from the tables above to calculate sales activity. The table below starts with units and their rents; the latter are capitalised at an appropriate yield. The 'rent free' column deducts 6 months of rental income in respect of each unit. Deducting this produces the 'gross value'. From this 'purchaser's costs' are deducted and this leaves 'sale proceeds'. Seller's costs are then deducted leaving net sales revenue.

Assuming a yield of 7%, rent-free periods of six months, purchaser's costs of 5.75% and sales costs of 1.5% of net sales proceeds, the 'sales timing' cash-flow below specifies in which quarters sales occur. Below this the there are two

Income profile

Unit	Area (ft2)	ERV (£/ft2)	ERV (£pa)	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Total
1	5,000	7.50	37,500									9,375							9,375
2	4,000	7.50	30,000									7,500							7,500
3	6,000	7.50	45,000									11,250							11,250
4	5,000	7.50	37,500									9,375							9,375
5	5,000	7.50	37,500									9,375							9,375
6	6,000	7.50	45,000									11,250							11,250
7	4,000	7.50	30,000									7,500							7,500
8	5,000	7.50	37,500									9,375							9,375
9	30,000	6.50	195,000												48,750				48,750
10	50,000	6.50	325,000												81,250				81,250
11	200,000	5.00	1,000,000															250,000	250,000
12	10,000	6.00	60,000												15,000				15,000
13	20,000	6.00	120,000												30,000				30,000
14	11,000	6.00	60,500									15,125							15,125
15	15,000	6.00	82,500									20,625							20,625
	376,000	**Gross income:**	2,143,000	0	0	0	0	0	0	0	0	110,750	0	0	175,000	0	0	250,000	535,750
Letting agent's fee (% annual rent)			15.00%	[1]	0	0	0	0	0	0	(66,450)	0	0	(105,000)	0	0	(150,000)	0	(321,450)
Solicitor's fee (% annual rent)			5.00%		0	0	0	0	0	0	(22,150)	0	0	(35,000)	0	0	(50,000)	0	(107,150)
Marketing						(9,000)	(5,000)	(2,500)	(10,000)	(5,000)	(2,500)	(5,714)	(2,930)	(1,364)	(607)	(311)			(44,926)
Income-related costs				0	0	(9,000)	(5,000)	(2,500)	(10,000)	(5,000)	(91,100)	(5,714)	(2,930)	(141,364)	(607)	(311)	(200,000)	0	(473,526)
Net income:				**0**	**0**	**(9,000)**	**(5,000)**	**(2,500)**	**(10,000)**	**(5,000)**	**(91,100)**	**(5,714)**	**(2,930)**	**(141,364)**	**(607)**	**(311)**	**(200,000)**	**0**	**62,224**

[1] This row and the one below contain conditional formula: if the difference between the next quarter's rent and current quarter's rent is greater than 0 then multiply the difference by 4 (quarters) and take 15%, otherwise 0

Construction costs

		Units 1–8	Unit 9	Unit 10	Unit 9 + 10	Unit 11	Unit 12	Unit 13	Units 12 + 13	Units 14 + 15	Total
Warehouse			*(550,000)*	*(900,000)*	(1,450,000)	(2,500,000)	*(520,000)*	*(520,000)*	(1,040,000)	(680,000)	–5,670,000
Office			*(300,000)*	*(300,000)*	(600,000)	(450,000)	*0*	*0*	0	0	–1,050,000
Buildings		(1,000,000)									–1,000,000
External		(300,000)	*(300,000)*	*(435,000)*	(735,000)	(1,500,000)	*(177,000)*	*(185,000)*	(362,000)	(200,000)	–3,097,000
Prelims		(100,000)	*(90,000)*	*(130,000)*	(220,000)	(320,000)	*(60,000)*	*(64,000)*	(124,000)	(80,000)	–844,000
Overheads		(30,000)	*(25,000)*	*(45,000)*	(70,000)	(170,000)	*(18,000)*	*(18,000)*	(36,000)	(20,500)	–326,500
Profit		(25,000)	*(20,000)*	*(37,000)*	(57,000)	(140,000)	*(15,000)*	*(15,000)*	(30,000)	(17,000)	–269,000
Contingency		(35,000)	*(30,000)*	*(50,000)*	(80,000)	(190,000)	*(20,000)*	*(20,000)*	(40,000)	(23,000)	–368,000
Planning fees		(5,000)	*(4,000)*	*(7,000)*	(11,000)	(26,000)	*(3,000)*	*(3,000)*	(6,000)	(3,000)	–51,000
Building regs		(3,000)	*(2,000)*	*(4,000)*	(6,000)	(15,000)	*(1,700)*	*(1,600)*	(3,300)	(2,000)	–29,300
Design fees		(55,000)	*(45,000)*	*(75,000)*	(120,000)	(290,000)	*(30,000)*	*(30,000)*	(60,000)	(35,000)	–560,000
Professional fees		(40,000)	*(35,000)*	*(60,000)*	(95,000)	(225,000)	*(23,000)*	*(24,000)*	(47,000)	(27,000)	–434,000
		(1,593,000)	*(1,401,000)*	*(2,043,000)*	(3,444,000)	(5,826,000)	*(867,700)*	*(880,600)*	(1,748,300)	(1,087,500)	–13,698,800
Development management fee	1.00%	(15,930)			(34,440)	(58,260)			(17,483)	(10,875)	–136,988
Funds surveyor	1.00%	(15,930)			(34,440)	(58,260)			(17,483)	(10,875)	–136,988
Total construction costs		(1,624,860)			(3,512,880)	(5,942,520)			(1,783,266)	(1,109,250)	–13,972,776
Administration costs											
Corporate acquisition (£pa)	(20,000)										
Property acquisition (£pa)	(4,000)										

