Investment Property Forum

Investment Property Forum Educational Trust

Investment performance and lease structure change in the UK

Research Findings

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The IPF Educational Trust and IPF Joint Research Programme

This research was commissioned and funded under the auspices of the IPF Educational Trust and IPF Joint Research Programme. The three-year programme supports the IPF's wider goals of enhancing the knowledge, understanding and efficiency of property as an investment class. The initiative provides the UK property investment market with the ability to deliver substantial, objective, and high quality analysis on a structured basis. It will enable the whole industry to engage with the other financial markets, wider business community and government on a range of complementary issues.

The programme is funded by a cross-section of 16 businesses, representing key market participants. The IPF Educational Trust and the IPF gratefully acknowledge the contributing organisations:

Capital & Regional, Donaldsons, Grosvenor, GVA Grimley, Investment Property Databank, KPMG, LaSalle Investment Management, Land Securities, Lovells, Morley Fund Management, Nabarro Nathanson, Prudential Property Investment Managers, Quintain Estates & Development, Scottish Widows Investment Partnership, SJ Berwin and Strutt & Parker.

Investment performance and lease structure change in the UK research team

Neil Turner*, Ian Cullen+, Jeremy Marsh+, Charles Ward#, Patrick McAllister #, and IPD staff in London and Paris

* Alecta Investment Management
\+ Investment Property Databank Ltd
\# The University of Reading Business School

The Project Steering Group

The IPF, appointed a project steering group to guide and assist the Research team. The full group worked on the stage 1 of the project, which comprised the historical analysis in response to the ODPM consultation paper on upward only rent reviews. A smaller group of four (##) oversaw stage 2 the forward-looking analysis and completion of the project. The IPF acknowledges the contribution from: Andy Martin## (Strutt & Parker), Richard Bartholomew (Boots Properties Plc), Michael Brodtman (CBRE), Adrian Elwood (Eurohypo), Mark Titcomb## (Eurohypo), Gerald Kaye (Helical Bar Plc), Michael Lindsay (KPMG), Jonathan Thompson (KPMG), Dion Panambalana (Lovells), Marin Cumberworth (M & G Prudential), Peter Pereira Gray## (The Wellcome Trust), Michael Newens (Vodafone) and Charles Follows## (IPF).

Preface

Introduction

The UK has long had a reputation as a market of long leases lengths. However, inexorably this has changed over the last 15 years. The average lease length in 2005 is much shorter than those of the 1990. In May 2004 the Office of the Deputy Prime Minister (ODPM) published a Consultation Document: Commercial Property Leases: options for deterring or outlawing the use of upward only rent review clauses. (UORR). The paper sets out six options:

- No change from present
- Total ban on UORR
- A ban on UORR, with floor to initial rent
- An automatic right to break if the UORR produced a rent above open market levels
- Set a (unspecified) limit to lease lengths making UORR unnecessary
- Compulsory lease price 'menu'.

The IPF had commissioned this research project before the ODPM consultation paper was published. The Research Team, lead by Neil Turner, quickly agreed to amend the project to help the IPF respond to the ODPM consultation. The project timetable was accelerated and stage 1 of the research - the historical analysis - was completed for the IPF. The research team then returned to the project to complete stage 2 the forward-looking analysis and the completion of the entire project.

Objectives

The research investigates the effects of changing lease structures on the investment performance of real estate portfolios. The project was split into a number of clearly defined tasks. First, a thorough overview of the literature on existing research on the pricing of variations in lease terms. Second, basic empirical analysis of property databases examined how variations in lease structures have produced disparities in the level and pattern of income growth and total return. Third, simulation approaches were applied to model the impact and implications of variations in lease structures on real estate performance. The project addressed the effects of changes in leasing practices within the wider context of the role of real estate in the multi-asset portfolio in terms of diversification and risk.

The IPF congratulates the Research Team on an excellent project that lays the foundation for a deeper understanding of how lease structure will impact on the cash flows, returns and risks from investing in commercial property in the UK. The first stage of the research findings, formed an integral part of the IPF response to the ODPM Consultation Document: Commercial Property Leases: options for deterring or outlawing the use of upward only rent review clauses. The forward-looking analysis and complete report will be part of the IPF's ongoing discussions with the ODPM.

The IPF invite comments on the findings and the recommendations for future research. Please address comments or suggestions to Charles Follows, Research Director, IPF 3 Cadogan Gate, London SWIX 0AS. cfollows@ipf.org.uk 020 7695 1649.

Contents

Contents

Contents

1 Executive Summary

This report presents the findings of the IPF Educational Trust sponsored research into modelling the impact on real estate returns of substantial lease regime change in the UK. It also describes the potential impact of this behaviour upon real estate allocations within a multi-asset portfolio.

This modelling has been undertaken in a historical context (1981-2003) and in a future context (2004-2025). The principal aim of the study was to identify the impact on the level and pattern of real estate total returns of introducing a new lease regime imposed by Central Government in the UK.

The key findings of the **historical modelling exercise** are:

Options two, three and four did not materially impact the pattern of total return delivery at the all property level. Further, the ALM work undertaken suggests that such muted impacts would not have had asset allocation implications for real estate. This was true for the yield adjusted results (where property yields were revised up and down to reflect the anticipated reaction of the capital market) as well as the unadjusted returns.

However, significant impacts were recorded at IPD market segment level. Generally, those segments with volatile rental cycles suffered large income penalties, lower returns and much higher levels of volatility. The Central London office markets were particularly affected.

All mutations of option 5 produced substantial reductions in property returns and mild increases in volatility. These differences were sufficient to materially reduce allocations to real estate in the ALM modelling exercise.

The **future modelling exercise** has highlighted that:

There are only small differences in return delivery between all of the options at the all property level for the yield unadjusted and yield adjusted results. We believe this is explained by the substantial, market-induced, lease structure reform that has already befallen the property market.

We find that the UK commercial leasing market is now in uncharted territory with regard to lease length. Never before in the modern history of the UK commercial real estate market have lease lengths been reduced to below 7 years at the all property level as they were by year-end 2003 for new leases granted.

Since lease lengths are so much shorter at the beginning of the future modelling work (year-end 2003) the market has removed – to a very large extent – UORR provisions within our modelled cash flows. Their arbitrary removal, therefore, by legislative intervention modelled under the various options is largely superfluous and consequently does not register large impacts on returns.

These results suggest that real estate allocations would be maintained at very high levels under any of the options modelled since the differences between the base case and the various options were marginal in the future series.

In a similar fashion to the historic modelling, the future returns did display larger impacts at the segment level and the yield adjustments reinforced the volatile market segments' vulnerability to short lease contracts with frequent marking to market of income.

Perhaps the most striking feature of the research is the reduction in the efficiency of real estate return delivery between our historic and future modelling results. Historically, risk adjusted (nominal

1 Executive Summary

returns/standard deviation) real estate returns have been as high as 1.21. At this level it is significantly ahead of other asset classes. The future modelling work, utilising the latest lease contract information, suggests this metric is no higher than 1. Although still above the other two major asset classes, it has clearly been affected by lease structure change and such deterioration may have series implications for real estate allocations in the future.

Finally, the research team would like to stress that the results, conclusions and potential impacts are conditional upon the assumptions made about market behaviour. The reader should be aware that we do not analyse the behaviour of individual assets or individual investors. Indeed, we assume that any specific risk has been diversified away and that all investors behave as if it has. Clearly, where small, individual investors or other non-diversified funds operate different behaviours to the efficient one we have assumed might prevail. Non-diversified investors operating in volatile market segments or segments where the majority of value of an investment is in the lease contract might exhibit different types of behaviour to those that we have assumed in our modelling exercise.

2 Introduction

The evolving nature of commercial leases in the UK, the threat of government intervention in the commercial leasing market and the introduction of the second Code of Practice for Commercial Leases has stimulated growing interest in the investment performance implications of flexible leases. However defined, flexibility in leases is generally associated with a redistribution of risk from the occupier to the investor. Whilst some investors may perceive this change as an opportunity to reposition themselves on the risk-return scale, others are clearly nervous about the implications for investment performance drivers such as income security, funding, volatility and returns.

A consultation paper reviewing Upward Only Rent Reviews (UORRs) was published in May 2004. The ODPM paper sets out six options:

- No change from present
- Total ban on UORRs
- A ban on UORRs, with floor to initial rent
- An automatic right to break if the UORR produced a rent above open market levels
- Set a (unspecified) limit to lease lengths making UORRs unnecessary
- Compulsory lease price 'menu'.

The ODPM has also requested suggestions concerning alternative lease structures that could be beneficial. A notable omission from the ODPM's options is a typical European and common North American-style lease of short duration (five years) and annual indexation of rent to a Consumer Price Index.

The evolution of leasing practices has meant that 'new' lease contracts can differ from traditional UK institutional leases in terms of their length, the provision for rental change and operating costs obligations. These changes may have significant structural implications for investment in UK commercial real estate markets. Much of the interest in UK property from asset allocators has been predicated on historical income growth and total return delivery recorded by IPD in that organisation's Standing Investment index. More specifically, asset allocators have identified high income yields, low volatility of return delivery and low correlation of returns with the other asset classes to justify higher allocations to real estate. The effects of lease reform can be analysed at a number of levels:-

i. At the multi-asset level, key qualities such as duration/liability matching characteristics, volatility, diversification and inflation hedging may change.

ii. At the sector level, the income growth generating abilities of property types, their total return delivery and the risk premium demanded should all be affected by substantial lease change. The impact of change is likely to be felt disproportionately across property types assuming differences in the volatility of segments' underlying rental value growth patterns.

iii. At the individual property level, it is clear that the relationship between income security and gearing potential can create significant pricing implications.

2 Introduction

We can identify a number of questions.

- How will the level of income return (initial yield) and pattern of income return (volatility) be affected by changes to leasing practices?
- How will changes in the volatility in the income return influence the volatility of capital and total returns?
- Which types of property are most likely to produce significantly different income growth profiles as a result of significant changes to leasing practices?

This report presents the results of the research. It is presented in nine chapters. Chapters one and two are the executive summary and introduction respectively. Chapters three and four provide a historical and contemporary review of UK leasing practices, charting the demise of the institutional lease in much of the UK commercial property market. Chapter five presents the literature review. It details the work that has been undertaken to date in the field of lease pricing. Chapter six outlines methodological issues the research team had to contend with and presents a transparent description of the method adopted by the research team. Chapter seven presents the results of the cash flow modelling. Chapter eight presents the results of the ALM work undertaken in this area. Chapter nine provides the conclusions to the report.

3 UK Lease Structures – historical perspective

3.1 The introduction of rent reviews

In the early 1950s, it remained the case that long fixed income lease investments with no breaks and no rent reviews were considered the most attractive form of investment in property. These assets yielded more than fixed income – to compensate for illiquidity and management costs – but the expected return from the investment was the running yield, effectively the internal rate of return. Life Funds were the principal investors and they were using the asset class to match their liabilities – which at that time, of course, were also of a fixed-income nature.

By the mid 1950s the potential damage of persistent and rising inflation on the real value of fixed interest assets was noted by investing institutions.

It became recognised that property assets, which only a few years earlier were considered 'the best' from an investor's perspective, began to be seriously questioned by institutional investors. The future value of a building governed by a 99-year lease that provided for a fixed rent for the complete term would clearly be undermined in an inflationary environment. The rent review in UK commercial property leases "can almost certainly be dated to 1955" (Scott, 1996 p. 134).

There appears to be a great deal of consensus as to why rent reviews were first introduced. A recognition that fixed interest property investments would be undermined by inflation is broadly accepted by most.

What is much less clear, and is a point upon which little consensus is found, is why, when rent reviews were introduced, were they of an upward only nature?

3.1.1 Why are rent reviews upward only?

In order to understand why the rent review clauses that have traditionally been written into leases are of an upward only nature, it is necessary to appreciate how and over what time period they were introduced. Table 3.1 sets out the current and average times to rent review from 1955 to the present time.

3 UK Lease Structures – historical perspective

Table 3.1

	Average time to rent review	Current rent review period (years)
1955	71.46	50
1956	66.02	40
1957	59.80	33
1958	53.18	33
1959	45.92	25
1960	38.90	21
1961	33.90	21
1962	30.78	21
1963	27.91	21
1964	25.41	18
1965	22.19	14
1966	20.19	14
1967	17.84	10
1968	15.48	7
1969	13.76	7
1970	11.66	7
1971	9.52	6
1972	7.67	5
1973	6.00	5
1974	4.58	5
1975	3.89	5
1976	2.80	5
1977	2.50	5
1978-1993	2.50	5

Source: Scott, 1996

The evolution of the upwards only rent reviews (UORRs) is less well documented than the reduction in their term and the incidence of occurrence.

The most common reason provided for the upward only nature of rent reviews is as follows. If it is accepted that the reason rent reviews were introduced was to protect investors from inflation and that initially they were introduced for 50 year periods, it is hardly surprising that they are upward only in nature and that both tenants and landlords were satisfied with this arrangement. Clearly, as nominal rents were expected to rise in line with inflation it was rational and logical that after such long intervening periods an adjustment would be made in an 'upwards' direction.

As inflation began to increase materially in the 1960s and dramatically in the 1970s the same method of reckoning was applied. However, since inflation was much higher the intervening periods between rent reviews needed to be shorter. Again, both tenants and landlords appeared to be satisfied that the arrangement was necessary in an environment of rapidly rising inflation – and the more rapid the level of inflation the shorter the intervening period between rent reviews.

3 UK Lease Structures – historical perspective

This argument has added credibility when it is recognised that between 1945 and 1989, there was only one period when rental values fell; this occurred in a number of different markets during the mid 1970s. However, significantly, in all these cases the level of rents recovered to their previous levels within five years – the normal rent review pattern of the period (Crosby and Murdoch, 1998). The rents agreed at review during this time period, even in these markets, would have been the same whether the rent review mechanism were upward only or upward and downward. This could explain why tenants entered into lease contracts with UORRs without caution – they would have been perceived to be of no greater burden than upward and downward reviews by the vast majority of tenants.

It was not until the 1990s when the industry witnessed severe rental value declines (in nominal and real terms), which were not recovered in many markets within a five year period, that UORR clauses begin to have a material impact.

There are two further reasons offered as to why rent reviews were introduced as upward only rather than simple open market rent reviews.

Firstly, in underwriting their liabilities, it was essential for institutions to demonstrate that the income from their asset base could not fall, however unlikely. In the 1950s, when the provisions were first introduced, many were still uncertain that inflation would be a long-term phenomenon and fewer still were predicting that inflation would reach as high as 25% per annum in the 1970s. So, in order to ensure that their income from assets held could not fall, the institutions opted for upward only rent reviews. The fear would have been that open market alone could have resulted in income falls if deflation had re-emerged – not an impossible scenario for professional investors operating in the 1950s with a recollection of the 1930s.

Secondly, since the period between rent reviews was 50 years, then 40 years, 33 years and so on, the upward only provision may have initially been a trade-off to compensate the landlord for having to wait such long periods of time before increases in income reflected the true level of rents for real estate assets.

