Chapter Seven: Net Rental Yield and Deferment Rate

Net Rental Yield vs Deferment Rate

Let's start by some clarifying definitions. The net rental yield is the amount that the landlord receives after deducting for void, management costs and maintenance costs, divided by the property price. The deferment rate, as defined by the PRA, is "the discount rate that applies to the spot price of an asset resulting in the deferment price, where the deferment price is the price that would be agreed and settled today to take ownership of the asset at some point in the future".[1] The deferment price reflects the foregone income or use during the deferment period.

These two rates are frequently run together, and as we shall show shortly, they are in fact mathematically identical, but they are defined differently. In this chapter we shall show how to derive one from the other, based on the definitions given.

Proof that the Deferment Rate Equals the Net Rental Yield

From the definition above, the deferment rate is the discount rate that when applied to the freehold price of vacant possession results in the price of deferred possession. The deferment rate itself is not directly market observable, but it can be estimated as a function of market variables. The method proposed here uses net rental yields, as follows.

Let d be the *current* net nominal annual rental, the current time being the *beginning* of the year. (We use 'd' here because the approach we are using derives from the dividend discount model, where 'd' is used to refer to (nominal) dividends.) 'Net' means the gross or headline rental paid by tenants, less the costs incurred by the lessor such as management, maintenance and the expected costs of void or empty periods while the property is being re-let. Then we shall show that

(7.1) $$q = d/S$$

where: q the deferment rate; d is the net rental as above, with the current time being the beginning of the rental year; and S is the estimated 'spot price', i.e., the freehold value of vacant possession estimated as the market value of an identical or similar property not encumbered by a leasehold.

Assume that the value S of a perpetual income producing asset is the sum of the present values of its individual cashflows. (This assumption is the bedrock of practically all financial theory.[2]) Assume that the discount factor is given by $1/(1+r+\pi+\lambda)$,

[1] PRA SS 3/17, July 2018.

[2] It underlies, for example, in the discount dividend model (e.g., Gordon, 1959) with property prices and rentals taking the place of stock prices and dividends. See, e.g., https://en.wikipedia.org/wiki/Dividend_discount_model.

where r is the risk free rate, π the risk premium demanded by investors for taking on risky cashflows, and λ the illiquidity premium demanded by investors for cashflows that cannot easily be exchanged at market. Assume also that cashflows grow at a constant rate g, so that future cashflows are $d(1+g)$, $d(1+g)^2$, etc. Define y as follows

(7.2) $$1/(1+y) = (1+g)/(1+r+\pi+\lambda).$$

Then from the definitions and assumptions above

(7.3) $$S = d[1/(1+y) + 1/(1+y)^2 + 1/(1+y)^3 \ldots]$$

and from the definition of the deferment price R_n as the present value of the future cashflows *minus* the present value of the first n cashflows, i.e. minus the "foregone income"

(7.4) $$R_n = d[1/(1+y)^{n+1} + 1/(1+y)^{n+2} + 1/(1+y)^{n+3} \ldots].$$

Divide every term in (7.4) by $(1+y)^n$, express in terms of S, and note that y meets the definition of q as the discount rate we apply to the 'spot' price S to give the deferment price R_n

(7.5) $$\begin{aligned} R_n &= d[1/(1+y) + 1/(1+y)^2 + 1/(1+y)^3 \ldots]/(1+y)^n \\ &= S/(1+y)^n \\ &= S/(1+q)^n. \end{aligned}$$

Define X as S/d. Then, substituting X into (7.3), and substituting q for y

(7.6) $$X = 1/(1+q) + 1/(1+q)^2 + 1/(1+q)^3 + \ldots$$

Multiply both sides by $(1+q)$

(7.7) $$\begin{aligned} X(1+q) &= 1 + 1/(1+q) + 1/(1+q)^2 + \ldots \\ &= 1 + X. \end{aligned}$$

Divide both sides by X and subtract 1, substitute S/d for X and rearrange:

(7.8) $$q = 1/X = d/S$$

which was to be proved.