Units	Gross rents	Capital Value	Rent free	Gross value	Purchasers costs	Sale proceeds	Sale costs	Net sales revenue
Units 1–8	300,000	4,285,714	–150000	4,135,714	–224873	3,910,841	–58663	3,852,178
Units 9–10	520,000	7,428,571	–260000	7,168,571	–389780	6,778,791	–101682	6,677,109
Unit 11	1,000,000	14,285,714	–500000	13,785,714	–749578	13,036,136	–195542	12,840,594
Units 12–13	180,000	2,571,429	–90000	2,481,429	–134924	2,346,505	–35198	2,311,307
Units 14–15	143,000	2,042,857	–71500	1,971,357	–107190	1,864,167	–27963	1,836,204
	2,143,000	30,614,285	(1,071,500)	29,542,785	(1,606,345)	27,936,440	(419,048)	27,517,392

Sales timing	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
Q9									3,852,178						
Q12												6,677,109			
Q15															12,840,594
Q12												2,311,307			
Q9									1,836,204						
Sales Rev	0	0	0	0	0	0	0	0	5,688,382	0	0	8,988,416	0	0	12,840,594

Gross entry value	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
Units 1–8									717,669						
Units 9–10												1,435,339			
Unit 11															3,588,346
Units 12–13												538,252			
Units 14–15									466,485						
	0	0	0	0	0	0	0	0	1,184,154	0	0	1,973,591	0	0	3,588,346
Value of remaining property based on gross entry value	6,746,091	6,746,091	6,746,091	6,746,091	6,746,091	6,746,091	6,746,091	6,746,091	5,561,937	5,561,937	5,561,937	3,588,346	3,588,346	3,588,346	0

Purchase price	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
Units 1–8									675,532						
Units 9–10												1,351,064			
Unit 11															3,377,660
Units 12–13												506,649			
Units 14–15									439,096						
	0	0	0	0	0	0	0	0	1,114,628	0	0	1,857,713	0	0	3,377,660
Value of remaining property based on purchase price	6,350,000	6,350,000	6,350,000	6,350,000	6,350,000	6,350,000	6,350,000	6,350,000	5,235,372	5,235,372	5,235,372	3,377,659	3,377,659	3,377,659	–1

Gross entry value	Build costs	Total costs	Profit/(Loss)	% Profit/ (Loss) on entry value
(717,669)	(1,624,860)	(2,342,529)	1,509,649	210.35%
(1,435,339)	(3,512,880)	(4,948,219)	1,728,890	120.45%
(3,588,346)	(5,942,520)	(9,530,866)	3,309,728	92.24%
(538,252)	(1,783,266)	(2,321,518)	(10,211)	–1.90%
(466,485)	(1,109,250)	(1,575,735)	260,469	55.84%
(6,746,091)	(13,972,776)	(20,718,867)	6,798,525	100.78%

further cash-flows showing the incidence of fees on sales. The first is based on gross entry value and the second is based on purchase price.

The table below includes a set of columns showing profit as a % of gross entry value. The figure seems very high but, remember, this is spread over a timescale of nearly three years.

