

Relevance of $Y_{P[\text{Dual rate}]}$ Model in the Valuation of Leasehold Interests in Contemporary Practice in England

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Abstract

The purpose of this paper is to: (i) empirically investigate the extent to which the use of the $Y_{P[\text{Dual rate}]}$ model for leasehold valuation actually reflects market agents' behaviour in England; and (ii) systematically examine its impact on leasehold valuations. The qualitative research methodology was adopted where interviews were conducted face-to-face and via phone with 105 purchasers of leasehold interests in Cressington Heath neighbourhood of Liverpool in 2012. QSR NVIVO 10 was used to code the data for analysis. It has been established that purchasers of leasehold interests do not make provision for an ASF in practice. Indeed, the method adopted is the direct opposite of what the model posits – purchasers use debt capital to procure property after which they commence amortising the loan periodically. There are also other approaches that can be used to make provision for a future expense and it is surprising the focus is on only the ASF method. Using the model to value, particularly, short leases leads to significant undervaluation, especially, when taxation is introduced. For very long leases, however, it does not actually matter whether it is $Y_{P[\text{Perpetuity}]}$, $Y_{P[\text{Single rate}]}$, $Y_{P[\text{Dual rate}]}$ or $Y_{P[\text{Dual rate adjusted for tax}]}$ that is used as the resultant valuation will be the same.

Keywords: Annual sinking fund, leasehold interests, investment method, valuation, England.

1. Introduction

Valuation can be required for various purposes, which are broadly categorised into statutory and non-statutory. These purposes include: (i) statutory – taxation/rating, compulsory purchase and compensation, aspects of commercial leases arising from landlord and tenant legislation, and fair rent for dwellings; and (ii) non-statutory – purchase or disposal of property, rental valuation, reinstatement cost for insurance, mortgage valuations and valuation for company accounts (Shapiro et al., 2013; Isaac and O' Leary, 2012).

There are five main traditional approaches to valuation (comparative, investment/income, profits, cost and residual approaches] and one main contemporary approach (hedonic pricing method). In one of the traditional valuation approaches (investment/income method), the $YP_{[Single\ rate]}$ and $YP_{[Dual\ rate]}$ models are often used to value freehold and leasehold interests respectively. As aptly noted by Shapiro et al. (2013), in comparison to a freehold interest, a leasehold interest is a wasting asset in that it will terminate sometime in the future. Thus, the adoption of the $YP_{[Dual\ Rate]}$ model for leasehold valuation is premised on the assumption that the leasehold purchaser will set aside a sum out of profit rent, which is then invested in an annual sinking fund (ASF) to recoup the leasehold interest purchase price at the end of the term. This, it is argued will enable him to purchase another property in the future and if the process continues, he will be in the same position as a freehold purchaser.

There is a debate as to whether or not it is appropriate to use the $YP_{[Dual\ Rate]}$ model in the valuation of leasehold interests. In most countries, the debate has been closed (Baum et al., 2011). In Australia, for example, the model is not used by the real estate industry (Whipple, 2006) and similarly, the US School of valuation does not use it (Fisher and Martin, 2004; Keating, 1998; North, 1984). In the UK, however, leaseholds are traditionally valued using the $YP_{[Dual\ Rate]}$ model (Chan and Harker, 2012, p.107) and indeed, the authors' interaction with some UK real estate industry practitioners in recent times confirms the observation of Chan and Harker. As Baum et al. (2011) and Mackmin (2008) aptly note, in the UK and the followers of UK practice, there has been and continues to be a battle between people wedded to the dual rate principle [see for example, Shapiro et al. (2013) and Johnson et al. (2000)] and those wedded to the single rate principle [see for example, Mackmin (2008) and Baum et al. (2006)].

Curiously, however, the arguments for or against the use of the model in England tend to be premised on personal opinions or theoretical analyses of the model's principles uncorroborated with any empirical evidence. Also, studies that have systematically investigated the impact of the model on leasehold values are notably non-existent. Thus, the aim of this paper is two-fold: (i) is to empirically examine the extent to which the use of the model actually reflects market conditions in practice; and (ii) to determine whether it actually matters if it is the $YP_{[Dual\ rate]}$ model or the $YP_{[Single\ rate]}$ model that is used to value leaseholds. To intimate what follows, the next section describes the research methodology that has been adopted for the study. This is followed by an overview of the debate on the

use of the model. In the penultimate section, empirical data is presented, analysed and discussed, whilst the last section deals with concluding remarks.