Observe that (7.8) holds whatever is on the right hand side of (7.2), i.e., it holds whatever constant growth rate we choose, and whatever the interest rate, risk premium or illiquidity premium that might be required by investors.

Which is really strange, too. Tunaru (2019, p. 50) says "For risk-management calculation purposes then, it is very important to have an accurate measurement of q. Lack of data availability and long-term horizon makes this exercise extremely difficult, if not practically impossible." This claim seems plausible. Who could predict unobservables such as dividend growth, risk premia and so on? Yet we can calculate q

by a simple formula using variables that are either directly observed or easily calibrated!

To give an example, Sheffield City Council recently reported that the average house price in the city is £163,288 and the average private monthly house rental is £600.[3] The corresponding average annual house rental is £600 times 12 = £7,200. We then have to make a judgment about the relationship of net rental to gross and let's suppose that net is 75% of gross (but see also the next subsection for more on this breakdown of gross to net). The average net rental would then be 75% times £7,200 = £5,400, giving us a q = 5,400/163,288 = 3.3%.

One can then envisage equity release lenders a similar approach to drill down further to obtain q calibrations for neighbourhood, property class and even individual properties.

Calibrating the Net Rental Yield

We now provide a more precise calibration of the net rental yield.

We first decompose the net rental yield as follows:

(7.9) $$net\ rental\ yield = y - v - c - m$$

where y is the gross rental yield or the yield paid by the tenant, v is the void rate, c is management cost and m is the maintenance cost.

Define the maintenance cost m as the rate of expenditure (as a percentage of gross rental) required to keep the property in perfect condition (i.e. such as to achieve the best sales price for a property of that size in the same area), and define the tenant maintenance share (s) as the proportion of m that the tenant is likely to spend on maintenance. s will typically vary between 0 and 100%. For a short rental, s will be close to zero, and for a long let we would expect s to be close to 100% in the early years of tenancy, falling over time. In the final years it might fall to zero, even for a standard tenancy, given the lack of incentive to keep in full order for the landlord's benefit.[4] For an ERM, it would seem unlikely that the 'tenant' at end of life, perhaps in the situation where the NNEG had bitten, would have any incentive to keep the property in good condition, so we would expect s to fall towards zero in that case too.

We now use the following calibrations:

- Void: we use the standard '1 month in 12' rule of thumb, i.e., $v = (1/12) \times y$.[5]

[3] *Sheffield Housing Market Bulletin*, January-March 2019, Sheffield City Council.

[4] In fact, we can also imagine $s < 0$. So if $s = 0$ reflects no active effort to keep the property in condition, $s < 0$ reflects a determined effort by occupiers to strip the property (e.g., of light fittings, marble fireplaces, etc.) or trash the property! It happens.

[5] An alternative is to use empirical void data. Average void period for landlords in private rented sector in the United Kingdom (UK) have varied from 2.4 weeks to 2.9 weeks. (Source: https://www.statista.com/statistics/421102/rental-properties-void-periods-in-the-uk/. Accessed 19

- Management cost: following Tunaru (2019, p. 32), we assume management cost $c = 10\% \times y$.
- Maintenance cost: again following Tunaru (2019, p. 32), we assume maintenance costs $m = 15\% \times y$.

Thus, the maintenance cost borne by the landlord and to be subtracted from the gross rental yield is $m = 15\% \times 50\% \times y = 7.5\% \times y$.

We then have

(7.10) $net\ rental\ yield = y \times (11/12 - 0.1 - 0.075) = y \times 0.7417.$

Thus, the net is 74.17% of the gross.

Again following Tunaru (2019, p. 31), we take

(7.11) $y = 5.6\%.$

Therefore

(7.12) $q = net\ rental\ yield = 74.17\% \times 5.6\% = 4.15\% \ \approx 4.2\%.$

So we use $q = 4.2\%$ as our 'best estimate' of the deferment rate.[6]

Term Structure of Growth

In the derivation of equation (7.1) it was assumed that there is no term structure to the cost of equity $(r + P)$ or to growth (g). Assuming a term structure would make a difference to the deferment rate. Decreasing the discount rate for early periods (say the first 20 years) or increasing the growth rate for the same period would have the effect of increasing q, because it would make the value of lost income higher as a proportion of the deferment price.

