

# **Pricing Short Leases And Break Clauses Using Simulation Methodology**

**Patrick McAllister**  
**Department of Land Management and Development**  
**Faculty of Urban and Regional Studies**  
**The University of Reading**  
**Whiteknights**  
**PO Box 219**  
**Reading**  
**RG6 6AW**

**Tel: 44 (0)118 9316657**  
**Email: [p.m.mcallister@reading.ac.uk](mailto:p.m.mcallister@reading.ac.uk)**

## **Abstract**

*This paper examines the changes in the length of commercial property leases over the last decade and presents an analysis of the consequent investment and occupational pricing implications for commercial property investments. It is argued that the pricing implications of a short lease to an investor are contingent upon the expected costs of the letting termination to the investor, the probability that the letting will be terminated and the volatility of rental values. The paper examines the key factors influencing these variables and presents a framework for incorporating their effects into pricing models. Approaches to their valuation derived from option pricing are critically assessed. It is argued that such models also tend to neglect the price effects of specific risk factors such as tenant circumstances and the terms of break clause. Specific risk factors have a significant bearing on the probability of letting termination and on the level of the resultant financial losses. The merits of a simulation methodology are examined for rental and capital valuations of short leases and properties with break clauses. It is concluded that in addition to the rigour of its internal logic, the success of any methodology is predicated upon the accuracy of the inputs. The lack of reliable data on patterns in, and incidence of, lease termination and the lack of reliable time series of historic property performance limit the efficacy of financial models.*

## **Introduction**

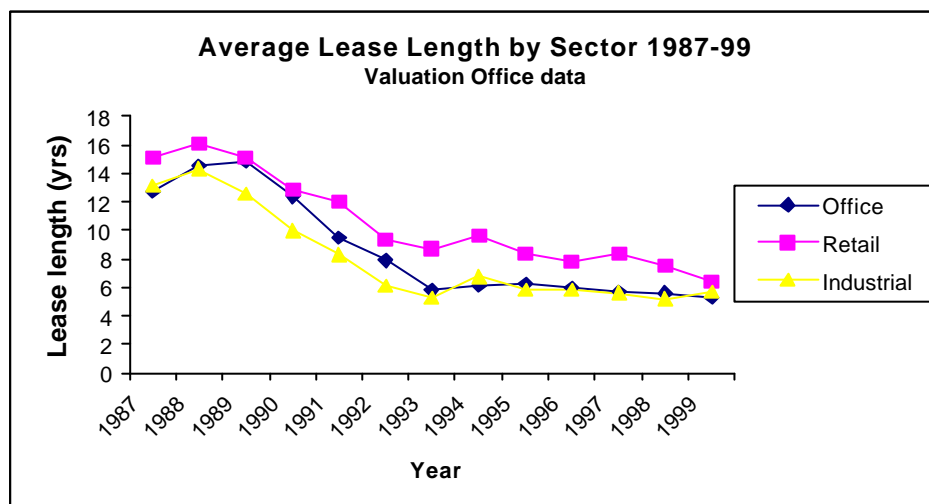
In the 1990's the commercial property market has seen a largely market-led acceleration in the evolution in leasing and occupational practices with the proliferation of serviced offices, short leases and break clauses. This has increased the diversity of investment characteristics produced by commercial property investment assets. Consequently, in a 'thin', (increasingly) heterogeneous, dispersed and 'noisy' market, valuers are faced with the problem of estimating rental and capital values. Given that the main valuation models rely upon transaction evidence involving comparable properties, increasing lease diversity exacerbates the methodological limitations of such models. Previous experience of short leaseholds, overrenting, lease inducements and abnormal rent review periods has illustrated how major structural market shifts tend to be followed by confusion surrounding and new developments in valuation methodology. Typically, as conventional pricing methods are shown to be unable to reflect accurately the financial implications of market change, problems of pricing efficiency have emerged.

This paper examines the growth of short leases and presents an analysis of their pricing implications for commercial property investments. It develops previous research on the financial implications of break clauses (see McAllister and O'Roarty, 1998 and 1999). The paper identifies the critical variables influencing the effects of short leases on risk and return and presents a framework for incorporating their pricing effects using cash flow simulation. The remainder of the paper is organised as follows. The first section outlines the changes that have occurred in the occupational market with particular emphasis on lease length and the distinctions between short leases and break options. This is followed by an analysis of the potential transaction costs associated with short leases and the factors influencing the level of transaction costs. Thirdly, previous research on the pricing of break clauses and the potential contribution of option pricing methodologies is critically assessed. Finally the methodology, rationale and results of a simulation approach to investment and occupational pricing are presented.