2. Research Methodology

The quantitative, qualitative and mix methodologies were examined as to their appropriateness and the qualitative methodology was ultimately chosen and within it, the case study philosophical approach was taken where Cressington Heath, a neighbourhood in Liverpool was used. Cressington Heath is to the south of Liverpool and is about 3.5 miles from the city centre. It is a new residential estate developed by Redrow and Bellway.

One Hundred and Five leasehold interest purchasers were purposively selected and interviewed in 2012. Semi-structured interviews were conducted with purchasers but based on the responses from some of them regarding a government scheme that they used to acquire their properties, an additional semi-structured interview was conducted with an official from Homes and Communities Agency for a better understanding of the scheme. The interviews were recorded and later transcribed and coded using QSR NVIVO 10 for analysis.

3. $Y_{P_{[Single\ rate]}}$ Model and $Y_{P_{[Dual\ rate]}}$ Model Debate

Support for the use of $Y_{P_{[Single\ rate]}}$ model to value leasehold interests traces back to 1853 when Cox observed that the most important factor to consider in leasehold valuation was the duration and, therefore, freehold will be more valuable. He illustrates with examples how the price paid for a leasehold interest is gradually returned to the purchaser over the duration of the lease using the present value of £1 concept, which shows that leaseholds were initially valued using single rate with no assumption regarding reinvestment; indeed, according to Cox, there was not debate about this. A slightly higher capitalisation rate was adopted in the valuation of leaseholds to reflect the fact that they are not the same as freeholds.

As Mackmin (2008) notes, the use of $Y_{P_{[Single\ rate]}}$ seemed well established in the C19th which rolled into the C20th but arguments in favour of the $Y_{P_{[Dual\ rate]}}$ model started emerging in the C20th as well. Albeit Webb (1909) argued in favour of using $Y_{P_{[Single\ rate]}}$, he equally introduced a new dimension by positing that when a leasehold interest is bought, it may be desirable to provide for the continuance of the income from the interest after the expiry of the lease term. Webb then observed that it will be necessary to form a sinking fund by putting aside a certain amount each year to accumulate with interest till the end of the term.

In support of the arguments against the use of $Y_{P_{[Single\ rate]}}$, Smith (1926a) opined that leaseholds are terminable interests and purchasers of such property need to recoup the purchase price when the lease expires; this can be done by setting aside a portion of the income from the property every year and creating with it a sinking fund which by compound interest will provide at the end of the term the initial purchase price. Reinforcing this view, Mackmin (1928) stated:

A Man purchases the lease of a house, having say twenty years to run, for the sum of £1,000. At the end of twenty years, he or his heirs will be without a house and perhaps without the capital to purchase one. He should therefore set aside each year and place at interest a sufficient sum of money which in twenty years will amount to the £1,000 so that capital is available for the purchase of a new house.

Hermes (1929) also noted: "Speaking generally, they realise (leasehold ground rents) about 2.5 years' purchase less than freehold ground rents on similar securities but this is, of course, after taking sinking fund into account". According to Parry (1930), it is quite possible to value leasehold interests accurately with $YP_{[Single\ rate]}$ but that the interest rate used in such a case is fictitious whereas in using the $YP_{[Dual\ rate]}$, it is the true interest rate that the buyer may expect his or her property to pay and for that matter the advantage is distinctly with the $YP_{[Dual\ rate]}$. Furthermore, Lawrence and May (1943) observed: "Although fair estimates of market value can be made on either a dual rate or single rate basis, it is suggested that the principle underlying dual rate figures is more in accordance with the facts of a terminable income and that the tables (dual rate) should be used in the valuation of all leasehold interests, particularly when the term of the lease is comparatively short"

As Mackmin (2008) has intimated, not only was the $YP_{[Dual\ rate]}$ model popularised as the method to be used in the valuation of leaseholds, but it was also being advocated as the necessary tool to be used for the calculation of premiums as captured in the words of Parry (1930): "As the investment of capital (premium) in this case is made by a lessee, it is obvious that his point of view should be taken in making the calculation rather than that of the freeholder...The calculation will therefore allow for 6 percent interest on capital and also provide for redemption of capital at (say) 3 per cent".

