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Investing to Manage Liability-Related Risk

An Exploration of Commercial Property's Liability Matching Qualities

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Abstract

Financial markets have experienced dramatic changes in recent years. Sustained falls in (and the extreme volatility of) global equity markets have called into question the appropriateness of high equity exposure for pension funds and insurance companies. Fixed income yields have fallen dramatically over the last decade, with enormous consequences for the valuation of liabilities and the level of prospective returns.

These market conditions, together with changes to pension and insurance company accounting (including FRS 17), taxation and changing demographics, have served to highlight the significant investment risks inherent in many institutions. As a consequence, investors are re-examining the appropriate investment policy with far greater emphasis being placed on liabilities. Much of this debate has focused simplistically on equities and fixed income investments. But what about asset classes that do not fall into these neat categories? In particular, could commercial property, the typical weighting to which among pension funds has fallen over time to around 5%, play an increased role in future?

This paper explores the extent to which UK commercial property could play a part in a multi-asset portfolio to match UK pension scheme liabilities. Such a topic appears worthy of investigation for a number of reasons. Commercial property exhibits both income and equity characteristics: rents contracted under leases are rather like the coupons from a corporate bond, and rental values can rise either through inflationary pressures or real economic growth, providing equity-type qualities.

After reviewing the relevant literature and some of the reasons why property may have fallen out of favour, we consider briefly both the positive and negative attributes of commercial property, and how the asset class differs from equity and bond markets.

We then seek to explore property's liability-matching qualities in two ways. First, we build a simple model to examine the relationship between the principal assets classes (equities, bonds and property) and liabilities, exploring how the two sides of the balance sheet interact. Second, we segment property's cash flows into the equity and bond elements to consider whether it may be possible to better exploit the different attributes of property.

Historically, most of the total return delivered to property investors has been through income rather than capital growth. We show that in current financial markets, the bond-like characteristics have become more dominant.

We find that property's blend of equity and fixed income characteristics means the asset class potentially offers valuable liability-matching qualities. A more refined approach to that traditionally adopted, in which the equity and bond components of property's value are considered explicitly, is worthy of further investigation for funds seeking to match specific liabilities.

1. Introduction

Financial markets have experienced dramatic changes in recent years. UK gilt and other fixed income yields have fallen dramatically in the last decade, with enormous consequences on the valuation of liabilities and the level of prospective returns. Sustained falls in global share markets during the three years to the end of 2002 have called into question the appropriateness of high exposure to equity markets for both pension and insurance companies.

Financial market developments have been complicated by changes to pension and insurance company accounting. In the UK for example, the introduction of FRS 17, which will be fully implemented in 2005, requires pension fund liabilities to be valued using AA bond yields as the discount rate. The resulting surplus or deficit will appear in company balance sheets and will be subject to the volatility of financial markets. Much of the discretion previously enjoyed by companies has been removed.

Further pressure on ability to match liabilities is coming from changing demographics. Fertility rates have fallen significantly in many countries, whilst life expectancy has risen.

In this fast-changing environment, investors are re-examining the appropriate investment policy to match future liabilities. Some commentators question the appropriateness of having any equity exposure within defined-benefit pension schemes (see, for example, UBS, 2003). In early 2003, the Boots pension scheme switched a predominantly equity portfolio entirely into fixed income assets. Other investors - both life and pension funds - have actively reduced equity exposure albeit in less dramatic fashion.

Much of this debate has focused simplistically on equities and fixed income investments. But what about other asset classes that do not fall into these neat categories? This paper explores the extent to which UK commercial property can play a part in a multi-asset portfolio to match liabilities.

Such a topic appears worthy of investigation for a number of reasons. Commercial property exhibits both income and equity characteristics: rents contracted under leases are rather like the coupons from a corporate bond, and rental values can rise either through inflationary pressures or real economic growth. Historically, most of the total return delivered to property investors has been through income rather than capital growth, further demonstrating its bond-type qualities.

The next section summarises the types of pension fund liabilities. Section three then reviews previous work that has examined this area, drawing mainly on literature in the UK and the US. Section four considers the principles that have driven asset allocation and, in particular, looks at the changing exposure to property investment by UK pension funds. This is followed by a brief overview of both the positive and negative attributes of commercial property, and how the asset class differs from equity and bond markets.

We then seek to explore the special attributes of property in more detail. Section six examines the effect of combining property in multi-asset portfolios under both a Minimum Funding Requirement regime and the new set of pension fund accounting standards under FRS17. Section seven then seeks to segment and 'un-pack' the relative importance of the bond and equity portion of property's cash flows. The variation across different types of property is explored. Section eight then presents a more refined approach to examining property investment from the viewpoint of liability-matching.

The focus of the paper is on UK commercial property in the context of UK pension funds. However, clearly there are wider applications of this work, for both non-UK property and for insurance funds, which go beyond the scope of this study.

2. Types of pension fund liabilities

Pension fund liabilities typically take the form of pensions or lump sum payments. Pensions lead to streams of payments, which for a given group of recipients will tend to gradually decline as mortality takes effect. Both pensions and lump sums can be fixed in nominal terms, subject to fixed annual increases, e.g. 3% pa, subject to increases in line with the Retail Prices Index (RPI), or subject to some more complicated or partial inflation linkage, such as Limited Price Indexation (LPI). LPI, introduced by the Pensions Act 1995, requires those pensions to which it applies to be increased each year by the lesser of RPI over a recent 12 month period and 5%. Pensions may not be reduced at any point even if the RPI declines.

Liabilities are commonly split into those for current pensioners, deferred pensioners, i.e. members who have left employment but are not yet in receipt of a pension, and benefits in respect of members who are still in employment and accruing further benefits.

Benefits payments for current pensioners are relatively easy to project. The main assumptions required are the average mortality of the group, i.e. the average expected proportion of benefits that will cease at each age on the death of members, and assumptions regarding the dependants' benefits that will come into payment on the death of members. While the assumptions regarding mortality are easy to apply in order to produce a projection of payments stretching into the future, it has been well publicised recently that the rate of improvement in mortality is not easy to forecast accurately. It should also be noted that the actual experience of any group will differ from the expected experience purely due to the random nature of actual deaths, and that this variation will be more pronounced in smaller groups.

The expected cashflows for deferred pensioners will typically consist of lump sum payments at a future (assumed) retirement date followed by a stream of pension payments. Prior to coming into payment benefits may be subject to fixed increases, increases in line with the RPI, or commonly, increases in line with RPI over the period between leaving service and retirement subject to an overall limit of 5% pa. More detailed cashflows would need to make allowance for the impact of deaths before retirement, the proportion of benefits taken as cash sums and possibly transfers out.

Liabilities in respect of members in service are typically split into those related to service already completed - the accrued liabilities, and those in respect of potential future service. In most circumstances, when considering the matching of such liabilities, it is the accrued liabilities that are being considered. This is both because the future accrual of benefits could generally be terminated and because a common funding target is for all the accrued liabilities of a scheme to be 100% funded. In different circumstances the accrued liabilities may be calculated as those benefits that members would be entitled to if pensionable service were terminated or, alternatively, may allow for the impact of future salary increases where these impact on the level of benefits.

The expected cashflows from benefits in respect of members in service are similar to those for deferred pensioners in that they typically consist of possible lump sum payments at a future assumed retirement date followed by a stream of pension payments. Prior to coming into payment benefits may be subject to a variety of fixed or RPI-linked increases, or future salary increases and once in payment a further range of increases may apply.

There is even greater uncertainty if the level of future cashflows from members in service than for deferred pensioners, as assumptions need to be made regarding how many and when members might leave service with deferred benefits, retire (normal, early or ill-health) or die in service, with different benefit levels in each of these circumstances.

It can be seen that the projected aggregate benefit payments for any scheme are likely to be a series of payments, generally stretching out for 50 years or more, with a wide variety of different forms of increases, fixed or inflation-linked both before and after coming into payment. Further, the projected

payments are based on a series of assumptions and are therefore only an approximation to the cashflows that will ultimately be paid out.

A scheme that wished to match or partially match its liabilities has a range of options to choose from. The most comprehensive matching would be achieved by purchasing immediate and deferred annuity contracts from insurance companies. For pensions in payment this may be an approach that would be considered, as it would eliminate not only the investment risk but also the mortality risk. However, there are limitations; for example, it would not be possible to cover the impact of individual salary increases.

Typically, a scheme seeking to closely match its liabilities would value its liabilities using the yields on gilts or other high quality bonds of appropriate duration and inflation characteristics. The complicated nature of pension liabilities, particularly inflation linkage is likely to mean that valuations may have to have regard to the pricing of derivatives as it is unlikely that many schemes' cashflows could be completely matched by a portfolio of the available bonds.

A scheme that decides to match some or all of its liabilities with bond-lie investments will need to decide what proportion of its liabilities it wishes to match and, if less than 100%, which liabilities to match. For example, it may decide to match only liabilities for current pensions or perhaps 75% of all liabilities due within the next 30 years, reflecting the limited supply of bonds beyond this term. Other decisions will be required on the use of derivatives, for example to help in matching inflation increases and the use of corporate bonds of different credit ratings. The use of corporate bonds gives a wider range of maturities and the prospect of higher yields, but with the risk of loss of return through defaults.

The degree and accuracy of matching should be commensurate with the extra risk reduction provided, the costs involved and the level of uncertainty in the liability payments. For example, precise matching of the expected cashflows for a group of members in service is unlikely to reduce risk much beyond approximate inflation and duration matching, in view of the uncertainty in the cashflows. Similarly, if a scheme retains 25% or more in equities, the difference in overall risk between approximate and more accurate cashflow matching of the remaining assets may not be significant.

There has been a perception, particularly in the property industry, that the treatment of property under the MFR, has been a factor in the reduced pension fund weightings to property over the second half of the 1990s. There is little or no direct evidence for this and it has clearly not affected allocations to overseas equities. At the levels of exposure to property that funds typically held in the 1980s and early 1990s it is unlikely that a reduction in property allocation would have materially reduced the volatility in the year to year MFR funding position. If we couple this with the fact that only a small minority of funds would have used the MFR position as their prime funding target, we can conclude that the structure of the MFR was at most a minor factor in changes to pension funds' property allocations. The replacement regime for the MFR is not expected to contain any biases either in favour of or against property and so any lingering concerns over the negative influence of the MFR should be removed.

Schemes looking beyond bonds to match or partially match their liabilities will primarily be doing so because they wish to increase the return potential from their assets. Attractive features of assets, aside from return potential greater than gilts and other high quality bonds, would be:

- The ability to generate cashflows with appropriate inflation linkage and duration characteristics for the scheme
- Capital values which show a high level of correlation with the discounted value of the benefits, using appropriate high quality bonds yields.

The question we will address is how well property is able to contribute to a scheme's liability-matching strategy.

3. Literature Review

3.1 Introduction

The role of real estate in investment portfolios has previously been explored from a number of perspectives. For example, the amount of property held in a multi-asset portfolio has been extensively examined (see Coleman *et al*, 1994, MacGregor & Nanthakuran, 1992, Hartzell *et al* 1986, Eichholtz *et al* 1995, Lee & Byrne 1998, Mueller & Laposa 1995, Pagliari *et al* 1995, and Stevenson 2001). Most studies focus on the asset side of an investment portfolio and show that property makes a significant contribution in efficient portfolios, although there has been concern about the valuation-based nature of returns (the so-called 'smoothing' issues, which are discussed below) used in a number of the studies. Property has also been looked at from the perspective of its inflation hedging ability; this is also considered briefly below. However, the main focus of this paper is to examine the role of property within an asset-liability framework. It contrasts with other property studies by looking at both assets and liabilities. Accordingly, the application of duration to property is reviewed.