The most popular argument, but completely contradictory to the liability matching theory, argues that both parties may have agreed to UORRs because they must surely result in increases in rent rather than falls since the interval between them is so long and rents and inflation are expected to behave in a similar fashion. As we have seen, it was not until the early 1990s (some 35 years after their introduction) that UORRs began to distort rental payment levels since rental declines were so severe in certain markets that rents agreed five years previously were still much higher than the current rental values.

In undertaking this research, no consensus has appeared as to which of the three alternatives above provide the correct explanation for rent reviews to be upward only in nature.

4 UK Lease Structures - current practice

Understanding the state of the current leasing regime that governs any property market is fundamental to appreciating investment performance. Income growth generation from an asset class determines to a very large extent total return delivery. Any change in UK lease structure away from long duration agreements, particularly if accompanied by the removal of UORRs, towards shorter duration and upwards and downwards rent reviews, will have profound implications for income growth in the future. This change in income growth patterns should affect total returns, risk premiums and pricing in UK real estate.

There has been substantial and veritable change in UK lease structures in the past 15 years. This chapter charts the progress of this change, highlighting the effective removal of UORRs from materially large swathes of the UK commercial property market. The contrast between the situation in 1990 and the end of 2003 (the latest date for which accurate data is currently available) could not be starker. In 1990, as 90% of leases within IPD by value were for 20 or 25 years, they would virtually all have contained market reviews of an upward only nature. If breaks are reflected, by 2003 well over 60% of leases by number were for five years or less or had a break in the first five years (although this dropped to 35% when ERV weighted).

In order for us to track the change in UK leasing practices through time, it is paramount that an accurate history of lease information and an up to date and equally accurate picture of the present lease regime in the commercial property market are available. Fortunately, the UK is blessed in these areas.

The interim and final reports for government (ODPM, 2004) and (ODPM, 2005) on the monitoring of the code of practice provide the most comprehensive sources of information in this area that have been made available to date. Chapters three and four of those documents analyse both the IPD and VOA information. IPD is generally regarded to provide coverage for the better quality property stock that is typically owned by large financial institutions (Life Funds and Pension Funds) and property companies, and occupied by large corporate, often multi-national tenants. It is also generally acknowledged that such properties are occupied on longer leases than smaller properties, which are often in less valuable areas, and occupied by small and medium sized enterprises. In order to obtain a broader view of the UK commercial leasing market therefore, the interim report also examined the VOA data. These assets are typically owned by smaller landlords and occupied by small and medium sized enterprises; they are often situated in less valuable locations.

4.1 Investment Property Databank Data

At the end of 2002 (at the time the Reading team undertook their analyses for the interim report), investors contributing to the Investment Property Databank (IPD) held over 13,400 properties. Over 11,000 of these properties were eligible to be included in IPD Annual Index, which is estimated to represent 75% of the assets held by UK institutions and listed property companies (IPD, 2003a). Not surprisingly, the number of tenancy records is far greater, standing at 77,000 for each year including both existing and new leases.

If the March year-end landlords are also included, an extra 11,000 tenancy records become available. Together, therefore, the interim report had at its disposal approximately 88,000 tenancies (both new and existing). Significantly, the number of new leases, once the two IPD samples were combined, was approximately 5,500 in each year of the study period (ODPM, 2004). It is the new leases, granted in the six-year period between 1997 and 2002, that were the specific subject of the study. Table 4.1 below provides a detailed breakdown of the number of leases by market segment that were included in the analysis.

4 UK Lease Structures - current practice

Table 4.1: **Number of new leases**

Principal Commercial Sectors	1997	1998	1999	2000	2001	2002
Retail	2,353	2,673	2,843	2,952	3,017	2,868
Office	1,322	1,493	1,425	1,827	1,569	1,588
Industrial	636	739	732	1,494	1,891	1,330
PAS Segments						
Standard Retails . South East	431	548	549	656	525	529
Standard Retails - Rest of UK	304	288	346	311	347	347
Shopping Centres	1,363	1,597	1,699	1,657	1,858	1,670
Retail Warehouses	255	240	249	328	287	322
Offices - City	222	265	213	316	296	304
Offices - West Ed	368	428	396	491	495	530
Offices - Rest of South East	430	474	509	627	482	421
Offices - Rest of UK	302	326	307	393	296	333
Industrials - South East	382	447	424	592	630	677
Industrials - Rest of UK	254	292	308	902	1,261	653
All Segments (excl other)	4,311	4,905	5,000	6,273	6,477	5,786

Source: ODPM, 2004

4.2 Method of analysis

The interim report discusses in some detail the two major options available when undertaking the lease analysis work, and the reader is referred to the appendix of that report for a full discussion (ODPM, 2004). However, it is appropriate at this point to highlight the issues involved and describe, in a general sense, the analysis that was undertaken.

4.2.1 Longitudinal versus cross-sectional approaches

Most previous studies of average lease length, for example, Crosby and Lizieri (1998), BPF/IPD (2002) and Nelson Bakewell/OPD (2003) have adopted a longitudinal approach. These utilise a single cohort of leases and analyse the different lease data for different years covered. Due to the natural bias upwards, this approach has clear limitations where the aim is to compare lease trends through time. To illustrate, if we were examining 1998 leases by using 2002 data, any lease granted for, say, three years would have expired, so the 1998 analysis would be based on the longer leases that remained in the sample by 2002. This would bias the 1998 lease lengths upwards.

Where the data permits, it is preferable to adopt a cross-sectional approach. In this type of analysis, instead of measuring lease lengths by using recently collected data, figures for each year are calculated using the data from that year. This requires a detailed historic tenancy dataset – a requirement that has hampered this approach in the past. However, where this can be overcome, the approach obviously eliminates the problem described above.

In the interim report a cross-sectional approach was adopted between 1997 and 2002. However, for analyses of earlier years, the use of longitudinal methods is unavoidable.

4 UK Lease Structures - current practice

4.2.2 Un-weighted and weighted measures of lease length

A further methodological issue that the interim report had to deal with was that of weighting the average lease length. Lease trends can be analysed on an un-weighted basis, with all leases in the sample having equal influence. However, various weighting techniques can be used to reflect the size or value of properties in the sample. This type of analysis should highlight whether larger and more valuable properties attract different lease terms than do smaller, less valuable buildings.

Three weighting factors were adopted in the interim report: the rent passing on each lease, the estimated rental value (ERV) and the floorspace of each unit. Previous studies have generally adopted rent passing as the weighting factor. However, during the compilation of the interim report, a potential problem with rent weighting was discovered. For leases granted with a rent-free period that was still in operation in the December of the year in which the lease began, the rent collected is zero. All such leases would, effectively, be excluded from the (rent passing) weighted averages whilst still be included in the un-weighted averages.

More disconcerting is the likelihood that long leases will have the longest rent-free periods, which, in turn, will be more likely to be in operation at the measurement point. This would mean that they would be excluded from the analysis. Secondly, in certain market segments rent-free periods are likely to be more common than in others. This could produce unknown biases in the weighted results.

By using three weighting schemes, the interim report could compare the consistency or otherwise of the weighted figures. The ERV weighting has been adopted as the benchmark.

4.3 Average Lease Term

As with other lease length studies in the recent past, the interim report has confirmed that in the UK institutional property market, average lease length for all property types has continued to decline. On an un-weighted basis, the all-property lease length has fallen from nearly 10 years in 1997 to just over 8 years in 2002. On an ERV-weighted basis, the average lease length has gone from 16.4 to 13.8 years at the all-property level. Table 4.2 highlights the trend through time.

4 UK Lease Structures - current practice

Table 4.2: **Average Lease Lengths - Main Sectors 1997 to 2002**

	1997	1998	1999	2000	2001	2002
Unweighted						
Retail	10.5	9.6	9.9	9.4	9.6	9.2
Office	8.0	7.6	7.2	8.3	7.7	7.6
Industrial	9.8	8.9	8.4	7.5	7.8	6.9
All Sectors (excl other)	9.6	8.9	8.9	8.6	8.6	8.2
Rent Weighted						
Retail	16.9	15.4	15.7	14.5	13.8	14.1
Office	14.8	12.7	12.5	13.4	12.5	11.0
Industrial	16.7	13.9	14.1	13.8	12.8	11.7
All Sectors (excl other)	16.2	14.2	14.4	13.9	13.1	12.6
Floorspace Weighted						
Retail	17.7	17.1	15.7	15.5	14.4	16.1
Office	13.0	12.3	13.7	13.0	14.3	14.4
Industrial	16.5	13.2	13.1	12.9	12.7	10.8
All Sectors (excl other)	16.0	14.2	14.1	13.5	13.7	13.4
ERV Weighted						
Retail	17.1	15.3	15.5	14.7	14.0	14.4
Office	15.8	14.5	13.8	14.4	13.1	13.7
Industrial	16.7	14.2	14.0	13.9	12.7	12.0
All Sectors (excl other)	16.4	14.8	14.6	14.4	13.5	13.8

Source: ODPM, 2004

The difference between the office rent-weighted and the office ERV-weighted length of lease in 2002 illustrates the bias of rent-free periods that was discussed in section 3.2.2. The rent-weighted measure is 2.7 years lower, illustrating the problem of rent-free period data excluding some longer lease from the analyses.

The same analysis was performed including break clause information. Here, the term of the lease is defined as the period to the first break(s) where existing or to the full term of the lease where theere are no breaks. At the all-property level, this has meant that the un-weighted average length of lease has gone from 8.7 years to 7.3 years and the ERV-weighted term has declined from 15 years to 12.2 years between 1997 and 2002.

The effect of break clauses appears to have shortened the lease term by between one to two years depending on the type of property analysed.

Interestingly, the un-weighted lease lengths for office and industrial properties on this basis were 6.2 and 6.0 years respectively as shown in table 4.3.

4 UK Lease Structures - current practice

Table 4.3: **Average Lease Lengths to First Break - Main Sectors 1997 to 2002**

	1997	1998	1999	2000	2001	2002
Unweighted						
Retail	9.9	9.1	9.3	9.0	9.2	8.5
Office	6.8	6.7	6.1	7.4	7.0	6.2
Industrial	8.2	7.9	7.3	6.4	6.8	6.0
All Sectors (excl other)	8.7	8.2	8.1	7.9	8.0	7.3
Rent Weighted						
Retail	16.2	14.9	15.4	14.1	13.5	13.0
Office	12.7	11.3	10.7	12.5	11.4	8.8
Industrial	15.0	12.7	12.6	12.9	11.5	10.0
All Sectors (excl other)	14.8	13.3	13.3	13.1	12.3	11.0
Floorspace Weighted						
Retail	17.2	16.4	15.2	15.0	14.0	15.3
Office	10.7	10.9	11.2	12.0	13.7	12.5
Industrial	14.7	11.8	11.7	12.1	11.9	8.7
All Sectors (excl other)	14.4	13.0	12.8	12.8	13.1	11.7
ERV Weighted						
Retail	16.4	14.8	15.2	14.3	13.7	13.3
Office	13.9	12.9	12.0	13.4	12.0	11.6
Industrial	149.0	12.9	12.7	13.1	11.5	10.4
All Sectors (excl other)	15.0	13.8	13.6	13.7	12.7	12.2

Source: ODPM, 2004

4.4 BPF/IPD Annual Lease Review 2004

The BPF/IPD Annual lease review (BPF/IPD, 2004) highlighted a continuation in the trend of ever shortening lease length in the UK commercial leasing market.

At the All Property level the average length of lease on new lettings (including the first break information) had fallen to 6.8 years in 2003 on an un-weighted basis and to 11.7 years on an ERV-weighted basis. Interestingly, the decrease in lease length occurred across all sectors. The un-weighted average length of lease for new lettings in 2003 for retail, offices and industrial was 8.8 years, 5.3 years and 4.7 years respectively.

4.5 The Final ODPM Report

The final report (ODPM, 2005) extended the cross sectional analysis of IPD lease structure to year-end 2003. Not surprisingly, the results are similar to the BPF/IPD annual lease review.

The main finding was that the average lease length has continued to fall across all three main property sectors up to the end of 2003. The average un-weighted lease length has fallen further to below 8 years in 2003, whilst the average ERV-weighted lease length has fallen to 13 years.

4 UK Lease Structures - current practice

The average lease length to the end of the first term or break, where one exists, has also fallen in all three sectors, with the All-Property un-weighted average again falling by around 2 years, from under 9 years in 1997 to under 7 years in 2003. The ERV-weighted average has also fallen by three years from 15 to 12 years over the same period.

The final report for the ODPM commenting on lease length concluded, " … there is no doubt that the long-term trend continues to be downward" (ODPM, 2005 p. 71).

4.6 The Drivers Jonas Research

Drivers Jonas (2004) have also utilised IPD data on new lettings from 2002. They were particularly interested in examining lease length by rental band and geographical region. They found that for smaller properties (rent at under £10,000pa), the average lease length was 4.4 years and that 85% of leases granted in this band were for less than 10 years. The findings for the higher rental bands were very different indeed and corroborate the interim report's findings on a weighted and un-weighted basis. For properties with a rent of £100,000pa or more the average lease length was 12.8 years and 74% of leases in this band were granted for periods of 10 years or more. All the analyses were undertaken on an un-weighted basis.

The team also found that leases in Greater London were 6.8 years compared to 9 years for the rest of the UK. Once again, this is an un-weighted measure of lease length and it is thought that the weighted measure would have led to a large increase in the length of London terms.

4.7 The frequency of different lease lengths

Whilst the un-weighted and weighted averages are informative, it is particularly useful to observe the frequency distributions of lease lengths granted between 1997 and 2003.

In examining these distributions in more detail, it should be recalled what the headline distributions were in 1990. This information is contained in the DETR (2000) study, which established that in 1990, around 60% by number and 90% by rent roll of all lettings contained within IPD were for terms of 20 or 25 years (although the analysis did not include the effect of breaks).

If breaks are included, by 1997 just over 10% by number and 30% by rental value had lease terms of 20 years or over. By 2003, leases of 20 years or over had dropped to just over 5% by number and to 20% ERV weighted (ODPM, 2005). By number, over 40% of all lease terms/first breaks were for periods of between 2 and 5 years and in both industrial and office markets this was well over 50% and no more than 10% of all leases in these sectors were for more than 10 years.

By number, in 2003, 79.8% of all lease contracts were granted for a term of 10 years or less (including the first break). On the same basis, once again in 2003, 62.5% of lease contracts were granted for 5 years or less. On an ERV-weighted basis, the same analysis for 2003 produces 43% for 10 years or less and 22% for 5 years or less.

For offices, the same analysis produced the following results. By 2003, 73% of leases by number were for 5 years or less (on an ERV-weighted basis this falls to 35%). For the industrial sector it was as high as 78% un-weighted. For retail, the same analysis highlighted that just 45% by number were for five years or less.