Once the valuation profession had bought into the $YP_{[Dual\ rate]}$ model, arguments about the need to use the $YP_{[Dual\ rate\ adjusted\ for\ tax]}$ model began to emerge. In computing leasehold interests, allowance has to be made for the fact that the investor is paying tax on capital and income (Wagstaff, 1926). According to Smith (1931), since income has to provide the yield on capital and ASF to recoup the capital, income tax becomes important, especially, when dealing with very short leases. The same argument has been made by other authors like Johnson et al. (2000), Harker et al. (1991) and Lawrence and May (1943).

The preceding arguments in favour of the use of $YP_{[Dual\ rate]}$ and $YP_{[Dual\ rate\ adjusted\ for\ tax]}$ models in valuing leasehold interests in the UK have been perpetuated up to the present as reflected in the observation of Shapiro et al. (2013, p.111):

However, when an investor buys a leasehold interest there is one factor that will not be met in a freehold interest, namely that one day the buyer's interest must cease and the buyer will have no further interest in the property; if the buyer obtains a further lease in the property at market rent to follow the expired lease, that will be a new lease with no market value.

The investor knows that one day the interest will cease to exist, at which point there is no capital asset. The investment will therefore decline from whatever was paid to nothing. Such an investment is known as a wasting asset since the asset wastes away naturally and inevitably.

The investor faced with such a situation must therefore take steps to deal with the loss of capital. Various methods are available, but for many years, the conventional approach has been to assume that part of the profit rent will be invested each year in an annual sinking fund.

Regarding the use of the $YP_{[\text{Dual rate adjusted for tax}]}$ model, the same authors have observed: “However, ASF is a cost, and ignoring the effects of income tax in respect of this leads to a misleading value...” (Shapiro et al., 2013, p.115).

Just as some people support the use of the $YP_{[\text{Dual rate}]}$ model in the valuation of leasehold interests, others have argued against its use. According to Merrett and Sykes (1973) the reinvestment assumption in the $YP_{[\text{Dual rate}]}$ model is a common remarkable persistent misconception. It appears the proponents of the dual rate principle have chosen to ignore the reinvestment fallacy (Robinson, 1989). The dual rate approach is outdated and hence an unsupportable method for assessing the market value of leasehold interests (Baum et al., 2006).

Other authors like Chan and Harker (2012), Baum et al. (2011), Mackmin (2008), Baum and Crosby (2008 and 1995), Gane (1995), Baum and Butler (1986), Trott (1986), Baum and Ming (1985), Bowcock (1983), Harker (1983), Enever (1981), Baum and Mackmin (1979), and Fraser (1977) have also argued against the use of the model. In the words of Mackmin (2008, p.92), for example:

Dual rate has to be declared defunct, it is not, and never has been, a tool capable of analysing leasehold sale prices objectively. A dual rate leasehold price analysis has to begin with the valuer accepting a “reinvestment principle” which leading experts on investment analysis consider to be a non-starter; it then requires the valuer to assume a sinking fund rate; and if a tax is to be incorporated in the analysis, an average rate needs to be used.....There are no longer any positive statements to be made in favour of the method.....neither the research by the RICS (Trott, 1980), nor the repeated strong criticism from academics and a few practitioners has been able to persuade the whole profession of its inherent weakness. Any reinvestment assumption is false and a reinvestment assumption at a low safe rate has no theoretical justification. The concept is as robust as a new car salesman requiring all purchasers to take out a profits policy with their purchase to replace the wasting aspects of the acquisition.