3.2 Duration

Duration has been used extensively as means of managing the risk of bond portfolios. Hicks (1938) and McCaulay (1938) developed the concept of duration in relation to interest rates and bond prices. Reddington (1952) introduced the notion of duration within an immunisation setting, where assets and liabilities are matched with a minimum of risk in any potential shortfall. The basic idea was that the mean duration of assets should be equal to the mean duration of the liabilities in order to minimise the shortfall between the two. The assets and liabilities will then have the same interest rate sensitivity - duration matching is, therefore, a risk minimising strategy.

Although the concept of duration has been extensively applied in the study of bonds (Bierwig et al 1983, 1989, 1990), it can also be applied to other assets categories such as equities and property.

With potential income growth assets such as property and equities, duration can be determined via a dividend discount model or an equivalent yield model. The relatively limited empirical work applying duration to property is reviewed below.

Hartzell et al (1988) report that property investors have some control over duration through the lease contracting process; the longer the lease contract the longer the duration.

Early work on UK duration was undertaken by Ward (1988), where it was shown that when rental growth was positive, the duration of property was longer than an equivalent bond (equivalent being the length of the lease equal to the maturity of the bond). Using simulations, Hamelink et al (2002) provide estimates of property duration, concluding that property has bond-like characteristics. Brown (2000) draws attention to the rate of inflation pass through (the sensitivity of rental growth to interest rate changes, which is a key driver of duration).

In future, there are a number of factors that are likely to cause the duration to fall. The average lease length in the UK is shortening (BPF/IPD, 2003). The average length of lease granted in 1993 was 18 years (on a rent weighted basis); by 2002/3, the average length of new leases had fallen to less than 14 years (and to under 11 years assuming tenancies have an equal weighting). The rise in short-term leases and licences of up to 4 years is particularly marked: in 2002/3, 17.4% of tenancies weighted by rent expire within 4 years compared to 8.1% in 1999. On an equally weighted basis, over 30% of new tenancies are expire within 4 years highlighting the fact that smaller units can often be let on shorter terms.

Crosby et al (2004) have estimated that for lease lengths with 10 years or less yields may rise by 2%, thereby raising the discount rate with an attendant fall in duration. Furthermore, should rent review periods shorten this will also lead to a fall in duration.

Currently, a topic receiving some discussion is that the UK Government is contemplating legislation against upward only rent reviews. This will have the effect of reducing rental growth and is also likely to increase the property risk premium, thereby raising the discount rate. The consequence of all these effects will combine to create lower duration for property.

Nonetheless, given the substantial bond-like contribution to property's total return and the fact that different properties will exhibit different durations, this area merits further investigation in the context of liability matching.

3.3 Inflation hedging

One of the attractions of property as an investment asset is that, as a real asset, it is believed to be an effective hedge against inflation. A number of studies have addressed this question for different countries (see, for example, Ganesan & Chiang 1998, Hartzell et al 1987, Hoesli et al 1994, Newell 1995, 1996, Ruben et al 1989). In looking at the inflation hedging properties, total inflation has been used as has inflation decomposed into expected and unexpected components.

Expected inflation, EI, represents investor's anticipation of inflation over a future period. Unexpected inflation, UI, is the difference between actual inflation, RPI, and what was expected in the previous period. That is:

$$UI_t = RPI_t - EI_{t-1}$$

Expected inflation is priced in the financial markets as an inflation premium.

There are many plausible approaches that can be employed in decomposing inflation. For example univariate Box-Jenkins (ARIMA-type) models have been employed to capture expected inflation with the residual representing the unexpected component. Another approach is to decompose inflation into 'permanent' and temporary components using the technique suggested by Holdrick and Prescott. This approach allows for a stochastic trend in the permanent component of inflation. On obtaining the two components a regression equation of total rates of return on expected inflation and unexpected inflation is employed. Clearly the results will be highly dependent on the method chosen to decompose returns.

Another distinction that needs to be made is that between short-term and long-term hedging capability. Long term hedging has been looked at from the perspective of co-integration analysis (Matysiak et al 1996). Broadly, cointegration is a sufficient condition for two or more series for the existence of a common attractor for the set of series. In other words, the series will not persistently drift apart over long intervals. In the current context this means that a finding of cointegration would imply that property returns are an effective hedge in the long run. The presence of long term (cointegrated) relationships can be formally estimated and tested (Johansen 1988, Johansen & Juselius 1990).

The earliest work in the UK was undertaken by Limmack and Ward (1988), where it was found that all property sectors hedged against expected inflation but not against unexpected inflation. However, Matysiak et al (1996) found that in the long term property returns compensated for both expected and unexpected inflation. Hoesli et al (1997) again found there is little evidence that property provides complete protection against expected and unexpected inflation on a short term (period-by-period) basis. Sing and Low (2000) provide a summary of recent studies, the broad consensus of the results being that, certainly in the short term, property provides a hedge against expected inflation but not against unexpected inflation. Over the short-term the results are mixed, depending on the time frame chosen. However, over the long term there appears to be some evidence that property does provide a hedge against both expected and unexpected inflation.

3.4 Smoothing

Property analysts report that returns are 'smoothed', largely due to the nature of the valuation process. The implication is that reported real estate returns are less volatile than would be the case for transactions-based returns. This has considerable implications for any analyses that are undertaken using the raw data. It is possible to employ so-called 'un-smoothing' techniques to obtain returns profiles that are perceived to reflect an underlying transactions market. Empirical work in this regard is fairly extensive (see for example Booth and Marcato (2003) and the references cited therein).

There is a large body of evidence demonstrating the existence of valuation smoothing for various property markets (see, for example, Chau et al 2001, Clayton et al 2001 and Fisher and Geltner 2000, Geltner 2001, 2003). 'Un-smoothing' models have been proposed in several papers (Blundell and Ward, 1987, Geltner, 1991, 1993 and Quan and Quigley, 1989, 1991) in order to obtain the underlying market series. (For a recent review of the relevant literature see Geltner et al, 2003).

An implication of smoothing is that property returns are serially correlated, which means that the previous period's returns are closely related to the subsequent period's returns. This is especially pronounced in the case of property monthly and quarterly data, but the degree of correlation falls off with annual data. For example, IPD annual return data over the period 1971-2002 displays a correlation of 0.28. Consequently, a literature has emerged addressing the question whether property data should be used as reported or if it should be 'adjusted' to reflect what is perceived to be a more volatile underlying market (see Brown & Matysiak 1998, 2000; Geltner 1991, 1993; Clayton et al 2001). Employing the procedure proposed by Blundell and Ward (1987), which effectively assumes an AR(1) process, the correlation between consecutive IPD annual returns, (current value and one-period lag) falls to 0.05, being statistically (at the one per cent level) indistinguishable from zero.

A relevant example where un-smoothing the data can make a difference is reported in Booth & Matysiak (forthcoming, 2004). The authors found that un-smoothed property data was more closely correlated with pension plan liabilities than smoothed data, for both mature and immature pension plans, thereby providing a better match for liabilities. Booth & Matysiak also report that correlation between UK equities and the un-smoothed property returns increases. The explanation offered for this increase is that the un-smoothed data may be a better representation of the underlying transactions prices than the smoothed data. Consequently, the transactions prices should more directly linked with the fundamental economic factors that affect all investment markets, such as long-term risk free rates. Similar reasoning suggests that the un-smoothed data should have a higher correlation with pension plan liabilities, implying that un-smoothed real estate returns are less risky when liabilities are taken into account, a feature that we explore in section 7.

4. Asset distributions

Before moving on to consider the suitability of property for the explicit purpose of matching liabilities, it is useful to understand the role of property to date. Whilst commercial property is held by a number of organisations, we are primarily interested in those institutions who invest for the purpose of meeting liabilities, principally pension funds and life insurance companies. The allocations made to property by these organisations are explored further below.

Both pension schemes and life insurance companies share the characteristics that their liabilities are long-term and, to a certain degree, predictable. The liabilities of other investors, such as general insurance companies and charities, are both short term and subject to greater uncertainty.

4.1 What drives asset allocations

Fundamentally, asset allocation decisions for any investor should be driven by one of two basic tenets:

- the need to enhance returns

- the need to reduce risk

Investment risk arises principally where the characteristics of assets held differ from the characteristics of liabilities for which assets are being held. In a mismatched strategy, as economic conditions change, an investment strategy may see the value of the assets diverge from the value of the liabilities. Obviously this situation presents a risk that, if allowed to persist, the assets may no longer be sufficient to meet the liabilities and the organisation becomes insolvent. A matched investment strategy reduces this risk.

In setting asset allocations therefore, liability driven investors must strike a balance between the risk of insolvency and the need to achieve a suitable level of return. It is arguably the case that the scope of any organisation to take risk in asset allocation decisions is at least partially dependent on the solvency position of the organisation. In considering solvency positions, there has historically been a difference between pension schemes and life insurance companies.

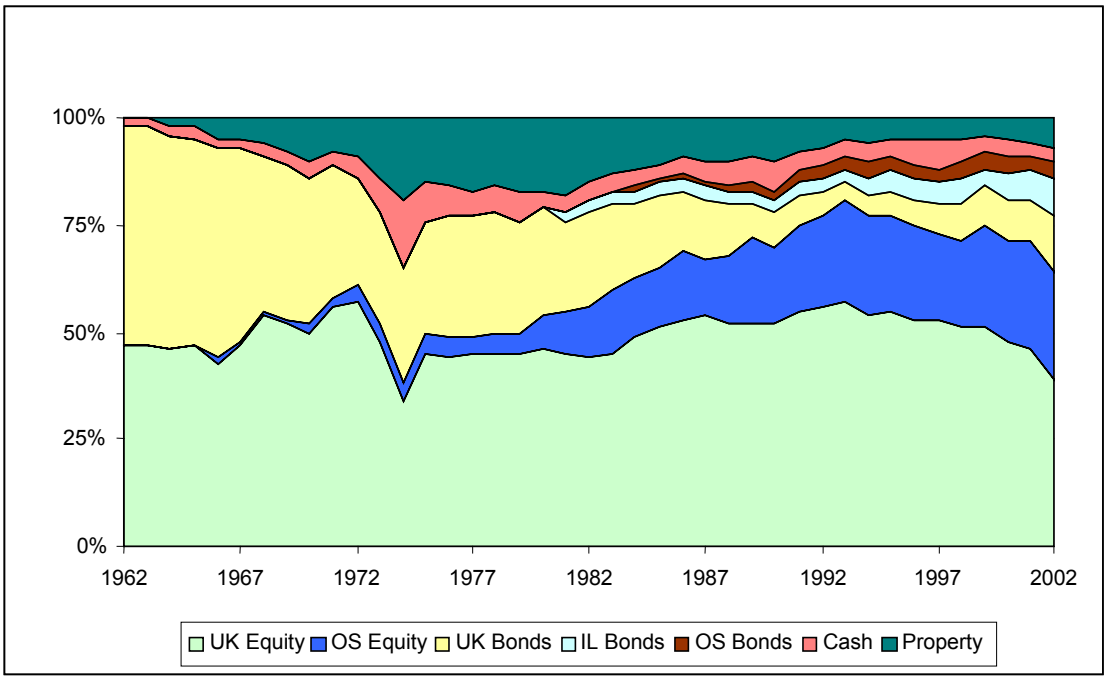
Until the introduction of the Minimum Funding Requirement in 1997, there was no statutory minimum measure of solvency in pension schemes. The potential mismatch between assets and liabilities, hidden to a large extent by the build up of surpluses during the 1980s and 1990s, was largely ignored. In contrast, life insurance companies have been subject to more stringent solvency tests placing greater emphasis on the need to address risk in asset allocation decisions.

4.2 Pension Schemes

4.2.1 Background

Historically, many pension schemes invested in balanced funds. Asset allocation within such funds is set by the investment manager, with the intention of maximising returns. Whilst balanced portfolios have generally maintained a small level of property investment, asset allocation has been predominantly equity based. With equities providing essentially a one-way ticket on returns, the risks associated with this approach were largely overlooked. Figure 4.1 outlines trends in asset allocation within pension schemes over the last 40 years.