4 UK Lease Structures - current practice

Table 4.4: **Frequency of different lease lengths - 1997 and 2003**

	All Prop	Retail	Office	Industrial
1997 - % of Leases				
<1 yr	6.4%	7.6%	4.8%	5.7%
1 yr	11.3%	11.5%	12.9%	7.7%
2-4 yrs	15.0%	12.1%	20.3%	14.5%
5 yrs	18.2%	14.2%	23.6%	22.0%
6-9 yrs	4.4%	2.1%	5.4%	11.2%
10 yrs	14.8%	14.2%	15.5%	15.4%
11-14 yrs	2.6%	2.5%	2.9%	2.2%
15 yrs	14.5%	19.7%	8.2%	8.3%
16-19 yrs	2.0%	1.6%	1.5%	4.6%
20 yrs	2.9%	2.8%	2.5%	3.9%
21-24 yrs	0.8%	1.4%	0.1%	0.2%
25 yrs	6.4%	9.3%	2.3%	4.1%
>25 yrs	0.6%	1.0%	0.2%	0.3%
All years	100.0%	100.0%	100.0%	100.0%
2003 - % of Leases				
<1 yr	8.3%	7.9%	6.5%	10.2%
1 yr	12.2%	10.9%	13.3%	13.5%
2-4 yrs	21.9%	13.1%	27.9%	31.7%
5 yrs	20.1%	16.6%	25.0%	22.2%
6-9 yrs	4.6%	2.5%	8.2%	5.3%
10 yrs	12.7%	16.1%	8.8%	10.0%
11-14 yrs	1.8%	2.1%	1.8%	1.3%
15 yrs	12.3%	21.3%	5.4%	3.0%
16-19 yrs	0.9%	1.1%	0.9%	0.5%
20 yrs	2.8%	5.1%	0.8%	0.5%
21-24 yrs	0.3%	0.4%	0.5%	0.1%
25 yrs	1.5%	2.7%	0.7%	0.4%
>25 yrs	0.6%	0.1%	0.3%	1.5%
All years	100.0%	100.0%	100.0%	100.0%

4.8 Rent Reviews

The interim report provides an excellent summary of the prevalence of rent reviews, their type and their frequency; again using IPD data. The main findings of the report are as follows.

4 UK Lease Structures - current practice

The average review term has hardly moved throughout the 1997-2003 period. The standard review term is still five years and the average review term just under five years.

Around 60-70%, depending upon the sector, of leases have five-year rent review patterns and this increases to between 80-90% when any kind of weighting is taken into account. This suggests, of course, that smaller lettings with lower rents are most likely to be let on lease contracts with no reviews.

Around 20-30% of leases, dependent upon the sector, were found to have no rent reviews on an un-weighted basis and this falls to around 10% when weighting of any kind is taken into account. This can be seen in table 4.5.

Table 4.5: **Frequency of Different Review Periods - Main Sectors 2002**

	All property	Retail	Office	Industrial
Unweighted				
No Review	22.6%	19.8%	22.4%	28.8%
1 yr	4.8%	5.6%	6.0%	1.5%
2 yrs	0.9%	0.7%	1.1%	1.0%
3 yrs	3.7%	1.9%	3.0%	8.3%
4 yrs	0.7%	0.5%	0.7%	1.1%
5 yrs	66.9%	71.0%	66.6%	58.3%
> 5 yrs	0.5%	0.4%	0.2%	0.9%
	100%	100%	100%	100%
Rent Weighted				
No review	11.2%	9.3%	11.9%	14.7%
1 yr	3.1%	2.9%	4.3%	1.4%
2 yrs	0.7%	0.5%	0.3%	1.9%
3 yrs	1.3%	0.7%	0.8%	3.2%
4 yrs	0.7%	0.1%	1.0%	1.5%
5 yrs	82.6%	85.8%	81.5%	76.6%
> 5 yrs	0.5%	0.6%	0.2%	0.6%
	100%	100%	100%	100%
ERV Weighted				
No Review	11.4%	9.7%	11.9%	15.0%
1 yr	2.8%	2.9%	3.1%	1.9%
2 yrs	0.6%	0.5%	0.1%	1.6%
3 yrs	1.1%	0.8%	0.7%	2.8%
4 yrs	0.6%	0.1%	0.7%	1.5%
5 yrs	83.2%	85.6%	83.3%	76.7%
> 5 yrs	0.4%	0.5%	0.2%	0.4%
	100%	100%	100%	100%

Source: ODPM, 2004

4 UK Lease Structures - current practice

This data does not however include a vast number of new leases granted with fixed or indexed rents which have resulted in new sectors of the market being established such as pubs, health and student accommodation.

The interim and final reports also found that where lease contracts do provide for a rent review during the term, the overwhelming majority of them have an upward only mechanism by which this rent is adjusted. Indeed, the interim report highlights that in 98.4% of cases (2,256 of the 2,292 leases in the 2002 sample) UORRs were in operation. The final report concurs with these findings.

The number of 'non-standard' reviews is still very low. Between 1997 and 2001, only 7% of leases contained fixed rent reviews, less than 5% contained stepped rents and only 1% had a turnover element.

4.9 Combining lease length and rent review information

The argument mainly relied upon by those who regard UK leasing practices as inflexible, is the reported prevalence of UORRs. The ODPM reported that by 2002, UORRs were found in 98.4% of leases granted that year that had reviews.

However, this is very different from reporting the often-interpreted version of this statement which is that 98.4% of all leases contain UORRs.

Only when the information on lease lengths and rent reviews are combined, can we begin to explore comprehensively the true, or effective, frequency of UORRs. Recall that on an un-weighted basis, the incidence of leases of five years or less taking into account breaks was around 60% in 2002. This represents substantial structural change in the market over the past decade. In 1990, 60% of the assets within IPD (by number) were governed by lease contracts for 20-25 year terms with UORRs. By the end of 2002 this had been completely reversed and 60% by number were either without a rent review mechanism altogether or were granted on terms that made it possible for the tenant to terminate at or before the first review.

Further detailed analysis is possible in order to combine the lease length data and the prevalence of rent reviews to arrive at an "effective frequency" of UORRs in the UK market that takes account of the change in lease length through time.

Firstly, the average lengths of new leases granted between 1990 and 2003 were obtained from IPD tenancy files. Secondly, the percentage of new leases granted for terms of five years or less were computed. From 1997 onwards this was taken from IPD tenancy file and prior to this the percentage was estimated. It was then necessary to estimate the percentage of five-year terms that had rent reviews within the contracts. Once again, IPD tenancy details were used from 1997 onwards and prior to that assumptions have been made. The tenancy detail information and assumptions combined to produce a long term average of around 10% - that is, of leases that are for five years or less 10% contain rent reviews. We have assumed that 100% of these were upward only in nature, although this is estimate is almost certainly too high.

By subtracting away those leases that were too short to contain rent reviews and adding back in those that although short contained rent reviews (all assumed to be upward only) we can arrive at an estimate for the percentage of new leases that contain UORRs. The analysis was run on a weighted and un-weighted basis. The complete set of results are contained in Appendix Two and selectively illustrated below.

4 UK Lease Structures - current practice

Figure 4-1: **Effective frequency of UORRs through time - All Property Weighted**

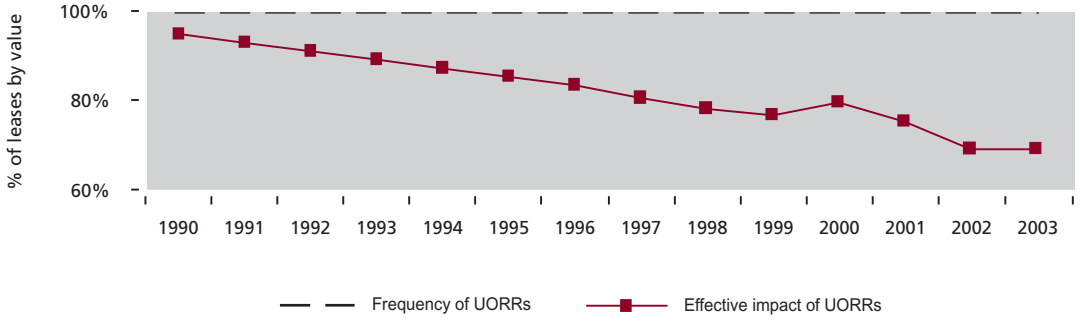


Figure 4-2: **Effective frequency of UORRs through time - All Property Unweighted**

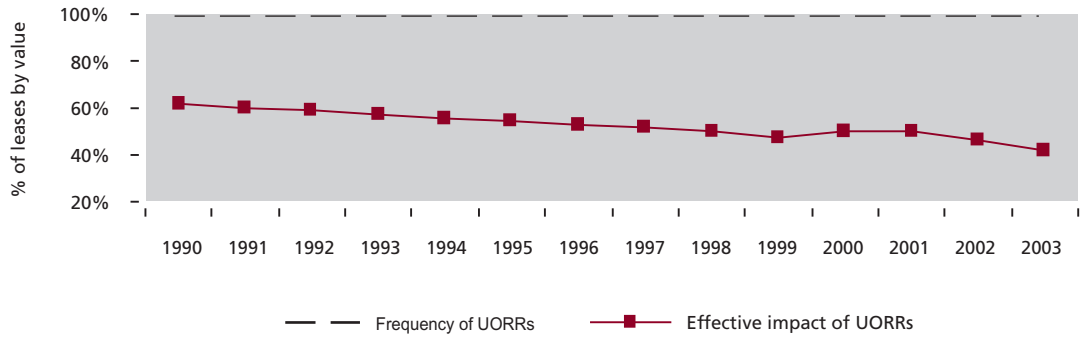


Figure 4-3: **Effective frequency of UORRs through time - Office Weighted**

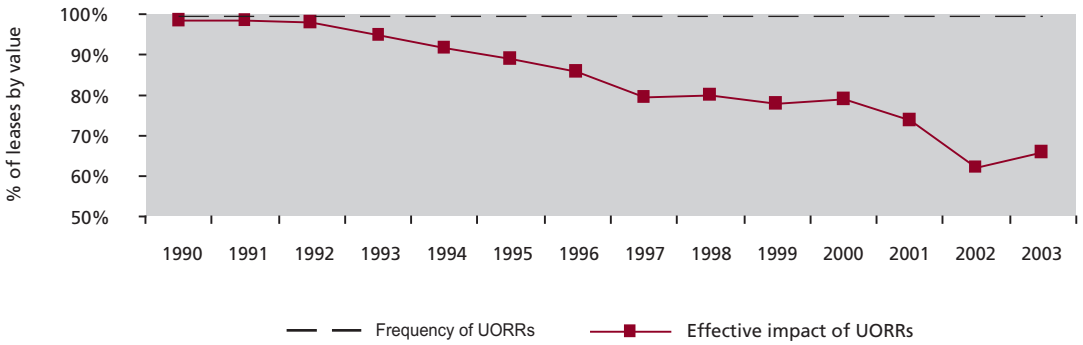
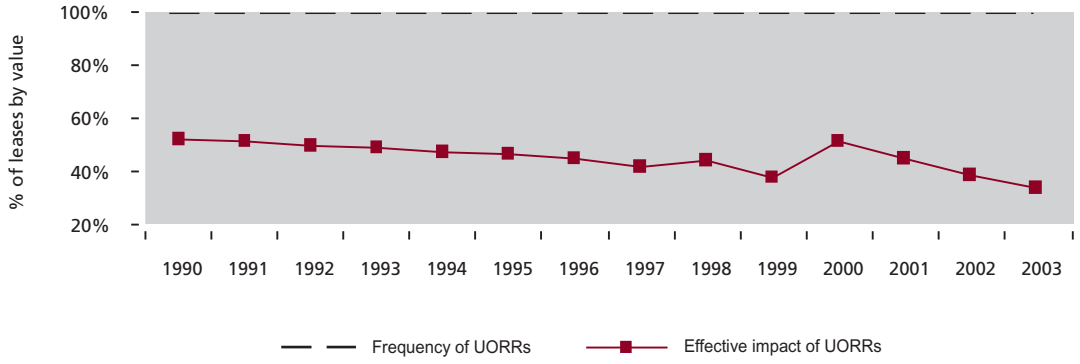


Figure 4-4: **Effective frequency of UORRs through time - Office Unweighted**



4 UK Lease Structures - current practice

So whilst the upward-only nature of rent reviews has remained constant through time, the shorter lease lengths have reduced their effective frequency considerably. For example, on an un-weighted basis at the all property level, the percentage of lease contracts granted in 2003 that were governed by UORRs was estimated to be 41%. Stunningly, the equivalent percentages for office and industrial property were 33% and 27% respectively at the end of that year. The all property number for the weighted lease information was 69%. The equivalent number was estimated to be 95% in 1990.

Table 4.6 presents a summary of the findings.

Table 4.6 Percent of Leases by Value

	Frequency of UORRs %				Effective Frequency of UORRs %			
	1990	1995	2000	2003	1990	1995	2000	2003
All Property Weighted	99.3	99.3	99.3	98.9	94.9	85.1	79.6	69.1
All Property Un-weighted	99.3	99.3	99.3	98.9	61.4	54.5	49.9	41.4
Office Weighted	99.1	99.1	99.1	99.5	98.7	88.8	79.1	65.6
Office Un-weighted	99.1	99.1	99.1	99.5	52.0	46.1	51.0	33.4
Retail Weighted	99.2	99.2	99.2	99.8	84.1	81.8	81.3	79.4
Retail Un-weighted	99.2	99.2	99.2	99.8	56.9	56.9	53.3	54.4
Industrial Weighted	99.6	99.6	99.6	96.2	99.2	87.5	75.2	49.0
Industrial Un-weighted	99.6	99.6	99.6	96.2	81.6	63.1	42.0	26.6

Source: IPD

It is important when modelling cash flows and total returns from real estate that both rent review data and lease length information are combined.

As we will demonstrate in the modelling section of the report, for the purposes of generating net income profiles in property portfolios, the frequency with which rental streams are marked to market is paramount - this will affect the level of income collected by landlords (or paid by tenants) and its volatility. The marking to market of rental streams is not just influenced by the frequency and type of rent review provision, it is also determined by length of lease.

We would refer the reader to the modelling results section of the report for a detailed review of this area. However, given the substantial lease length change that has occurred in the UK commercial leasing market over the last 15 years, the marking to market of rental streams is occurring at a much faster rate than ever before (and arguably much faster than is widely appreciated) across all property types.

If this does inject greater volatility into the cash flows and capital values of commercial real estate to the extent envisaged by our modelling exercise, allocations to real estate should come under threat. Ironically, of course, the appetite for real estate amongst investors could not be higher. These investors are, of course, attracted to the asset class due to historic total returns, which have been fundamentally influenced by historic lease structures that did not mark to market income as frequently as contemporary, shorter, contracts.

5 Lease Pricing – A Review of the Research

5.1 Introduction

The dramatic changes to leasing patterns in the 1990s and the increase in the political relevance of the subject have produced growing interest in lease pricing from real estate researchers. A range of models drawn from economic theory, most substantially from real options, has been developed to analyse lease pricing problems. Whilst most of the work discussed below focuses on only one of the lease variations proposed by the ODPM - the abolition of upward only rent review provisions[1] - it is extremely germane since the ability of rents to fall is probably the most complex aspect of a shift to shorter, more flexible leases. Researchers have largely neglected the problems associated with multiple consequences in short leases. Much of the work is quite technical and can verge on the impenetrable to the lay reader. However, although tempting, technical difficulty is an unconvincing reason for dismissing research which can help us to understand market outcomes and processes.