And Baum et al. (2011, p.127) had this to say: “...the single rate approach is the only objective method of analysis of leasehold sale prices, and hence the only objective leasehold valuation approach as it mirrors the behaviour of buyers”. Furthermore, Chan and Harker (2012, p.106) have opined:

It is concluded that if valuers accept that the only justification for a Dual Rate adjusted for tax valuation is the taxation difficulties that surround recoupment of capital, then the same valuation can be achieved using Single Rate valuation of the net of tax income. From that conclusion, we suggest that valuers of the “UK School” might consider that not only should Dual Rate valuation be regarded as defunct, but also that the more appropriate approach might be to move to a net of taxation approach. Such an approach would unite the “UK School” with the “US School” and would be more appropriate method in a globalised valuation environment.

To encapsulate the above discourse, there is an ambivalent literature on the use of the YP_[Dual rate] model. At one end of the spectrum are the apologists of the dual rate principle who have stuck religiously to it in order to justify its use by UK valuers. At the other of the spectrum, are people who have criticised the model by arguing that its continuous use is indefensible and should be consigned to the dustbin. However, a careful examination of the debate bespeaks that the arguments, either for or against the use of the model in the UK are theoretical in nature, which are not premised on empirical research and there is therefore the need for this present research to determine the extent to which in practice leasehold purchasers use the ASF method to recoup capital. Indeed, a recent observation of Chan and Harker (2012, p.113) underscores the need for this empirical research:

To use the cricket analogy used by Mackmin (2008), the Dual Rate theory argument looks more likely to be a series of one day matches rather than a single day match. But the umpire here needs to research into the practice of the market bidder rather than the opinion of the cricket coach as to how a particular ball should be bowled.

The other issue, which has not been interrogated in the literature, relates to the actual effect that the use of the YP_[Dual rate] model has on leasehold valuations.

4. Data Presentation, Analyses and Discussion

4.1 Types of Leasehold Ownership

The types of leasehold ownership/purchases encountered in the study are two: (i) sole ownership constituting 30 of respondents [28.6%] where the title was in the name of one person; and (ii) joint ownership [75 respondents or 71.4%] where the title was in the names of two persons. Regarding sole ownership, this related to single males or females and married males or females. In other words, with the sole ownership, the title was in the name of only an unmarried male, an unmarried female, a married male or a married female. In terms of joint ownership, it was established that the title was in joint names of married couples (male and female joint names). It is important to note that whether it is sole or joint ownership, it was considered as one respondent in each case. Table 1 shows the breakdown of respondents in the various categories and sub-categories.

Table 1: Categories of Respondents Regarding Ownership

Sole Ownership [30]			
	No.	% [of 30]	% [of 105]
Unmarried Males	12	40.0	11.4
Unmarried Females	5	16.7	4.8
Married Males	10	33.3	9.5
Married Females	3	10.0	2.9

Total	30	100	28.6
Joint Ownership			
	No.		% [of 105]
Married couples [male and female]	75		71.4

Source: Field Survey, 2012

4.2 Types of Mortgage Market

All the survey participants purchased their properties by taking mortgages from banks and the mortgage period was ranged from 25-30 years. It was discovered that each respondent participated in one of two types of mortgage markets. The first type is the open market where any potential mortgagor had to shop around in order to choose an appropriate mortgagee. The LTV ratio ranged from 70-90% implying that the equity contribution or deposit of mortgagors ranged from 10-30%. In this market, 85 [81%] of the respondents participated.

In the second type of mortgage market, the interview with an official from the Homes and Communities Agency (HCA) established that the government through HCA and participating UK house-builders like Redrow and Bellway offer financial help to first time-buyers to purchase new homes. The scheme is called HomeBuy Direct and its primary objective is to make new homes affordable to potential purchasers who are priced out of the open housing market; it is thus, UK's government low-cost new home ownership initiative. For any purchaser to qualify for the scheme: (i) his annual income should be below £60,000; and (ii) he should not already own or have owned a property.

Under the Scheme, HCA and a house-builder provide equal equity loans up to 30% of the full purchase price which is paid to the mortgagee. The mortgagor then deposits 5% of the remaining amount [that is, full purchase price minus the equity contributions of HCA and the house-builder]. In this way, the equity contribution of the mortgagor and the mortgage amount are significantly reduced thereby making the transaction relatively affordable. The equity loans from HCA and the house-builder are interest free for the first five years, after which an interest of 1.75%, rising annually by the Retail Price Index plus 1 is expected to be paid.