Figure 4.1 Asset allocation trends in UK pension schemes



Source: UBS Pension Fund Indicators 2003, WM Survey

Over recent years however, there has been a migration away from the balanced portfolio approach to schemes adopting an asset allocation particular to the liabilities of the scheme.

Table 4.1: Benchmark trends

Year	Percentage of schemes adopting specific benchmark
1992	9
1997	32
2002	80

Source: Russell Mellon CAPS

The reasons for this trend are numerous, but include:

- falling interest rates placing greater emphasis on liability values
- falling equity markets and surpluses bringing the importance of asset allocation to the fore
- increased reporting requirements (MFR, FRS17) highlighting (poor) funding positions to trustees/sponsors
- the continued change in pension schemes, from increased legislation changing the nature of schemes' liabilities to changes driven by sponsors, such as closure to new entrants/future accrual
- the Myners Review of Institutional Investment which encouraged trustees to consider setting scheme specific benchmarks rather than benchmarking themselves against their peers.

In general, the Myners Review should have proved favourable for property investment given the fundamental purpose of the Review was to examine investment in "alternative" asset classes. Amongst the recommendations made by Myners was that pension scheme trustees consider the merits of such investments. Is it therefore not surprising that property, as perhaps the most familiar of these alternatives, has seen a return to the fore.

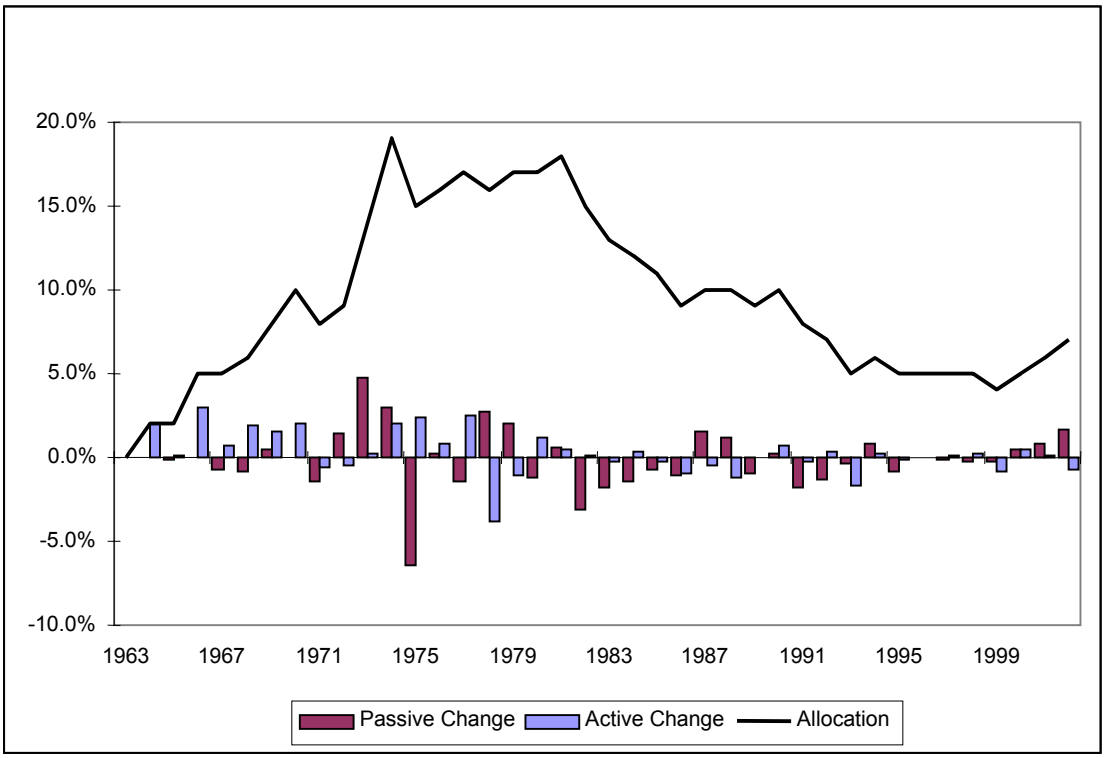
4.2.2 Changes in property allocations

Whilst figure 4.1 illustrated the trend in property allocations, this does not really give the full picture. By considering the change in asset allocations due to general market movements separately from the change due to "active" asset allocation decisions, we can determine whether or not property has increased in prominence.

If, as suggested in table 4.1, the majority of pension schemes have now set scheme specific benchmarks, if allocations to property are increasing, we would anticipate seeing positive "active" allocations to property over recent years.

In figure 4.2, year-on-year changes in asset allocation as a result of market movements represent passive movements in asset allocation. Active movements then represent the difference between the passive allocation at the end of the year and the actual allocation at the end of the year.

Figure 4.2: Active and passive changes to property allocations



Source: UBS Pension Fund Indicators 2003, WM Survey

We see that in very few years since the 1970s have pension schemes on average, actively increased their allocation to property. Whilst major changes in allocations took place during the 1970s, the recent rise in allocations to property are attributable more to the falls in equity markets than any active move towards property.

Indeed, it appears that the significant falls in equity markets over the last three years have required pension schemes to actively cut back on property allocations so as to increase the equity allocation. By reference to the experience of the 1970s and early 1980s, current allocations to property remain low. At the end of September 2003 the typical UK Pension Scheme, as defined by the WM 2000 Universe, had the following asset mix:

Equities	71%
Bonds	25%
Property	4%
Total	100%

4.2.3 Summary

Responsibility for all investment decisions, including setting asset allocation, lies with the pension scheme trustees. However, trustees are generally reliant on advice from their Actuary and/or Investment Consultant in setting and implementing investment strategy.

To offer such advice requires knowledge of the characteristics of the liabilities, an understanding of the characteristics of those assets that provide a suitable “match” within a chosen investment strategy

allowing risk to be reduced and finally, the availability of suitable products to implement such a solution.

Asset/liability studies tend to focus initially on the equity/bond split, property being regarded predominantly as a diversifier to equities and bonds and thus forming part of the secondary decision making process. Why should this be the case? Given that property shares characteristics with both equities and bonds, yet is largely uncorrelated with both, why should the initial decision not focus on the equity/bond/property split? Whilst some actuaries do allow for property explicitly in their asset liability models, it is often ignored as an asset class.

Is this because the general characteristics of property are not sufficiently widely understood to allow advisers to properly place property within the asset allocation framework? Or are the more undesirable characteristics of property – and perhaps the problems associated with historic returns noted in section 2 – such that trustees/consultants are reluctant to accept meaningful allocations to property? In either case, we argue that greater education of both trustees and consultants of the potential merits of property investment may be appropriate. This paper seeks to provide an introduction to the asset class (section 5) before exploring its potential use in matching liabilities.

5. Property's attributes: an overview

In order to understand how property might play its role in matching liabilities, it is important to understand its investment characteristics. This section outlines property's attributes - both positive and negative - compared with other assets. Some features can be dealt with explicitly in the assessment of net returns to investors or through the way in which property is held by investing funds; other attributes will be reflected in the additional return premium, relative to risk free assets, that property should be expected to deliver.

5.1 Property's disadvantages

5.1.1 Illiquidity

Direct property is less liquid than listed assets. Transactions can take several months between the decision to buy or sell and completion. Investors may be concerned that they are not able to increase or decrease their property exposure as easily as can be achieved in other asset classes.

However, perhaps the key issue for investors is *not* that property is illiquid, but rather whether or not prospective returns provide sufficient compensation for relative illiquidity in the form of an implied premium. Funds with long-term time horizons may be able to take advantage of relatively illiquid assets such as property and enjoy higher risk-adjusted returns; for other funds, the implied illiquidity premium may not be sufficient.

Moreover, it is generally appreciated that property should be held for the medium- to long-term. The inability to buy or sell significant portions of an entire property portfolio in the very short term is not generally of concern to funds with longer-term time horizons.

The recent IPF report on illiquidity (IPF, 2004) highlights the fact that the uncertainty regarding the time to sale is a risk faced by property investors that is not taken into account when using historical returns data. For long term institutional investors, with a high quality portfolio, liquidity risk appears to be small. However, for some types of investor, particularly those with short-term time horizons, the risks faced are large (and probably much larger than is generally appreciated). The additional risk can be measured by different target holding periods and types of property. The report presents several analyses of illiquidity by using proxy measures, but argues that illiquidity is multi-dimensional and complex in that no single measure can fully capture the essence of illiquidity in the property markets.

Many of the measures used in the equities markets, such as transactions rates, spreads and transactions price movements due to trading are problematic to apply in thinly traded markets such as real estate.

5.1.2 Costs and expenses

It is more expensive to transact and manage property than other assets. A combination of stamp duty, legal and other fees can amount to around 5.75% of the purchase price for the most UK assets and often higher elsewhere in Europe. Other fees are associated with the management of a portfolio, including rent collection/management, rent reviews and so on, all of which will impact the returns received by investors.

But such costs can be estimated with a reasonable accuracy. The issue, therefore, is whether the net returns, after allowing for these costs, are sufficiently attractive; it is again a question of pricing.

5.1.3 Valuations

The fact that property performance is largely based on valuations (estimates of open market prices) rather than actual transactions is also cited as a disadvantage. Valuations cause suspicion: differences can arise between an individual valuation and the price that a property might actually fetch in the market place.

However, valuation practice in the UK has undergone significant changes in recent years. Most valuations for institutional investors are undertaken by external valuers, often on a quarterly basis, providing greater rigour and independence than was the case in the 1970s and 1980s. More rigorous and transparent analysis of performance takes place, thanks largely to the growth of Investment Property Databank, which produces property indices and performance measurement services, and recommendations contained in the Carsberg report (2002). Similar trends are starting to occur in the rest of Europe. Various studies have been carried out into the accuracy of valuations (see Crosby, 2000, McAllister, 1995, Drivers Jonas, 2003).

5.1.4 Difficulties in constructing diversified portfolios

Direct property is both heterogeneous (each property is different) and, in most cases, indivisible and 'lumpy'. There is little commonality of ownership between one investor's portfolio and another. By contrast, equities and bonds can be bought in small quantities, and there is considerable overlap between different investors' equity and bond portfolios. It is therefore difficult to assemble a diversified portfolio of directly-held buildings. Small funds cannot buy directly large assets such as shopping centres, retail warehouse parks or big city centre offices. Even medium and large funds find that the largest properties may skew their portfolios significantly. As a result, property portfolios tend to contain a relatively high level of specific risk (see, for example, Morrell 1998).

However, the growth of property unit trusts and other pooled vehicles, together with the development of multi-manager capabilities, mean that small and medium sized funds can increasingly gain access to property indirectly. A number of specialist vehicles have been created that invest in large lot size assets (such as shopping centres, retail parks, industrial estates and offices). Market risk can be diversified more efficiently.

5.1.5 The legacy of the 1980s/early 1990s

Commercial property significantly under-performed other UK assets during the 1980s and early 1990s. According to the Investment Property Databank (2004), real returns from property averaged 4.8%pa

during the 1980s, significantly below both UK equities (that delivered 11.1%pa real) and UK gilts (that delivered 8.1%pa real). Property yields during much of this time implied levels of rental growth that were unrealistically high (Morrell, 2003).

Although it is difficult to prove such a claim, it is likely that prolonged periods of under-performance led many investors to be disillusioned towards property, particularly since weightings to the asset were far higher than their current levels. These concerns were exacerbated by property's illiquidity.

5.1.6 Management hassle

It is sometimes suggested that property has taken up a disproportionately large amount of time at trustee meetings relative to the size of the asset class. This is partly due to the nature and size of mandates that were typical of the 1980s, many of which were advisory and necessitated trustee approval over detailed portfolio management issues. Today it is much more common for pension funds to have either delegated more authority to a property fund manager, or for investment to be made in pooled investment schemes, both of which have reduced the time spent dealing with property issues.

