

**TOWARDS A TRANSPARENT APPROACH TO THE APPRAISAL  
OF OVER-RENTED PROPERTY**

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by

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## **ABSTRACT**

We develop a number of alternative discounted cash flow approaches to the appraisal of over-rented property. These reveal the complicated risk characteristics and option characteristics of over-rented property, indicating that more sophisticated appraisal techniques are necessary.

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## 1. INTRODUCTION

The appraisal of freehold properties let at rents in excess of their open market rental value (“over-rented” properties) has become an important issue in the 1990s, particularly in respect of City offices. This has exposed some technical and methodological limitations in traditional valuation techniques.

Most of the literature on this issue has been concerned with open market valuations but in this paper, we are concerned primarily with the appraisal of “worth” rather than the establishment of open market value. We respond to the challenge of the Mallinson Report (1994) by developing and discussing a number of alternative discounted cash flow (DCF) appraisal models. The different models bring out the risk characteristics of over-rented property and indicate the important financial issues which should be considered by investors in the appraisal process. They also suggest that more sophisticated appraisal techniques could be applied in this area.

Section 2 of this paper considers the traditional approach to the valuation of over-rented property, which is theoretically incorrect. We then consider a number of DCF investment appraisal methods, starting with the “super-gearred” equity approach in Section 3. In Sections 4 to 6 we discuss the “contemporary” approach and what we call the “conventional actuarial approach”, and compare the resulting appraisal formulae. Section 7 applies the traditional convertible bond valuation method to the appraisal of over-rented property; interestingly, there are similarities between this approach and a corrected, traditional property valuation approach. In Section 8, the different DCF investment appraisal methods are used to bring out the risk characteristics and certain option characteristics of over-rented property.

As well as responding to the Mallinson Report, this paper develops further the ideas of Crosby and Goodchild (1992) and illustrates an application of the techniques of Adams et al (1993a). We also suggest that the ideas of Ward and French (1995) are worthy of the further development and application to the appraisal of over-rented property.

## 2. TRADITIONAL APPROACH

Property market practitioners still generally use a traditional approach to the valuation or appraisal of over-rented property which is inappropriate to the problem at hand. That portion of the passing (i.e. current) rent represented by the estimated open market rental value is capitalised, as if the property were rack-rented, using the “all risks” yield. The remaining portion of the passing rent, known as “top-slice” income, is treated as fixed until the end of the lease and capitalised using the yield on long-dated gilts plus a premium determined by, among other things, the quality of the tenants’ covenants. Notwithstanding the discussion in Section 8 of this paper, there are two problems with this approach as pointed out by Martin (1991): it may be that the open market rental value is expected to rise above the passing rent before the end of the lease; and growth in the open market rental value is ignored in capitalising the top-slice income, leading to double counting of part of the income.

Further problems arise with the traditional approach to valuation of over-rented properties if there is a complication, which is not unusual. For example, it is possible in periods of oversupply for properties to be let at a rent which effectively overstates the true rent, if the tenant receives a rent-free period or capital inducements (such as fitting out costs, golden hellos etc.) in return for paying a higher rent.

In effect, the problems exposed by the phenomenon of over-renting are specific examples of the criticisms levelled at traditional valuation techniques, namely that no explicit attempt is made to establish the profile of rental flows from the investment. In the specific case of over-rented property, no explicit attempt is made to establish the length of time for which the property is a fixed-income investment and, hence, no attempt is made to determine whether the investment has *any* income growth potential during the remaining period of the lease.

Attempts to deal with the appraisal of over-rented property on a more scientific basis have concentrated on growth-explicit DCF methodology. This first requires an estimate of future rental growth so that the review at which the estimated open market rental value overtakes the passing rent (which we call the “crossover point”) can be determined. The crossover point is estimated using the surveyor’s best estimate of rental growth, which requires an inflation assumption. There are a number of alternative ways in which growth-explicit DCF techniques can be used to appraise the worth of over-rented property. These will be discussed in turn in the following sections.

