

Options in Real Estate Contracts¹

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Philip Booth², Robert Ashurst, Gerry Blundell, Stephen Brown, Martin Cumberworth, Guy Morrell, Rusell Pugh, Chris Waites

1. Introduction

The purpose of this paper is to introduce the characteristics of a number of option-pricing problems in real estate investment. Many of these problems have been poorly researched and those from outside the real estate finance area may well find fertile areas for future work in this field.

The major forms of option clauses in real estate lease contracts can be classified as follows:

1. Upward only rent reviews whereby the landlord is able to change the rent at each review to the higher of the current rent being charged to the tenant and the level of market rents on similar properties. In a sense, we can say that the rental income from a property can be "sliced" into component parts. Those parts are, a fixed income stream and an option to receive an equity income stream. There is no reason why property income should not be securitised into these component parts.
2. Break clauses, whereby a tenant can break a rental agreement and proceed to rent a different property at market rents (or rent no property at all). This will generally be exercised if market rents have fallen, but there may be other practical issues involved as well.
3. A range of "real options" related to property development opportunities including both physical redevelopment and a change to a more valuable alternative use.

2. The Upward Only Rent Review

Both traditional open market valuation and DCF investment appraisal methods ignore the option nature of upward-only rent review clauses. The option arises because the clause provides a fixed nominal floor, below which rents cannot fall for the term of the lease, except through the creation of a void. The option nature

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² Philip Booth is Professor of Real Estate Finance and Chairman of the Faculty and Institute of Actuaries' Property Investment sub-committee. The other authors are all members of that committee.

of the upward-only rent review system can be largely ignored in times of relatively high inflation, as the fixed nominal floor is of limited importance. However, in a low inflationary environment in which falls in nominal market rents are more likely, the existence of the floor should be taken into account. It is worth noting that, by the

Consider the situation of a property with one review remaining review: for example, assume that there are nine years remaining on the lease and there is a rent review in four years time. At the end of the lease, the tenant can walk away from the property. If the general level of market rents is above the current rent from the property in four years time, the rent can be raised at the review to the market rental level. If, on the other hand, the general level of market rents is lower than the current rent receivable, the current rent can continue after the review. The freeholder can choose the higher of the current and the market rents.

Traditional valuation methods have long-since been regarded as inappropriate for appraising a property in this situation. The normal would be to use discounted cash flow techniques, based on the expected present values.

Consider the value of the option to receive the higher of the current passing rent and the market rent at the next review. We wish to find an expression for the present value of the rental income in the five-year period following the next rent review date. That is, we wish to evaluate:

$$V\left[\text{Max}\left(R \cdot \ddot{a}_{\overline{5}|i}^{(4)}, S(t) \cdot \ddot{a}_{\overline{5}|i}^{(4)}\right)\right]$$

where

- V[.] denotes the present value
- R is the current annual rent (paid quarterly in advance)
- S(t) is the market rent at time t
- i is the rate of interest appropriate for valuing the fixed income stream to be paid by the tenant. There is little published work on the value that should be taken by i. One possibility is that it should depend on the yield available from a corporate bond issued by a company of the same quality as the tenant. However, there are a range of practical situations where this may not be appropriate. On the one hand, the property income stream is less liquid than that from the equivalent corporate bond. On the other hand, if a tenant "defaults" the property can be re-let. Income from re-letting could perhaps be compared with recoveries from a corporate bond in default.

The annuity function represents the value of an annuity of one per annum payable quarterly in advance for five years after the review at time t. It can be taken outside the functions V and Max. To simplify the discussion therefore, the annuity function will be ignored and we will concentrate on the expression:

$$V[\text{Max}(R, S(t))]$$

DCF methods normally take the value of the income stream as the value of the higher of the current rent and the rent that would be achieved if rents grow at the expected rate. Thus,

$$V[\text{Max}(R, S(t))] = V[\text{Max}(R, E[S(t)])]$$

where $E[\cdot]$ is the expected value.