Profit-share calculation

Total revenue	
Sales rev	27,517,392
Rents	
	27,517,392
Total costs	
Acquisition costs	(6,746,090)
Income-related costs	(473,526)
Build costs	(13,972,779)
Admin costs	(14,000)
Interest	(1,342,242)
	(22,548,637)
Scheme profit	4,968,755
% Profit/Cost	22.04%

Appraisal cash-flow

				Q1	Q2	Q3	Q4	Q5	Q6
	REVENUE								
1	Income-related costs (from income profile above)					(9,000)	(5,000)	(2,500)	(10,000)
2	Sales revenue (from above)								
A	**Net revenue**			0	0	(9,000)	(5,000)	(2,500)	(10,000)
	EXPENDITURE [1]								
	Construction costs								
3	Warehouse					(226,667)	(226,667)	(226,667)	(830,000)
4	Office								(200,000)
5	Buildings					(333,333)	(333,333)	(333,333)	
6	External					(166,667)	(166,667)	(166,667)	(365,667)
7	Prelims					(180,000)			(344,000)
8	Overheads					(16,833)	(16,833)	(16,833)	(35,333)
9	Profit					(14,000)	(14,000)	(14,000)	(29,000)
10	Contingency					(29,000)	(29,000)		(60,000)
11	Planning fees					(8,000)			(17,000)
12	Building regs					(5,000)			(9,300)
13	Design fees					(90,000)			(180,000)
14	Professional fees					(67,000)			(142,000)
15	Development management fee					(8,935)	(8,935)	(8,935)	(17,308)
16	Funds surveyor					(8,935)	(8,935)	(8,935)	(17,308)
B	**Total construction costs**			0	0	(1,154,370)	(804,370)	(775,370)	(2,246,916)
	Other costs [2]								
17	Purchase Price			(6,350,000)					
18	Stamp duty			(254,000)					
19	Acquisition costs			(101,450)					
20	Acquisition finance costs			(40,640)					
21	Property Acquisition admin costs				(1,000)	(1,000)	(1,000)	(1,000)	(1,000)
22	UK Income Tax on Rents [3]		8.50%						
C	**Total other costs**			(6,746,090)	(1,000)	(1,000)	(1,000)	(1,000)	(1,000)
D	**Project cash-flow (A+B+C) [4]**	**IRR**	**15.16%**	(6,746,090)	(1,000)	(1,164,370)	(810,370)	(778,870)	(2,257,916)
23	Loan draw-downs (from row 30)			4,384,959		750,341	522,841	503,991	1,460,495
24	Loan repayments (sum of rows 31–33)				(63,034)	(63,034)	(73,820)	(81,336)	(88,581)
25	Bank financing			4,384,959	(63,034)	687,307	449,021	422,655	1,371,914
26	Equity cash-flow [5]	**IRR**	**25.99%**	(2,361,131)	(64,034)	(477,063)	(361,349)	(356,215)	(886,002)
27	Opening equity cash-flow [6]				(2,361,131)	(2,425,165)	(2,902,228)	(3,263,577)	(3,619,792)
28	Closing equity cash-flow [7]			(2,361,131)	(2,425,165)	(2,902,228)	(3,263,577)	(3,619,792)	(4,505,794)
	Finance Account [8]								
29	Opening balance				(4,384,959)	(4,384,959)	(5,135,300)	(5,658,141)	(6,162,132)
30	Draw-downs	LTC:	65%	(4,384,959)		(750,341)	(522,841)	(503,991)	(1,460,495)
31	Repayment on sales		65%						
32	Amortisation (after 3 years)		50%						
33	Interest Paid				63,034	63,034	73,820	81,336	88,581
34	Interest		5.75%		(63,034)	(63,034)	(73,820)	(81,336)	(88,581)
35	Closing balance			(4,384,959)	(4,384,959)	(5,135,300)	(5,658,141)	(6,162,132)	(7,622,627)

[1] Under 'expenditure' the construction costs for each cost heading are apportioned across the building period
[2] Purchase price, stamp duty, acquisition costs (professionals and bank fees) - all from the 'acquisition costs' table and 'prop acq admin costs' from the 'construction costs' table
[3] There is no income tax as all income is negative
[4] This is an ungeared IRR
[5] This is a geared IRR
[6] Project cash-flow less bank financing
[7] i.e. cumulative balance
[8] Drawdown = costs (but not prop acq admin costs and income tax) * LTC ratio
Repayment on sales = conditional check to see if sales rev > (opening balance + drawdown + amortisation) payments. If it is then repayment would be total of opening balance + drawdown + amortisation for that quarter. If not then repayment = sales rev * repayment %
Amortisation = not relevant unless cash-flow stretches beyond 3 years
Interest paid = positive cash-flow derived from interest row (see below)
Interest = interest on opening balance

Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Total
(5,000)	(91,100)	(5,714)	(2,930)	(141,364)	(607)	(311)	(200,000)		(473,526)
		5,688,382			8,988,416			12,840,594	27,517,392
(5,000)	(91,100)	5,682,668	(2,930)	(141,364)	8,987,809	(311)	(200,000)	12,840,594	27,043,866
(830,000)	(830,000)	(833,333)	(833,333)	(833,333)					(5,670,000)
(200,000)	(200,000)	(150,000)	(150,000)	(150,000)					(1,050,000)
									(999,999)
(365,667)	(365,667)	(500,000)	(500,000)	(500,000)					(3,097,002)
		(320,000)							(844,000)
(35,333)	(35,333)	(56,667)	(56,667)	(56,667)					(326,499)
(29,000)	(29,000)	(46,667)	(46,667)	(46,667)					(269,001)
(60,000)		(95,000)	(95,000)						(368,000)
		(26,000)							(51,000)
		(15,000)							(29,300)
		(290,000)							(560,000)
		(225,000)							(434,000)
(17,308)	(17,308)	(19,420)	(19,420)	(19,420)					(136,989)
(17,308)	(17,308)	(19,420)	(19,420)	(19,420)					(136,989)
(1,554,616)	(1,494,616)	(2,596,507)	(1,720,507)	(1,625,507)	0	0	0	0	(13,972,779)
									(6,350,000)
									(254,000)
									(101,450)
									(40,640)
(1,000)	(1,000)	(1,000)	(1,000)	(1,000)	(1,000)	(1,000)	(1,000)	(1,000)	(14,000)
									0
(1,000)	(1,000)	(1,000)	(1,000)	(1,000)	(1,000)	(1,000)	(1,000)	(1,000)	(6,760,090)
(1,560,616)	(1,586,716)	3,085,161	(1,724,437)	(1,767,871)	8,986,809	(1,311)	(201,000)	12,839,594	6,310,997
1,010,500	971,500	1,687,730	1,118,330	1,056,580					13,467,267
(109,575)	(124,101)	(3,835,515)	(109,177)	(125,253)	(5,982,911)	(56,456)	(56,456)	(4,040,260)	(14,809,509)
900,925	847,399	(2,147,785)	1,009,153	931,327	(5,982,911)	(56,456)	(56,456)	(4,040,260)	(1,342,242)
(659,691)	(739,317)	937,376	(715,284)	(836,544)	3,003,898	(57,767)	(257,456)	8,799,334	4,968,755
(4,505,794)	(5,165,485)	(5,904,802)	(4,967,426)	(5,682,710)	(6,519,254)	(3,515,356)	(3,573,123)	(3,830,579)	
(5,165,485)	(5,904,802)	(4,967,426)	(5,682,710)	(6,519,254)	(3,515,356)	(3,573,123)	(3,830,579)	4,968,755	4,968,755
(7,622,627)	(8,633,127)	(9,604,627)	(7,594,909)	(8,713,239)	(9,769,819)	(3,927,349)	(3,927,349)	(3,927,349)	
(1,010,500)	(971,500)	(1,687,730)	(1,118,330)	(1,056,580)					(13,467,267)
		3,697,448			5,842,470			3,927,349	13,467,267
									0
109,575	124,101	138,067	109,177	125,253	140,441	56,456	56,456	112,911	1,342,242
(109,575)	(124,101)	(138,067)	(109,177)	(125,253)	(140,441)	(56,456)	(56,456)	(112,911)	(1,342,242)
(8,633,127)	(9,604,627)	(7,594,909)	(8,713,239)	(9,769,819)	(3,927,349)	(3,927,349)	(3,927,349)	0	0

Key points

- A development cash-flow also provides a useful statement of potential viability – an essential ingredient of any negotiations with possible lenders, and can deal with phased acquisition and disposal costs and revenues.
- The developer is a risk-taker: construction costs and interest rates may alter and anticipated rent and investment value may not be forthcoming.
- Simple ratios and thresholds, sensitivity analysis, scenario modelling and probability analysis are all recognised methods of analysing risk.
- A fall in tenant demand may lead to a fall in rent, increase the likelihood of voids, incentives and rising yields. If this coincides with rising borrowing rates then it can wipe out highly a geared residual value. A sophisticated analysis of risk should recognise the interdependence of these variables.
- In terms of risk management, Fisher and Robson (2006) found that the following methods were employed (in decreasing order of popularity): fixed-price contract, pre-let, forward sale, option to purchase site, joint venture, phased disposal, mixed or flexible use and interest rate cap.
- Sources and methods of property investment and development funding are numerous and some, particularly for large, complex schemes, may be very sophisticated arrangements indeed.
- Finance may be in the form of debt or equity and may be project / property asset specific or corporate. Debt-based project-specific finance would be an asset-based mortgage whereas corporate debt would be secured against company e.g. a debenture (mortgage debenture or other bond-style debt). Equity-based project-specific finance might take the form of a Special Purpose Vehicle (SPV), joint venture or an equity-sharing arrangement such as a partnership arrangement. Corporate equity would be raised by the issue of shares, etc.
- Investing in commercial property has long been an effective tool to diversify larger investment portfolios. Indirect property investment vehicles in general and REITs in particular enable smaller investors to acquire shares in diverse property portfolios.