## Changing lease structures: scope, definition and characteristics

Although the use of short leases is not by any means a new feature of the general property market, the recessionary conditions of the early 1990s saw a clear change in leasing practices for institutional grade property. Such a market environment empowered tenants, seeking greater flexibility and reduced risk, to secure shorter leases and/or an option to break at least once during the term of the lease. For example, in 1993 over 35% of landlords granted break clauses in over 50% of new or renewed leases with only 8% stating that they never granted them (CIG, 1993). Based upon Valuation Office data, the most recent research on lease lengths indicates that there has been a dramatic decrease in lease length in all sector of the property market.

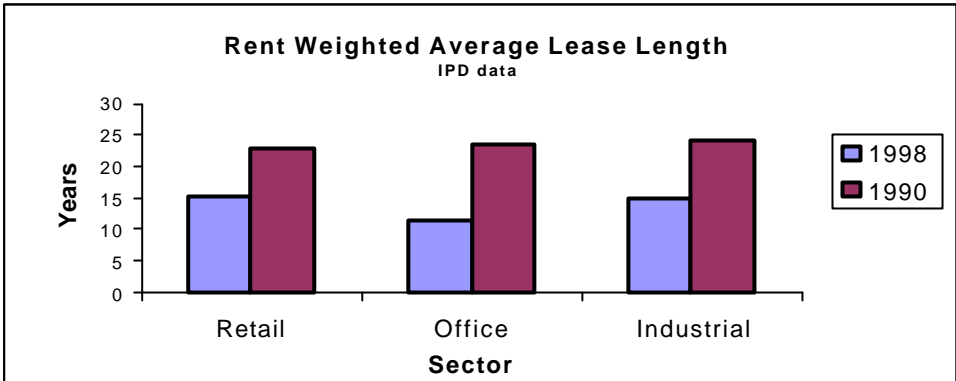
**Figure 1**



Source: Adapted from Crosby *et al* (2000)

Although the use of Valuation Office data produces a huge sample (37620 transactions), it is not a sample of the institutional market. In secondary and tertiary markets, shorter leases are more usual in all market conditions. It is apparent that there are important distinctions between high and low value properties if we examine the most recent IPD figures where there are notable differences between rent weighted and unweighted average lease lengths. Whereas the rent unweighted figures are generally consistent with Valuation Office data, the rent weighted lease lengths are significantly longer indicating that lease lengths tend to be longer for the more valuable properties.

Figure 2



Source: Adapted from Crosby *et al* (2000)

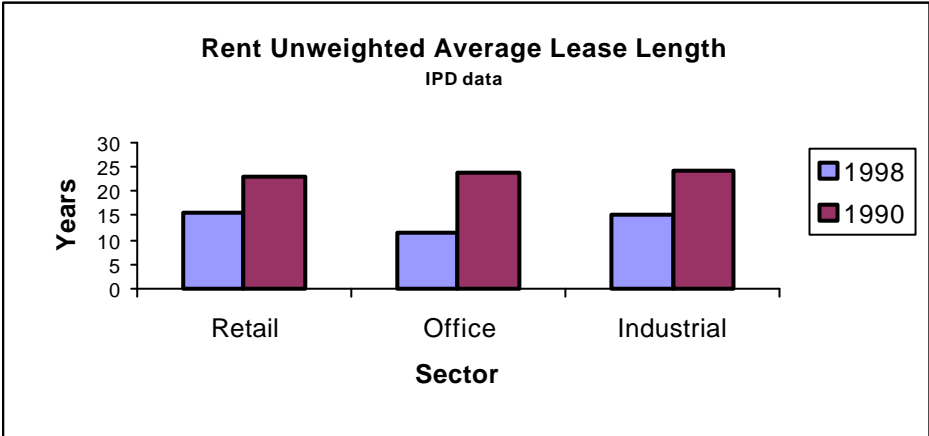


Figure 3

Source: Adapted from Crosby *et al* (2000)

The average figures on lease length tend to disguise the fact that lease structures have become increasingly diverse. For instance the IPD data for 1997 and 1998 shows that for the office sector over 50% of the office leases granted were for less than 10 years. Although there is no published data to confirm conclusively the extent of the transformation, an inescapable result of the granting of shorter leases and break options is that within institutional grade property, there is now a wider range of leases lengths.