5.2 The Lease Pricing Problem

The options outlined in the ODPM's consultation paper have the potential to affect the level and security of income generated by commercial property assets leased to business tenants. Naturally, changes to the level and security of income will also affect capital security and returns. The options proposed by the ODPM each have some different and some common consequences for income profiles generated by leases. We do not consider each one in turn. We discuss below the consequences for the landlord of imposing a shift to shorter leases (five years) and outline the critical factors affecting the extent of these risks. Hence we discuss mainly option five since it incorporates elements of the other options.

5.3 Short leases – the investor's perspective

It is possible to identify four potential benefits of short leases from the investors' perspective.

i. a higher income return,
ii. tenant attraction and retention,
iii. creation of tenant turnover and
iv. increased flexibility to refurbish and redevelop
v. Apart from (i), these benefits are likely to be limited to particular assets and/or market circumstances.

5.4 The downside of short leases is much more obvious and is associated with increased possibilities of:-

i. voids producing no rental income and associated additional costs;
ii. falls in rent;
iii. negotiation weakness at rent review;
iv. risks associated with depreciation and repair and maintenance;
v. reduced quality of new tenant and new lease; and
vi. reduced liquidity.

[1] This is probably due to the fact that the UORR provision is one of the lease events that is directly comparable to a financial option.

5 Lease Pricing – A Review of the Research

It is apparent that, from the perspective of the value of the investor's interest, a key financial issue relates to the cost and the associated probability of tenant vacation and/or the level of a downward rental adjustment. If these variables were certain, incorporating their effects into rental and capital valuations would be more straightforward. Manifestly this is not the case. In order to estimate the financial costs associated with potential letting termination, three key questions need to be addressed:

- Firstly, what is the probability that the tenant will terminate the occupation? This will be determined by both occupier-specific and market factors.
- Secondly, assuming that the probability of tenant vacation is greater than zero, what are the projected costs of a letting termination?
- Thirdly, what is the probability that the rent passing will exceed the Market Rent at the point of potential letting termination or the likelihood of a downward rent review?

These issues also interact with the security of tenure provided to business tenancies through the 1954 Landlord and Tenant (Business Tenancies) Act. Under this legislation, tenants have the right to renew business tenancies (subject to certain conditions). A large proportion of landlords currently grant short leases only if the tenant agrees to 'contract out of the 1954 Act'. In mainland Europe, it is rare that tenants have security of tenure and short lease terms. If new legislation imposes short lease terms, landlords will more often incur the costs of potential voids and/or the additional costs associated with lease renewals and related court procedures.

Obviously, the estimation of these three variables is characterised by uncertainty. Given the choice, it seems rational that investors will require that the expected net wealth generated by a short lease will be equal to the expected net wealth generated by a long lease.

5.5 Short leases – the occupier's perspective

The technological and business stimuli motivating many business occupiers to seek shorter leases have been well documented. Given that the tenant has identified the need for a short lease term, they will then have to make a decision concerning the financial value to them of this lease term. A major negotiation parameter will be set by investors' required 'compensation' level for a short lease. However, for tenants who value flexibility, it is necessary to decide whether this price is worth paying.

The positive value of the right to vacate will in most circumstances lie with tenants who benefit from increased flexibility in the management of their operational property holdings, the negotiating advantage associated with the ability to make the landlord incur costs associated with tenant vacation and the possibility of a downward adjustment of rent. From the tenant's perspective the main risks of long leases relate to the expected costs of exit. These will be determined by the actual costs of exit and the probability of exit. Such costs will vary according to business sector, individual company and market conditions. Key factors will be:-

- fit outs costs;
- anticipated growth/contraction in the company;
- business structure of the company;
- the use to which the premises are put (core versus secondary)
- probability of building obsolescence and depreciation; and
- probability of location obsolescence.

5 Lease Pricing – A Review of the Research

Further, in order to assess the tenant's position it is important to appreciate the available alternatives. In a long lease, these are to assign the lease, to sublet surplus space or to negotiate surrender with the landlord. The relative cost of these options is dependent upon market conditions at the point of desired termination of occupation. In good market conditions it is reasonable to assume that there is a high probability that a lease can be assigned, surplus space can be sublet or that a landlord will accept a surrender payment. However, in a market downturn, the demand for premises will be lower, with obvious consequences for the probability and costs of assignment/subletting and surrender. It follows therefore that market volatility is an influential determinant of the tenant costs of occupation termination.

Whilst the lease price should fall somewhere between the negotiation parameters of the landlord and tenant, it is also likely that in many cases the value of flexibility to the tenant will not exceed the required 'compensation' to the investor for additional risk. In addition, there are information asymmetries: whilst occupiers should be able to estimate the financial cost of lease flexibility to the investor, the investor will find it much more difficult to estimate the financial value of lease flexibility to the occupier. Indeed, occupiers have difficulties in estimating the financial value of lease flexibility to their businesses.

The constantly changing lease structure in the UK means that academics and practitioners are faced with the following question(s). How does the property industry either determine new rent levels for different terms of trade (with the new lease regime implying in particular the loss of UORRs, much greater use of break options and ever-shortening terms) and price these different terms in an investment sense?

The research team were faced with a combination of these problems, being charged with measuring the net income growth and annual capital value change generated by portfolios governed by different lease regimes in order to produce total return series.

5.6 Research Approaches

The academic literature appears to present three different solutions to these problems - DCF, Simulation and Option Pricing. Each has its strengths and weaknesses. There are also problems that are concerned with the behavioural issues and heterogeneity of real estate. A good example is the applicability of option pricing to break clauses where factors other than those suggested by finance theory are at play in determining tenant behaviour.

5.6.1 The DCF approach

Applying the DCF approach to value different lease variants would seem at first a simple exercise. But while it would be relatively easy to include shorter lease terms, it is more difficult to demonstrate exactly how sensitive the valuation would be to changes in expectations and different economic environments. How would the valuer respond to changes in the variability of economic outlooks? What kind of forecasting model would be assumed? The key problem (also discussed below) is that discounted cash flow approaches focus on expected cash flow rather than possible cash flows. Whilst most probable cash flows may be identical for different lease options, the range of possible cash flows is often much more variable. It quickly becomes obvious that conventional DCF techniques provide little guidance on how to adjust values in the face of large variations in lease characteristic.

5 Lease Pricing – A Review of the Research

5.6.2 The Option Pricing Approach

An obvious approach for academic researchers is to employ option pricing techniques. These are based on the analysis of financial options and stem from work by Black and Scholes (1972) and were applied to real estate in a rigorous and elegant approach by Grenadier (1995). The best of these models produce "closed-form solutions"[2] and take into account the changes in value of different variations in lease characteristics in a way that reflects different economic environments, and can provide some valuable insights into the normative pricing of lease variations. There are however some theoretical problems with these models. The first difficulty is that financial option values are justified on the basis of liquid markets in which portfolios of assets can be quickly traded and re-constructed. Without such markets, the modeller has to resort to assuming adjustments for different elements of risk reflected in an appropriate discount rate. Different approaches have been suggested in order to derive appropriate risk-adjustment but it should be noted that they require researchers to borrow other theoretical models derived from stock-market research. It also must be stressed that options are defined as contingent securities: their value depends on behaviour of the underlying asset. Given a market-based value of one lease, values of other related leases can be derived using option price approaches, but it becomes more problematical to generate values in the absence of any market indicator.

5.6.3 The Monte Carlo approach

An alternative approach is to use Monte Carlo simulation in either a conventional DCF or an options framework. Both of these require information on the distribution of events and decisions by the landlord or tenant. This approach has been widely advocated and has resulted in professional software aimed at producing Monte Carlo solutions to cash flow modelling. These models provide ways of simulating future returns and allow users to explore the sensitivity of the value to changes in inputs.

5.7 Features of Leases

5.7.1 Break clauses

One obvious issue which might be explored using a pricing model is the provision of a break clause. Early work by Lizieri and Herd (1994) used simulation but assumed probabilities of the break being taken by the tenant. Ward (1997) assumed that the break would only be taken if it were financially optimal for tenants. The argument made for this simplistic view was that if the value to the landlord was calculated on the basis of financially optimal decisions taken by the tenant, the value to the landlord could only be greater if the break were taken at any other time. Both of these early studies however suffered because of the lack of reliable data on the incidence of breaks being offered, taken and the financial consequences.

[2] The preference for finding closed form solutions stems partly from the satisfaction of modelling a complicated problem by an elegant and parsimonious model and partly because the construction of a formula or algorithm can result in almost instantaneous calculations of values or prices.

5 Lease Pricing – A Review of the Research

5.7.2 Rent Reviews

Several studies by French and Ward (1997) discussed the pricing of UORRs using an option pricing (Monte Carlo) approach. In a later paper with ODPM (2004), the comparison of DCF models and option pricing approaches was covered and the point was made that since option pricing rested on risk-neutral arguments, the expected rental path in a conventional DCF approach was not the same as that implied by an option pricing approach. This would be important for leases, since the UORR feature would appear to depend on the future expected rental growth. The option pricing approach effectively lowers the implied rental growth matched by a reduced discount rate and thus produces different but consistent answers to the DCF numbers.

Like any good model, lease pricing models illuminate how and why rents are formed in a market place. The research discussed below helps us to understand the changes to investment risks caused by different lease structures. Most models have attempted to generate practical solutions. They help us to identify the crucial variables and assumptions, data problems and micro-market structures that can frustrate analytical solutions.

5.8 The Option Pricing Approach to Lease Pricing: Grenadier' s Model

The most influential recent work on lease pricing is Grenadier's (1995) article analysing a whole range of lease options. Although challenging, it is important and has been influential in stimulating further research in this area. Grenadier explores the analogy of different lease lengths being comparable to bonds with different maturities. He sets out to produce an equilibrium rent for any length of lease and a term structure of lease rates analogous to a term structure of interest rates. His approach is to set out the processes by which short-term rents are generated – in essence by interaction of the evolution (as a geometric Brownian motion) of supply, demand and asset values. It is assumed that the value of a service flow (rent) from a lease can be replicated by buying the asset and writing a European call option on the underlying asset.[3] In simple terms, a lease can be represented as buying the property and agreeing that the seller has the right to reclaim the property at the end of the period of use. The seller would only reclaim the property if it had some positive value, and thus the right to reclaim the property. Given the above, the value of the rent is the (equilibrium) value of the freehold interest less the value of a European call option exercisable at the end of the proposed lease period (capital value less value of right to buy it for nothing at end of period of use). Having established the value of the call option, the equilibrium long-term lease payment is an annual equivalent of the difference.

Using this model, Grenadier derives a set of interesting hypotheses about the pattern of lease lengths in different market conditions. Like the term structure of interest rates, he describes three possible term structure shapes – downward-sloping, upward-sloping and single-humped. It is hypothesised that a downward-sloping curve would be associated with a 'hot' market where there is a high ratio between capital values and construction costs. This creates an incentive to build and generates the expectation of an increase in supply with rents falling in the future. Given this expectation occupiers place higher value on short leases relative to long leases since they do not wish to be 'stuck with' a fixed rent in a falling

[3] Essentially the occupier/investor can get identical value (compared to a lease) by buying the freehold interest in the asset today whilst simultaneously receiving the present value of the freehold interest at the end of hypothetical lease term.

5 Lease Pricing – A Review of the Research

market. Landlords, in turn, prefer longer leases where rental falls are expected and would rationally accept less rent relative to short leases. Conversely, in a 'cold' market, the curve is upward sloping. Occupiers expect a lack of new supply, in turn, creating an expectation of future rental increases and rationally pay more for long fixed rent terms. For intermediate cases, the term structure takes a single-humped shape, with no anticipated supply in the short term but a supply response expected in the medium term, and occupiers pay more for protection against short term rises in rent but expect rents to fall in the medium term[4].

Although the model does not take into account transaction costs, vacancies/non-renewals and taxes, there is a powerful message that short lease terms should not automatically produce higher rents. For fixed rent leases and for short leases landlords will require different rents depending on their expectations of future market conditions. If they expect market conditions to improve in the future, they should regard short leases more favourably compared to an expectation of deteriorating market conditions. Grenadier's work revealed the optionality inherent in real estate interests and the key role of rental volatility and the model of behaviour in rents. However, it is based upon a hypothesis of landlord behaviour – the expectations hypothesis – that works well in explaining the term structure of interest rates. It is questionable, to say the least, whether this is an accurate representation of landlord behaviour.

5.9 Applications of the option pricing approach to UK leases

So far, the assumptions made by Grenadier about these variables in pricing the call option have not been discussed. They are discussed in depth in further work which draws upon Grenadier and applies it to the UK leasing context. For instance, Ambrose et al (2002) draw directly from Grenadier (1995) in their pricing model of upward only adjusting rent review leases. Following Grenadier (1995), Ambrose et al (2002) utilize the concepts of market equilibrium relationships in the development of a model for pricing path dependent cash flows.[5] The assumption of market equilibrium is important since

"The equilibrium context implies that in an efficient market, all leases with the same maturity should provide the same present value to the lessor, irrespective of whether the rental rate is fixed, fully variable or partially variable" (Ambrose et al, 2002, 35)

This is a simplistic assumption since it assumes that whatever the lease, the landlord will extract the same value from the tenant's occupation of the property. Drawing upon standard option pricing theory, they make a number of assumptions about

- The (constant) risk free rate
- The instantaneous drift coefficient (growth in rents)
- Instantaneous volatility
- Rental behaviour (a standard Brownian motion is assumed)[6]

[4] This could just as easily be described from the investor's perspective. In a 'hot' market, investors anticipate low future rental growth and require higher rents for short leases since such leases expose them to future downturns. In a 'cold' market, they anticipate higher growth and require lower rents for short leases since such leases enable them to 'access' anticipated higher rents.

[5] UORR clauses present a complication for the development of analytic option pricing solutions to lease pricing. Since the rent after review depends partially on the rent prior to review (it cannot fall below it), the new path(s) depend on the previous path. This tends to complicate a formulaic solution.

[6] This is a stochastic (random) process in which the random variable moves continuously and follows a random walk with normally distributed, independent increments. This assumption about rental value behaviour is important and does not necessarily reflect how rental values actually behave.

5 Lease Pricing – A Review of the Research

They devise an analytic solution to the lease pricing problem. Similarly to a sensitivity analysis, using their pricing formula they estimate a whole set of ratios (UORR rent / Adjustable Rent) based upon different assumptions of the real interest rate and volatility. The use of a sensitivity-type approach illustrates an important point. Even if researchers have confidence in the 'real world' applicability of their model (which is not always the case), there is also empirical uncertainty about the inputs into pricing models. This is not trivial. If landlords are not operating from a common information set, they will not generate common pricing solutions.