### **3. “SUPER-GEARED” EQUITY APPROACH**

The passing rent could be valued as a perpetuity and the expected rents receivable over and above the passing rent (after the crossover point) valued as a “super-gearred” equity type investment. We understand that this approach is sometimes used in practice. The fixed income portion is similar to a corporate bond and should be valued at an appropriate nominal rate of interest. The “super-gearred” equity element arises because after the crossover point, the right to receive rents over and above the passing rent is an inherently real investment, the present value of which increases dramatically for small changes in rental growth rates.

There is also a strong element of inflation gearing in the “super-gearred” equity as any increase in nominal rents will all impact upon the “super-gearred” portion in the appraisal process. The “super-gearred” equity portion of the rental stream has a risk profile unusual among marketable investments and determining a risk discount rate is therefore difficult.

It is tempting to think that this approach avoids the need to consider the option nature of over-rented property (see Section 8). This is not the case. Any equity share has an option element to it, in that limited liability truncates the distribution of returns. Similarly, the “super-gearred” portion of the rent receivable from over-rented property contains an option as this part of the rent cannot go below zero (in fact, it is even more complicated as this portion of the rent cannot fall below the difference between the highest rent received at any rent review and the level of income receivable at the time of valuation). This option element can generally be ignored in the valuation of equity shares but is likely to assume greater significance in the case of the “super-gearred” equity of an over-rented property.

#### 4. CONTEMPORARY PROPERTY APPRAISAL APPROACH

With the contemporary approach, the value of the income received before the crossover point (term income) and the value of the income received after the crossover point (the reversion) are calculated separately and then added together.

In estimating open market value, market evidence is used to calculate an implied rental growth rate and hence to estimate the crossover point (see, for example, Crosby, 1992). Standard property valuation methodology is then employed to value the term income and to value the reversion.

In appraisal of worth, a more sophisticated approach is possible based on expected future cash flows, using explicit estimates of future rental growth rates, refurbishment costs etc. This could take the same form as the contemporary approach for estimating open market value, but with growth rates and yields based on forecasts. Ignoring all costs, and using more convenient actuarial notation and conventions, the basic approach of Crosby and Goodchild (1992) would give:

$$V_0 = R_1 a_{\frac{i\%}{m+s}} + \frac{R_2}{w} v^{m+s}$$

where  $V_0$  is the present value of the property

$R_1$  is the annual passing rent

$R_2$  is the annual rent immediately after the crossover point

$w$  is the appropriate “all risks “ yield.

$m$  is the estimated number of years between the valuation date and the time at which the level of market rents will equal the passing rent.



$s$  is the number of years between  $m$  years from the valuation date and the following rent review.

$a_{\overline{k}|i^{(k)}}$  is the present value of an annuity of 1 per interval payable in arrears for  $k$  intervals, using a nominal rate of interest  $i$  per interval.

$v$  is  $(1 + i)^{-1}$

There is further discussion of this model in Section 6, when we compare it with a conventional actuarial approach proposed in Section 5.

## 5. CONVENTIONAL ACTUARIAL APPROACH

The “conventional actuarial approach” is an application of the ideas in Adams et al (1993a). As in the contemporary approach, the conventional actuarial approach values the term income separately from the reversion. The term income is valued using an appropriate nominal rate of interest, as it is effectively a fixed-interest investment. But the reversion is valued at an appropriate real rate of interest as it is effectively a real investment.

The following notation will be used in addition to that previously defined:

$A_0$	=	present value of the term income at the valuation date.
$B_{m+s}$	=	present value of the reversion, valued at the crossover point.
$B_0$	=	present value of the reversion, valued at the valuation date.
$\ddot{a}_{\frac{(4)}{k}}$	=	present value of an annuity of 1 per annum payable quarterly in advance for $k$ years, using a nominal rate of interest $i$ per annum.
$g_r$	=	expected annual real growth rate of open market rental values.
$j$	=	the appropriate real rate of interest for discounting the variable rents.
$n$	=	rent review period in years.