Notes

1. Incidentally, looking back at CF2, developer's profit was £765,507. Discounting this at 10% per annum over two years equates to £632,650 and deducting the NPV of -£42,895 produces the same NPV of £589,755.
2. Byrne (1996) provides a clear explanation of the difference between the two sampling methods available in the @RISK software program. 'Monte Carlo' sampling is random and, given a probability distribution, the more probable values are likely to be sampled. If the number of iterations is small, events in the tail may not get sampled. 'Latin Hypercube' uses a form of stratified sampling where each input distribution is divided into equal strata. This is done according to the number of iterations to be run; if there are to be 1,000 iterations then the distribution is divided into 1,000 strata. A stratum is selected randomly and a value sampled from within: this is done 'without replacement' so, over the entire run, every stratum is sampled once. The consequence of stratification is a higher standard deviation because values are sampled from right across the distribution.
3. Multicollinearity refers to linear inter-correlation among two or more variables, i.e. they actually measure the same phenomenon to a significant degree.

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Glossary

Acquisition costs The costs associated with purchasing a property, such as solicitor's and estate agent's fees.

Alienation Sale of freehold or leasehold interest (see also **Assignment**).

All Risks Yield (ARY or *y*) Conventional metric used to capitalise rental income to determine the capital value of a property. The yield is usually derived from comparable evidence and encapsulates future expectations of the investor regarding income and capital growth, the qualities of the property and the tenant. But these factors are not explicitly quantified in this unit of comparison. Instead they are implicitly handled by adjusting the yield. Initial, term and reversion yields are all examples of all risks yields.

Ancillary costs Development costs over and above direct building costs such as site clearance, landscaping and so on.

Appraisal (of worth) Estimation of the financial value of a property to a particular investor.

Arbitrage A method of dealing in (typically large quantities of) financial assets in order to secure a profit from a (usually small) variation in the price quoted in different markets.

Arm's length A description of a market transaction that takes place between parties that are believed to have no connection or special relationship.

Assignment Transfer of ownership of a leasehold interest in a property between an **assignor** (the transferor) and an **assignee** (the transferee).

Asset valuation Undertaken on behalf of a company for the purpose of reporting the financial value of a property held as a tangible fixed asset.

Base rate Underlying interest rate set by the Bank of England.

Break option Some leases include an option for the landlord and/or the tenant to terminate the lease before it expires. The option usually defines the period of notice to be given and may be subject to financial penalties if exercised.

Break-even rent The rent that would need to be achieved when letting a new development to ensure the profit margin is maintained.

Business Rates Property tax paid by occupiers of business premises in England and Wales.

Commonhold A form of property ownership introduced in England and Wales in 2004 which involves the freehold tenure of part of a multi-occupancy building with shared ownership of and responsibility for common parts.

Contingency allowance Money put aside in the development costs to help pay for any unforeseen expenditure.

Contract rent The rent specified in the lease contract at the valuation date (see also **rent passing** and **term rent**)

Cost The financial expenditure used to produce something.

Covenant A binding one-way agreement whereby the covenantor is the only party bound by the promise.

Deed A legal instrument used to grant a right, typically a transfer of title in property.

Depreciation The diminution in value caused by the physical deterioration and obsolescence that a building undergoes during its life.

Property Valuation, Second Edition. Peter Wyatt.

Depreciated replacement cost The current cost of reproduction or replacement of a property less deductions for all relevant forms of obsolescence.

Derived demand Demand created in a market to help meet other demands. For example, the demand for factories is derived from the demand for manufactured goods.

Developer An entrepreneur who is responsible for the creation and renewal of properties. Two types can be distinguished: the 'investor-developer' who retains completed schemes as part of an investment portfolio; and the 'trader-developer' who disposes of completed schemes in order to raise collateral for the next development.

Development The process by which buildings are constructed for occupation or for sale / investment. Property development for occupation and investment is like any other economic activity – satisfying needs through the allocation of scarce resources.

Development yield Rent achieved upon letting a new development divided by the cost of the development. This is often calculated for the benefit of investor developers (see **developer**).

(The law of) **diminishing returns** or **diminishing marginal returns** refers to the principle that, in a production system, having fixed and variable inputs, keeping the fixed inputs constant, as more of a variable input is applied, each additional unit of input yields less and less additional output.

Direct property investment Investment in physical properties as opposed to **indirect property investment**.

Discount rate Rate at which a cash-flow is discounted to present value.

Discounted cash flow Cash flow expressed in present values by discounting.

Dual capitalisation Using the profits method of valuation the net adjusted profit can be split into two components and capitalised separately. This is normally done so that the element of profit to be (notionally) paid as rent can be capitalised at a lower rate than the remaining profit return to the operator.

Dual rate Traditional approach to capitalising a profit rent from a leasehold interest where the return *of* capital is calculated at a lower rate than the return *on* capital.

Easement The right over a property to do or prevent something. A right of way or a right to fish are typical examples of easements.