Booth and Walsh (2001) build upon their previous work to take an ostensibly more pragmatic approach to the valuation of UORR leases. They start off from the premise that, in order to value future rental income, they need a stochastic model of future rack rents. They consider two possible models of rental behaviour - a standard Brownian motion and an autoregressive model. Early in the paper, they highlight the importance of assumptions about data behaviour and estimation. Whilst using IPD index, they are conscious that estimating growth and volatility from this source is not satisfactory. In another paper, Booth and Walsh (2001b) provide a critique of previous research focusing on the use of standard option pricing assumptions. In particular, they suggest that standard assumptions about constant volatility and a random walk are likely to be inappropriate. They go on to discuss the weakness of the "perfect certainty expected present value" (or DCF) approach. As noted above, the fundamental weakness of DCF approaches is that they ignore differences in the full probability distribution of the growth of rental income and fail to make allowance for possible rather than just expected rent rises. Logically Booth and Walsh apply different discount rates for the secure rent passing and the uncertain future uplifts, but acknowledge practical difficulties in estimating a risk-adjusted discount rate for the uncertain future rental uplifts[7]. Making arbitrary assumptions about a risk adjusted discount rate for the rental uplifts, they use both analytic (for single review leases) and simulation (for multiple reviews) approaches to derive prices[8]. In common with Ambrose et al (2002), they present the results of their models under a wide range of assumptions about rental behaviour, volatility, growth, time to reversion and relationship between market rent and rent passing. It should be noted that the emphasis on making the option pricing models more realistic also has the effect of making the models normative. In other words, researchers discard the task of deriving equilibrium values in favour of allowing investors to introduce more flexible models in which they can impose their own preferences and expectations.

Whilst the work cited above focuses on assets values to the investor, McCann and Ward (2004) examine the optimal lease length from the tenants' perspectives and question the applicability of a term structure. The premise is that from the tenant's point of view, the cost of space varies with the lease length quite independently from the term structure of rental rates so that the value of a lease to a tenant is not exogenously given. In other words, the standard assumption that landlords will extract the same value from the property regardless of lease structure is disputed. The occupancy value will therefore be a function of tenant-specific and market variables – legal and search costs, relocation probability and costs, rent and repairing costs, opportunity costs and ability to assign. They develop a model which, given certain assumptions, prices the range of lease lengths for individual tenants. Their key conclusion is that there is a clientele effect that overlays the financial equivalence of different lease lengths. In essence,

[7] Estimating the discount rate for the contracted rent is relatively straightforward and is driven by the credit rating of tenant.

[8] Ward and McAllister (2003) present a Cox, Ross and Rubenstein binomial tree option pricing approach to the valuation of UORR provisions which produces identical solutions to simulation methods.

5 Lease Pricing – A Review of the Research

landlords should maximise returns by ensuring that the asset is leased to the tenant (segment) for whom it is the optimal lease. The real world observation is that clearly some tenants require long leases for the purposes of being able to recover their initial costs or because of the goodwill associated with the site; department stores and head offices of major companies tend to move infrequently, and small companies may prefer, for business reasons, to take on short leases if they plan to expand or re-locate within their planning horizon. In these circumstances, business reasons dominate the term structure of rents and it is not possible to trade between different clienteles in the way associated with financial models of term structure and arbitrage.

5.10 Empirical Evidence on Lease Rents and Prices

Notably absent from this discussion so far is mention of empirical evidence of differential lease pricing. Following Grenadier's (1995) suggestion that hypothetical pricing solutions should be compared with actual market rents, there has been work that has attempted to identify a term structure of lease rates. ODPM (2004) has documented how legal precedent in the UK has influenced court judgements on how variation in lease terms should be priced. Generally, these judgements have been based on limited (if any) formal research. At the aggregate level, there are significant methodological barriers to identifying the effects of lease terms on rents. In the absence of specific evidence of market 'rules', researchers are faced with problems of trying to disentangle the effects on rents of tenant and building quality and market conditions from lease provisions.

Two Swedish studies have found mixed results. Gunnelin and Soderbergh (2003) report that differences in lease terms have statistically significant effects on commercial rents in the Stockholm CBD for 7 out of 15 years between 1977 and 1991. Partially confirming the term structure of lease rates, they identify an upward sloping curve in the bullish 1980s and a downward sloping curve in the bearish 1990s. Englund et al (2003) find much more mixed results for more recent trends in three Swedish centres. In only half the cases is the null hypothesis that lease length has no effect rejected and there is typically an upward slope in the terms structure of lease rates. This is counterintuitive given the market conditions and it suggests that the research, hampered by a lack of variations in the lease structures, has struggled to cope with the problems of isolating the effects of lease terms on rents from the other variables. They make an important criticism of regression studies that examine for evidence of lease length effects on rents. They argue that previous studies fail to allow for possible variation in the term structure of lease length.

This is the case with ODPM (2004) who, in similar work in the UK, report similar counterintuitive results. In some markets, they find that short lease terms are associated with low rents, whilst in others they are associated with high rents. It is difficult to assess whether this is due to genuine term structure effects. ODPM (2004) suggest two other possible explanations for the findings. First, the model is failing to account sufficiently for the effects of tenant quality and building/location characteristics relative to lease terms – an argument that would be consistent with the McCann and Ward paper. Second, and more interesting, is an implied behavioural explanation for the lack of an impact of lease terms on rent. Their interview survey of market participants found that in the process of rent negotiation, agreement on rent usually preceded agreement on detailed lease terms. This could be explained either by both parties having common views on the characteristics of the leases even before the terms were settled or that the bargaining structure was inefficient within the current institutional environment. Although there has been

little explicit research on the potential of cognitive biases to affect lease prices, it is clear that this may be a fruitful area of investigation. Rental expectations are central to the issue of lease pricing. Behavioural finance, with its roots in the psychological study of human decision making, has found that individuals often do not process information efficiently when making judgements about complex problems. Consequently, judgement and decision-making can be distorted by apparent irrationality and bias.

5.11 Summary and Implications of Literature Review

This brief account of the research into the valuation and pricing of lease variations has argued that traditional methods based on discounted cash flow are prone to problems of inconsistency and bias. Modern approaches based on option pricing have proved interesting and as long as assumptions are accepted, result in pricing implications that could be useful to landlords and tenants.

Property is not simply a financial asset and its value does not fit neatly into the theories developed to explain market prices in well-traded capital markets. However, investors have to compare the returns earned from property with the returns they earn from other assets and the desire for benchmarking and comparisons are inevitably forcing property investors to recognise the imperatives of financial market disciplines. The brief review of research illustrates how property researchers have been applying financial approaches to the analysis of variations in lease structures. Our conclusion is that the findings have been of significant help in explaining how rents might or ought to reflect the lease structure but provide very little evidence on whether tenants and landlords view the problem in the same way. Anecdotally tenants are reluctant to "buy" and landlords are reluctant to "sell" flexibility by adjusting rent to an appropriate level (justified by any financial model). The recognition of these institutional deficiencies was thus persuasive in our decision not to use formal financial models, and instead adopting a careful pragmatic approach to re-examine the returns, rents and yields actually experienced during the past two decades of the property market.

Key Points

- The historic change in leases and government intervention in the letting market have generated growing research interest in the investment consequences of shifting leasing patterns.
- Shifts towards more flexible leases produce a much greater range of possible cash flows from property assets. The vast majority of the additional possible cash flows are below 'the floor' provided by the UORR provision. Whilst the absence of a UORR results in the possibility of rental falls, short lease terms produce multiple risks to investors.
- It is accepted that DCF techniques cannot efficiently price different lease terms. Both the level and volatility of future rental growth are critical determinants of the possibility of cash flows below the below 'the floor' provided by the UORR provision.
- Finance theory suggests that lease pricing adjustments should be contingent upon expectations of future rental growth and volatility. However, it is questionable whether models of lease pricing can account for the complex consequences of more flexible lease terms.
- Researchers have been unable to establish a clear empirical link between rental levels and lease terms.

6 Simulating Lease Reform – Aims, Approach and Methodology

6.1 Introduction

In this chapter we set out the methodological issues that need to be addressed in attempting to measure the impact of lease reform and discuss the approach, assumptions and choices made in this project. We discuss some of the possible approaches and pitfalls that need to be addressed and considered when investigating the possible effects of shifts in leasing regimes and outline the ways in which we have addressed some of the difficulties in order to generate a robust model.

6.2 Ex ante or ex post perspectives?

One possible approach to investigating the impact of a change to the leasing regime on investment performance is to examine the counterfactual position. In essence the question is "How would the introduction of new leasing regime have affected investment performance if the new regime had been introduced in the past?" This backward-looking approach essentially involves the adjustment of past performance figures to measure the implications of alternative lease structures. As discussed further below, it requires assumptions about the reactions to lease reform by market participants.

Alternatively, we could use a forward looking analysis. Essentially the question addressed is "How will the introduction of a new leasing regime affect investment performance if it is introduced in the future?" The central methodological difficulty is that actual impacts are conditional upon future market conditions and future reactions of market participants to market changes. These are unknown and, although it is worthwhile to examine impacts under different scenarios, the quantity of and uncertainty about the necessary assumptions create a credibility issue.

In our analysis, we model from both ex ante and ex post perspectives. We attempt to simulate how IPD All Property Index and its constituent market segments would have performed from 1981-2004 if the leasing regimes in the ODPM's consultation document had been in place. For the same variables, we also generate a hypothetical scenario of index performance for a future 20-year period. In this scenario, we do not forecast future markets conditions and the results of the analysis are not a forecast of future effects of lease reform. Rather we simulate the impacts of lease reform assuming that present lease conditions persist and make specific assumptions about the pattern of rents and capitalisation rates. Rather than in a specific Monte Carlo sense, we use simulation to conduct 'experiments' with a model of a commercial real estate portfolio for the purpose of assessing its behaviour under selected leasing conditions and of evaluating various lease reform options.

6.3 Macro or micro modelling?

The analysis of the implications of shifts in lease structure regimes can also be undertaken at different levels. A bottom-up approach involves simulating portfolios consisting of individual assets with individual variations in age of building, sector, tenant, lease structure and income inter alia. Such approaches can be based upon actual or hypothetical assets. The main advantage of this approach is its flexibility and its ability to replicate a realistic pattern of lease events for a realistic portfolio. The key disadvantage is the large amount of programming necessary to perform simulations. A much less time consuming approach is to adjust the recorded performance of portfolios at the macro-level assuming that events had changed the performance pattern.

6 Simulating Lease Reform – Aims, Approach and Methodology

In our analysis, we combine both micro-level and macro-level assumptions. At the micro-level, with a lease structure base of 1981, we generate a set of 25 hypothetical individual properties for each IPD market segment. Each sample has a representative set of lease lengths and reversionary structures for 1981. This is then used to create a net income received at the base year. Future income received is then estimated by growing the rental values using the appropriate (macro-level) IPD historic rental value growth indices and allowing the income to adjust accordingly. Macro-level assumptions about the consequences of lease events such as lease terminations and break clauses are also used to incorporate the cash flow effects of these lease events. Historic IPD records are used to estimate factors such as the probability of tenant vacation, void period etc. Capital returns at the market segment level are estimated by applying historic capitalisation rate series to the total segment income. Capital returns were not calculated for the individual hypothetical asset but they are computed at the market segment level and aggregated to the All Property level.

6.4 Data requirements and assumptions

As noted above, projections or assumptions need to be made about a whole range of variables already specified above including:

- probability of occupier vacation;
- financial costs of occupier vacation;
- level of new rent at lease term expiry;
    - rental growth (net of depreciation);
    - volatility;
- terms of new lease;
- quality of new occupier and
- correlation of the above.

The estimation of many of these variables is less problematic in ex post studies since we can observe actual rental growth and volatility and incidence, costs and consequences of tenant vacation. However, it is important to bear in mind that there is a possible sample selection bias. Data on tenants who sought flexible lease terms may not provide a reliable sample of the whole universe. For ex ante studies the variables are unknown and estimates are prone to error.

In our analysis, as noted above, for the ex post simulation we have used actual historic IPD records to estimate the costs and probabilities associated with lease expiries and rent reviews. Actual rental growth variables have also been used. Further necessary information regarding costs and capital expenditure assumptions were based upon information in the Strutt & Parker / IPD Lease Events Review or derived through specific database interrogations. This is the best data available and it is difficult to justify taking a different approach. For the ex ante simulation, we considered a number of possible methods of estimating rental growth and capitalisation rate series over a period of 20 years. Given the lack of available long-term forecasts (and the inherent vagaries of the long term forecasting process), we use historic rental growth figures and capitalisation rate series as a basis for our scenario. In order to account for the shift in inflation expectations since the mid-1990s, rental growth is simply based upon historic real

6 Simulating Lease Reform – Aims, Approach and Methodology

rates of rental growth plus 2.5%. The capitalisation rate series is the historic IPD series. We tested alternative options for generating capitalisation rate series including (Monte Carlo) simulation. However, the use of historical capitalisation rate data seemed most plausible since it maintained cyclicality in the time series (as did Monte Carlo simulation) and preserved the pattern of correlations between the sectors.

For the ex ante scenario, the base case current lease structures were assumed to remain stable for the projected period. To be clear, in the absence of government intervention, it was assumed for the base case that there would be no significant changes to UK lease structures. Current data on lease events (void periods, lease terminations etc) was also assumed to remain stable and was taken from the Strutt & Parker / IPD Lease Events Review.

6.5 Market and institutional behaviour

Simulating the reaction of market participants to changing lease structures raises a number of difficult methodological issues. We have argued above that, given a choice, investors would be irrational to grant alternative lease forms that produced a loss of capital value. Consequently, one approach to modelling future cash flows is to assume that investors can recover all additional expected costs through an increase in rental income (usually through the initial contracted rent). Inevitably, this would produce an outcome where the implications of changing lease structures were neutral in terms of their effect on financial values.

However, implicit in this assumption is an efficient and instantaneous shift to a new pricing regime. This is unlikely in practice. Even in actively traded markets, a combination of asset heterogeneity, thin trading and 'bundling' (through incentive packages) produces a lack of reliable market signals making difficult the estimation of the market price of the established lease term. Hence even the 'benchmark' for pricing the alternative lease term can be prone to uncertainty. Moreover, as noted above, there has been little evidence to suggest that lease terms have clear effects on rents achieved. In addition, our analysis of the relationship between unexpired lease length and capital value (capitalisation rate) indicates that, despite a great deal of anecdotal comment, it is difficult to establish a strong pricing impact of lease length.

We are also faced with the problems of incorporating institutional reactions to changes in leasing patterns. We have highlighted above how ability to borrow is influenced by income security and, in turn, produces reduced liquidity for assets with higher risk leases. Even if characterised as 'short term and irrational', misperceptions of risk by valuers, lending and/or investing institutions may exacerbate these problems and generate significant effects on price formation. Further, we have noted above that legal precedent and landlord and tenant can also influence the outcome of rental negotiations. Although some of these issues will have transitory rather than persistent effects, they generate potential costs to investors in any switch in leasing regime. The methodological problem is how to incorporate these costs.

In the absence of 'compensating' increases in rental income, we may see the supply of space decrease as the profitability of new development reduces and/or commercial land values decrease. Assuming no increase in demand for space, any reduced supply will produce an increase in price as the market shifts to a new equilibrium. Modelling a transition to a new equilibrium pricing regime is likely to be extremely complex since returns from investment in new supply are not just affected by the value of asset but also by its cost of production (including land costs).

6 Simulating Lease Reform – Aims, Approach and Methodology

Another (simpler) approach is to assume that investors do not have any ability to increase prices in response to (imposed) changes in the leasing regime. This may be a realistic assumption in the short term but is unlikely to be maintained since investors should rationally require increased reward for increased risk. In addition, tenants will typically have lower expected costs of occupancy under the proposed alternative lease regimes and should rationally be prepared to pay more in rent.