With this method, the present value is:

$$\frac{1}{(1+i)^t} \cdot R + \frac{1}{(1+j)^t} \cdot \text{Max}(E[S(t)] - R, 0)$$

It might be reasonable to value the income R (the current rent) at the same rate of interest as that at which one would value a corporate bond for a company of the same credit quality as the tenant. The only way that R will not be received will be if the company creates a void. The difference between the expected market rent and the current rent is an “equity type” income which could be valued at a higher “risky” rate of interest.

This DCF formula is clearly theoretically unsound. Consider the case where $E[S(t)]$ is less than R . Assume $R = 10$ and $S(t) \sim N(x, 1)$. If $x = 9.99$, $Pr(\text{income receivable} > 10) = 0.5$; if $x = 5$, $Pr(\text{income receivable} > 10) = 0$. However, an income stream of 10 would be valued in both cases. Mathematically, the problem with most published valuation approaches arises from taking the maximum of two expected pay-offs, rather than the expected value of all possible pay-offs. This is the fundamental weakness of the DCF expected present value approach. These weaknesses are addressed in the work of Booth and Walsh (2001a) and Booth and Walsh (2001b).

Correcting for this by using a distribution for $S(t)$ leads to the following formula. The present value of future income is given by:

$$P.V. = \frac{1}{(1+i)^t} \cdot R + \frac{1}{(1+j)^t} \cdot E[\text{Max}(S(t) - R, 0)]$$

The expectation is now outside the square bracket. We can obtain precise valuation formulae with certain simplified distributions for $S(t)$. For example, if we choose a lognormal distribution for $S(t)$ with:

$$E[S(t)] = S(0) \cdot e^{\mu t}$$

where the force of growth μ could be negative, and

$$\text{Var}[\log(S(t))] = \sigma^2 \cdot t$$

we obtain:

$$E[\text{Max}(S(t) - R, 0)] = E[S(t)] \cdot N(a_1) - R \cdot N(a_2)$$

with

$$a_1 = \frac{\log(E[S(t)]/R) + (\sigma^2/2) \cdot t}{\sigma \cdot \sqrt{t}}$$

and

$$a_2 = \frac{\log(E[S(t)]/R) - (\sigma^2/2) \cdot t}{\sigma \cdot \sqrt{t}}$$

where $N(\cdot)$ is the cumulative normal distribution.

When $E[S(t)]$ is large in relation to R , $N(a_1)$ and $N(a_2)$ are both just below 1. When $E[S(t)]$ is relatively small, $N(a_1)$ and $N(a_2)$ are both just above 0. The Equations give the following formula for the present value of the future income.

$$P.V. = \frac{1}{(1+i)^t} \cdot R + \frac{1}{(1+j)^t} \cdot \{E[S(t)] \cdot N(a_1) - R \cdot N(a_2)\}$$

This formula gives present values which change smoothly with changes in the expected value of and variance of future rents. It allows completely for the option characteristics of the property freehold and can be applied, using numerical methods, whatever the future distributions of market rents. The method is compatible with the approach to option pricing of Pemberton (1997). An appropriate risk discount rate, j , has to be chosen. This approach can be regarded as an "adjusted DCF approach" or "generalised DCF approach". It correctly takes into account the full probability distribution of rents. Equivalent pure option-pricing methodologies can also be adopted and such approaches are developed in Booth & Walsh (2001a), Booth & Walsh (2001b), Ward & French (1997) and Ward et al (1998).

An explicit method of pricing the option, using a binomial pricing model, was first developed by Ward & French (for example, see Ward and French (1997)). At a rent review, the owner has the option of continuing at the existing rent or, at no extra cost, receiving an increased rent if market rents have increased. The upward-only rent review option is, therefore, analogous to an equity call option. Ward & French provide a critique of their own model, the substance of which is that it is hard to apply the model in practice. First, if the option is applied to a property with more than one review until the expiry of the lease, the option is a compound option with a number of different exercise dates and the exercise price is dependent on whether the rent was increased at a previous review. Additionally, the implicit assumption is made that the rent takes only one of two

values at review: the expected market rent or the passing rent. A true binomial model requires a series of possible changes in rental value at discrete time intervals within the review period, ultimately leading to a distribution of possible rents at review. A further criticism of the Ward & French approach in Booth & Walsh (2001a) is that it treats the underlying quantity from which the option is priced (the value of a rental stream with upward and downward reviews) as if it is a tradable quantity in small units. This is not the case. Indeed, the underlying probably does not have an observable market price. Nevertheless, Ward & French do find intuitive results from their option-pricing model. In particular, as the volatility of rents increases, the value of the option increases. It should be noted that the critical determinant of the value of the option is the volatility of *nominal* and not of *real* rents. It should also be noted that the upward only rent review contracts apply to individual properties so that the volatility of rents that is relevant is the volatility of rents relating to the individual property being appraised, not to a property index (such as the IPD index³).