However, a pronounced term structure to either risk premium or growth seems unlikely. A forward rental rate is the rate one would pay to lease the property with a forward starting date for a certain period. But why would the market imagine that the forward rate between years 39-40 is significantly different from that between years 40-41, for example? It is difficult to see what information would justify such a jump, and there must be a presumption that we shouldn't introduce additional complicating factors without good reason. In short, there is little point assuming any growth term structure.

March 2019.) If we take the mid-point, 2.65 weeks, then the average void rate by this measure would be 2.65/52 = 5.1%, as compared to the 'rule of thumb' void rate of 11/12 = 8.3%.

[6] If we use the empirical void rate of 5.1%, then net is 77.4%% of gross and we would obtain $q = 4.3\%$.

Term Structure of Deferment Rate

Observations of deferment rates using leasehold prices show a term structure (of which more in the next chapter), with the deferment rate for short leases higher than for long leases. This effect arises because the value of a short-term lease approaches that of a short-term rental, and the short-term rental reflects the gross, rather than the net rental yield. As the leasehold term increases, its value will approach that implied by the net rental yield, which can be shown as follows.

Let q_0 be the short term (i.e., annual) rental yield *gross* of annual costs c such as void rate, maintenance, share of management etc. Assume the following (crude) model:

(7.13) $$q_0 = (1-c)A = q_t(1-c/t)A$$

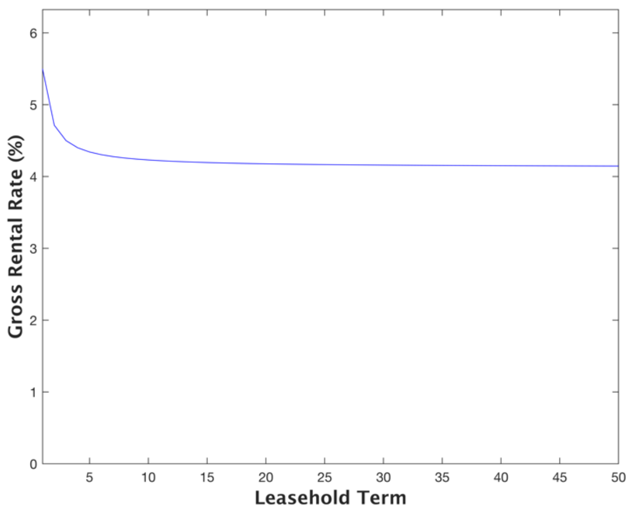
where $A = (y + y^2 + y^3 \ldots)$ and q_t is the gross effective rental yield over a let of t years. Then

(7.14) $$q_t = q_0(1-c)/(1-c/t)$$

Thus the gross rental converges to the net rental as the leasehold term increases.

Figure 7.1 gives an illustrative plot of the gross rental vs leasehold term.

Figure 7.1: Gross Rental vs Leasehold Term



Notes: based on illustrate values of initial gross rental = 5.5% and c (costs) = 25%.

For the chosen calibration (q_0 = 5.5% and c = 25%), the gross rental goes from initial value, 5.5% relatively quickly towards a long-run value of 4.1%.

The Deferment Rate and the Real Risk-Free Rate

In Consultation Paper CP 7/19, the PRA proposed "to take account of movements in real risk-free rates when setting the deferment rate,"' in order to prevent variability in the real risk-free rate causing variability in the forward rate:

> The PRA would increase (reduce) the deferment rate if the review shows there has been a material increase (reduction) in long-term real risk-free interest rates since the last update.[7]

In our derivation of equation (7.1) above, however, we showed that the deferment rate is equal to the current net rental yield, i.e. the nominal net rental payment divided by the current nominal house price. The real risk-free rate does not enter into it!

So what is going on here? Well it would appear that the PRA proposal implicitly depends on some assumed relationship or equivalence between the deferment rate and the real rate of interest, but no further details are given.