In our analysis, we have not adjusted rental levels to reflect changes in the leasing regime. Given the discussion above, we find it difficult to generate plausible models of investor and occupier reaction to lease reform. Hence, for the various lease reform options, rental value change remains constant for all options (although income collected obviously varies considerably). For the capitalisation rate series, we have simulated two scenarios:

- Historic capitalisation rates are used and not adjusted. This implies that investors place the same multiplier on income despite increased income volatility. Although it is difficult to find empirical evidence to contradict this assertion, it would be counterintuitive to many investors. We also take a second approach.
- Historic capitalisation rates for a given point are adjusted in direct proportion to the effect of a lease reform option on income collected. For instance if, in a given year, a higher risk lease structure produces a 10% fall in income collected, the capitalisation rate is adjusted by an equivalent proportion; i.e. it is increased by 10% so a 7% capitalisation rate would become 7.7%.

6.6 Optional or obligatory?

An important issue will be whether we assume that investors have a choice about granting alternative lease terms. This will influence their pricing power. If legislation makes the granting of certain lease structures mandatory, then landlords will have no choice but to grant these terms. Prices will be set by the interaction of supply and demand in the market. Investors will not be able to set a menu of prices for leases where they compensate for differential risk. Further, in the absence of any oligopolistic pricing power, the imposition of a new lease regime by legislation could, in the short term, create a slow adjustment to a new pricing equilibrium. There can be no presumption that investors will be compensated for the additional risk taken.

We assume that a lease reform option is imposed and that all new leases are granted in line with the new lease regime.

6.7 Benchmark

As stated above, in order to evaluate the impact of changing the lease regime on investment performance, it is necessary to generate an appropriate benchmark against which alterations to the actual lease regime can be compared. In our research, the objective was to generate a portfolio performance that closely matched the performance of IPD index. Having generated such a portfolio, the impact of changing the lease regime could be measured by changing the assumptions about lease length, review clauses etc. It was, therefore, important that the performance of our base case hypothetical portfolios tracked the performance of the appropriate IPD indices. In practice, this proved problematic. Essentially, the key problem is that the actual IPD portfolio is a moving average. A certain amount of refreshment of the portfolio was also necessary to reflect the reality of fund manager behaviour, and was accomplished by introducing new tenancies into the portfolio.

6 Simulating Lease Reform – Aims, Approach and Methodology

As noted above the research team decided that it was important to be able to model, as accurately as possible, the net income growth profile of the IPD standing investment index between 1981 and 2003. These results would then act as a benchmark and were used to assess the model's robustness. In regard to lease structure, it was considered that these years were characterised by two distinct periods. Between 1981 and 1990 the traditional 20-25 year institutional lease dominated the lease contracts governing the properties within the IPD databank – the actual assumptions are detailed below.

- 25-year lease contracts
- 5-year UORR pattern
- No break options
- No indexation provisions

Following 1990, the property market experienced widespread structural change with regard to lease contracts. At this point leases became shorter and incorporated tenant break options - amongst many other changes – a process that continued up until 2003 and is of course still ongoing. The research had to make certain assumptions with regard to the frequency that break options were exercised and the ensuing voids periods experienced by landlords. This was undertaken by using the historical information contained within the IPD Lease Events Review.

A portfolio of properties was generated at 1980. Reviewing rental movements in previous years and assuming a realistic lease structure with an appropriate level of reversion at the beginning of the performance measurement period achieved this. For example, the research team estimated that at the beginning of the performance measurement period, the portfolio was 20% reversionary. Without this necessary adjustment, the ensuing income growth measured by the team would have been considerably understated. The cash flows were then simulated by observing the interaction between the research team's assumptions regarding rates of lease renewal, void periods, break option exercise rates, gross to net adjustments and the actual rental value movements recorded by IPD.

Details of the assumptions that were made by property type are shown in Appendix One.

For each of the 10 market segments of IPD, 25 lease contracts were modelled. The results were then aggregated, at the appropriate weights, to produce an All Property net income growth pattern year on year. Further necessary information regarding costs and capital expenditure assumptions were based upon information in IPD Lease Events Review or derived through specific database interrogations. A certain amount of refreshment of the portfolio was also necessary to reflect the reality of fund manager behaviour, and was accomplished by introducing new tenancies into the portfolio.

7 The Results

7.1 Introduction

Below we present the results of the simulation exercises and discuss some of the implications for portfolio construction and performance. We stress that our results (and by implication our analysis) are conditional upon the assumptions made about market behaviour under different scenarios. The plausibility of the results relies upon the plausibility of the assumptions made. We present the results at the All Property Level and at the market segment level. We do not analyse the behaviour of individual assets but assume that the specific risk is diversifiable. It is probably worth re-iterating the key assumptions of the modelling exercise at this stage.

In the ex post simulation of a hypothetical portfolio's performance, it is assumed that rental growth, lease events and sector weightings are as recorded by IPD. Readers are referred to both the methodological section and the technical appendix for further information regarding the assumptions. Given the absence of empirical evidence or a robust lease-pricing model, the level of Market Rents is not adjusted to reflect alternative lease regimes. However, in reality, it is likely that investors would be able to obtain some level of rental premium for flexibility. Consequently, the effect of this assumption is to exaggerate the negative effects of lease reform on performance. To estimate capital growth, two approaches are taken.

- Firstly, recorded IPD capitalisation rates are applied to portfolio rents. Effectively, this is the same as assuming that there is no effect on capitalisation rates when different lease structures emerge.
- Secondly, for each lease option capitalisation rates are adjusted proportionately to the change in portfolio rental income. For example, a 10% fall in rental income in a portfolio leads to the equivalent of a 10% (of the original) change in the capitalisation rate. This effectively assumes that investors consider falls in income to be permanent.

The actual effect on capital growth is likely to be between these two extremes.

In the ex ante simulation, we do not forecast future market trends. Essentially we attempt to model how a current typical portfolio would perform if the past were to repeat itself, particularly with regard to real rental value movements.

7.2 Prior Expectations

Each of the ODPM's options has a different level of risk. We rank below the various options in order of (expected) adverse consequences.

- Limit lease length (assumed to be either a five year or 10 year lease with five year break) - this is likely to be the most risky option since it increases the probability of termination of occupancy and effectively allows review to market rents at the same time.
- Ban upward only rent reviews.
- Ban upward only rent review subject to a 'floor' of the initial rent.
- Give tenant the right to break if the property is over-rented at rent review – this is more complex than a ban and may well generate better performance than Option 3. It is possibly the least risky. For a termination of occupancy and/or a downward shift in the rent to occur the property must be over-rented and the tenant must be prepared to initiate a break. In all likelihood, where the property was over-rented, there would often be a complex signalling 'game' between investors and occupiers.

7 The Results

In terms of regional and sector effects, it is clear that we should expect that the most volatile markets would experience the worst performance relative to the Base case. For instance, retail warehousing and City and West End offices had dramatically different performance in the 1990s and we should expect that the latter office markets would have had much worse performance if more flexible lease structures had been in place.

7.3 All Property Results

We present below the results at the All Property level for each lease option in term of average per annum; total return (with standard deviation), capital growth, income return and total income collected for whole period. The results are largely consistent with prior expectations where recorded yields remain unadjusted. Total returns are highest for the base case and lowest for the short lease options. There is very little difference in terms of performance between the other three options.

The results become less clear when we examine the results for the yield adjusted simulation. Obviously the amount of income collected remains unaffected by this change. However, although it is counterintuitive, Option 2 delivers marginally higher average total return that the base case. We believe that this is due to two factors. Firstly, the fall in capital values due to yield adjustment increases income return. However, as we have detailed in Appendix One, the increased volatility in capital growth actually improves the arithmetic average capital growth. When we examine risk-adjusted returns (unit of return per unit of risk), it is clear that the base case always beats the various ODPM options.

Table 7-1

EX POST SIMULATION 1981-2003	Yield Unadjusted					
All Property	**Total Return Mean (%)**	**Total Return S Dev (%)**	**Risk-adjusted return**	**Capital Growth Mean (%)**	**Income Return Mean (%)**	**Total Income Collected (£ Million)**
Base case	11.03	9.10	1.21	3.94	7.09	651.60
Option 2	10.85	9.33	1.16	3.79	7.06	619.06
Option 3	10.88	9.23	1.18	3.81	7.07	624.68
Option 4	10.77	9.18	1.17	3.70	7.06	622.21
Option 5 -10	9.52	8.70	1.09	2.55	6.98	520.44
Option 5 w/out ind	9.47	8.70	1.09	2.49	6.98	530.21
Option 5 w ind	9.18	8.80	1.04	2.20	6.98	574.31

7 The Results

Table 7-2

EX POST SIMULATION 1981-2003	Yield Unadjusted					
All Property	**Total Return Mean (%)**	**Total Return S Dev (%)**	**Risk - adjusted return**	**Capital Growth Mean (%)**	**Income Return Mean (%)**	**Total Income Collected (£ million)**
Base case Unadj.	11.03	9.10	1.21	3.94	7.09	651.60
Option 2	11.11	9.98	1.11	3.71	7.41	619.06
Option 3	11.06	9.65	1.15	3.72	7.33	624.68
Option 4	10.90	9.58	1.14	3.55	7.35	622.21
Option 5 -10	9.94	8.98	1.11	1.33	8.61	520.44
Option 5 w/out ind	9.65	8.93	1.08	1.18	8.47	530.21
Option 5 w ind	8.43	9.80	0.86	0.67	7.76	574.31

7.4 Why is the response so muted at the All Property level?

When we aggregate to the All Property level we witness little impact upon the total returns and volatility. Total returns are decreased by 0.20% per annum and volatility is increased by 0.20% per annum.

The research team put forward five explanations for these findings.

- The conversion of net income profiles into capital values utilises the historic yields reported by IPD. These yields are a function of the complex mutual relationships between rental values and lease terms that prevailed at the time they were recorded. It is perfectly plausible (and investigated in the next section) that investment yields would have reacted very differently and travelled a different course had the landlord and tenant been negotiating rents outside an UORR framework. An example would be 1993 - upon the forced rejection of the UK from EMU, yields on UK Gilts fell markedly during the year. Due to the prevailing lease structure at the time – long leases with UORRs – investors also re-priced property, and initial yields fell by 1% as investors recognised the inherent protection provided by over-rented property governed by traditional UK leases. Such a yield re-rating where portfolio income fell as recorded by our model is very unlikely. It could be easily argued, therefore, that total returns may have been lower and more volatile than those recorded within our model as the capital market priced in more volatile movements in cash flows.
- It should be recalled that for much of the performance measurement period very long 'legacy' leases governed the portfolio. That is to say, although the model banned UORRs on new leases granted, many old leases (say those granted in 1980) ran on for a further 25 years and clearly behaved as UORR contracts.

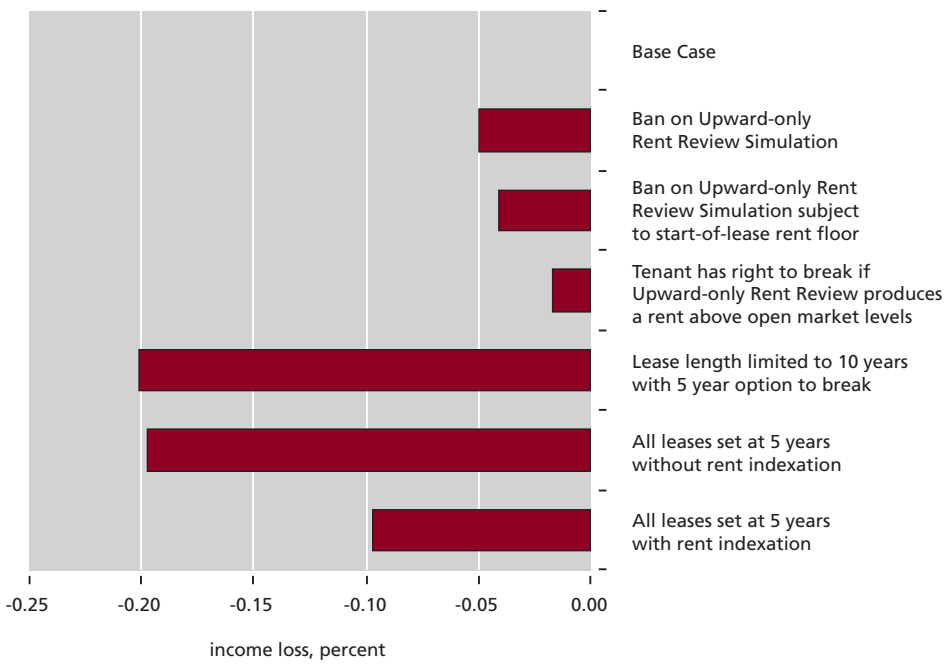
[9] The loss of income for each market segment is calculated as follows: base case income less income collected under the lease option that provides the least income for that market segment.

7 The Results

- Much of the performance measurement period was one characterised by high, albeit falling levels, of inflation. For much of the period, therefore, rents across all property types rose in nominal terms. This had the effect of limiting the impact of falling income growth up to 1991. However, there was a loss of income and a fall in total return delivery between 1992-2003 – although when measured over the full period it had a rather more diluted impact than many might have envisaged.
- Due to the weights attached to the three sectors through time (the office component declines from well over 56% to 31% during the performance measurement period) the 'all property' returns are relatively unscathed as the retail and industrial sectors compensate for the damage inflicted upon the office component.
- As noted in the methodology chapter, annual average total returns may be providing a misleading indicator of performance differentials due to the effect of volatility. When we look at income collected, the effects become more perceptible.

Although a crude performance indicator, total income collected over the simulation period is a useful check on whether the model is capturing the effects of changing lease regimes. We see the disparities in performance even more starkly here. However, they are largely consistent with the total return differences. Over a 22-year period, the base case collects approximately 20% more income than the various forms of Option 5. This is broadly consistent with an annual performance difference in terms of total return of 1.5% per annum.

Figure 7-1: **Income Penalties of Lease Reform Options at all property level**



7 The Results

7.5 Sector and Regional Effects

Historically, the various market segments in the IPD index have had, often quite dramatically, different performance experiences. Whilst the office markets in the South-East and London experienced quite volatile 'boom and bust' conditions, other sectors such as retail warehouses did not undergo any falls in rents across the sector. Consequently we should expect that the effects of the various lease reform options will have varying sector and regional effects. Below, we illustrate for the ex post simulation the gap between the base case and Option Five (a five year lease) for all the market segments.