5.2 Property's advantages

The main advantages of direct property are highlighted below.

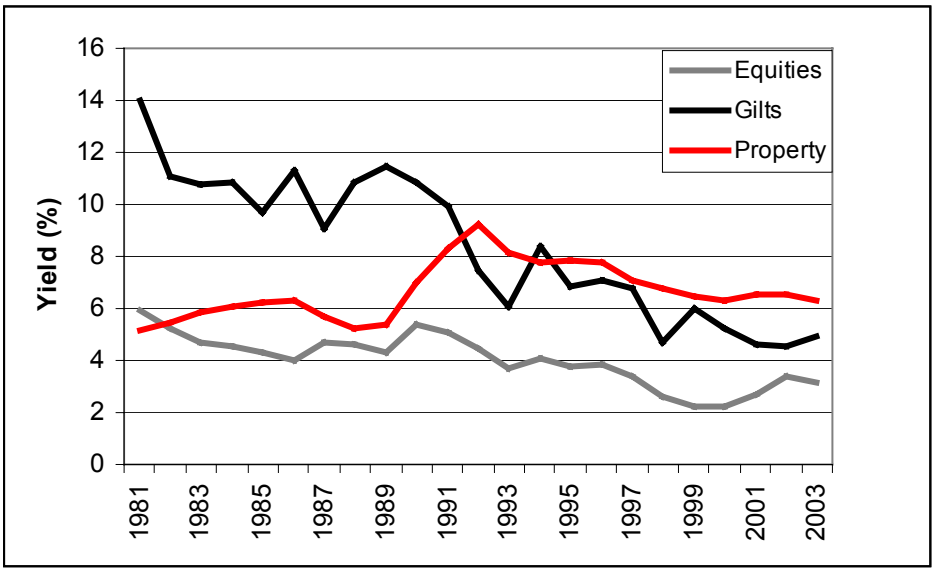
5.2.1 High running yield

Property currently has a high running yield (the ratio of income and capital value, allowing for acquisition costs) compared to other UK assets. In a low growth, low inflation environment, this is very attractive to pension funds, insurance companies and private individuals.

Figure 5.1 shows UK property, gilt and equity yields. For much of the 1980s and early 1990s, property yields were below gilt yields. Since the mid-1990s, property yields have been significantly higher than other assets. Currently, there is gap of some 1.5% to 2.0% between average property yields and 5-year gilt yields.

Changes in property yields suggest that investors' rental growth expectations or target return requirements must have varied through time. As Figure 5.1 shows, property initial yields (the relationship between rent passing and capital values after allowing for acquisition costs) have varied over the last twenty years, both in absolute terms and relative to the yields of other UK assets. At the start of 1982, for example, the average initial yield for the market as a whole stood at 5.2%; four years later they had risen to 9.2%. Equivalent yields, which reflect the initial rent passing and future increases in income due to rent reviews and lease renewals based on current values (with no projections of future rental growth), were generally higher but show a similar pattern over time. Note that during the 1980s, property yields were below gilt yields; from 1992 this relationship reversed, again indicative of a change in investors' expectations.

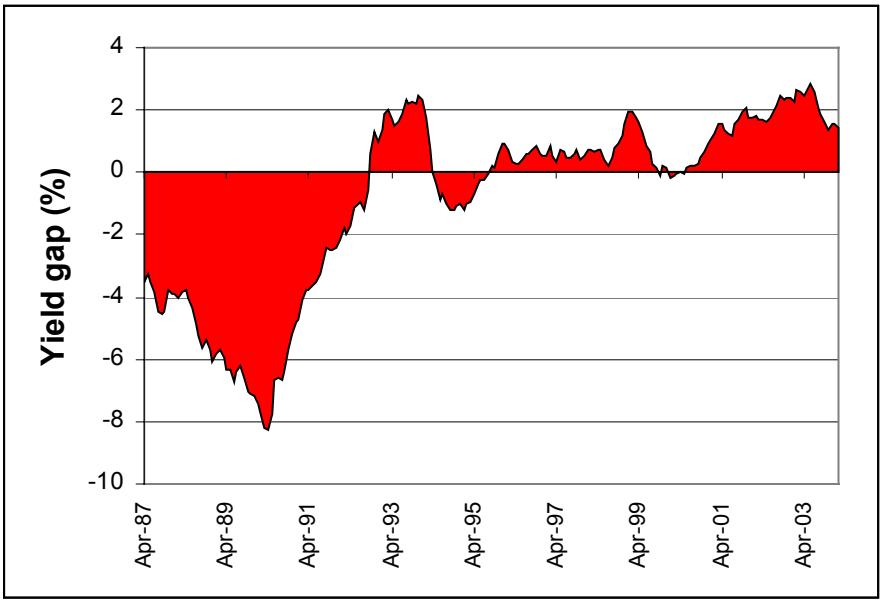
Figure 5.1: UK property, equity and gilt yields



Source: Investment Property Databank (IPD Annual Index) and Datastream (5 year gilt yields and FTSE All Share dividend yield)

High property yields have encouraged some investors to borrow and take advantage of relatively cheap short-term interest rates. Figure 5.2 shows the difference between initial property yields[1] as measured by the IPD Monthly Index. The stark contrast between the experience of the late 1980s, when property yields were significantly lower than swap rates, and the environment since the mid-1990s is clear to see. Despite recent increases in swap rates and falls in property yields, a positive differential exists.

Figure 5.2: Gap between UK Property Initial Yields and 5-year Sterling Swap Rate



Source: Investment Property Databank (IPD Monthly Index All Property Initial yield and Datastream (5-year Sterling Swap rate

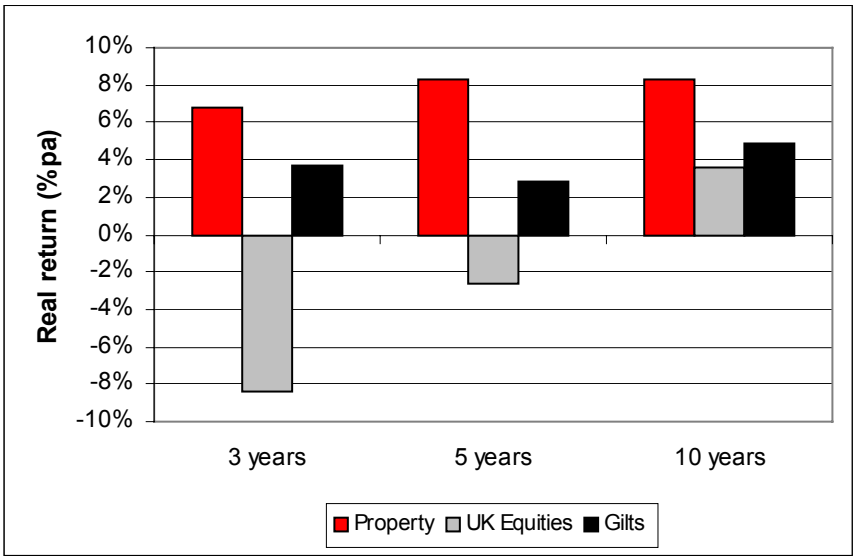
[1] The current rental income of property as a proportion of current capital values, after allowing for purchase costs. Increases in rental income as rent reviews and lease renewals occur are ignored.

Property's high yield means it shares some of the characteristics of fixed income assets. Rents contracted under leases are rather like the coupons from a corporate bond. However, there are important differences. Bond prices reflect both regular coupons and the repayment of principal upon redemption. By contrast, property valuations generally assume rental income is paid into perpetuity (in the case of freehold investments) although valuers will adopt varying assumptions regarding voids and capital expenditure depending on the nature of the property under consideration. Property yields do not reflect a pre-defined capital payment at the end of a lease, and therefore yields are not directly comparable to a bond's gross redemption yield. Corporate bonds are at risk of default whereas the opportunity exists to re-let a property vacated by a tenant which may have terminated its lease before expiry (in other words, the asset has intrinsic value). Unlike a bond, however, property investors may be required to spend money to maintain the value of a building, depending on the type of asset and terms of the occupational leases, or else suffer a diminution of rental values through depreciation.

5.2.2 Enhancing return

Commercial property has performed well over the last decade. Over the ten years to the end of 2003, real total returns averaged 8.3%pa; the three and five-year averages are 6.8%pa and 8.3%pa respectively[2]. Such returns are significantly higher than the long-run average of 4.3%pa (1971 to 2003). Property has significantly out-performed equities and gilts in recent years. It is therefore capable of performing strongly both in absolute and relative terms, as Figure 5.3 shows.

Figure 5.3: Real total returns from UK assets over various periods to end 2003



Source: Investment Property Databank (Property Investors Digest, 204) equity and gilt yields taken from FTSE Actuaries indices

Of course, this is no guarantee that future returns will be as competitive. There is general recognition that prospective returns will be lower than those delivered recently but they imply a reasonable premium over risk free assets. The Investment Property Forum survey of UK property forecasts indicate total returns of around 8% to 9% over the next few years, as table 5.1 shows.

[2] Investment Property Databank (2004) Property Investors Digest

Table 5.1: Consensus property total return forecasts, as at February 2004

	2004	2005	2006
Maximum	10.1	11.0	12.0
Minimum	5.0	5.0	6.4
Range	5.1	6.0	5.6
Standard deviation	1.3	1.5	1.5
Median	8.0	7.8	9.0
Average	**8.0**	**8.0**	**9.1**

Source: Investment Property Forum survey of 25 participants

The PriceWaterhouseCoopers annual survey of institutional fund managers' views included estimates of prospective returns across different asset classes from 21 respondents managing some £440bn of UK pension fund assets. The median estimate for property of 5% per annum real was around 100bp below that from equities but nonetheless represented a "..strong return in excess of the risk-free rate" (PriceWaterhouseCoopers, 2003).

Deutsche Bank (2003) considers that property "...is more or less fairly priced as an investment". Henderson Global Investors (2003) suggest, based on analysis undertaken in December 2002, that:

> "Following a period of strong property performance, prospective long-run returns will be below those experienced recently and are in the region of 5.5% to 6.0% a year, after inflation. This is significantly lower than the real return of 8% to 9% a year delivered over the last decade. However, unlike the early 1980s and 1990s, property yields are higher than gilt yields. This level of return implies a premium over risk-free assets of between 3.5% to 4% under a central economic scenario. In an historical context, such a level of excess return looks reasonably attractive."

Since these reports, demand for commercial property investment has been strong, yields have fallen somewhat and, other things being equal, prospective long-run returns will have fallen.

5.2.3 Diversification effects

Property is not perfectly correlated with other assets. It is also less volatile than equities. Property can therefore lower the volatility of returns in multi-asset portfolios.

It is important, however, not to exaggerate its diversification attributes. Some of its perceived diversification benefits are probably over-stated because property returns are based largely on valuations rather than actual prices, which leads to 'smoothing' of returns. As a result, historic measures of volatility and correlation with other assets are arguably too low.

As noted in section 3, various approaches can be employed to 'un-smooth' returns series so that they better reflect underlying prices, resulting in higher volatility and correlation measures (see, for example, Blundell and Ward, 1987, Geltner, 1989 and Chaplin, 1997). Nonetheless, even allowing for such factors, the balance of evidence suggests that property helps to lower overall portfolio risk.

5.2.4 Mixture of bond and equity...with embedded options

Property is an unusual asset class in that it exhibits both fixed income and equity characteristics. Current rents are contractually agreed and are usually protected, at least in the UK, by 'upward-only' rent reviews, forming the fixed income component. This segment is prone to inflation and the risk of tenant default. The equity component of a property's value arises from the prospect of increases in rental income as rental values rise either through real rental growth or inflation. In some parts of Europe rental income during a lease is linked to inflation.