Economics A social science studying the way in which individuals and societies choose among the alternative uses of scarce resources to satisfy wants.

Economic rent Sometimes referred to as scarcity rent. The surplus earned by any factor of production over and above the minimum earnings necessary to induce it to do its work.

Effective rent Rent net of financial concessions, such as discounted rent-free periods.

Efficiency ratio The ratio between net and gross internal area which provides a measure of how efficiently the space in a building can be used.

Elements of comparison Specific characteristics of properties and transactions that cause prices to vary, for example, the nature of the legal rights conveyed, location, physical and economic characteristics and use.

Equated Yield The **internal rate of return** of a growth explicit cash flow, see **Target rate of return**.

Equivalent Yield Single yield that can be used to capitalise both the term and reversionary incomes. It is the **internal rate of return** of a growth implicit cash-flow, meaning that any future growth in the income stream is allowed for in the choice of the yield. Most reversions occur within a five-year period due to frequency of rent reviews so, unless the reversion is many years away or the term income is very low compared to the reversionary income, the equivalent yield will be very close to the yield used to value the reversionary income stream.

Exchange Price See **Price**

Existing use value (EUV) This is a basis of value published by the RICS for valuing business premises under the assumption that alternative uses are disregarded.

Exit value The market value of a property at the end of an assumed **holding period**.

Exit yield The yield used to capitalise the projected rent at the end of a **holding period** to calculate the **exit value**.

External works Development costs not directly attributable to the main building construction such as car-parking, access roads and so on.

Factors of production Often grouped under four headings – land, capital, labour and entrepreneurial ability – these are the resources, or inputs, of any economic activity.

Fair value The price at which a property could be exchanged between knowledgeable, willing parties in an arm's length transaction, regarded as synonymous with the IVSC definition of market value.

Fixtures, fittings & equipment (**FF&E**) Items associated with a particular trade operating from a property and which are usually transferred with the property when the business is sold as a going concern (see also **plant & machinery**).

Flexi-lease A generic term used to describe modern business leases that are short and include incentives such as rent-free periods and options such as break clauses.

Freehold The legal term used to describe ownership of property held in fee simple.

Freehold ground rent The (usually very low) rent paid to the owner of a freehold interest in property by the owner of a long leasehold interest in the same property.

Forward sale The sale of a property development to an investor or owner-occupier before completion.

Full repairing and Insuring (FRI) lease terms The most common lease arrangement in England and Wales whereby the tenant is responsible for internal and external repairs and insuring the property.

Future value The market value of a property at some future date.

Gearing How borrowed funds increase or decrease the equity return.

Going concern (and going concern value) An operating business (and the value of an operating business).

Goodwill Future economic benefits arising from intangible business assets. Transferable or inherent goodwill may be generated from a property-specific name and reputation, customer patronage or location and would be included in a property valuation. Personal goodwill, which is excluded from the valuation, refers to profit generated over and above market expectations, perhaps due to the particular skills of the business operator and which would not be transferred when the business is sold.

Gross development value (GDV) The value of the project before any costs associated with its sale have been deducted.

Gross internal area (GIA) The area of a building measured from the inside of each external wall.

Gross rent (as opposed to **net rent**) The rental income before any deductions have been made for management, repairs and so on.

Growth rate Rate at which rents or capital values have increased in the past or are expected to in the future. The actual growth rate may differ from the expected rate or a growth rate implied by the relationship between initial yield and target rate of return.

Headline rent The rent paid before the annual equivalent of any incentives has been deducted.

Hereditament A hereditable property.

Holding period The period for which an investor intends to hold a property investment.

Hope value That part of market value over and above existing use value that could be attributed to a change of use or development potential.

Imputed rent An estimated value to account for costs when a firm uses its own capital – it is usually based on the opportunity cost of the funds.

Income yield Annual income as a proportion of capital value.

Indirect property investment Investment in financial shares in a company or units in a trust that owns properties as opposed to **direct property investment**.

Initial Yield A particular type of **income yield,** being the *initial* income divided by purchase price. It is a common market measure of investment performance. The initial yield is lower than target rate because investors expect income and capital growth in the future.

Internal rate of return The rate at which a cash-flow (including the purchase price) must be discounted to give an NPV of 0.

Internal repairing and Insuring (IRI) lease terms An alternative to an FRI lease where the landlord takes responsibility for external repairs.

Investment The act of spending money or time on something with the expectation of profit in terms of an acceptable flow of income and /or appreciation in capital value.

Investment Value Discounted value of expected net revenue.

Key money Money paid to an existing tenant who assigns a lease to a new tenant where the contract rent is below market rent (see also **premium**).

Landlord Owner of the freehold interest in a property. The term 'landlord' was coined to reflect the aristocratic nature of landownership in the UK.