Booth and Walsh also used an option pricing technique with the value of the option adjusted for a parameter, equivalent to the market price of risk in CAPM, which can be used in option pricing problems where the usual assumptions about tradability, hedging and so on, do not apply: the method is discussed in Hull (1997).

The following table shows some selected results from Booth and Walsh (2001a). There are three pricing methods. Method 1 is an expected present value discounted cash flow method. Method 2 is the generalised discounted cash flow method, allowing for the value of the option: this uses a “corporate bond” rate of interest to discount the fixed stream (6%) and a risky rate (j) to value any income above the fixed stream. Method 3 is the option pricing method, adjusted for the market price of risk λ .

Table 2.1: Value of the Upward Only Rent Review Option

³ The Investment Property Databank (IPD) represents the largest sample of UK property investment portfolios. The company provides performance measurement services to investors and produces performance data including the IPD Annual and Monthly Indices. As at 31.12.2000, the IPD Universe comprised £97bn of investment property.

Method	j or λ	Volatility 10%		Volatility 20%	
		Expected rental growth		Expected rental growth	
		0%	3%	0%	3%
2	<i>j=10%</i>	3.4%	1.4%	6.7%	4.5%
3	<i>$\lambda=0.069$</i>	3.2%	1.4%	6.3%	4.2%

The figures show the percentage increase in the value of the upward only rent review property over and above the value from method one i.e. it is the explicit value of the option. Too much notice should not be taken of the differences between methods two and three. The choice of method between 2 and 3 is a methodological issue not a practical issue. The parameters can be chosen to equalise the results from these two methods (as is done in the italicised cell, for example). Both of methods 2 and 3 explicitly value the upward only rent review option. The results are intuitive. The value of the option, for a given volatility of rents, decreases as expected rental growth decreases. The value increases as volatility increases, for given expected rental growth. Real rental growth over the last twenty years has been 1.3%. If this were to be repeated over the term of the lease, combined with inflation of 2.5%, this would imply nominal rental growth of 3.8% (slightly higher than the higher specimen figure in table 2.1). Again, it should be stressed that the rental growth figures apply to individual properties and not to averages. In fact, only one category of property had rental growth higher than inflation in the last twenty years. It is clear that the fall in inflationary expectations over the last eleven years will make a significant difference to the value of the upward only rent review option. At the end of 1989, ten year inflation expectations, estimated using the break-even methodology (see Deacon and Derry, 1994) were 6.8%. At the end of 2000, they were 2.6%. If this translates into a 4.2% fall in nominal rental growth expectations, it is clear from the figures above that this would lead to significant increases in the value of the option.

The problem of valuing upward only rent review properties with several reviews to the end of the lease is more difficult. This solution was developed in Booth and Walsh (2001b). This kind of option is often known as a “clique” or “look-back” option. At the first rent review, the landlord can determine whether the market rent or the current rent is higher. If the market rent is higher, the call option is “activated” and the market rent is received. At the next rent review the exercise price of the new call option to receive the market rent after that time is the market rent after the first review and so on. If, at any review, the market rent is lower than the passing rent then the passing rent continues to be the “exercise price” of the call option to buy the market rent at the following review.

Simulation can be used to value such a compound option using stochastic investment models for rental growth and rental yield changes. This way, a probability distribution for the amount and value of future pay-offs can be determined. This should be a compound distribution, with the probability distribution of rents at the second and subsequent review being determined by the outcome of the first rent review.