Figure 7-2: **Performance gap between Base Case and Option 5**

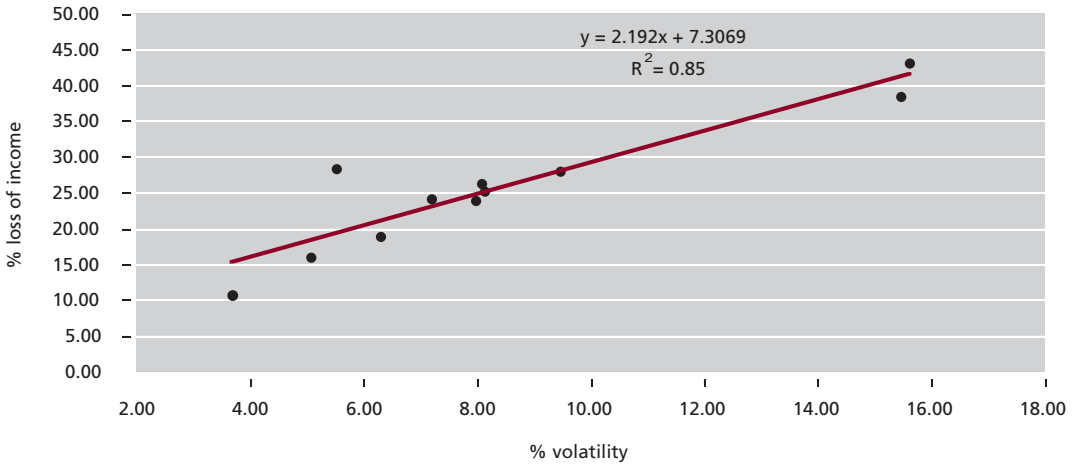
Not surprisingly, it is the sectors and regions that were hardest hit by the recession of the early 1990s and the office market downturn of 2000-2002 where performance would have been most badly affected by lease regime change.

Rental volatility (and associated sector and geographical variations) is a key variable. We have plotted loss of income by segment against the volatility (by rental value) of each segment as a scatter diagram below.[9]

[9] The loss of income for each market segment is calculated as follows: base case income less income collected under the lease option that provides the least income for that market segment.

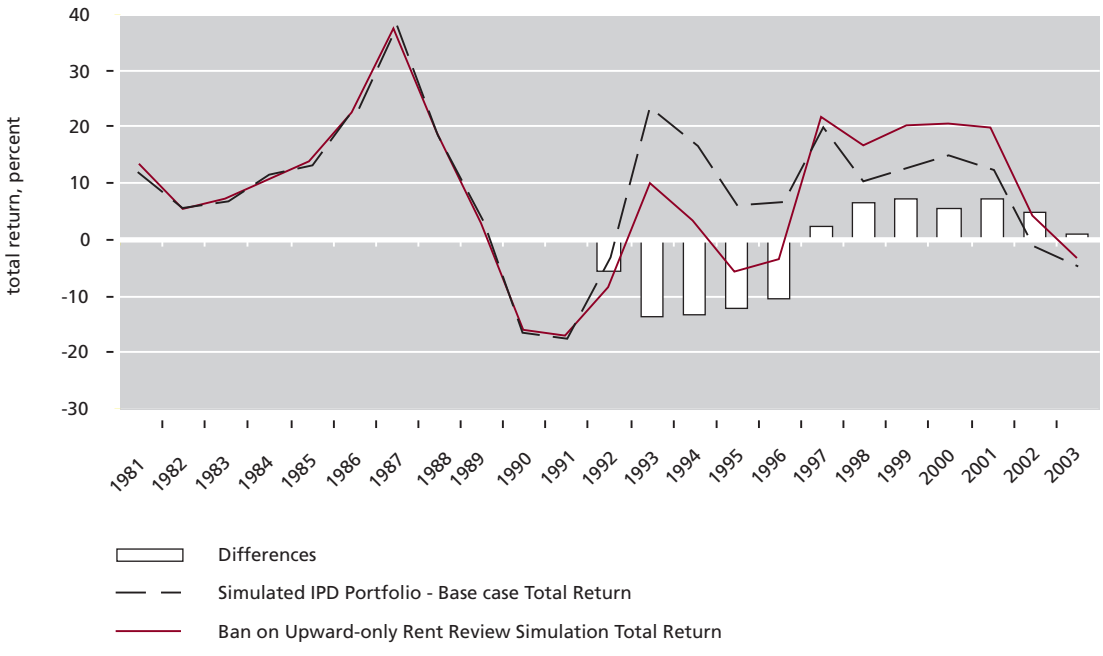
7 The Results

Figure 7-3: **ERV volatility against loss of income (Historic)**



City Offices provide a good example of the effects of banning UORR clauses in a volatile letting context. As we can see in Figure 7.4, total returns from the base case and Option 2 are identical until 1990-1. Given the absence of any nominal falls in rental values, this is expected. With the recession of the early 1990s, sharp differences appear in performance. Although total income collected would have been some 17% lower for the landlord during the complete performance measurement period, the growth from a lower base in the latter half of the 1990s produces higher returns for Option 2 at that point in time.

Figure 7-4: **Ex Post Simulation of City Office Market – Option 2**



7 The Results

For the retail and industrial markets, the loss of income was negligible and total returns were almost completely unaffected. Further, levels of returns and volatility were very similar to the base case. This can be explained by the differences in the patterns of rental value growth between the office, retail and industrial sectors.

The retail sector has been able to combine the highest rate of annual rental value growth with the lowest standard deviation. Indeed, it is the only sector of the UK market that has consistently delivered real (inflation adjusted) growth. The industrial market, whilst not delivering positive real rental value growth between 1980 and 2003 nonetheless provided respectable growth, but crucially it was delivered at relatively low levels of volatility.

The office market displays exactly those rental value patterns that are vulnerable once the support of UORRs is removed. The sector's rental value has fallen in inflation adjusted terms through time but it has done so in a volatile manner. When cyclical upswings do happen (as in the late 1980s and late 1990s), they are perfectly captured by the rent review provisions in standard leases, and are never relinquished in the cyclical downturn due to the upward only nature of the contracts. Further, combining such rent review provisions with long leases has protected the investment market from much volatility since the marking to market process only occurred at the end of the lease.

7.6 Index-linked leases

A puzzling feature is the poor total return performance (relative to non-indexed leases) of index-linked portfolios, despite the fact that such leases are typically among the best in terms of collecting income. This is invariably due to the fact that index-linked leases have the lowest level of average capital growth recorded.

This is in turn related to the use of arithmetic averages for reporting investment performance and the fact the index-linked portfolios generate smother increases in income through time. The reader is invited to review Appendix One for a fuller explanation of this issue.

7.7 The adjusted yield returns

There are several noteworthy impacts that we can report concerning the comparison with the unadjusted historic results.

7.7.1 All Property level

The all property returns for the Base case, by definition of the methodology applied, have stayed the same in every respect. We can recall that the yield adjustments were made from the base case. Obviously the amount of income collected remains unaffected by this change.

Interestingly, for all other options, both returns and volatility have increased relative to the unadjusted yield series. Across all the options, the all property return increased by about 20 bps and the volatility increased by about 40 bps.

7 The Results

We believe that this is due to two factors. Firstly, the fall in capital values due to yield adjustment increases income return. However, as we noted in the methodology section, the increased volatility of changes in capital values can improve average capital growth. When we examine risk-adjusted returns (unit of return per unit of risk), it is clear that the base case always beats the various ODPM options.

The most striking feature of the adjusted yield results is that the relatively limited impact on long-term performance of Options Two, Three and Four is maintained. However, the risk-adjusted return is lower than the base case of the yield unadjusted results.

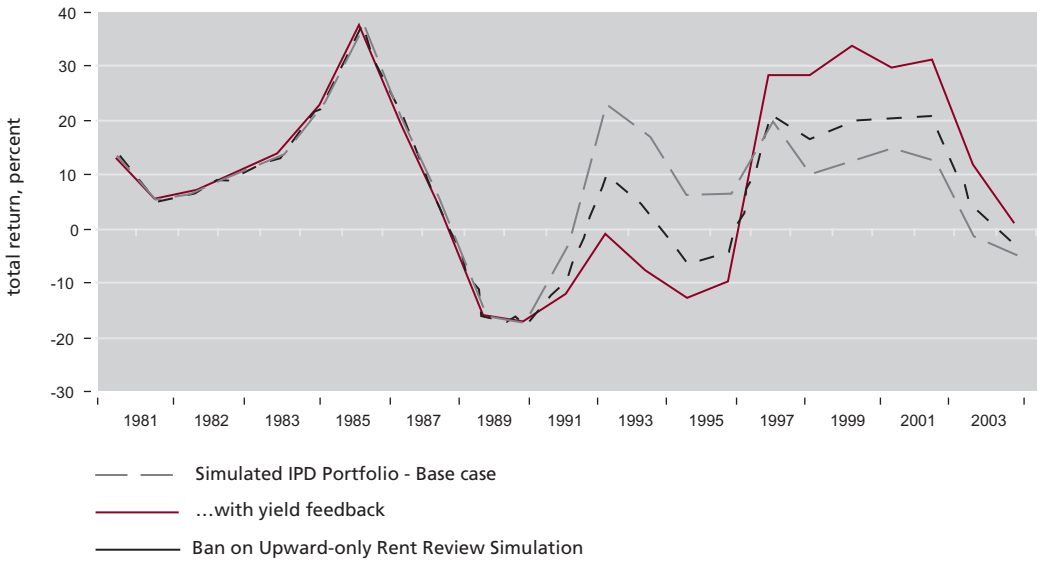
7.7.2 At the segment level

The largest differences between the unadjusted and adjusted returns were revealed at the segment level. The greater the volatility of the segment (in terms of total return as measured in the unadjusted series and by segment rental value movements), the larger is the increase in the volatility of the yield-adjusted returns. For example, the Central London office markets were particularly affected. The City and West End office markets, although experiencing stronger returns – as with almost all segments under all options – also witnessed dramatic increases in volatility.

The City's volatility increased to 17.13% under option 2 (13.45% unadjusted) and over 18% under 5a, 5b and 5c (no more than 13.5% unadjusted). The West End fared no better. Whilst slight increases in returns were recorded under many options the volatility increased dramatically for all options for office markets. The unadjusted series recorded average standard deviations of 15% across all options for the West End office market. However, when the results had the yield adjustment applied, the returns posted an average of almost 17.5% for the same segment.

The yield-adjusted results for the retail warehouse sector by comparison appear to be relatively muted. Given the lack of effect on income collected, the adjustment process added practically nothing to the volatility of returns for this segment.

Figure 7-5: **City Office Market - option 2 - with yield adjustment**



7 The Results

7.8 Summary of the historic research

The artificial introduction of the various ODPM options in 1981 would have had little impact on the level and pattern of total return delivery at the all property level up to the end of December 2003.

Adjusting the historic results to take account of the main factors thought to dampen the impact (yield adjustment) made little impact at the all property level. Returns and risks were both marginally increased.

Across the unadjusted series, the more volatile market segments are the ones worst affected. Adjusting the returns to take account of anticipated yield movements exaggerates the differences between volatile and less volatile segments.

7.9 Modelling Forward-Looking Scenarios

7.10 Introduction

There are various reasons why we must be cautious in concluding that an introduction of any of the lease reform options in 2005 would have the same effect (by order of magnitude) as our model has suggested would have occurred in a historical context. For the purposes of generating net income profiles in property portfolios, the frequency with which rents are marked to market is paramount - this will affect the level of income collected by landlords (or paid by tenants) and its volatility. The marking to market of rents is not just influenced by the frequency and type of rent review provision, but also by length of lease.

Indeed for the accurate modelling of cash flows, the appropriate unit of analysis combines the length of lease with the frequency of rent review, as we have endeavoured to do in chapter Four.

7.11 Unadjusted Yield Returns

7.11.1 All Property Level

The first striking difference between the historic and forward-looking analysis is that there is much less variation between the options in the total income collected over the simulation periods. This is, in turn, reflected in the limited variation in total returns between the options. The base case still produces the best risk-adjusted returns. However, the 'convergence' in performance is not unexpected, as we have noted above. When we are starting from a base case that includes a relatively flexible pattern of lease lengths, it is not surprising that legislation to impose flexible leases does not produce dramatic differences in income collected and returns.

The variation in the pattern of return delivery between the **historic base case** series and the **forward-looking base case series** is worth commenting upon. The nominal levels of historic and forecast returns were expected to be different since we had introduced lower inflation expectations in the forward-looking series. The long-run decrease in returns from 11.03% to 8.32% is, therefore, not surprising. The standard deviation decreased from 9.10% to 8.32% between the historic and forecast

7 The Results

returns.

This means that the return per unit of risk has been reduced. Historically, the risk-adjusted return was 1.21 and well ahead of other asset classes. The forward-looking modelling work suggests this measure is no higher than 1 – UK real estate returns on a risk-adjusted basis appear to have been diluted by the lease structure changes described in chapter four.

Table 7-3

Ex Ante Simulation 2004-2027	Yield Unadjusted					
	Total Return Mean (%)	Total Return S Dev (%)	Risk-adjusted return	Capital Growth Mean (%)	Income Return Mean (%)	Income Collected Sum (£ million)
Base case	8.32	8.32	1.00	1.35	6.98	268.78
Option 2	8.35	8.82	0.95	1.40	6.96	259.76
Option 3	8.35	8.56	0.98	1.38	6.97	265.66
Option 4	8.42	8.64	0.97	1.45	6.97	263.25
Option 5 -10	8.14	8.58	0.95	1.18	6.96	258.54
Option 5 w/out ind	8.18	8.65	0.95	1.21	6.96	264.59

Table 7-4

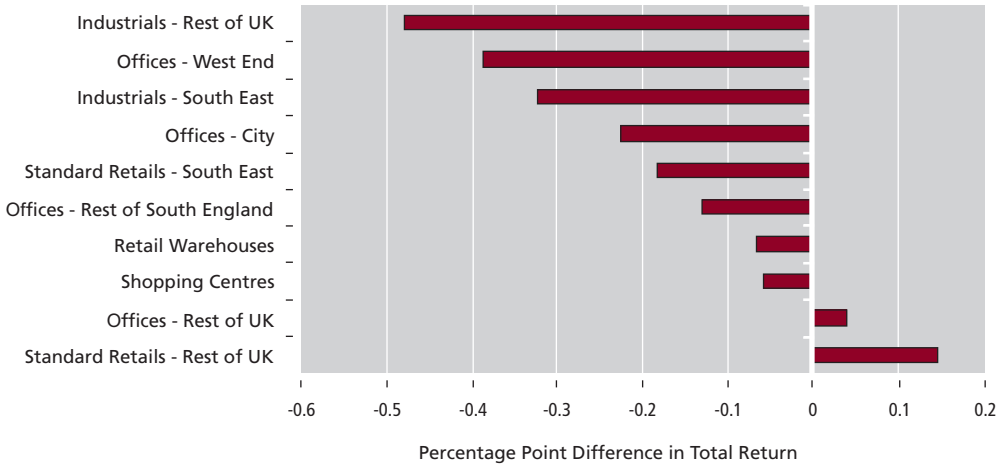
Ex Ante Simulation 2004-2027	YA - Yield Adjusted					
	Total Return Mean (%)	Total Return S Dev (%)	Risk-adjusted return	Capital Growth Mean (%)	Income Return Mean (%)	Income Collected Sum (£ million)
Base case Unadj.	8.32	8.32	1.00	1.35	6.98	268.78
Option 2	8.75	9.78	0.89	1.54	7.20	259.76
Option 3	8.50	8.92	0.95	1.44	7.06	265.66
Option 4	8.72	9.29	0.94	1.60	7.12	263.25
Option 5 -10	8.65	9.99	0.87	1.42	7.23	258.54
Option 5 w/out ind	8.59	10.12	0.85	1.51	7.08	264.59

7.11.2 At the segment level

Just as variation in returns between options at the all property level were reduced, so the returns between market segments were also found to converge. The bar chart below illustrates that the performance difference between option 5 and the Base case was narrowed to just 47 bps for the rest of UK industrial and below 40 bps for the volatile office markets. The same bar chart for the historic modelling exercise (figure 7.2) displayed much larger disparities.