Before any meaningful analysis of the pricing implications of reduced lease lengths can be made, it is important that their characteristics are appreciated. Although both short lease terms and break clauses have the effect of reducing the effective length of the lease, there are important distinctions between them. Break clauses tend to be much more variable than 'standard' short leases. There is no single, universal form or type of break clause. Issues related to precise drafting, timing, beneficiary, penalties and frequency are variable. The right to break may occur once or more than once during a lease, may invoke a financial penalty, and may or may not coincide with rent review(s). Such an opportunity may occur at a stipulated point(s) or may be invoked at any time during the lease. The empirical evidence suggests that in terms of timing, options to determine a lease may be categorised into two broad types, namely; short term breaks and rent review breaks (Drivers Jonas, 1997). Short term breaks are defined as those occurring within the first three years of the term and account for 44% of all leases with break clauses represented within the IPD database, interestingly they tend to be a feature of less valuable properties. Rent review breaks are defined as options which coincide with the rent review date and account for 45% of such leases, with 25% occurring at the time of first review and 20% coinciding with subsequent reviews. The latter are closely related to properties with high rental values. The exact nature of the wording can have significant implications for the landlord and tenant. Since there is equally no standard form of wording or timing regarding break clauses, their implications can be diverse. In common with rent review clauses, 'pioneer' break clauses can be difficult to exercise with poor drafting, or arguably intentionally ambiguous drafting, being subject to a literal interpretation by the courts. Break clauses will vary in the length of notice of break required and the financial penalty (if any) associated with lease. Moreover, with regard to short leases, a distinction also needs to be drawn between cases where the lease subject to the 1954 Business Tenancies Act or whether it has been 'contracted out'. Anecdotal evidence suggests that short leases not subject to the act are more desirable from the landlord's perspective since the tenant cannot seek to renew the lease on the same terms at renewal, the tenant cannot use the protection of the 1954 Act to remain in the property under interim rent provisions and negotiate without pressure and, consequently, the landlord can be more pro-active in the management of the asset.

## Changing lease structures: costs and benefits

From the investors' perspective, obviously the main issue concerning short leases is that the tenant can vacate the premises forcing the landlord to incur the costs associated with finding a new tenant and possibly managing a void property. The positive value of the right to vacate will in most circumstances lie with the tenant who benefits from increased flexibility in the management of their operational property holdings, the negotiating advantage associated with the ability to make the landlord incur costs associated with tenant vacation and the possibility of a downward adjustment of rent. In the event that occupation is terminated, there are also transaction costs associated with tenant relocation for both the landlord and the tenant. However, it should be stressed that it is necessary to look beyond the single property. The importance of property as a cost and its contribution to profitability will vary between tenants. The probability of tenant vacation may be driven by purely operational factors where property costs are a relatively minor element of the corporate strategy rendering factors such as market conditions irrelevant.

All tenants will incur fixed costs associated relocation such as moving costs and business disruption. However, costs will be variable between tenants. Tenants with high transaction costs are likely to have one or more of the following attributes: relatively high sunk costs in terms of fitting out and/or plant and machinery; established client profile strongly linked to location or the existence of inherent goodwill; difficulty in acquiring substitute premises and/or a large financial penalty associated with any break option.

In the event of tenant vacation, the landlord will also have a number of fixed and variable costs. Fixed costs will include mainly marketing and legal fees associated with finding a new tenant. Variable costs will include potential loss of rental income due to void and/or rent free period to new tenant, costs of other possible incentives to new tenant and management costs of rates, service charge, insurance, security, utilities etc. The level of these variable costs is largely a function on the length of the void period and their *a priori* estimation will rely upon a forecast of market conditions at the point of potential letting termination. For the landlord a letting termination will only be financially beneficial when the benefits of tenant vacation exceed costs. This may occur when there is a substantial financial penalty associated a break option and/or reletting provides an opportunity for

improving covenant strength. In practice, these scenarios will be limited and will tend to be associated with ‘hot’ markets – markets in which tenants are unlikely to vacate. In addition, a short lease offers the potential for a decrease in income.

Although it is well established that landlords have successfully resisted the incorporation of non-upwardly only rent reviews (see Crosby and Murdoch, 1998), the granting of a short lease or break option can be analysed as providing the opportunity for a one-off downward adjustment of rent. In the event that the rent passing exceeds the estimated rental value at the point of potential letting termination, it is more likely that the tenant will at a minimum seek a decrease in the rent to market level before accepting lease continuation/renewal<sup>1</sup> or, alternatively, may vacate leaving the landlord with potential void costs and a return to market rent. The probability of rent passing exceeding rental value at the point of potential letting termination will depend on the rate of rental growth between letting commencement and point of potential letting termination, the volatility of the rental growth and the time period to potential letting termination.