It is extremely difficult to perform any primary analysis on the value put on an upward only rent review clause in practice. Properties are infrequently traded and each property is unique. It is not easy to find properties which are very similar except that one has an upward only clause and the other does not. Nevertheless, it is interesting to assess how the property market prices embedded options, using what limited information is available. In a heterogeneous private market, where information is not immediately available to all participants (in contrast to public equity markets), significant pricing anomalies might reasonably be expected to exist.

The following examples from one market participant gives some indication of what the property market would pay for the benefit of a typical, institutional lease, with the benefit of upward-only rent reviews compared to investments without such characteristics. The key limitations of such a study are summarised below.

1. The sample size is small.
2. The conclusions represent the views and experience of one particular player in the market (Henderson Global Investors).
3. The results are based on a simplistic comparison of the prices paid for investments with short unexpired lease terms (where there is no benefit of a long lease with upward only reviews) against what hypothetically would have been the case if the same property were let to the same tenant on a new 15 year lease. The assessment of what the market price would have been using the hypothetical assumption of a new lease is subjective.
4. Because they are recent purchases, no assessment can yet be made as to whether or not the investment decision was successful.
5. The discount reflects the combined effect of not having upward only reviews plus the perceived benefits of having a new long lease.
6. All are taken from the industrial sector.

The key conclusion is that the purchases were bought at significant discount to the market price had the properties been let on traditional institutional terms.

Table 2.2: Comparison of purchase prices of investments with short unexpired term and hypothetical price

Town and date of purchase	Price	Unexpired term/period to tenant break	Hypothetical price at purchase (£m)	Discount	Notes
Warrington Apr 2000	£3.50m	4 years	£4.85m	39%	
Portsmouth Sep 2000	£4.75m	7 years	£5.72	11%	
Heathrow Feb 1999	£16.6m	3 years	£20.26m	22%	Tenant only break
Northampton Aug 1999	£5.28m	3 years	£6.85m	30%	Tenant only break
Enfield Aug 1999	£5.35m	2 years	£6.6m	23%	Tenant only break

Source: Henderson Global Investors

3. From Where did the Upward Only Rent Review Come?

Upward only rent reviews are not the only type of rental contract which is available to landlords and tenants. The upward only rent review appears to date back to the 1960s and was cemented by a House of Lords Judgement of 1978 (United Scientific Holdings Ltd v Burnley Borough Council). In this, it was ruled that the upward-only rent review clauses were fair to both tenant and landlord. They were fair to the landlord because they enabled the landlord to obtain a fair rent instead of a rent far below that which reflects the value of the property and inflationary and real increases in rents. They were fair to the tenant because, without them, under inflationary conditions, it would not be possible for a tenant to obtain a long lease. In recent changed economic conditions, as we have noticed, the option value of the upward-only review will have fallen. These changed economic conditions have involved a reduction in inflation which makes a fall in nominal rents more likely if the volatility of real rents is unchanged. Some have argued that upward only rent reviews are fundamentally unfair and that legislation should outlaw such clauses. The Department of the Environment has consulted twice on this issue. On the other hand, it could be argued, that the upward-only rent review clause exists, like any contractual relationship, because the benefit to the landlord had a lower cost to the tenant than an alternative relationship of similar value to the landlord. The benefit to the landlord can come in the form of

greater stability and certainty of levels of future rent (and, hence, lower risk) and possible reductions in the cost of development finance (because of the cash flow certainty). The cost to the tenant of alternative contractual terms could, for example, be a higher equilibrium level of rents in the absence of an upward-only rent review clause. In addition, the tenant may be less concerned by future downside variability of rent than by the affordability of the initial level of rent. However, Booth pointed out that, as market conditions change, the relative costs and benefits of the option embedded in upward-only rent reviews would also change. Alternative contract clauses might then evolve. Indeed, there was evidence to suggest that this was happening (and is still happening: see below).

Crosby *et al.* (1993) looked at the possible fall in value of existing investments if upward-only rent review clauses were “banned”. The estimated fall in value of the IPD database was 4.3% across all properties. The most serious fall would be for properties closest to lease renewal. This estimated fall is calculated from the rise in yields which survey evidence suggested would result from a ban on the upward-only rent review clause. This rise in yields would arise because of a higher risk premium and reduced expected cash flow after reviews. The estimated fall in the market value of properties from the removal of the option value of the upward only rent review (gained simply from survey evidence) was remarkably close to the theoretical values for the optionality which were calculated by Booth and Walsh.