The purchaser becomes the legal owner with 100% title to the property and can sell it at any time in the open market without restriction. When the property is sold, HCA and the house-builder are entitled to a share of the proceeds equivalent to their percentage equity contributions. After one year of ownership, the purchaser has the option to make part payments ["staircasing"] of the percentage equity contributions of HCA and the house-builder at the prevailing market value until he has 100% equity in the property – indeed, that is what is expected under the scheme. However, if during the mortgage period, the mortgagor is unable to acquire 100% equity, any outstanding loan is fully repaid at the end of the mortgage period.

The entitlements of HCA and the house-builder to a share of future sale proceeds are secured via second and third charges respectively on the title, the first charge being the mortgagee's entitlement. The title is therefore encumbered by the stakes that these three parties have in the property. Twenty [19%] of the respondents acquired their properties via this scheme. However, with effect from April 2013, house-builders no more contribute equity under the scheme and so the equity loan is provided by only the government.

Ground rent for the leases purchased ranged from £200 – £750 per annum and the term of all the leases was 999 years with a commencement date of 1st January 2006. The prices at which the properties were bought ranged from £124,995 to £252,995 depending on the year a property was bought, type of property and number of bedrooms.

4.3 Use of ASF Method to Recoup Initial Capital Outlay

It was first of all important to establish the extent to which the respondents were aware of the ASF method as one of the approaches that can be used to make provision for future expenditures. Only two [1.9%] of the respondents were aware of it and their knowledge of it was based on the fact that they had done real estate management related programmes in the University. The remaining 103 respondents [98.1%] had never heard of it.

When the respondents were asked to explain the measures they had taken to ensure that when their leases terminate in the future, they would be able to continue to own property, the responses were as follows. The responses of 10 [9.5%] of the purchasers was to the effect that they did not need to be concerned about it now since the future will take care of itself. In the words of one respondent A: “.....I do not need to be worried about this now. As the adage goes “I will cross that bridge when I come to it”.

Another respondent [B] noted:

“.....why should I be concerned about this type of future? Let us even assume that the lease was for a shorter period, the same process I have used to acquire this property will be used in the future and that is to say, I will take a mortgage”.

Based on the response of respondent B above, a part from the fact that he was not concerned about the future, mention is also made of an approach that will be used in the future, which is borrowing from lending institutions (use of debt capital). Like respondents B, three other respondents in the above category additionally intimated that they will take mortgages in the future. Indeed, the use of debt capital in the future as an approach as observed by the above four respondents was echoed in the rest of the survey participants' (outside the above category) responses on the issue. For example, one of them noted:

Is this a theoretical question or what? I am sure you already know the answer but you are still asking me. Practically, it is common knowledge that in this country, virtually everybody acquires property via a mortgage. And it is the same route I will take if at any point in the future I have to acquire another property.

The statement of respondent B above to the effect that if the house he bought was a shorter lease, the same approach will be adopted in the future was a common theme in the

responses of the other survey participants. Thus, their responses regarding how they will acquire another property in the future were unrelated to the duration of the lease purchased. Table 2 summarises the above issues and corresponding percentage responses to those issues.

Table 2: Survey Participants' Responses to Relevant Issues

Awareness of ASF Method	No.	%
Aware of ASF Method	2	1.9
Unaware of ASF Method	103	98.1
Total [N]	105	100
Method Adopted to Make Provision for Future Expense		
Not Concerned about the Future	6	5.7
Not Concerned about the Future and Use of Debt Capital in the Future	4	3.8
Use of Debt Capital in the Future	95	90.5
Use of ASF Method	0	0
Total [N]	105	100

Source: Field Survey, 2012

4.3.1 Discussion

The results from the survey show that as high as 98.1% of the respondents were unaware of the ASF method as one of the techniques that can be used to make provision for future expenditures let alone to use it. It is therefore not astounding that no respondent has used it. The approach leasehold purchasers will rather use is debt capital; 94.3% of the respondents from Table 2 will adopt this approach. Indeed, it is reasonable to intimate that the rest of respondents who reported that they were not concerned about the future now are likely to use such approach in the future since that is the common practice. The use of debt capital as an approach is the direct opposite of what the ASF principle posits.