It is apparent that, from the perspective of the value of the landlord’s interest, a key financial issue relates to the cost and the associated probability of tenant vacation and/or downward rental adjustment. If these variables were certain, incorporating their effects into rental and capital valuations would be more straightforward. Manifestly this is not the case. In order to estimate the transaction costs associated with potential letting termination, three key questions need to be addressed. Firstly, what is the probability that the tenant will terminate the letting? This will be primarily determined by letting specific factors such as the structure of any break clause in terms of drafting and financial penalty, the circumstances of the tenant and market factors such as rental trends between letting commencement and termination and the state of the letting market at point of potential letting termination. Secondly, assuming that the probability of tenant vacation is greater than zero, what are the projected costs of a letting termination? Thirdly, what is the probability that the rent passing will exceed the open market value at point of potential letting termination or the

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<sup>1</sup> In some circumstances, the landlord may refuse to lower the rent taking the view that the tenant’s transaction costs exceed the potential benefits of tenant vacation. The authors have anecdotal evidence of such situations where tenants paying rents that exceed market level by 60% have not used a break option to negotiate a market rent.



likelihood of a downward rent review? Obviously, the estimation of these three variables is characterised by uncertainty.

To summarise, this analysis suggests that there has been a transformation in the lease lengths in the UK's commercial property market further increasing the heterogeneity of commercial property as an asset class. Attempts to price rental income flows subject to short leases and break clauses will also need to reflect how the interaction of the structure of the break clause (if appropriate), uncertainty about future market conditions and the variations in landlord and tenant circumstances produces diversity in the implications of short leases and break clauses. Below previous research is reviewed, this is followed by the presentation of a methodology for incorporating these uncertainties into a pricing model.

## **Previous research**

It is apparent that there is a wide variety of factors affecting the financial implications of short leases and break clauses. Valuers are faced with the task of reflecting the rental and capital value implications of this diversity within their assessments. Indeed, the issue of how valuers should take account of short leases raises fundamental issues about the limitations of the valuation process given the nature of the property market. At a general level the commercial property trading environment is characterised by high search costs, relative illiquidity, bargaining and a small pool of buyers and sellers and, thus, price dispersion. Consequently, market structures produce a restricted, variable and 'noisy' flow of transaction evidence. Since the appraisal process is essentially retrospective in that it is reliant upon historic information on transactions to estimate current prices, the low volume of transactions (and uncertainty associated with individual pieces of transaction evidence) within the property market leads to a relative scarcity of new price information. Such limitations are greatly exacerbated when non-standard property interests are being appraised. Consistent with other appraisal approaches to 'anomalies', research has found that valuers tend to use rather *ad hoc* adjustments to reflect the effects of break clauses (Herd and Lizieri, 1994). Although it may be argued that any application of generalised risk adjustments by market participants to account for break options should also be used by valuers in assessing market values, previous research has shown that established rules-of-thumb in valuation practice are often at odds with activities in the market or that there is diversity of application within the market (O'Roarty *et al*, 1997). Thus, given

asset heterogeneity and ‘thin’ market effects, the application of market comparable based models of valuation will be problematic. This limitation will be further exacerbated by the diversity of break clauses and letting circumstances which will in turn tend to produce diversity in their financial implications.

Although there has been limited discussion of methodology for pricing short leases, break clauses have been the subject of some analysis. Lizieri and Herd (1994) examined approaches to the problem by practitioners and found a notable lack of consistency between valuers and in the internal logic of their assumptions. They developed a simulation approach to formally account for the probability that tenants may exercise the right to prematurely determine the lease and found evidence of inconsistency in the application of yield adjustments as a remedy for the impact on value of break options. Indeed their research suggested that in general valuers tended to adopt a conservative approach (presenting an opportunity for arbitrage trading)<sup>2</sup>. Their model derived the probability of tenant vacation from evidence about an ‘average’ rate of non-renewal by tenants. However, given the diversity in the structure of break clauses and the heterogeneity of tenant circumstances, the applying ‘average’ probabilities is just as likely fail to account accurately for the implications of break clauses and its application also to produce arbitrage possibilities. Moreover, their pricing model failed to incorporate the additional risk inherent in break clauses and short leases that there is an effective single point downward rent review possibility

There has been considerable interest in the potential application of option pricing techniques to property investment and development decisions (see Grenadier, 1995; Ward, 1996; French *et al* 1998; Patel and Sing, 1998 and Rowland, 1998). If we examine the option to vacate from a typical option perspective we can see the limitations of such methodologies. In a typical option product the investor acquires the right to buy (call option) or sell (put option) an underlying asset before or at a pre-agreed date. In this case, since we are concerned with options to vacate, the similarity is with a European put option where the tenant has the right to vacate (sell) at a pre-agreed date. The value of the option is a function of movement in the price of the underlying asset. Logically, the price