It should be noted that  $\frac{m+s}{n}$  is not necessarily an integer and therefore, we may not be calculating the present value of the property at the time of a rent review. It will be assumed, however, that  $4(m+s)$  is an integer and thus we are valuing immediately before the receipt of a quarterly rental payment. The period  $m+s$  years must be less than the term of the lease,

otherwise the investment is akin to a fixed-interest investment for the remainder of the lease, with the rent adjusting to the level of market rents when the lease is reviewed.

The present value of the term income is:

$$A_0 = R_1 \ddot{a}_{m+s}^{(4)} \quad (1)$$

where the valuation rate of interest is a nominal rate appropriate to the risk level of an over-rented property (which may be quite high as, if a void occurs before the crossover point, it would not be filled at rent  $R_j$ ).

The present value of the reversion, at time  $m + s$  years from the valuation date is:

$$B_{m+s} = \frac{R_2 \ddot{a}_n^{(4)}}{1 - \left( \frac{1 + g_r}{1 + j} \right)^n}$$

The present value of the reversion at the valuation date is therefore:

$$B_0 = \frac{R_2 \ddot{a}_n^{(4)} v^{m+s}}{1 - \left( \frac{1 + g_r}{1 + j} \right)^n} \quad (2)$$

where  $\ddot{a}_n^{(4)}$  and  $v^{m+s}$  are calculated at an appropriate nominal rate of interest.

Therefore:

$$V_0 = A_0 + B_0$$

or

$$V_0 = R_1 \ddot{a}_{m+s}^{(4)} + \frac{R_2 \ddot{a}_n^{(4)} v^{m+s}}{1 - \left( \frac{1 + g_r}{1 + j} \right)^n} \quad (3)$$

using equations (1) and (2).

## **6. COMPARISON BETWEEN THE CONVENTIONAL ACTUARIAL APPROACH AND THE CONTEMPORARY PROPERTY APPRAISAL APPROACH**

It is interesting to note the following differences between the conventional actuarial approach and the contemporary property appraisal approach:

- (i) Rather than allow explicitly for rental growth and discount at an appropriate rate of interest, the contemporary property appraisal approach discounts at a lower nominal rate of interest to allow for rental growth, although Crosby and Goodchild (1992) do suggest that their method can be further developed and adapted.
- (ii) In its simple form, the contemporary property appraisal approach does not allow explicitly for the timing of rent reviews.
- (iii) In calculating the present value of the reversion, the conventional actuarial approach is carried out in real terms whereas the contemporary property appraisal approach is carried out in nominal terms.

Crosby and Goodchild (1992) believe that an appropriate rate of interest which allows for risk should be used in valuing the reversion. We agree but prefer to work in real terms and explicitly. One advantage of this is that it is easier to determine the appropriate valuation interest rate, index-linked government bonds being the appropriate, comparable risk-free investment. In the contemporary property appraisal approach, it is important to ensure that

the inflation assumption underlying the expected nominal rental growth rate is compatible with the nominal valuation rate of interest.

The choice of the rate of interest to value the term income and the choice of the rate of interest at which the reversion is discounted to give its present value are also important. The term income could be valued at a rate of interest approximately equal to the redemption yield on a bond issued by the same company. If the tenant is very secure, this will be a nominal rate of interest, lower than that normally used to value expected cash flows from property when not over-rented. This is because there is a secure fixed income stream expected. If the tenant is not secure, the over-rented property is particularly risky as any replacement tenant would pay a rent which is lower than  $R_j$ . In this case, the rate of interest used to calculate the present value of the term income would be higher. Thus, both the conventional actuarial approach and the contemporary property appraisal approach bring out the need to assess the security of the tenant. The traditional property valuation approach wholly obscures this.

The rate of interest at which the reversion is discounted to give its present value should probably be similar to the nominal rate of interest used for valuing a property of the same risk level which is not over-rented. However, the risk characteristics of the over-rented property are different (see Section 8) and this should be reflected in the rate of interest.