Lead-in period An initial phase, before construction activity starts; allows for preliminary matters such as planning and the assembly of the project team to take place.

Lease The contract terms of a leasehold interest. It sets out the essential feature of the arrangement e.g. length, rent to be paid, time and method of rent reviews, responsibility for outgoings etc.

Leasehold A form of tenure where one party buys the right (usually in the form of regular rental payments) to occupy a property for an agreed length of time.

Legal interest The entitlement in law to the ownership of an interest in property.

Lessee See **Tenant**

Lessor See **Landlord**

Letting fee A payment to an agent instructed to find tenants for a vacant property, normally calculated as a percentage of the first year's rent.

Liquidity refers to the time taken to transfer ownership of a property interest, from initial marketing to sale completion. Transaction costs are high for property when compared to other investments. They typically comprise agent and legal fees (approximately 1.75% of the sale price) plus Stamp Duty Land Tax (4% of the sale price if it is over £500,000, 3% if less than £250,000 and 1% if less than £120,000) but the holding period for a property investment is usually longer than for other types of investment so annualised costs are lower.

Macroeconomics The study of economy-wide phenomena, such as total consumer expenditure.

Market An abstract concept concerning all the arrangements that individuals have for exchanging goods and services with one another. Economists often study the market for particular goods and services, such as the labour market, the car market, the commercial property market, the housing market, the building materials market, the credit market, and so on.

Market rent The rent that a property would probably command in the open market as indicated by current rents on comparable properties as at the valuation date.

Market Valuation *See* **Valuation**

Market Value An estimate of the most likely selling price for a property at a particular point in time.

Marriage value The value in excess of the sum of the values of individual interests that might be produced when they are merged.

Microeconomics The study of economic behaviour of individual households and firms and how prices of goods and services are determined.

Mortgage A legal instrument for guaranteeing a specified property interest as security for the repayment of a loan under certain terms and conditions.

Net development value (NDV) The value of the development after costs associated with its sale have been deducted.

Net internal area (NIA) The area of a building measured from the inside of each external wall and deducting non-useable space such as corridors, lift lobbies, toilets, etc.

Net present value Discounted (present) value of a cash-flow (including purchase price).

Net realisable value The amount at which an asset could be disposed of, less any direct selling costs. In valuation terms it is a market value less costs of sale; it is an exit value.

Net rent (as opposed to **net rent**) The rental income after any deductions have been made for management, repairs and so on.

Normal Profit Profit sufficient to keep a firm in its current line of business.

Opportunity cost The highest valued alternative that has to be sacrificed for the option that was chosen.

Over-rented property A property where the contract rent is higher than the market rent.

Overage Difference between the contract rent and market rent on an over-rented property.

Option fee A financial payment by a developer to a landowner for the right to purchase land at some future date for development.

Outgoings The expenses associated with the holding of property. These include maintenance and repair, insurance, taxes (rates, council tax) and the management.

Phased development A development that is completed a few units at a time.

Pre-let An arrangement whereby a tenant agrees to occupy premises before construction is complete.

Premium Financial consideration paid by a tenant to a landlord (or by an assignee to an assignor) as a capital sum in lieu of rent. A **reverse premium** is paid by a landlord to a tenant (or by an assignor to an assignee).

Present value Discounted (present) value of a cash-flow.

Price Recorded consideration for a property.

Professional fees Payments to professionals involved in the development process, such as architects, project managers and engineers.

Profit rent The difference between the rent received from the owner of an inferior interest and the rent paid to the owner of a superior interest. It is the rental income return to the owner of a leasehold property investment.

Property Legal right(s) and interest(s) in land and buildings.

Rack-rented A property investment that is let at the current market rent.

Rateable value 'The rateable value of a non-domestic hereditament … shall be taken to be the amount equal to the rent at which it is estimated the hereditament might reasonably be expected to let from year to year if the tenant undertook to pay all the tenant's rates and taxes and to bear the cost of the repairs and insurance and other expenses (if any) necessary to maintain the hereditament in a state to command the rent' (Paragraph 2(1), 6th Schedule, LGFA 1988).

Real estate A term used to describe immovable property which includes land and improvements to the land such as buildings.

Real property A legal term used to describe ownership rights over real estate.

Recoverable amount The amount which the enterprise expects to recover from the future use of an asset including its residual value on disposal.

Rent A regular payment made by a tenant to a landlord for the right to occupy a property, usually as a condition of a lease.

Rent cover The number of years it would take to eliminate profit assuming letting (and hence sale of the investment) were delayed.

Rent-free period A fixed length of time within the term of a lease during which no rent is paid.

Rent passing see **contract rent**

Rent review The mechanism by which the rent is periodically reviewed. If the rent review is upward-only (and most are) and if market rents have fallen, the rent will stay the same. If the landlord and tenant cannot agree the new rent then the matter can be referred to an independent expert or arbitrator (as specified in the lease).