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<sup>2</sup> Recent discussions by the author with practising valuers suggests that many feel obligated to assume ‘worst case’ scenarios when valuing properties with short leases or break clauses due to potential client dissatisfaction and negligence claims. Anecdotal evidence suggests that valuers assume that all tenants will not renew and that their will be avoid period despite acknowledging that the reality is usually quite different.

volatility of the underlying asset is a key determinant of the value of the option with increasing volatility producing higher option values. Although mathematically complex in derivation, the operation of option pricing models is relatively simple. The key variable – volatility – is either estimated from analysis of historic price data or is obtained by analysing implied volatility in transactions. It can be recognised how the volatility of property rental and yield series can impact of the financial implications of an option to vacate. Where the rental value at the point of potential letting termination is lower than the rent passing, the right to vacate may act as a downward rent review. This point is further analysed below. However, reliable application of these pricing models is, therefore, predicated on reliable historic time series and/or adequate transaction data. There are well documented problems with both these requirements in the commercial property market. Moreover, even in markets which are relatively deep, mis-estimation of volatility is a problem in valuing options (Hodges, 1990).

A good example of the limitations of the application of option pricing models to break clauses is Ward (1997). He presents an approach derived from the binomial option pricing model. Ward identifies volatility in rents as the primary factor affecting value making assumptions about the circumstances in which the tenant will vacate. Pricing outcomes are presented on the basis of a range of assumptions about rental volatility. Moreover, the focus on future rental levels (and associated volatility) ignores the role of other issues such as tenant circumstances and break clause structure. The emphasis on volatility as the primary determinant of option value will be more appropriate where there is uniformity in the structure of the option but may be problematic where there is heterogeneity in the probability of exercise. In a typical European option, the rational investor will always exercise the option when they are ‘in the money’. However, in the property market we have seen that each break option is unique in terms of structure of the option and the tenant attitude to exercise. It is illuminating to contrast this study with the case of pricing upward/downward rent reviews (Ward and French, 1997). In this case, the rationale for the application of option pricing models seems more appropriate. Where the open market rental value is below the rent passing, the rent will always fall in the case of a non-upwardly only rent review i.e. the option will be exercised since it is ‘in the money’. Ward’s break option pricing model assumes that this rule also hold for break clauses. In reality, tenants may choose to exercise the break whether rents have fallen or not and in some cases may be unwilling to use the ‘threat’ of break to lower the

rent. Moreover, in the case of downward rent reviews also, the pricing implications are dependent simply upon the volatility assumption and Ward and French (1997) demonstrate the relatively wide range of possible volatility-dependent pricing outcomes.

### **Estimating the inputs**

It has been argued above that the key questions in assessing the financial implications of a short lease concern the probability of tenant vacation, the costs associated with potential vacation and the probability of fall in the rental value below the level of rent passing. A framework is presented below which allows the incorporation of the key factors affecting these variables to produce explicit quantification of the expected costs of a letting termination.