Using the $YP_{[Dual\ rate]}$ model implicitly assumes that every leaseholder purchaser automatically uses the ASF method but the empirical evidence does not support it. The assumption is unconvincing and unsustainable as it does not reflect the behaviour of real estate market agents; that is not what market bidders do in practice. It is astounding that the concentration is on only ASF when, realistically, there are other methods that can be adopted, the common method being the use of debt capital.

A second approach that can be adopted is the concept of PV£1, which is the sum of money when invested today at a given rate of compound interest will accumulate to £1 after a given number of years. For example, provision can be made for an amount of £100,000 that is to be spent in 10 years time by discounting £100,000 at an appropriate interest rate and then investing that discounted lump sum to accumulate to £100,000 in 10 years time. The calculation will be as follows:

Future Liability	100,000
PV£1 in 10 years @ say 6%	<u>0.5584</u>
Discounted Value	<u>55,840</u>

Thus, the amount to be invested today at 6% to accumulate to £100,000 in 10 years time is £55,840. The impact of inflation can be incorporated where predicted inflation rate is determined so that the PV£1 concept makes allowance for the replacement of capital in real terms.

Thirdly, the leasehold purchaser could hold a portfolio of investment vehicles. Therefore, such a purchaser may make provision for future capital expenditures relating to the leasehold purchase by relying on returns from the other investment vehicles that he owns.

It has to also be noted that the apologists of the ASF theory have failed to recognise an important dimension of it. The theory as advocated by its supporters is for the replacement of the original capital but such a replacement deals with historic values. The implicit assumption here is that values will remain static by the end of the lease, irrespective of the term. This is forcefully captured in the observation of Mackmin, a supporter of the theory, which has already been quoted above but it is reproduced here for ease of reference. He observes:

A Man purchases the lease of a house, having say twenty years to run, for the sum of £1,000. At the end of twenty years, he or his heirs will be without a house and perhaps without the capital to purchase one. He should therefore set aside each year and place at interest a sufficient sum of money which in twenty years will amount to the £1,000 so that capital is available for the purchase of a new house.

Indeed, that is the basis on which the ASF£1 will produce table is compiled in investment and valuation textbooks. If value will remain static or it is assumed that it will fall by the end of the lease's term, then the ASF can serve its purpose. However, it a truism that there can be inflation, which can erode the value of capital in real terms but the theory, does not factor this. Even though value can remain static or fall in the future, it is common knowledge that what normally happens in reality is that the property value grows over time. Thus, if a house is bought today at £1,000 and there is inflation, its value or a similar house's value in 20 years time cannot be the same as £1,000; it will be higher, say £5,000. In the light of this, if provision is made by way of ASF to recoup £1,000, it will not serve its purpose and therefore the ASF theory completely breaks down.

But what is the impact of using the $YP_{[Dual\ rate]}$ on leasehold valuations? Table 3 is used to answer this question. The Table contains YP factors computed using appropriate formulae

at selected years assuming: (i) a remunerative rate (return on capital) of 7%; (ii) an accumulative rate (return of capital or ASF rate) of 2.5%; and (iii) a tax rate of 40%.

Table 3: YP Factors at Selected Years

Term (Yrs)	Appropriate YP Factors			
	YP _[Perpetuity]	YP _[Single rate]	YP _[Dual rate]	YP _[Dual rate adjusted for tax]
10	-	7.02	6.28	4.57
25	-	11.65	10.07	8.42
50	-	13.80	12.46	11.48
75	-	14.20	13.40	12.86
100	-	14.27	13.83	13.54
125	-	14.28	14.05	13.89
150	-	14.29	14.16	14.07
175	-	14.29	14.22	14.17
200	-	14.29	14.25	14.22
225	-	14.29	14.27	14.25
250	-	14.29	14.28	14.27
275	-	14.29	14.28	14.28
300	-	14.29	14.28	14.28
325	-	14.29	14.28	14.28
350	-	14.29	14.28	14.28
375	-	14.29	14.29	14.28
400	-	14.29	14.29	14.29
425	-	14.29	14.29	14.29
450	-	14.29	14.29	14.29
475	-	14.29	14.29	14.29
500	-	14.29	14.29	14.29
Perpetuity	14.29	-	-	-