The conventional actuarial approach provides a framework in which all relevant variables are made explicit and comparable investments can be used to develop estimates of these variables. The true risk characteristics of over-rented property, still obscured in the contemporary property appraisal approach, are effectively brought out. Furthermore, using computer spreadsheets or summary formulae of the type developed in Adams et al (1993b), it

is possible to assess the sensitivity of the property present value to changes in relevant financial variables.

## **7. THE CONVERTIBLE BOND APPROACH**

A further transparent DCF approach, which is analogous to the traditional approach to valuing convertible bonds, will be described in this section.

A convertible bond offers the holder a bond instrument with guaranteed terms for conversion into equity. Conversion normally takes place when the income from the equity on conversion has reached a higher level than the income on the bond. An over-rented property is similar in some respects. The holder receives the passing rent until the open market rent overtakes the passing rent. Income is fixed then variable, with the variable portion commencing when the nominal level of the variable portion has overtaken the fixed level. The risk and option characteristics of over-rented property are, however, different in some respects from convertible bonds (see Section 8).

Assuming that the crossover point is within the term of the lease, the convertible bond approach involves valuing the property as if it were let at the open market rent and then valuing the “income advantage” before the open market rent overtakes the passing rent. This has the advantage of allowing a standard appraisal of the market-related element, treating separately the income advantage which is at risk if the tenancy becomes void. The present value of the first component can be calculated using either a nominal or real terms model. But the second component should be valued using a nominal DCF model - the passing rent is defined in nominal terms and the crossover point is determined by the growth rate of nominal rents.

The above approach is similar to the traditional approach to the valuation of convertible bonds, (See Day and Jamieson, 1980) and is still widely used (Rutterford, 1993) in practice.

In mathematical terms, the present value of the over-rented property is:

$$V_0 = \frac{R_0 \ddot{a}_n^{(4)}}{1 - \left(\frac{1+g_r}{1+j}\right)^n} + R_1 \ddot{a}_{m+s}^{(4)} - R_0 \ddot{a}_n^{(4)} \left[ \frac{1 - \left(\frac{1+g}{1+i}\right)^{m+s}}{1 - \left(\frac{1+g}{1+i}\right)^n} \right] \quad (4)$$

This formula holds when  $(m+s)/n$  is an integer i.e. when we are valuing immediately after a rent review. Adjustments can be made if we are valuing between rent reviews. In a sense, the convertible bond approach is a corrected appraisal version of the conventional property valuation approach. The third term on the right of equation (4) is to avoid double counting part of the income before the crossover point: one of the problems with the traditional approach which was mentioned in Section 2.

The appropriate rate of interest  $j$  for the first term on the right of equation (4) would be a real rate of interest used for valuing property let at open market rents. This could be determined by looking first at the real returns from index-linked government bonds and making an allowance for risk. The appropriate nominal rate of interest for the second and third terms might be that for a bond issued by a company of similar standing to the tenant. It should be borne in mind, however, that the whole term income, not just the income advantage, should strictly be valued at such a rate of interest. This could be allowed for by valuing the third term at a rate of interest appropriate for valuing a freehold property let at open market rental value. Thus the whole of the fixed portion (represented by the second term) would then be valued at the lower rate of interest.

Convertible bond investors talk of the “market premium”. This is the difference between the market price and the theoretical value calculated using the traditional approach. It represents



the time value of the option which convertible bondholders have to take either the debt or the equity investment. Should such a premium exist for over-rented property? The market premium for over-rented property could be defined as the open market value less the appraisal of worth. The latter could be calculated using the contemporary property appraisal approach, the conventional actuarial approach or the convertible bond approach. The fact that the owner possesses an option - to collect the passing rent or the market rent, whichever is higher - implies a positive market premium. But any such premium will depend on a number of factors including the following which relate particularly to over-rented property:

1. The risk of a void. This could cause the market value to be less than the present value of the expected cash flows. If a void occurs, the property will be re-let at the open market rent and the income advantage will be lost. There is no comparable difficulty with convertible bonds. This suggests a discount to expected net present value, although the risk of the void could be factored into the interest rate at which the income advantage is discounted.
2. The outstanding term of the lease. In equation (4), we have assumed that the crossover point is before the lease expires. As soon as the lease expires, any option characteristics are lost.
3. The level of inflation. Inflation could pull market rents above the passing rent, but without any value being added in "real terms".