The survey did not take into account the likely increases in rents resulting from less onerous lease terms: it is therefore an estimate of the pure option value. This arises partly because upwards and downwards reviews would produce a lower expected cash flow for a given initial rent level. Initial rents may also increase because cash flows are less secure. The investor will wish to be compensated for this higher risk by an increase in expected cash flow. It is also possible that alternative mechanisms would evolve to redistribute the cost and risk between landlord and tenant. These alternative contract terms could involve either lower or higher costs for the tenant.

There is evidence for the erosion of the traditional lease contract. This might have resulted from the higher value of the upward only rent review option in low-inflationary conditions or perhaps from the need for greater business flexibility (so that the tenant is willing to pay more current rent to avoid options being written against him). The most common length of lease now is 15 years rather than the 25 years that was normal at the end of the 1980s. Break clauses are becoming more common (see below) and are written into 14% of leases, according to the IPD databank, the average length of lease is now 13 years. The average for industrial and office properties is ten years. Five years between reviews is still normal (five yearly reviews are used in 70% of leases weighted by rent). This means that most industrial and office properties will only have one “option exercise date”. This consideration of average trends masks the much greater variety of lease terms which is developing, as is pointed out by French (2000). By 1995 only 7% of new leases were for more than 20 years and 20% were between 10 and 15 years and 65% for less than ten years. (so that the tenant is willing to

pay more current rent to avoid options being written against him). Potential changes to UK accounting standards, whereby corporate tenants might have to allow for the capitalised value of future rental commitments on their balance sheet, could further encourage the trend towards shorter leases.

In different countries, different option-types may exist. There is a wide variety of contract forms for example:

- In general in continental Europe there may be provision for uprating rents by a proportion of inflation but no provision for lowering rents on deflation. This is an interesting example, as it is similar to the pair of options embedded in limited price indexation of pensions (price indexation to an upper limit is allowed; however, there is an effective lower limit of zero)
- In Italy the average length of lease is 6 years and indexation is 75% of cost of living increase (again there are options embedded in this)
- In France, the nature of the contracts can be very complex. They will include a provision to increase rents in line with a construction cost index but an application can be made to increase rents further if rents are very out of line with market rents (again there are embedded options).

Market analysts would predict that leases will continue to shorten. Tenants seem willing to pay a rent premium of 10-15% over conventional leases: it is interesting that this is greater than the option value of the upward only review that we have calculated above (however, it is unclear whether these leases would include break clauses which would be an option in favour of the tenant, which would, itself, have a value).

4. Financial Analysis of Break Clauses

The upward-only rent review clause is only one of a variety of options which can exist in real estate leases. The U.S. retail market provides an example of multiple options in leases for example: renewal clauses, break clauses for the landlord if tenant sales do not reach a specified level, break clauses for the tenant if an anchor store closes, an option to increase leased space.

Gemmill et al (1998) examined the problem of the valuation of "break clauses", whereby a tenant can break a lease at specific points. In a sense, a break clause is the mirror image of an upward only rent review. If a break clause exists and market rents fall below current rents, the tenant can leave so that the building has to be re-let at market rents. A better understanding of the nature of the break clause, in option terms, can be gained from the following reasoning. Consider the basic rental agreement as an agreement for the tenant to pay a fixed sum at a certain date and assume that the risk-free rate of interest is zero. For the landlord, the break clause is like holding a cash asset and being short on an equity put (as, if the market rent -which we will consider to be the equity income- is less than the initial fixed rent, the landlord will have to purchase the market rent by giving up the fixed rent). An upward only rent review clause and a break clause is therefore equivalent to a right to a fixed cash sum plus a long equity call

(on the market rent) and a short equity put (on the market rent). The put/call parity relationship used in option pricing makes use of the fact that holding an equity plus a long put position plus an obligation to pay a fixed cash sum is equivalent to a long equity call. Re-arranging the put/call parity relationship, we have:

$$\text{equity} = \text{long equity call} + \text{fixed cash sum asset} + \text{short equity put}$$

If the fixed cash sum asset is judged to be equivalent to the income from the lease without reviews, such a lease with an upward only rent review (long call on market rents) and a break clause (short put on market rents) must be equivalent to a lease to receive the market rent through an either-way lease (equity in market rents).