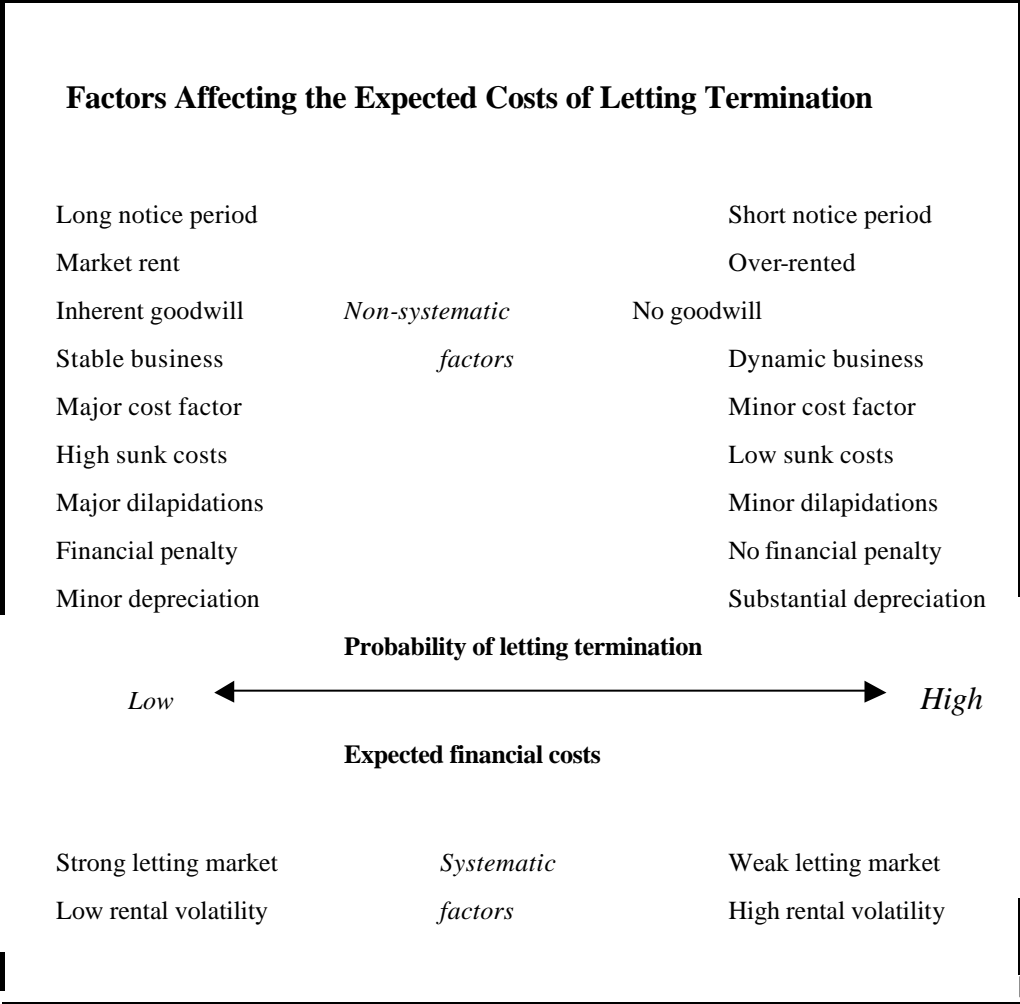
In the UK published research on tenant turnover is limited so that there is little empirical evidence of the probability of letting termination. However, even if available, the value of mean figures will be limited since there are likely to be individual features of tenants which will affect their propensity to vacate. It is apparent from the analysis above that the probability of tenant vacation will also be influenced by the nature of the specific tenant, lease, market sector and building as well as market factors. Below the probability of tenant vacation is specified as a function of ten factors (see McAllister and O’Roarty, 1999 for a discussion of how this approach can contribute to the estimation of the probability of tenant vacation). The ten factors are;

- the length of the notice period,
- the amount of the financial penalty,
- the expected cost of dilapidations,
- the estimated amount spent fitting out premises,
- expected availability of alternative premises,
- the estimated costs of relocation,
- the growth/contraction of the tenant’s business,
- the relative contribution of property to profitability,
- expected depreciation,
- expected rental growth and
- expected volatility in rents.

The net costs are taken as a function of present value of the fixed and variable costs outlined above which may be incurred at letting termination. The variable costs are dependent on the expected

length of the void period at letting termination. Figure 1 illustrates how they interact to influence the expected probability of letting termination and expected financial costs.

**Figure 1**



The next stage is to use the estimated probability of letting termination to calculate the expected costs of tenant vacation. The key variable is the expected length of the void period. The expected costs of void will be a function of the estimated probability of costs being incurred and the amount of these costs. In addition, there is a possibility of a downward rent review. The probability of the rent passing exceeding rental value at rent review is dependent upon the expected level of rental growth, time to rent review and the volatility of rental growth.

Hence, in the absence of reliable transaction evidence involving comparable leases, investors pricing adjustments should be based upon

- expected rental volatility,
- expected probability of tenant vacation,
- expected costs of tenant vacation,
- expected rental growth and
- time to rent review

### **Capital valuation**

Given that there is substantial uncertainty associated with a number of the variables, the pricing of short leases lends itself to simulation modelling<sup>3</sup>. The main benefit of simulation is that it provides flexibility in defining the characteristics (in terms of mean, standard deviation and distribution) of the uncertain variables and the relationship between them. In this case, given that some of the variables have relatively clear upper and lower limits, truncated normal and lognormal distributions have been used in addition to assuming normal distribution of variables (see below for a details of the inputs and assumptions of the simulation). The basic approach is that the simulation output of the net present values of two identical hypothetical properties is compared. One is subject to a break clause whilst the other is let on a 'standard' length lease assumed to be 15 years in this case. It is assumed that after the point of letting termination, the cash flows for the properties become equal. Each simulation has 10,000 iterations.

The results are presented in Table 1. The estimated cash flow is presented in Appendix 1. Given the assumptions of the simulation, the inclusion of the break clause is estimated to produce a reduction in value of 2.12%.

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<sup>3</sup> @RISK is used here.