The proportion of a property's value attributable to the fixed income component can vary enormously, both between and within different sectors of the market. Bond-type investments – that exhibit a large proportion of total value in contracted rents – could be of particular appeal to funds seeking a higher yielding alternative to fixed interest investments.

This mix of attributes is appealing to investors. It is possible to structure a portfolio with biases towards the fixed income component, or the equity component, depending on the objectives of a particular fund. Blundell and Morrell (1997) and Exley (2002) have explored this subject which is highly relevant to liability matching and will be explored further in section n of this paper.

In addition to the mix of bond and equity, commercial property is unusual in that is characterised by embedded options. These occur due to the existence of upward only rent reviews in most commercial leases, which can be off-set by a tenant's break clause. In addition, the development of property - either through a change of use or physical redevelopment - can act as a release of value through the exercise of options (see Booth et. al., 2001, Booth and Walsh 2001, Ward and French, 1997)

5.3 Summary

Commercial property has a blend of attributes, some of which are beneficial to funds seeking to match liabilities, whereas others are disadvantageous. The combination of equity and bond characteristics could mean that it is particular appeal to pension funds and insurance companies seeking to match liabilities. However, the traditional approach to investment does not explicit segment property's cash flows into its component parts. This could obscure the utility of the asset class to different types of investors.

The next section explores the effect of including property in more detail by examining its impact on a portfolio's asset:liability structure. Section seven then segments the bond and equity components of property in more detail.

6. The value of property to UK Pension Funds in portfolio construction

6.1 Introduction

As noted in section 3, much of the work examining the impact of including property in a multi-asset portfolio has focused on the asset side of the equation only, typically through mean/variance analysis. The purpose of this section is to extend previous investigations by considering the contribution of property to efficient portfolio construction when looking at both assets *and* liabilities.

Section 6.2 starts by considering assets only. Section 6.3 then introduces liabilities by presenting an analysis of property's contribution under the Minimum Funding Requirement (MFR). In order to highlight the potential impact of forthcoming accounting standards, the section concludes by examining portfolio efficiency under FRS17.

6.2 Assumptions and analytical framework

Section 4 outlined the typical UK pension fund asset distributions as at the end of September 2003 according to the WM 2000 Universe. These form the basis of a hypothetical current portfolio structure which, for ease of reference, are as follows:

Equities	71%
Bonds	25%
Property	4%
Total	100%

Despite the impact of difficult markets during recent years, and the consequential impact on fund solvency, equities are still the dominant asset class for the majority of UK pension schemes. By contrast, property has very modest exposure. It tends to be regarded as a risk diversifying asset though many funds seem to be relaxed about excluding property from their portfolios, partly as a consequence of the low typical exposures. With the introduction of changes to pension fund accounting, in the guise of FRS17, it will be interesting to see how pension fund asset allocation may shift over the next few years.

Whilst peer group information is readily available on the assets of UK pension schemes, information on the liabilities is less forthcoming. Despite these difficulties, it is important to take account of the liabilities in assessing the appropriateness of any asset portfolio. Based on our experience, we estimate the liabilities of a typical UK pension fund to be summarised as follows:

Actives	40%
Deferreds	20%
Pensioners	40%
	100%

In seeking to understand the investment choices faced by the typical pension scheme, we aim to model the key dynamics of the scheme, particularly prospective fund solvency. This process involves building a model of the major asset classes – equities, bonds and property – and their key characteristics. We also need to build a simple model of the liabilities, the main features of which have been outlined above. The key insights from the modelling process arise from considering both assets and liabilities jointly and in understanding how the two sides of the balance sheet interact. Although the dynamics of any individual scheme are extremely complex, some powerful observations can be made by using a simple model.

The key inputs to building a model of the asset classes are the expected returns, the associated risks (as measured by the standard deviation of returns) and the relationship between these returns (the correlations). In assessing these inputs, we should be mindful of history but also bear in mind that historic patterns tend to be extremely unstable through time. Essentially, we need a forward -looking perspective that takes into account views of current market pricing and future equilibrium levels. In making such assessments, we take into account the views of fund managers and also any market information on consensus views. The key asset class assumptions are shown in table 6.1.

Table 6.1 : Asset class returns, risks and correlations

	Return	Risk	Correlations		
	%pa	%pa	Equities	Bonds	Property
Equities	8.0%	18.0%	1	0.5	0.2
Bonds	5.5%	10.0%		1	0.2
Property	7.5%	15.0%			1

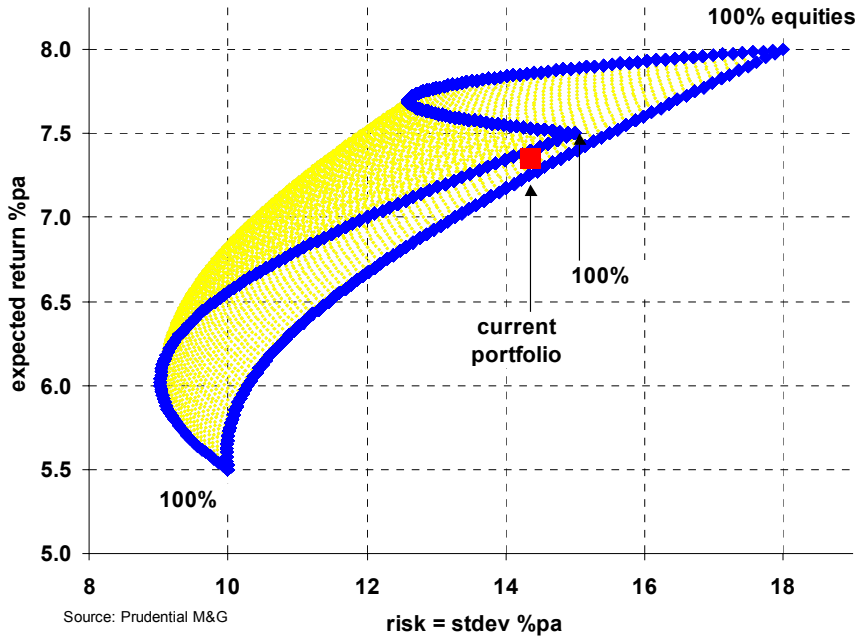
Whilst there is no "right" answer to such assumptions, we feel that these figures are intuitively reasonable. Equities offer the highest returns, but also the highest level of risk. Bonds (measured here as AA rated, for consistency with FRS17) have lower returns, but less uncertainty. Property sits somewhere between the two, with returns closer to equity levels. Property's risk is consistent with the results had historic indices been 'unsmoothed' to overcome problems associated with serial correlation, as noted in section 3; the historic volatility of published returns has been around 10%pa. A key feature of the correlation structure is the low correlations between property and the equity and bond asset classes. The equity/bond correlation is set at average levels through history. Overall, these aim to be starting assumptions that are used for illustration in our modelling.

Our analysis assumes that an appropriate sample of bonds can be bought to match liabilities exactly. Whilst this is a sensible starting assumption, in practice, this may well not be the case. The consequence is that property's potential role in liability matching is likely to be understated.

6.3 Examining assets only

By looking at different combinations of assets, we can compute portfolio risks and returns. Figure 6.1 shows the possible risk and return outcomes from portfolios chosen from the equity, bond and property asset classes from the assumptions outlined above. Each data point represents a different portfolio mix. The combinations of pairs of assets are also shown (in bold) to aid understanding of portfolio composition. In principle, we are looking for portfolios that have the highest return for a given level of risk (or lowest risk for a given level of return). Such portfolios are generally referred to as "efficient" and the set of efficient portfolios, called the "efficient frontier", is represented by the leading edge on the left hand side of the chart.

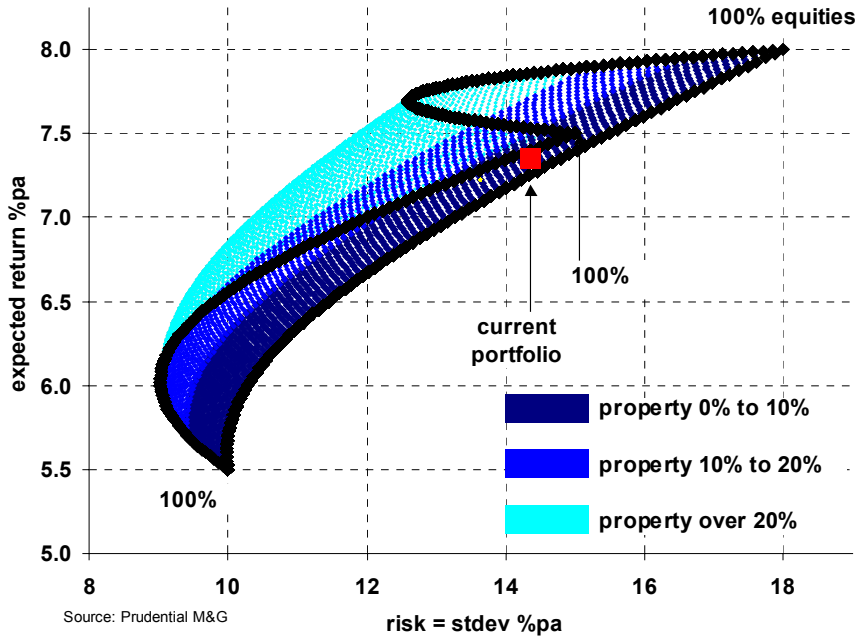
Figure 6.1: Possible combinations of Assets



We can see that the highest return portfolio comprises 100% equities, which also has the highest risk. As we move to lower risk portfolios these are initially formed by combinations of equities and property. For risks lower than about 12.5%, bonds start to be incorporated into efficient portfolios i.e. efficient portfolios are formed from combinations of equities, property and bonds. For very low risk portfolios, at the extreme left hand of the frontier, equities no longer feature and portfolios are combinations of bonds and property only.

It is also interesting to redraw Figure 6.1 showing where different property exposures occur within the opportunity set. Figure 6.2 shows three different bands of exposure – 0% to 10%, 10% to 20% and 20%+. Generally, the efficient portfolios will all contain over 20% property, except at very low risk levels.

Figure 6.2: Possible combinations of Assets showing Property allocations



It is worth noting from Figures 6.1 and 6.2 that the current portfolio mix of 71% equities, 25% bonds and 4% property does not look very "efficient" as it lies a long way from the efficient frontier. This is indeed true if we take no account of the liabilities. Figure 6.2 demonstrates that, if risk is viewed in terms of the volatility of absolute returns (and liabilities are ignored), then higher property asset allocations generally result in more efficient portfolios: higher returns are delivered for any given level of risk.

6.4 Assets and liabilities: property under MFR

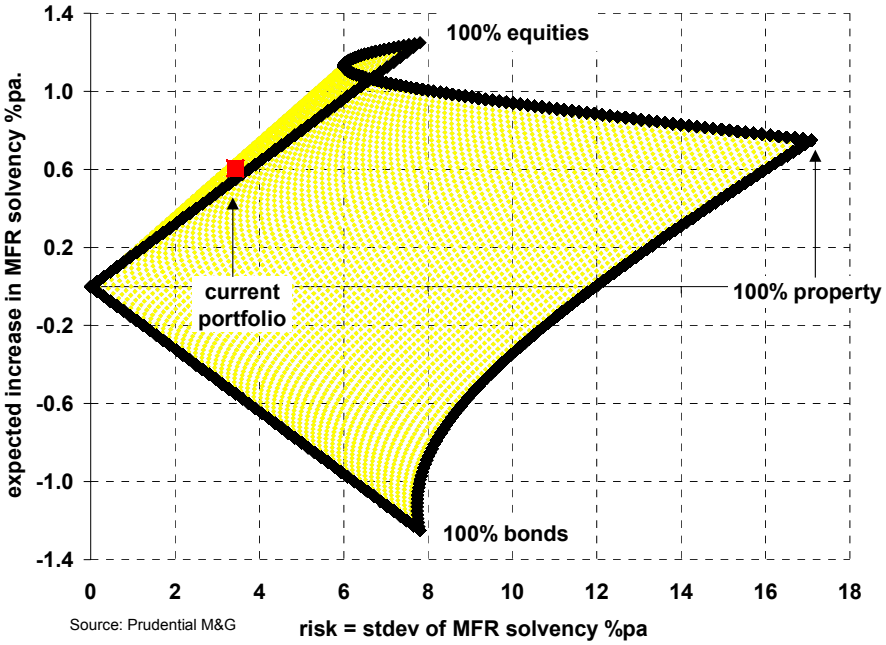
Under MFR rules, the liabilities were broadly described in terms of "matching" assets. In particular:

- Pensioner liability was matched by bonds.
- Active and Deferred liabilities with more than 10 years to normal retirement age (NRA) were matched by equities.
- Liabilities with under 10 years to NRA were matched by a combination of equities and bonds.