Residual method of valuation The mathematical technique used to value a development site.

Residual value The estimate of site value resulting from a residual valuation.

Reverse yield gap Because bond-type investments are less risky than equity-based investments (including property) logic would dictate that yields on the former are lower than the latter. But in an inflationary economy the fixed income from bonds is eroded whereas the dividends and capital values from equities inflates. Consequently yields on equities may be lower than yields on bonds to reflect their real growth potential. This phenomenon is known as the reverse yield gap.

Reversionary property investment A property investment where the current rental income is below market level and is expected to revert to a market rent at some point in the future.

Reversionary yield When valuing a reversionary property using the term and reversion technique, it is necessary to capitalise the initial term income at a term yield and capitalise the reversionary income and a reversionary yield.

Risk premium An additional element of return over and above the risk-free rate of return.

Royal Institution of Chartered Surveyors (RICS) The professional body that regulates the UK valuation profession.

Running yield The current income expressed as a proportion of capital value.

Sale and leaseback The simultaneous sale and leasing back of a property by the same party. The purchaser of the freehold interest becomes the new landlord-investor while the seller becomes the occupying tenant.

Scarcity A reference to the fact that at any point in time there is a finite amount of resources, in relation to the infinite amount of 'wants' for goods and services.

Scenario modelling A means of evaluating the impact of uncertainty on a valuation by modelling pre-determined combinations of input variables, usually a range of scenarios is tested.

Sensitivity analysis A means of evaluating the impact of uncertainty on a valuation by changing the value of an input variable by a pre-determined amount, say plus or minus 10%.

Service charge A payment by a tenant in addition to rent for items such as maintenance of common parts, building insurance and so on.

Specialised trading property A property which is usually bought and sold as part of a going concern.

Stamp Duty Land Tax (SDLT) A tax on the acquisition of a chargeable interest in property. The amount of tax is calculated as a percentage of the consideration for the property. For non-residential or mixed residential / non-residential property the rates are as follows: consideration (including a premium in lieu of rent) up to £150,000 the rate is 0%, £150,001–£250,000 it is 1%, £250,001–£500,000 it is 3% and £500,001 or more it is 4%. SDLT is also payable on the acquisition of leasehold interests with a net present value of more than £150,000 and the rate is 1%.

Stepped rents Rent which increased in stages at pre-determined points.

Target rate of return (or equated yield) Discount rate selected by an investor, often based on a risk-free base rate plus risk premium but may be derived from comparison with other investments. It is to be distinguished from the **internal rate of return** which is ultimately achieved from the investment.

Tenancy Often confused with leases but in the case of tenancies the interest is usually short term and continues on a fixed cycle (weekly, monthly, annually) until one or other parties takes steps to end it.

Tenant The leaseholder or owner of a lease.

Tenure Although the concept of feudal tenure has little relevance today, tenure now generally refers to the way in which a tenant holds an interest in property from a landlord or other holder of a superior interest.

Transfer earnings The opportunity cost of the land in its current use.

Upward-only rent reviews A clause inserted into most UK commercial leases which prevents the rent agreed at rent review from falling below the current contract rent.

Utility In economics this is a measure of relative satisfaction gained by consuming different combinations of goods and services.

Valuation An estimate of the exchange price achievable in the market for a property. The estimate is supported by experience and knowledge of the valuer together with an interpretation of market transactions, drawing out units of comparison from comparable properties, adjusting evidence and applying it to the subject property.

Value Estimation of price that would be achieved if the property were to be sold in the market.

Value-in-use Defined in FRS11 as 'the present value of the future cash flows obtainable as a result of an asset's continued use, including those resulting from its ultimate disposal'. Unlike replacement cost, which represents the cost to a typical occupier conducting the same class of business as the actual occupier, value-in-use is a measure of the value of the asset to the specific occupying business.

Value to the business The worth of a property to a business occupier.

Viability statement Usually a cash-flow based assessment or valuation of developer's profit.

Void period A time allowance after construction is finished to allow for tenants or investors to be found.

Worth In investment terms, a specific investor's perception of the capital sum he or she would be prepared to pay (or accept) for the stream of benefits expected to be produced by the investment. There is likely to be a range of prices at which purchasers would be willing to transact an investment. Each investor will estimate the worth of the investment taking into account personal tax, borrowing, risk and other criteria specific to that investor. The concept is similar to **value-in-use** in the context of occupiers.

Years' Purchase Multiplier used to convert income to capital value.

Yield Capitalisation rate, divisor or ratio (usually expressed as a percentage) between the income received from an investment and its capital value. Its level depends on several factors, such as expectations of future growth and perceived risk. The yield is therefore used to describe the quality of an investment.

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