## Simulation inputs

<b>ERV (standard 15 year lease on FRI terms with 5 yearly UORR)</b>	<b>£ 100,000</b>
<b>Holding period mean rental growth</b>	<b>5.00%</b>
Distribution	Normal
Mean	5%
Standard deviation	2.58%
<b>Annual rental volatility</b>	<b>10.00%</b>
<b>Holding period rental volatility</b>	<b>2.58%</b>
<b>Expected exit yield</b>	<b>5.88%</b>
Distribution	Truncated Lognormal
Mean	5%
Standard deviation	0.15%
Lower limit	4.5%
Upper limit	10%
<b>Expected probability of break</b>	<b>0.67</b>
Distribution	Truncated normal
Mean	0.7
Standard deviation	0.2
Lower limit	0
Upper limit	1
<b>Estimated costs of break (in terms of ERV per annum)</b>	<b>0.88</b>
Distribution	Truncated normal
Mean	0.75
Standard deviation	0.25
Lower limit	0.25
Upper limit	2
<b>Target Rate of Return</b>	<b>8%</b>
<b>Correlation</b>	

Rental growth/exit yield.	-0.5
Rental growth/probability of break.	-0.5
Rental growth/expected costs of break.	-0.5

In addition, the above output is based on the assumption that all the variables are independent. Although @RISK offers the facility to specify correlation between the inputs, these are unknown and themselves prone to uncertainty. Several general relationships can be hypothesised.

- The correlation between rental growth and exit yield is expected to be negative.
- The correlation between expected probability of break and rental growth is expected to be negative<sup>4</sup>.
- The correlation between expected costs of break and rental growth is expected to be negative.
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The output is displayed in Table 7

**Table 7**

<b>Simulation output</b>		
	<b>No break</b>	<b>Break Yr 5</b>
<b>Minimum</b>	£986,463	£805,402
<b>Maximum</b>	£7,313,273	£7,297,488
<b>Mean</b>	£2,328,242	£2,281,620
<b>Standard deviation</b>	£725,018	£733,689
<b>Variance</b>	5.26E+11	5.38E+11
<b>Skewness</b>	1.085575	1.067134
<b>Kurtosis</b>	4.871327	4.828597
<b>Mode</b>	£2,173,580	£1,786,721
<b>95% C.L.</b>	> £1,386,029	£1,324,679
<b>COV</b>	0.311	0.322



Generally as the correlation decreases between the variables, the mean and standard deviation increase. However, this is not proportionate since the coefficient of variation also increases. We should note two further points.

## **Rental valuation**

One possible approach to estimating the rental 'premium' to 'compensate' for the shorter lease term and the associated possibility of downward rent adjustment is to require that the output of the simulated NPVs for the two income streams should be identical so that the goal is to identify the rental premium payable for the short lease to achieve this objective. This can be accomplished by a process of backward iteration ie. trial and error. When the target output is identified, the rent payable for the short lease can be adjusted until it produces similar simulation output to the 15 year lease. An important point is the period over which the rental premium should be payable. For a short lease the appropriate period is obviously the term of the lease. However, the break clause situation may be different since the break and the rent review are commonly linked. Let us assume we are looking at a decision between a 15 year lease with five yearly rent reviews with a break after five years and a fifteen year lease with five yearly UORRs. It would not be rational for the landlord to accept that a rental premium should be payable after the break point since this provides an incentive for the tenant to vacate. However, in the event that rental growth is lower than expected the tenant will be wary of being 'locked into' a potentially premium rent for the length of the lease. The most equitable solution is that the property is reviewed to the higher of open market rental value at break point or open market rental value *on standard lease terms at letting*.<sup>5</sup> Returning to our example, what is the rental premium that provides similar simulation output relative to a standard lease?

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<sup>4</sup> This and the subsequent hypothesis are based upon the inference that rental growth provides a proxy for property market wellbeing.

<sup>5</sup> Even then when there has been a fall in rental values, the tenant will be more likely to vacate.

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Simulation output

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		<b>No break</b>	<b>Break Yr 5</b>
Rent		£ 100,000	£ 111,900
Minimum		£976,243	£810,567
Maximum		£6,953,854	£6,985,835
Mean		£2,329,129	£2,329,991
Standard deviation		£728,323	£737,258
Variance		530454500000	543548600000
Skewness		1.090212	1.073443
Kurtosis		4.809435	4.773015
Mode		£1,262,220	£1,865,281
95% C.L.	>	£1,384,031	£1,373,189
COV		0.31	0.32

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Alternatively the difference between the two original expected NPVs for the two alternatives can be decapitalised over the appropriate period – in this case five years. In this case

$$\frac{2328242 - 2281620}{YP5 \text{ years @ } 8\%} = \frac{46622}{3.9927} = 11676$$