Digging deeper, it turns out that there *is* an equivalence, but only under conditions that do not hold. We start with the dividend discount equation:

(7.15) $q + g = r + \pi$

where q is the deferment rate, g the growth of nominal net rental, r the risk free rate and π the risk premium. Now assume first that the property investment is risk free, i.e. that there is no risk premium π. Then

(A1) $\pi = 0$

Substituting into (7.15) we obtain

(7.16) $q + g = r$

Second, assume that g, the imputed growth in net rental, is equal to the general inflation rate i:

(A2) $g = i$

Hence

(7.17) $q + i = r$.

[7] CP 7/19 S2.4

Finally, assume (as stated in CP 7/19 para 2.5 that the nominal rate r is the sum of the expected general inflation rate and the real rate rr, a relationship known as the Fisher Effect:

(A3) $$r = i + rr$$

and where

(A4) $$E[i] = i$$

i.e., we assume that expected and actual inflation are the same. Substituting and subtracting both sides of (A3):

(7.18) $$q + i = rr + i$$

Hence

(7.19) $$q = rr$$

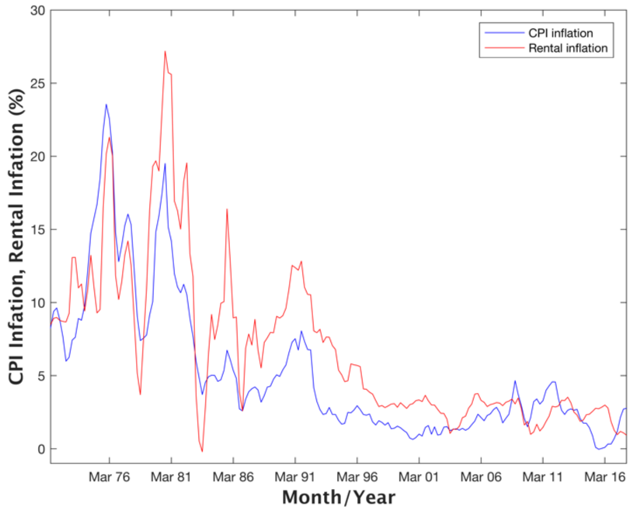
Given those four assumptions (A1-A4), it follows that the deferment rate and the real interest rate are identical.

We would question those assumptions, however. First, a property portfolio is clearly not risk free. An investment in a housing portfolio is commensurate to an investment in a *risky* index-linked bond, as opposed to an investment in an index-linked gilt, which is virtually risk free. This consideration suggests $\pi > 0$, so that the risky deferment rate will be higher than the real risk-free rate. Moreover π may vary through time.

Second, while rental inflation and general inflation are likely to be correlated, they are not the same. Nominal rentals will tend to go up line with inflation, indeed rental costs are part of the UK Consumer Price Index,[8] but as Figure 7.2 below shows, rental inflation and CPI are far from 100% correlated. There are long periods, such as 1991-2004, when rental inflation is consistently higher than CPI.

Figure 7.2: UK Consumer Price Inflation versus UK Rental Inflation, 1970-2017

[8] Historical data from ONS 1988 - 2004 can be found here.



Source: OECD

Third, assumption (A3) above depends on the unobservable quantity, the *expected future* rate of inflation. This variable, as the Bank of England must know, is difficult to predict with any certainty, and hence is difficult to monitor.[9] By contrast, the net rental yield, which we proved above to be mathematically identical to the deferment rate, is relatively simple to observe.

In short, if the PRA wants to monitor the deferment rate – which we think is a reasonable idea – then it should monitor developments in the net rental yield.[10] But monitoring an irrelevant variable like the real risk-free rate makes about as much sense as monitoring the frog population to see how the llamas are getting on.

[9] It is possible that the PRA intends to monitor market expected real interest using the return on index-linked gilts. However, returns on index-linked gilts have been negative in the 2010s, whereas we would not expect the deferment rate to be negative. The CP also notes (S2.4) that the deferment rate *will* always remain positive, in order to comply with Principle III of SS 3/17, but give no rationale of why this should be so.

[10] Note that the mathematical equivalence of the deferment rate and net rental yield also depends on the dividend discount model, but without additional assumptions like (A1)-(A4) above.