For our typical pension scheme, the MFR "matching" asset portfolio for the liabilities will be approximately 50% equities and 50% bonds.

Figure 6.3 shows how the efficient combinations of assets change when we take account of the MFR liability structure. Under this framework, we measure return as expected change in MFR solvency, and risk as the standard deviation of MFR solvency, rather than considering the assets in isolation. Both expected returns and risks change as a result of bringing liabilities into the equation. We can see that the highest return portfolio is still 100% equities, but the highest risk is 100% property. As we move to lower risk portfolios these are initially formed by combinations of equities and property. For risks lower than about 6%, bonds start to be incorporated into efficient portfolios. For very low risk portfolios, property no longer features and the minimum risk portfolio is 50% equities/50% bonds (as would be expected). The current portfolio now looks to be pretty much on the efficient frontier.

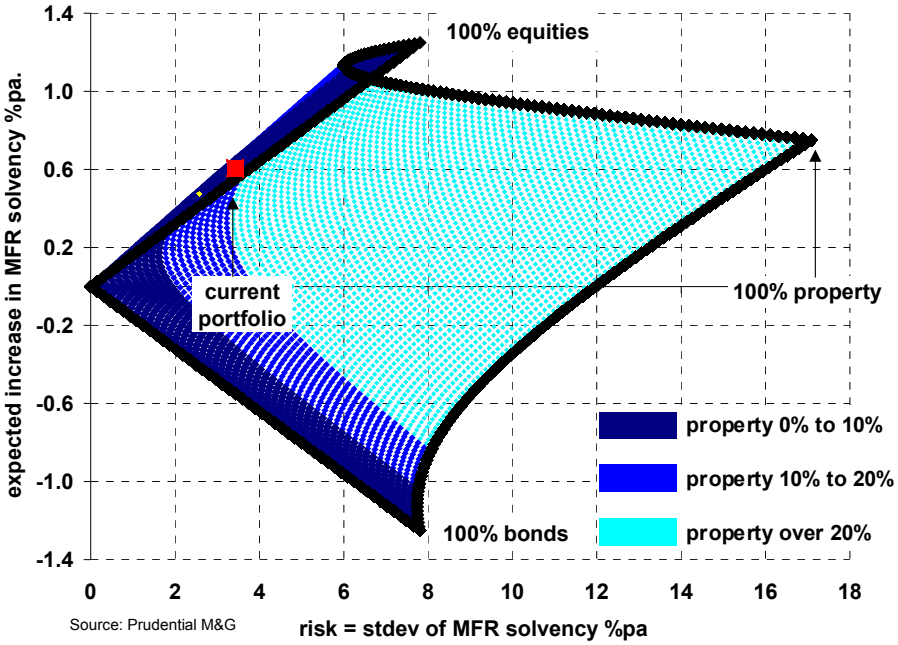
Chart 6.3 : MFR combinations of Assets



Source: Prudential M&G

Again it is helpful to see where the different bands of property exposures occur. Figure 6.4 gives us this perspective. The most striking result is that it is now the 0% to 10% property allocation that hugs the efficient frontier for most of the risk spectrum. Only at very high levels of risk tolerance do efficient portfolios contain more that 10% property. Holding more than 20% property does not appear to be worthwhile (at least on our assumptions about asset class risks and returns and liability characteristics). This conclusion contrasts starkly with the situation when assets are considered in isolation and illustrates the impact on asset allocation if MFR was the sole criterion influencing asset allocation.

Figure 6.4 : MFR combinations of Assets showing Property allocations



Source: Prudential M&G

6.5 Assets and liabilities: property under FRS17

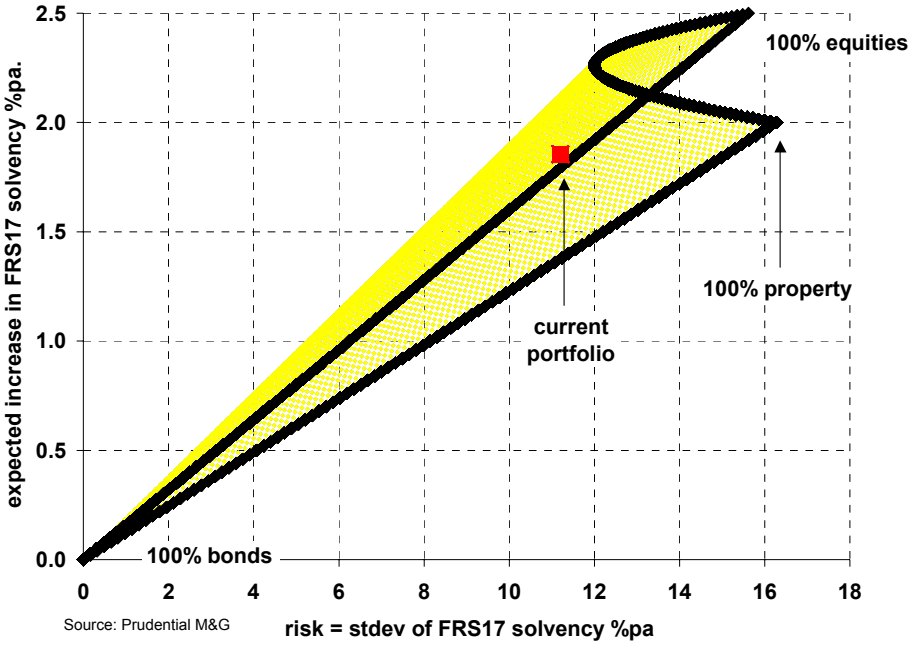
However, importance of MFR as a minimum funding standard will shortly be superceded by a new set of pension fund accounting standards under FRS17, which companies must follow when reporting the impact of their pension schemes in their accounts. The broad thrust of these new standards is as follows:

- Assets to be taken at market value.
- Liabilities to be valued using AA bond yields as discount rate. This effectively means the "matching" assets for the liabilities are now 100% bonds.
- Changes to pension costs are to be reflected in both company balance sheets and potentially in the P&L. These changes may be extremely volatile year on year as much of the discretion previously enjoyed by the company has now been removed.

FRS17 is expected to be fully implemented in 2005. Meanwhile, many schemes are starting to consider the implications for investment strategy of the new accounting regulations.

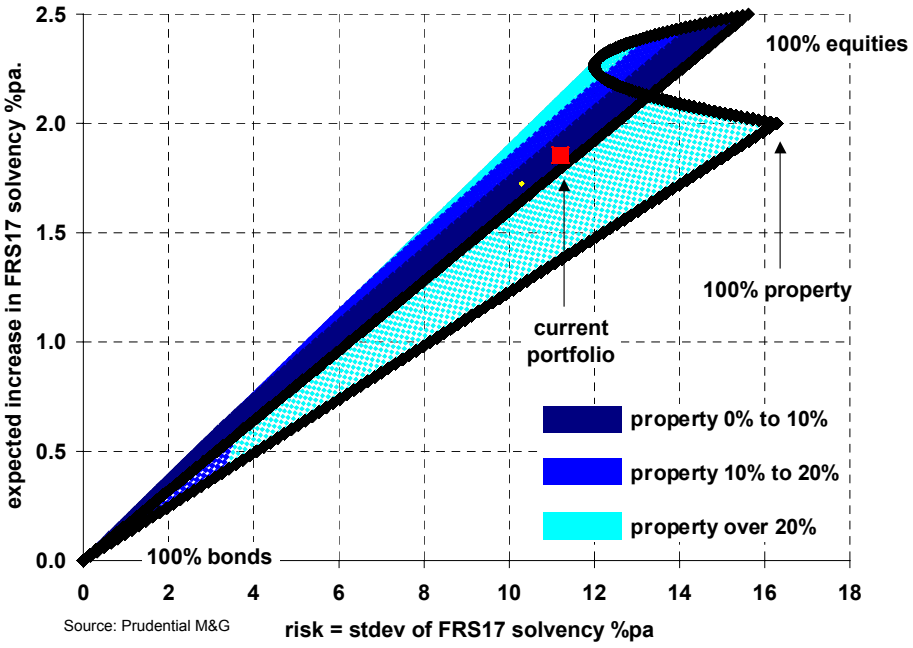
Figure 6.5 shows how the efficient combinations of assets change yet again when we take account of the FRS17 liability structure. Again, both expected returns and risks change for all portfolios. We can see that the highest return portfolio is still 100% equities, and the highest risk is still 100% property. As we move to lower risk asset combinations, the efficient portfolios are initially formed by combinations of equities and property. For risks lower than about 12%, bonds start to be incorporated into efficient portfolios and these remain a combination of all asset classes until we reach the minimum risk portfolio of 100% bonds. The current portfolio now looks some way from the efficient frontier. Again we redraw Figure 6.5 to show the bands of property allocations in Figure 6.6.

Figure 6.5: FRS17 combinations of assets



Source: Prudential M&G

Figure 6.6: FRS17 combinations of assets showing property allocations

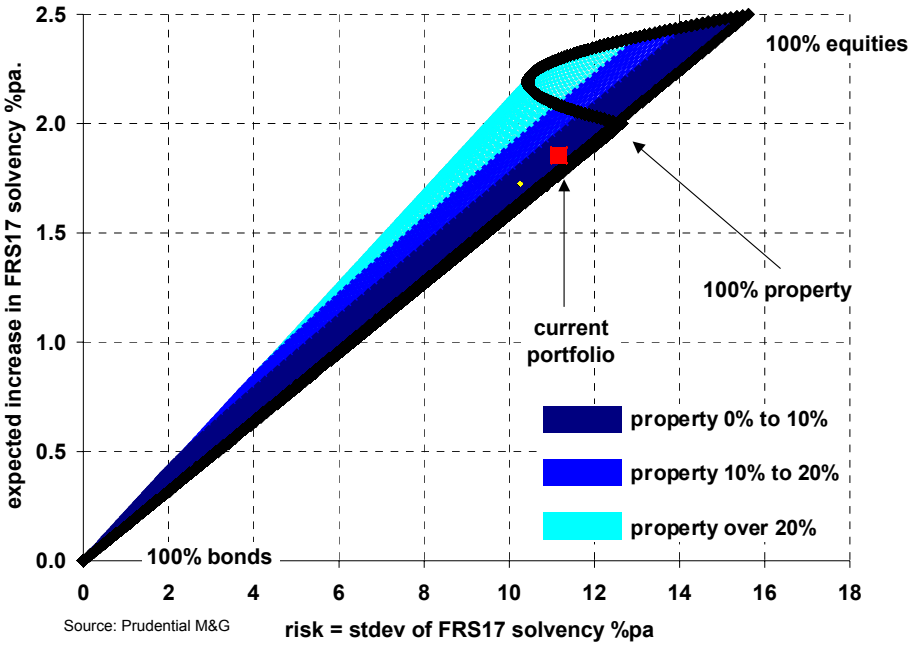


Source: Prudential M&G

Figure 6.6 shows that FRS17 looks to be a more favourable regime for property allocations compared to MFR. Efficient portfolios do contain low levels of property at very low levels of risk tolerance but as risk levels increase, so do property allocations. Whereas the MFR portfolios favoured equities over property as risk levels increased, under FRS17 there is a more even playing field for property. As the typical pension fund asset mix migrates towards the new efficient frontier there appears to be scope for more property investment, except at very low levels of risk tolerance.