This assumes, of course, that the break and the upward only rent review can be exercised at the same time. It can be shown that a similar relationship exists for the tenant. The tenant can be regarded as having an obligation to pay a fixed cash sum from a fixed lease (i.e. negative cash or a loan). The upward only rent review clause then requires the tenant to pay the market rent if that is higher: this is equivalent to being short on equity calls (tenant will have to deliver the market rent having the benefit of giving up the fixed rent). A break clause is then equivalent to holding a long equity put position (tenant will be able to pay the market rent in exchange for not paying the fixed rent if the fixed rent is higher - which is equivalent to selling an equity at a fixed price lower than the market price). Again, re-arranging the put/call parity relationship, we obtain:

$$-\text{equity} = \text{short equity call} + \text{obligation to pay fixed cash sum} + \text{long equity put}$$

Thus the tenant, who has the equivalent of an obligation to pay a fixed cash sum plus a long equity put and a short equity call has the equivalent of holding the negative of the equity (equivalent to an obligation to pay market rent). Thus, it can be demonstrated that the tenant also has the equivalent of an either-way lease.

This result is also common sense. On the one hand, the tenant with a break clause should never have to pay above market rent (because he could exercise the break and leave). On the other hand, the landlord should never have to accept less than market rent (because the upward only clause can be activated to raise rents to market levels).

This analytical approach is useful for the purposes of valuation and understanding the conditions under which break clauses, combined with upward only rent reviews may lead to any overall option value. *Prima facie*, it would appear that a property let with a break clause combined with an upward only rent review may as well be let on an either-way lease. Indeed, Gemmill et al (1998) discovered that the value of a lease with a break clause and an upward only rent review (valued using stochastic simulation techniques) was the same as the value of a lease valued assuming that rents drifted up at the expected growth of market rents (i.e. an either-way lease).

5. Practical Issues in the Valuation of Break Clauses

There are reasons why the valuation of leases with both break clauses and upward only rent reviews could be much more complex. Dealing with these complex practicalities could be a fruitful area for further research.

First, break clauses could exist without an upward only rent review. This would imply a put option in favour of the tenant (although, if we can price the upward only rent review call, we should be able to price the put using the put/call parity relationship). Secondly, the timing of the break clauses and the review dates might be different. This could create a very complex option structure. For example, a 12-year lease with a break at 3 and 6 years and upward only rent reviews at 5 and 10 years would involve (for the landlord):

- A short put at 3 years
- A long call at 5 years
- A short put at 6 years
- A long call at 10 years

More interestingly, all the options would be path dependent on the exercise of (or non-exercise) of the others. In some cases, the exercise price would also depend on the level of market rents at the exercise dates for previous options.

There are a number of further practical considerations that may affect this analysis. Most reflect stickiness or frictional costs and the fact that property ownership or occupation has characteristics beyond those involved in traded financial instruments. They include the following:

- Even where it may appear to be in the tenant's best interest to exercise a break (because market rents are lower than the passing rent), he may not do so due to the costs of moving, disruption to his business and the lack of a suitable alternative neighbouring building.
- There may be other immediate adverse financial consequences for the tenant in terms of the expenses of making good and other contractual commitments. Unlike a traded option "in the money", securing value from a break option may require an initial cash outlay by the tenant.
- One of the key issues for a landlord when a break clause is exercised is the likely length of any void period. Indeed there are alternative approaches to valuation of break options that revolve around the volatility of tenants' occupancy requirements and possible voids. These may be given greater weight than (say) the distinction between upwards only and up or down rent review clauses.
- A break clause on a long lease may be perceived to have greater value to a (poorly capitalised) individual tenant than to a landlord. The tenant may be concerned about non-systemic risk effects to his business where the landlord may be able to take a portfolio view.