### Conclusion and Discussion

The introduction of break clauses and short leases has altered the distribution of risks and rewards between landlords and tenants. Moreover it is apparent that diversity in lease structures exacerbates the existing drawbacks of conventional appraisal. In the context of break clauses specifically, diversity in their terms further increases the problems of applying conventional methodologies. In common with the valuation (and pricing) of previous ‘anomalies’, the analysis suggests that valuers

and/or other market participants may be mis-pricing assets let on these bases – most probably with a conservative bias. Although there is increasing interest in the application of option pricing methodologies, it is important to be aware of their limitations. Such models rely on rental volatility as the main determinant of price adjustment. A significant problem is the estimation difficulties associated with such factors in the property context. Implicitly homogeneity in the nature of the clause and (implicitly) the probability of option exercise is assumed. A central tenet of this analysis is that such models also tend to neglect the price effects of specific risk factors such as tenant circumstances and the terms of break clause. Specific risk factors (as defined here) have a significant bearing on the probability of letting termination and on the level of the resultant financial losses. Most of the variables influencing the probability of letting termination can be easily observed.

The major benefit of simulation methodology is that uncertainty in the key variables is recognised and incorporated into the pricing process. Such methods offer rationale, although not comprehensive, solutions. In addition to the rigour of internal logic, the success of any methodology is predicated upon the accuracy of the inputs. The framework presented here is insufficient given the problems of estimating future market conditions and the use of deductive reasoning concerning the factors affecting letting terminations. Although it can be reasonably argued that the such limitations render such a framework prone to error, the major benefit is that explicit and transparent analysis and consideration is permitted. Research focusing on issues related to the costs and probability of letting termination such as the incidence of letting termination, the characteristics of tenants that break, the ‘deterrent’ effects of financial penalties/dilapidations costs, the effect of long notice periods etc would provide data for more efficient pricing and the assessment of worth of short leases and break clauses.

## **References**

Corporate Intelligence Group, (1993) Market Research Survey reported in *DoE Consultation Paper on Commercial Property Leases: Response by IPF*, London, Investment Property Forum.

Crosby, N. and Murdoch, S. (1997) ‘The influence of procedure on rent determination in the commercial property market of England and Wales’ Paper delivered at RICS ‘Cutting Edge’ Research Conferences, Dublin, 1997.

Crosby, N., Lizieri, C and Murdoch, S. (1998) "Changing Lease Structures in Real Estate Office Markets" Paper delivered at ERES/AREUEA conference, Maastricht

Crosby, N., Markwell, S and Murdoch, S. (2000) *Monitoring the Code of Practice for Commercial Leases*, DETR, London (forthcoming).

Drivers Jonas (1997) *Commercial Leases - A Permanent Revolution*, Drivers Jonas Research

Grenadier, S. (1995) "Valuing lease contracts: A real-options approach" *Journal of Financial Economics*, Vol .38, pp. 297-331

Lizieri, C. and Herd, G. (1994) 'Valuing and appraising new lease forms: the case of break clauses in office markets' Proceedings of RICS The Cutting Edge property research conference, September, 1994.

Lizieri, C. (for the Business Space Research Team) (1997) 'The changing market for business space: occupier requirements, market response and valuation impacts' Paper delivered at RICS 'Cutting Edge' Research Conference, Dublin, 1997.

McAllister, P. and O'Roarty, B. (1998), "The legal and valuation implications of break clauses: a behavioural perspective" Paper delivered at RICS Cutting Edge conference, de Montfort University, 1998.

McAllister P. and O'Roarty, B. (1999) "Pricing break clauses: a fundamental approach" Paper delivered at the RICS Cutting Edge conference, Cambridge.

O'Roarty, B., McGreal, S. and Adair, A. (1997) 'The impact of retailers store selection criteria on the estimation of retail rents' *Journal of Property Valuation and Investment* 15 (2) pp 119-130.

Patel, K. and Sing, T.F. (1998) "Application of Contingent Claim Valuation (Real Option) Model for Property Investment Analysis" Paper delivered at RICS 'Cutting Edge' Conference, de Montfort University, 1998.

Reynolds, K. (1997) 'Tenant Break Clauses and the Landlord and Tenant Act 1954; The Issues, the Problems and the Tactics - Can Tenants Use Break Clauses to Re-negotiate Rents Downwards?' in Proceedings of Henry Stewart Conference Studies, *Break Clauses*, Cafe Royal, London W1, Wednesday, 23 April 1997.

Rowland, P. (1999) "Pricing lease covenants: turning theory into practice" Paper delivered at PRRES conference, Kuala Lumpur, 1999)

Slessenger, E. and Ballaster, R. (1994) 'Tenants' break clauses', *Estates Gazette*, Issue 9446, pp.196-7.

Ward, C. (1997) 'Risk neutrality and the pricing of specific financial aspects of UK leases' Paper delivered at RICS 'Cutting Edge' Research Conferences, Dublin, 1997.