Although we have tried to use consensus asset risk and return assumptions, it is worth seeing how flexing some of these assumptions may impact on our results. Probably the most controversial of our chosen assumptions, at least within the property community, will be the risk assumption. Many in the property industry would point to low historic levels of volatility and claim our 15% number is far too high. Figure 6.7 shows the results of changing this assumption form 15% to the historic average of 10%. As one would expect, the general effect is to raise the attraction of property. Over 20% allocations to property now feature at much lower risk levels than previously.

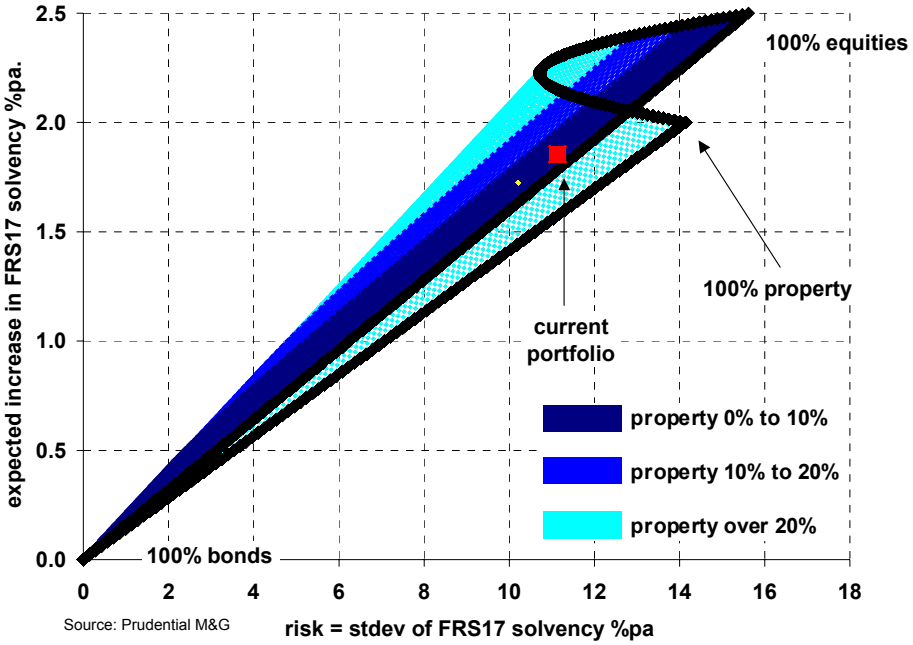
Figure 6.7: FRS17 combinations of assets (10% property volatility)



Source: Prudential M&G

Another set of assumptions worth flexing are the correlations between property and both equities and bonds. We have assumed both correlations are 0.2, but some would be comfortable assuming zero correlations. Figure 6.8 shows the impact of setting the property/equity and property/bond correlations to zero, whilst maintaining the lower 10% property volatility assumption, to be more in line with history.

Figure 6.8: FRS17 combinations of assets (10% property volatility and zero correlations)



Source: Prudential M&G

Assuming lower correlations has undone some of the gains from assuming lower property volatility. This is to be expected: if the lowest risk portfolio is 100% bonds, then adding property assets will increase risk and this risk will increase more if there is a low correlation between bonds and property. Property would be more favoured if it had a high correlation with bonds. Overall, the effect of decreasing correlations with bonds outweighs the (slightly) positive impact of lowering correlations between property and equities.

6.6 Summary and limitations of analysis

This section has sought to illustrate commercial property's contribution when liabilities are included as one input to strategic asset allocation. Whilst FRS17 may not be the sole criterion that determines asset allocation, the analysis has highlighted the potential impact of moving towards bond-based liability matching, which is a more general trend facing the investment community.

So far as FRS17 is concerned, we conclude that the accounting standard should create some opportunities for property as an asset class. Our assumptions for returns, risks and correlations provided a starting point for modelling. Relaxing these inputs has highlighted the importance of both property's expected volatility and its correlation with bonds. Section 5 noted that property can be seen as part bond, part equity. The degree to which properties exhibit bond-type characteristics will clearly influence expected volatility and correlations, and this is explored in the next section.

7. The segmentation of property cash flows

7.1 Introduction

The previous section examined the impact of including property on the assets and liabilities of a fund treating property as 'just another asset'. The objective of this section is to explore the effect of segmenting property's equity and bond components.

To match liabilities it is helpful if an asset class exhibits at least one of two characteristics:

- A degree of positive correlation with factors driving changes in the level of liabilities.
- Its capitalisation rate needs to demonstrate some positive correlation with the yields being used to capitalise liabilities.

Our starting point was to review the extent to which property and its main sectoral subsets met these criteria by comparing trends in property and bond yields, and income growth with earnings growth.

Table 7.1 compares property and equities against fixed coupon gilts over the last twenty year period. Equity yields have mirrored those of gilts over the period as a whole (despite the last three years) while property yields have tended to move in the opposite direction.

Table 7.1 : A Match Against Liabilities? 1981-2002 Track Record

Item	Property (IPD Universe)		Equities (All Share)	
	Correlation	Mean Rel.[1]	Correlation	Mean Rel.[1]
Income yield against gilts	0.19	-0.1%	+0.86	-4.4%
Income growth against earnings	0.77	+0.5%	0.42	+1.0%
[1] Mean relative to bonds				

Source : IPD, ONS, Barclays, Capital, Jones Lang LaSalle Index

However, property's income growth is better correlated than dividends with earnings growth, a major factor driving the liabilities of many defined benefit schemes. Despite growing marginally slower than dividends, net property income growth exhibits a closer correlation with annual earnings growth - a trait that may help explain why property was seen as an inflation hedge in some quarters.

We repeated this analysis by broad sector categories of property to see if some sub-segment of the IPD Universe matched better than the overall average (table 7.2). The results did not suggest any sector was bucking the overall trend, although shop and industrial income growth were better correlated with earnings growth than offices.

Table 7.2 : Analysis of Matching Potential by Sector 1981-2002

Item	Shop		Office		Industrial	
	Corr.	Mean Rel.[1]	Corr.	Mean Rel.[1]	Corr.	Mean Rel.[1]
Yield	0.24	-.7%	-0.15	0.0%	0.50	+1.7%
Income Growth	0.81	+1.6%	0.69	+.4%	0.85	-0.9%
[1] Mean relative to bonds						

Over the 22 year period retail property's income growth has exceeded average earnings by 1.6% pa, suggesting that, when segmented, portions of the property market are capable of matching **growth** in liabilities if not matching changes in the rate, those liabilities are capitalised.

7.2 Segmenting Cash Flows

However, the last 20-30 years has been dominated by a fall in inflationary expectations which drove both equity and gilt yields down, thereby raising their yield and return correlations. This may be viewed as largely a one-off event; a further fall in gilt yields of the proportion seen since 1980 could be viewed as unlikely and arguably the positive correlation we have seen between gilt and equity yields is a thing of the past.

If the past is a poor guide to the future then direct analysis of the **future** stream of returns offered by property may help. Instead of disaggregating whole property streams by sector, instead the idea is to disaggregate them by type of income - separating out the components of the hybrid.

The prospective flow of income from a property (or a portfolio) can be divided into three components:

That **contracted under the current lease** - a fixed stream of nominal income that extends until the end of the lease. This is effectively a bond with the tenant's covenant as security. The average remaining period on a UK commercial lease is currently just over 10 years although, as noted above, the length of lease has shortened over the years.

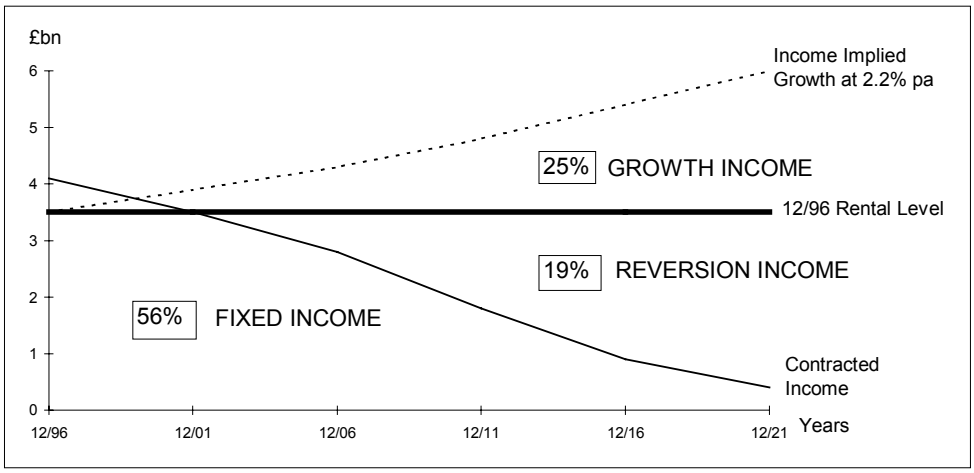
Any possible **increase in income under the current lease** contract. Since rental levels in the market vary through time they are frequently different to contracted income. Most commercial lease contracts provide for the rent to be adjusted to market level every five years provided the adjustment is upwards. Effectively this provides the owner with a call option on rents that could be exercised. At end 2003 current income was some 10% less than market rents but rents trended down in 2003 and are expected to do likewise in 2004.

With the average lease terminating in 10-11 years' time, a considerable volume of future income will be the product of leases as yet unsigned. These are effectively the **equity component** of the hybrid - it represents a relatively uncertain future value preceded by a period with zero yield until the end of current leases.

The idea is not new. In 1997 Blundell and Morrell developed this concept drawing on work of others in this area. Figure 7.1 illustrates the analysis showing the steadily diminishing stream of contracted income from 1996 for the whole IPD and the call option components of income represented by reversion and growth in the diagram.

At 12/96 the IPD sample had an estimate market value of some £52.7bn. It generated a contracted income of just over £4.2bn per annum fixed over a term of the lease contracts in place. Because these contracts are finite as one moves forward from 12/96, the flow of contracted income falls, until at 2021 it has diminished to £0.4bn per annum.

Figure 7.2 : Components of Property Income



Source: Blundell and Morrell (1997)

Capitalising this fixed contractual income stream at 9%[3] produced an estimate of the present value of the contracted income of £29.5bn at 12/96, over half the open market valuation of the IPD. This went a considerable way to explaining why property exhibits bond-like return characteristics.

The remaining 44% of 12/96 values represented "equity" exposure to property, deliverable only if current contracted income is raised to market rental levels in the future. This component can be further divided between:

Present value dependent on rises in income to rental levels as they stood at 12/96 (reversion income 19%).

Present value dependent on rises in income to rents above 12/96 levels as a result of inflation in market rental values (growth income 25%).

As figure 7.1 shows, the IPD Universe's aggregate 12/96 rental level was £3.5bn at 12/96, less than contracted income because some of it had been contracted when market rental levels were higher. The wedge of reversion income widens as current contracts terminate and properties are re-let. Discounted at 9% this wedge of future income has a present value of £10.2bn or 19% of the value of the IPD at 12/96. This left 25% of value in property dependent on expected future growth in rental levels from end 1996 plus releasing beyond existing contracts.

An implied nominal growth rate of just over 2% pa from 12/96 is sufficient to make up the balance and solves for the remaining 25% of market value, assuming a nominal discount rate of 9%.