Source: Computed by Authors Using Appropriate YP Formulae

The YP factors in Table 3 show that with short leases, there can be significant differences in the value depending on which model is used. For example, where the term of a lease is 10 years, the factors for $YP_{[\text{Single rate}]}$, $YP_{[\text{Dual rate}]}$ and $YP_{[\text{Dual rate adjusted for tax}]}$ factors are 7.02, 6.28 and 4.57 respectively. This implies that there will be a decrease in value by 10.54% if $YP_{[\text{Dual rate}]}$ is used instead of $YP_{[\text{Single rate}]}$. Where $YP_{[\text{Dual rate adjusted for tax}]}$ is used instead of $YP_{[\text{Single rate}]}$, the percentage decrease in value becomes 34.90% which is very significant.

However, as the term of the lease increases, the differences in values begin to reduce. Thus, for example, if the term is 100 years, the reduction in value is 3.08% using $YP_{[\text{Dual rate}]}$ instead of $YP_{[\text{Single rate}]}$; the percentage decrease is 5.12% if $YP_{[\text{Dual rate adjusted for tax}]}$ is used instead of $YP_{[\text{Single rate}]}$. From year 250 towards perpetuity, the YP factors are almost the same with infinitesimal differences and indeed, from year 400 towards perpetuity, the YP factors are actually the same. Thus, for very long leases, it does not actually matter whether it is $YP_{[\text{Perpetuity}]}$, $YP_{[\text{Single rate}]}$, $YP_{[\text{Dual rate}]}$ or $YP_{[\text{Dual rate adjusted for tax}]}$ that is used to value leasehold interests – the value will be the same. Regarding short leases, when the $YP_{[\text{Dual rate}]}$ model is used, it leads to significant undervaluation which is more pronounced when the $YP_{[\text{Dual rate adjusted for tax}]}$ model is adopted. Ironically, it is these short leases that some of the apologists of the $YP_{[\text{Dual rate}]}$ argue that it should be used to value them.

5. Conclusion

The extent to which the use of $YP_{[\text{Dual rate}]}$ in valuing leaseholds reflects market conditions in practice has been empirically investigated. It has been established that bidders of leasehold interests, in practice, do not use the ASF theory to make provision for future capital expenditures; what they use (debt capital) is the direct opposite of what the ASF principle posits. There are other techniques that can be used but the focus in the literature is on only the ASF method, which is surprising. Also, the ASF theory totally ignores the impact of inflation even though it is a reality.

The impact of using $YP_{[\text{Dual rate}]}$ on leasehold interests' values has also been systematically examined. The analysis has shown that for very long leaseholds, it does not actually matter which model is used as the resultant valuation will be the same. However, it has a significant impact on the valuation of short leases as it leads to undervaluation, particularly where taxation is introduced.

It is concluded that the $YP_{[\text{Dual rate}]}$ model should be declared defunct as argued theoretically by many critics of the model in the literature. There is no doubt that a leasehold interest is a wasting asset and, therefore, less attractive or secure in comparison to a freehold interest. However, being a wasting asset is dealt with like any other feature that contributes to insecurity or less attractiveness by adopting higher capitalisation rate in the valuation of leasehold interests to compensate for higher risks. Due to the fact that market bidders do not actually use the ASF method in practice and also the fact that using $YP_{[\text{Dual rate}]}$ model leads to undervaluation of short leases, its use should be discontinued.

However, because the debate has been raging on for so many years it will, admittedly, be a herculean task to convince the ardent apologists of the model who are religiously stuck to

it and have defied any theoretical logical and plausible explanation against its use to jettison it. This herculean task is underscored by Mackmin (2008, p.93) who has observed that in order to discourage its use, it will require: (i) academics to cease all teaching of dual rate methods on accredited courses; (ii) practitioners to reject leasehold valuations prepared on dual rate basis; (iii) publishers to remove dual rate and dual rate taxation tables from all future editions of valuation tables; and (iv) software suppliers to delete the dual rate option from their valuation software.

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