We believe that an appropriate method of appraisal, in the absence of more sophisticated techniques, would be to use one of the DCF models discussed in Sections 4,5 and 7 and then

consider whether the market premium or discount to expected present value is at the appropriate level, given the risk and option characteristics of the over-rented property. However, a better understanding of the option characteristics could lead to the development of better appraisal methods based on option pricing theory. We turn to this in Section 8.

## **8. THE TRUE NATURE OF OVER-RENTED PROPERTY**

The transparent nature of the proposed models, the conventional actuarial approach and the convertible bond approach, helps in determining the valuation rates of interest and also reveals the true nature of over-rented property.

The conventional actuarial approach is particularly effective at bringing out the risk characteristics. Consider first the effect of a change in the rate of inflation with real variables unaffected. If the rate of inflation increases (or decreases), the real value of the term income will fall (or rise); the length of time the term income is received will also probably shorten (or lengthen). If real rental growth rates increase (or decrease), the length of time the term income is received will shorten (or lengthen) as the market rent will overtake the passing rent earlier (or later).

The reversion provides some inflation protection. The real amount of any future payment should not fall below the current level of open market rents for longer than the period between rent reviews, unless real rental growth rates are negative. There is also a nominal floor to the rent receivable, equal to the passing rent, until the end of the lease. This therefore has option characteristics in that the investor can take whichever is higher: the passing rent or the open market rent. The present value of the over-rented property could be regarded as comprising a fixed rental portion; a variable rental portion, to be received after the level of market rents has risen above the current level of rents receivable; a nominal floor to rents which creates option characteristics; and a real floor under the rent which gives the investor some inflation protection characteristics, on an essentially fixed income investment in the early years: this also creates option characteristics.

The convertible bonds approach brings out the option characteristics in a different way. There is a guaranteed income for a fixed period with the possibility of sharing in future rental growth, if market rents increase above the passing rent. This is rather like holding a call option on a property freehold let at market rents which will be exercised if market rents increase above the passing rent. This is the way in which convertible bond investors view such instruments [see Rutterford (1993)].

The convertible bond approach has the advantage of being similar to an approach already used to value marketable investments, although it does not explicitly split the term and reversion incomes. The similarities between over-rented property and convertible bonds could lead to the application of the option pricing methods currently used to value convertible bonds to over-rented property. However, there are further differences between convertible bonds and over-rented property which may make these option pricing methods difficult to apply directly. Firstly, property has an additional built-in option through the upward only rent review, in the sense that, at each review, the rent can be changed to a new level, below which it cannot fall. Ward and French (1995) have already proposed the application of option pricing methods for property let at open market value because of the option nature of the upward only rent review. Secondly, if the open market rent overtakes the passing rent, the increase cannot be effective until the next rent review. Thirdly, the interest from a convertible bond is independent of the dividend which can be obtained from the equity upon conversion. In contrast, the passing rent and open market rent (the two possible levels of income from an over-rented property) may be correlated as both relate to open market rents, at different times in history, which may be serially correlated.

## **9. CONCLUSION**

We have developed a number of different DCF approaches to the appraisal of over-rented property. The transparent nature of the DCF technique makes it applicable to a wide range of property interests including over-rented property but also means that it tends to reveal its own inadequacies. Thus, attempts to develop DCF formulae reveal the complicated risk characteristics of over-rented property. Each DCF approach we develop brings out different risk characteristics. This, together with the option nature of over-rented property, suggests that even more sophisticated appraisal techniques are necessary, and this should prove to be a fruitful area for further research.

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