This implied rate is lower than the future expectations for growth in market rents for space as it contains implicit expectations for future vacancies, depreciation and indeed anything that will subtract from the income flow enjoyed by the owner. It is therefore unsurprising that the 2.2% pa implied in Figure 1 was less than anticipated inflation (which had broadly matched growth in market rents over the long term). The analysis suggested that the current contracts (fixed income plus growth to current market rental as at 12/96) represented some 75% of total open market value, the balance attributed to possible future rental growth within current contracts and the residual value of the properties after the expiry of current contracts.

[3] A 9% discount rate was used based on inputs that were appropriate at the time of undertaking the analysis. It was composed of a real interest rate of 3.5%, a property risk premium of 2.5% and expected inflation of around 3% pa.

Exley (2002) refined this analysis by separating the rental growth within existing lease contracts from the residual value of income stream into perpetuity beyond existing leases. He used option pricing to evaluate the rent review driven income growth - the UK upwards only rent review is effectively a call option on the rental market exercisable by the owner. In a retrospective analysis Exley found that the value of contracted lease income in the IPD had steadily risen as a proportion of the total valuation, from 38% in 1980 to 80% in 2000, reflected in the progressive derating of property yields relative to equities and bonds.

7.3 Stock Variation

Rather than report the replication of this work for the latest IPD figures (an update of the work reported above confirmed Exley's analysis) instead we focused at the level of the individual asset to explore whether it would be possible to construct portfolios which exhibited particularly bond-like characteristics.

Anecdotally property is an extremely heterogeneous asset class. Analysis of a sample of individual capital returns within the LaSalle Investment Management database over the 1986/1998 period revealed a mean correlation of pairs of only 0.26. We took four assets (described in Table 6.3) which exhibited significantly different yield structures and lease lengths; one of them (D) is an index linked lease which is being found more often and is often associated with unusual types of occupier.

Table 7.3 : Segmenting cashflows from individual properties

Characteristics	**A**		**B**		**C**		**D**	
Description	**Retail Park**		**CLO Office**		**High Yield Office**		**Index Linked Leisure**	
Income ('000s)	1660		524		532		760	
ERV ('000s)	1701		475		380		760	
Remaining lease term (yrs)	19		7		4		19	
Market value ('000)	26320		6000		3750		11200	
Equivalent yield (%)	6.3		8.2		11.5		7.0	
Assumed void at lease end (yrs)	1		2		1		1	
Implied rental growth[1] (% pa)	2.8		2.8		1.8		2.5	
Outputs (£'000s)								
PV	26602		6029		3737		11314	
Contracted income	19262	72%	2871	48%	1737	46%	8990	79%
Contracted rent review	3529	13%	12	0%	0	0%	1932	17%
Post lease residual	3811	15%	3146	52%	2024	54%	390	3%
[1] To equate PV with market value								

The approach outlined in 6.2 was then applied to project the cash flows of these four assets and to capitalise them to present values (PV) using the valuation yields as discount rates. The stock was

evaluated over a 25 year period with an assumed new lease succeeding the existing one after a refurbishment period.

The results revealed that the proportion of PV generated by the **existing** contracted income varied significantly, being largely dependent on the length of the lease remaining. Additional income could be derived depending on the **rent review** structure, likely future rental growth and the degree of 'over-rent' - the extent to which the passing income exceeds open market rents (ERV in Table 6.2). In two cases, A and D, this was a significant proportion of PV.

The **residual** represented the balance of the PV.

It is helpful to understand the drivers that affect the value of the different segments of a property's cashflows, which are summarised below.

Table 7.4 Sources of value change

	Discount Rate	Default of Existing Tenant	Rental Change	Re-leasing Period
Contracted Income	✓	✓		
Contracted Rent Reviews	✓	✓	✓	
Residual	✓		✓	✓

Unlike the currently contracted income the residual is influenced by the releasing period and the future trend in ERV growth, both of which reflect the future rate of nominal growth. In this respect the residual may be regarded as an equity option exercisable at the end of the current lease. Investors seeking bond style exposure would focus on assets exhibiting types A and D characteristics where the 'bond' component is highest and the equity/residual lowest.

However, it is rare to find single assets that have no residual as the average length of commercial lease is now below 11 years. The next section explores the potential benefits to liability matching investors if beneficial ownership of the bond and equity components of the property hybrid could be split.

8. A more refined approach to liability matching

In this section we explore the extent to which the different components of property should exhibit different sensitivities to economic and financial market conditions.

We also consider some of the practical issues concerned with separating the component parts of the assets and the related cashflows. The relevance of the very fast technological developments in the markets in CDO's and credit derivatives and whether the techniques enabling the routine separation and deconstruction of cashflows involving credit risk can be transferred to the property market are also considered. We then move on to look at the extent to which each component might be expected to behave in the same (or different) way as the financial market asset it most nearly resembles.

Finally, we comment on whether this approach (whether or not it involves actual separation of the cashflows) might be expected to make property a more attractive asset to pension funds, and potentially to other institutions, due to its liability matching characteristics.

8.1 Separation Issues

In the previous section, we have suggested that the flow of income from a typical property investment can be regarded as comprising three components:

1. Payments contracted under the current lease – effectively a bond with the tenant's covenant as security.
2. Increases in income under the current lease – often, where adjustments are upward only, akin to a call option on rents.
3. Future income after the end of the current lease – the equity component.

In today's low interest low inflation environment, the bulk of the value in a typical portfolio is concentrated in the first element. Investors can of course choose to construct a portfolio that maximises the bond-like component (or indeed the equity-like characteristics) by selecting an appropriately structured portfolio.

But it is also worthwhile considering whether the cash flows can actually be physically and financially separated to the extent where they could be separately traded. This would for example make the bond-like element directly comparable in pricing terms with the tenant's corporate bond(s).

There are a number of relevant examples in the financial markets e.g.:

- Gilt stripes, launched in 1996, which provide investors with the ability to hold an asset that meets a liability maturing on a specific date or series of dates.
- CDOs, which pool a number of separate debt instruments and by subordination and tranching, create new instruments with different credit risk characteristics.
- Credit derivatives which provide protection against default on individual or pools of credit and can themselves be rolled into CDO structures.

There are isolated examples of similar techniques being applied to property markets. One is the use of residual value insurance techniques to provide a guaranteed floor to the value of the equity component – this is similar in many ways to a credit derivative product. And securitisation of cash flows from property portfolios has been successfully achieved (see, for example, the securitisation of Broadgate by British Land, and Canary Wharf).

Careful consideration also needs to be given to some of the practical issues around separation. Securitisation techniques rely on the ability to ring-fence the relevant cashflows. Obvious questions arising include:

- Loss of flexibility e.g. in the event of the tenant's financial failure and default, can the bond and equity interests be kept separate without impairing value?
- Could actions taken by a tenant impair the ultimate equity value?
- Multiple occupancy may pose specific problems.

8.2 Characteristics of the Different Elements

8.2.1 The Bond-like Component

At first glance, there are great similarities between the bond-like component of a property lease and a corporate bond issued by a tenant. In each case, the investor is assuming exposure to the credit risk of the owner/occupier, and absent default/renegotiation of terms, the return is known at the outset.

There are however some important differences:

- Payment profile. In particular there is no redemption payment.

- Security. Frequently bonds are secured against specific underlying assets whereas a property may rely on a general corporate covenant.
- Negotiated exits or transfer of obligations. Subletting is commonplace in the property world, although usually subject to guarantees from the prior tenant, so that a contingent liability remains. Renegotiation of bond instruments in financial markets is rare, and usually happens as an alternative to default.
- Recovery rates. Post default recovery rates on property are likely to be substantial – indeed in buoyant property markets recoveries may exceed 100% if a new tenant willing to pay a higher rent can be found promptly. Recoveries from corporate bonds may be zero or 100%, historically the average has been around 30%-40%.

8.2.2 The Call Option

In low inflationary times, the value attributed to future rent increases typically comprises a relatively low proportion of value (see 7.3 below). The call option represents the right to income from future rent increases from the date(s) of future rent reviews. It is a call option in the sense that it is only exercised if rents rise. In a typical upwards-only rent review lease, there is no downside (although the default risk may rise on a substantially over-rented property).

There are some clear distinctions to be drawn with financial market call options.

- There is no existing market.
- The option typically arises at a series of future dates, rather than at a single fixed date (European options) or up to a fixed date (American options).
- The value of the option at exercise is not well defined.

8.2.3 The Equity Component

Arguably no two equity interests are ever alike. But there are some particular distinguishing features that apply to the equity arising at the end of a property lease.

- Timing. Cash flow arises only after the end of the existing lease. No income is receivable ahead of this date.
- Real options. Significant optionality may be embedded in the form of redevelopment, refurbishment, extension etc.

8.3 Relative Importance of the Component Parts

The table below uses the Mercer Investment Consulting appraisal model (based on option pricing techniques) to estimate the proportions of property values represented by the basic lease, rent increases and residual value for a representative property with a 20-year lease.

Table 8.1: Relative importance of property components

Year	IPD Yield	Gilt Yield	Lease Value	Rental Increases	Residual Value
1980	6.0%	13.7%	38.3%	36.0%	25.7%
1985	6.6%	10.5%	47.2%	29.3%	23.5%
1990	8.7%	10.4%	61.5%	21.1%	17.4%
1995	8.2%	7.8%	71.2%	12.3%	16.5%
2000	7.7%	4.7%	80.0%	6.0%	14.0%

Source: Exley (2002

The changes in value attributable to the three components over the period reviewed is striking. From something approaching parity in 1980, the bond component now accounts for 80% of value on a representative 20-year lease. By comparison the call option is now only 6%.

This view of property tends to discount the inflation matching characteristics of property as an asset class. It is worth noting however that there are a growing number of property assets let on terms that do provide explicit inflation linked income, particularly arising out of Government PFI/PPP arrangements. These assets do provide a more effective inflation linked hedge.

9. Conclusions

Commercial property generally represents a small proportion of typical pension fund portfolios. The small rise in property weightings in recent years can be attributed mainly to the poor performance of equities rather than to any active allocation to property. Since the 1980s, the asset class has been largely overlooked in preference to equities despite the fact that it has significantly out-performed UK equities and bonds over the last decade.

Such a position appears anomalous. Whilst property has obvious and well-documented disadvantages, it also offers investors the benefits of a higher running yield, the potential to deliver attractive total returns and strong diversification qualities. Over the last twenty years, the bond-like characteristics of property have grown. This is attributable to the shift to a low interest / low inflation environment. More recently, this trend has coincided with pension funds and other long term investors moving out of equities and into bonds. In our view, the benefits of property investment and the changing characteristics of the asset class have not been fully appreciated.

One explanation for the approach to property is that it has been poorly understood by those taking asset allocation decisions. It is hoped that this paper has gone some way to enhance the understanding of property as an asset class, particularly in the context of helping to match liabilities.

This study has examined property's potential in two respects. Firstly, it has explored its potential liability-matching qualities when combined with equities and bonds. The overall conclusion from this work is that, within the new FRS17 framework for pension fund accounting and similar bond-based approaches to valuing assets and liabilities, efficient portfolios do contain property, and the weighting to the asset rises as the risk tolerance increases. This suggests there is scope for more property investment than is currently the case even for funds with relatively low risk tolerance levels. Clearly, the overall results are sensitive to the assumptions adopted in any models, and further work in this area is recommended.

The second focus of this report has been to segment cashflows in order to explore property's bond and equity qualities in greater detail. It argues that a more refined approach, which distinguishes the

bond and equity components, can enable funds to match liabilities more effectively than would otherwise be the case. This has implications for the type of investment properties held by pension funds and provides the scope for a more tailored approach to property selection. There is also the opportunity for the property fund management industry to structure pooled products that are specifically designed to match future liabilities

Clearly any changes to UK commercial property leasing practice, currently being considered by the Office for the Deputy Prime Minister, could have significant implications on property's future role in this area and need to be monitored closely.

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