- The introduction of break clauses in the UK market is a relatively recent phenomenon: it may take time before a pricing metric has been established.

For all these reasons, the expected relationship between break clauses and upwards only rent review may not hold good in practice.

6. Development Options and Other Real Options

6.1 Real Options in Real Estate

The recent edition of the Journal of Property Investment and Finance (Volume 19, no. 1, 2001) has a number of papers on "real options". These are options which relate to real or tangible assets. A fundamental aspect of an option is that it must have a time value. If we take a typical property development, it could be asked, why should any of a potential site remained undeveloped as any such absence of development will reduce future cash flows. The answer is that a real option may exist, the time value of which outweighs the benefit of early development. For example, a developer may have planning permission to build x square feet of office space. However, the developer may wish to build only 0.8x and then wait to see how the value of office space changes with changing supply and demand patterns before committing the remaining 0.2x to development: it may have a greater value in a different use. Options may exist to take shops subject to there being an anchor store. Alternatively, those financing a shopping development may have the option to withdraw if a certain percentage of the floor space is not pre-let.

It is sometimes possible to enhance a property's value through a change of planning use. This is a form of option, the value of which may be particularly high for certain property types and sectors where their current value is underpinned by alternative uses which command a higher value. For example, it may be possible to secure planning consent for a change of use from low-value agricultural land to more highly valued residential or commercial use. The understanding of the value of real options has, in recent years, focused developers' attention on the benefits of non-specificity of a property. If the option to change a planning use has a value, then so must the ability to use (with relatively little refurbishment) a building for a range of purposes. Indeed, one of the benefits of the private finance initiative is that private developers have realised the importance of designing buildings (for example a school) in such a way that the building still has value if the service flow of income from the school disappears (in marked contrast to school buildings built in the 1960s).

6.2 Development Options

The release of value through the development process is complex and can be seen as a combination of contiguous options that can be exercised at different times, each with different risk/return profiles. This section describes different parts of the development process in the context of real options.

- The emergence of an alternative use for a property or land, referred to above, may create additional value as investors/developers are prepared to pay above existing use value for that property in the expectation of securing planning consent to change its use or redevelop. Additional value may also be released for the same planning use if redevelopment of the existing structure leads to a significantly higher end value after allowing for the full costs of development. In this example, additional value is secured by the landowner (that is, the option is exercised) without having spent any additional money; the landowner is passive, although the original property may have been bought in the hope or expectation that alternative uses would become more valuable. The additional value is released by selling to a purchaser who attaches some 'hope' value to the property. The full development potential will not, however, typically be realised at this stage as the purchaser requires some reward for taking on the risk associated with the development process.
- Alternatively, the existing landowner may seek to release further value by spending money to prepare a development proposal and secure a planning consent. This will usually lead to a higher value being attached to the property with the benefit of a planning consent, either for an alternative use or for improved property within the existing use. Whilst no physical alteration in the property has been made and any expenditure is modest relative to the full cost of redevelopment, the existing property owner can, in some cases, enjoy a significant increase in value. To have exercised this form of option, the landowner is required to have spent some money securing a planning consent. This expenditure is potentially abortive in the sense that either the consent is not forthcoming or market conditions change such that the alternative use no longer attracts a premium value once the full costs of development have been allowed for. Critically, however, the increase in value arises before any firm commitment to develop has been made by the existing owner. Again, prospective purchasers will require reward for undertaking the development and so not all of the increase in value will flow to the existing owner.
- The final example is where the existing landowner actually undertakes the development and, potentially, secures the full increase in value after allowing for development costs. It is important to note that, once taken, the decision to proceed is irreversible and the scheme must be completed: it is extremely difficult to sell mid-way through the construction period. The exercise of this option therefore requires significant capital expenditure and the bearing of risk. This uncertainty comes from various sources including a change in occupier market conditions (the rent secured on completion, the tenant, lease terms and so on), investment market conditions (the market yield attached to the completed development) and the physical construction process (cost overruns, delays in the construction period and so on).

Intentionally, the above examples are simplified and illustrative. Many complex variations exist in practice which alter the risk/return profile of development and

the way options associated with development can be exercised which go beyond the scope of this paper.

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