7 The Results

Figure 7-6: **Forecast Yield Unadjusted - Option 5 w/o Indexation minus Base Case**



7.12 Adjusted Yield Returns

7.12.1 At the all property level

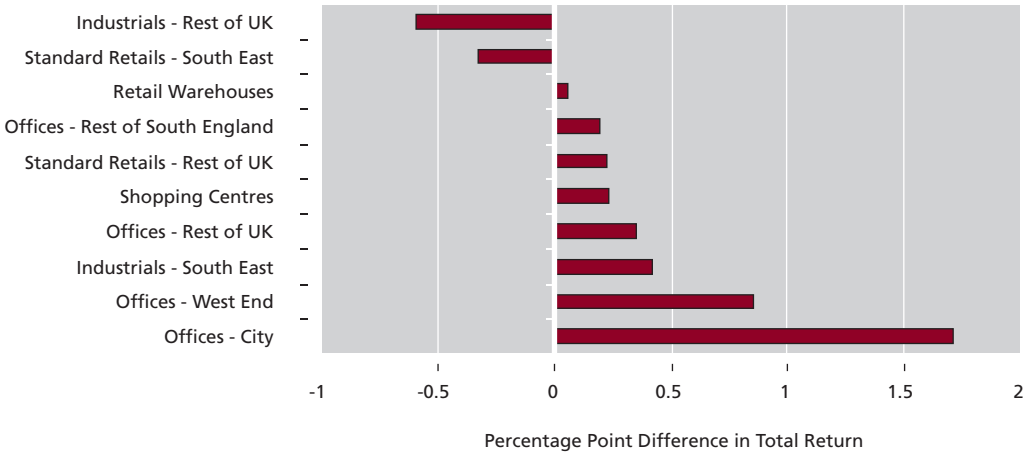
The adjustment process to the yields had the impact of increasing the all property returns across all options relative to the Base case. The returns increased by around 30bps per annum across all options. However, as with earlier adjustments, this came at the price of increased volatility – which rose by around 85bps per annum on average across the options. As a result, we find further deterioration in therisk- adjusted return, although it should be pointed out that the further weakening is reasonably marginal relative to the step change witnessed by going from the historical to the forecast results.

7.12.2 At the segment level

The City and West End office markets are two segments that recover all of the return loss relative to the base case. This is consistent and plausible. The City office market's returns increase to 9.03% pa from 7.09% pa, but the standard deviation of these returns has increased from 13.85% to 20.82%. The headline rate of return may have been improved, but on a risk-adjusted basis returns have been badly affected.

7 The Results

Figure 7-7: **Forecast Yield Adjusted - Option 5 w/o Indexation minus Base Case**



We find similar results in the West End. In general, for markets which are subject to significant rental volatility and significant leasing impacts for year-on-year returns, the introduction of the yield feedback mechanism rebuilds the total return to Base case levels through increasing income return (offsetting losses of capital growth), but at the price of hugely increased volatility.

7.13 Summary of forecast returns

The introduction of the various ODPM options in December 2003 would produce results at the all property level similar to the Base case going forward.

There is a high degree of similarity between the options in the forward-looking series. This holds for unadjusted and yield-adjusted results. The yield-adjusted series recorded higher returns and higher standard deviations of returns.

Adjusting the yields at the segment level resulted in higher returns for volatile segments, but at the price of even higher relative changes in standard deviations. Overall risk-adjusted performance deteriorated.

8 Allocations to Property from an ALM process

8.1 Historic Results

Following on from the modelling results set out above, we have constructed a simple ALM model of a pension fund. The key starting point is the estimates of forward-looking asset returns, risks (standard deviation of returns) and correlations for the major asset classes of UK equities, bonds and property. It should be noted that these are forward looking estimates which aim to be consensus views. Whilst these inputs are sometimes contentious, these assumptions are used primarily to obtain Base case property allocations. When looking at changes to lease structure it is the differences in allocations that are important, rather than the absolute levels.

Our starting assumptions are as follows:

	Annual mean	Annual stdev	correlations		
			Equities	Bonds	Property
Equities	8.00	18.00	1	0.5	0.1
Bonds	6.00	10.00		1	0.0
Property	7.50	15.00			1

Note that bonds here refer to AA rated corporate bonds, which also represent the natural liabilities of the scheme under the accounting rules of FRS17. The risk for property is a contentious subject in its own right. There are differences of opinion whether the low historically observed volatilities should be enhanced to take account of the artificial smoothing of the valuation process. We have deliberately assumed a volatility at the high end of the spectrum to give "worst case" results. Again it should be emphasised that it is the differences in allocations arising from changes in lease structure that are important, rather than the absolute levels. It should also be noted that the 7.50%/15% return/risk attributed to real estate is different to the base case that was modelled.

Inputting these assumptions to the model, together with the liability profile of the scheme, gives us a set of optimal property allocations at different risk levels. To simplify the output, we will look at the highest allocations to property assets within each of three different risk bands – low, medium and high risk. The choice of risk category for a particular pension scheme will depend upon a variety of factors, such as current surplus/deficit, ability of the scheme sponsor to pay different levels of contributions and the desired volatility of contributions.

The base case results are as follows:

maximum property allocations for different risk levels

	low	medium	high
Base case	12%	22%	35%

It is interesting to observe how sensitive these results are to changes in the underlying assumptions. We consider several possibilities.

8 Allocations to Property from an ALM process

	maximum property allocations for different risk levels		
	low	medium	high
Base case	12%	22%	35%
Property annual return down 0.5%	9%	17%	27%
Property annual return down 1%	4%	7%	11%
Property annual risk (stdev) down by 1%	12%	24%	38%
Property/equity correlation lower by 0.1	12%	24%	37%
Property/bond correlation higher by 0.1	13%	26%	39%

These results are fairly intuitive. Decreasing property returns makes property a less attractive asset to hold at all risk levels. Conversely, decreasing risk makes property more attractive, as does increasing the correlation with bonds (i.e. increasing the correlation with the liabilities of the scheme). Decreasing the correlation with equity returns is also has a positive impact on property allocations. From these examples, it would appear that changes to return expectations are more important than changes in risk or correlation estimates.

So how do changes in lease structures impact on our underlying risk and return assumptions? Firstly, it is worth recalling the results of the modelling work under different lease regimes (all results are for yield unadjusted, but the adjusted series had little impact):

Option 2 (a ban on UORR's). This has the effect of reducing property returns by 0.2% pa, and also increasing volatility by 0.2% pa. The correlation with equities is reduced by 0.05, but the correlation with bonds is broadly unchanged.

Option 3 (a ban on UORR's, but with floor of initial rent). This has the effect of reducing property returns by 0.15% pa, and increasing volatility by 0.1% pa. The correlation with equities is reduced by 0.05, but the correlation with bonds is broadly unchanged.

Option 4 (Tenant has right to break if UORR produces a rent above open market levels). This has the effect of reducing property returns by 0.15% pa, and increasing volatility by 0.1% pa. Correlations with equities and with bonds are broadly unchanged.

Option 5a (Lease length limited to 10 years with 5 year option to break). This has the effect of reducing property returns by 1.5% pa, but reducing volatility by 0.4% pa. The correlations with equities is reduced by 0.05, but the correlation with bonds is increased by 0.05.

Option 5b (All leases set at 5 years without rent indexation). This has the effect of reducing property returns by 1.5% pa, but volatility is unchanged. The correlation with equities is unchanged, but the correlation with bonds increases by 0.05.

Option 5c (All leases set at 5 years with rent indexation). This has the effect of reducing property returns by 1.75% pa, but reducing volatility by 0.1% pa. Correlations with equities and with bonds are broadly unchanged.

8 Allocations to Property from an ALM process

The impact on property allocations can be summarised as:

	maximum property allocations for different risk levels		
	low	**medium**	**high**
Base Case	12%	22%	35%
Option 2 (ban UORR)	10%	18%	29%
Option 3 (ban UORR, floor of initial rent)	11%	22%	33%
Option 4 (right to break if UORR > mkt)	11%	21%	32%
Option 5 (10yr lease with 5yr break)	5%	6%	7%
Option 6 (5yr lease, no indexation)	4%	5%	5%
Option 7 (5 yr lease, with indexation)	2%	2%	3%

The results of the historic modelling exercise suggest that options two, three and four have modest negative impacts on property allocations, but the impact on theoretical property allocations is only marginal. By contrast, options 5a, 5b and 5c produce an outcome that is extremely unfavourable for the asset class. In these cases property is valued as a portfolio constituent purely for diversification benefits (although some may argue this is really the current status and theoretical allocations will never be achieved in practice).

8.2 Forward Looking Scenario - Results

The results from the modelling exercise between 2004-2025 were then run through the same ALM model. It is important to note that the base case represents the 7.5%/15% return/risk assumption that we believe an actuary would use in his modelling exercise. It is the differences to the base case results (for example, the difference between the base case and option 2) that are made to the 7.5%/15% return/risk assumption, which lead to difference in real estate allocations.

The results suggest that real estate allocations would be maintained at high levels if any of the modelled options were in place. Further, there is little difference between using either adjusted or unadjusted yields. The major difference is between historic and forecast data for the variants of Option 5. Historic data reduced property to a purely diversifying role in the portfolio, but the forward-looking scenario showed property still playing a significant role in portfolios. For the forward-looking scenario results as a whole, the differences between the various options are quite marginal from an asset allocation perspective.

The research team has decided to compare each modelled option with the base case in each of the two timeframes separately. We can recall that little impact was measured (certainly for options 2-4) in the 1980-2003 period predominantly due to:

- The impact of large numbers of legacy leases with UORR provisions still active throughout the period;
- High levels of reversion at the beginning of the period; and
- High nominal rental value growth during the period.

8 Allocations to Property from an ALM process

These elements conspired to produce income growth and total return delivery at similar rates for the base case and many of the options – particularly at the all property level – during the 1980-2003 period.Similarly, and probably to the great surprise of many in the industry, little impact was discerned between the base case and the various options for the 2003-2025 period. The single, following, reason is strongly advanced to explain this phenomenon:

- The average lease length is so short by the end of 2003 that the market has removed – to a very large extent – UORR provisions within the modelled cash flows. Their arbitrary removal, therefore, by legislative intervention under the various options is largely superfluous. Instead of the marking to market of rents occurring through the removal of **UORRs within long leases**, it occurs simply though **lease termination/renewal of short leases.**

Table 8-1 summarises the historic and forward-looking results

Table 8-1

HISTORIC data - Yield Unadjusted

	changes to inputs		Maximum property allocations for different risk levels		
	mean % pa	stdev % pa	low	medium	high
Base Case	0.00	0.00	12%	22%	35%
Option 2	-0.18	0.22	9%	18%	29%
Option 3	-0.15	0.12	11%	21%	32%
Option 4	-0.26	0.08	9%	19%	29%
Option 5-10	-1.51	-0.40	2%	2%	3%
Option 5 w/out ind	-1.56	-0.41	2%	2%	3%
Option 5 w ind	-1.85	-0.30	2%	2%	3%

FORECAST data - Yield Unadjusted

	changes to inputs		Maximum property allocations for different risk levels		
	mean % pa	stdev % pa	low	medium	high
Base Case	0.00	0.00	12%	22%	35%
Option 2	0.03	0.50	10%	22%	35%
Option 3	0.03	0.24	11%	22%	35%
Option 4	0.10	0.32	11%	22%	37%
Option 5-10	-0.18	0.26	9%	18%	27%
Option 5 w/out ind	-0.14	0.33	11%	21%	32%

8 Allocations to Property from an ALM process

HISTORIC data - Yield adjusted

	changes to inputs		Maximum property allocations for different risk levels		
	mean % pa	stdev % pa	low	medium	high
Base Case	0.00	0.00	12%	22%	35%
Option 2	0.09	0.88	10%	22%	34%
Option 3	0.03	0.55	10%	22%	35%
Option 4	-0.13	0.48	10%	20%	32%
Option 5-10	-1.09	-0.12	3%	4%	6%
Option 5 w/out ind	-1.38	-0.18	3%	4%	5%
Option 5 w ind	-2.60	0.70	2%	2%	3%

FORECAST data - Yield adjusted

	changes to inputs		Maximum property allocations different risk levels		
	mean % pa	stdev % pa	low	medium	high
Base Case	0.00	0.00	12%	22%	35%
Option 2	0.42	1.46	11%	22%	37%
Option 3	0.18	0.61	11%	25%	36%
Option 4	0.40	0.98	11%	23%	37%
Option 5-10	0.33	1.68	10%	22%	34%
Option 5 w/out ind	0.26	1.81	10%	20%	33%

9 Conclusions

The research has modelled the cash flow impacts of various proposed lease reforms upon historical and forward-looking real estate returns. It has been stressed throughout that the results of any impact assessment are conditional upon the assumptions made. There are particular difficulties in estimating (and quantifying) the effects on rental levels and capitalisation rates of shifts in leasing regime. In the absence of a compelling, practical and theoretical model and unambiguous empirical results, we have assumed scenarios at the extreme end. In our simulation of how the market would have performed in the past had alternative lease regimes been in place, we assume no effect on rental and yield levels. Alternatively we assume that yields adjust to reduce values by capitalising rental 'losses'. The former is likely to underestimate the performance effects of lease regime changes, while the latter will probably overestimate them. We have no way of quantifying how market participants would have reacted in reality. There are a number of conclusions.

The ex post results highlighted that had Government intervention taken place in the early 1980s, total returns from real estate would have been impacted upon. Generally, returns would have been reduced and volatility increased. At the all property level, these impacts were relatively muted for options two, three and four (banning UORRs, threshold leases and providing an option to break where over-renting occurs at an upward only review) and subsequently allocations to real estate would have been maintained at relatively high levels. However, we need to be careful about the interpretation of total return differences. The additional volatility introduced by drops in income can lead to improved capital growth figures.

The modelled variants of option five (a statutorily imposed short lease length) in a historical context, penalised real estate returns more dramatically. The impact was sufficient to reduce real estate allocations in a multi-asset portfolio. These findings held for yield unadjusted and yield adjusted (to reflect anticipated capital market behaviour) results. Further, more volatile market segments were particularly affected by any lease options, even options two, three and four recording discernible impacts.

Whilst the impacts may seem relatively minor at the All Property level, it is important to bear in mind that falls in nominal rents were only experienced for

a) part of the period of the historical simulation,

b) in a minority of the market segments and that

c) investors were shifting the portfolio weightings towards less volatile segments during the historical simulation period.

The forward-looking modelling work has highlighted that were Government intervention to have taken place at the end of 2003 only small impacts would have been registered across all options at the all property level. However, differences at the segment level were still very large. The yield unadjusted and yield adjusted returns produced similar results.

We believe these finding are logical and consistent with substantial lease structure changes that have already taken place in the UK commercial property market since the early 1990s. The decreasing lease lengths recorded in the commercial market through time have served to remove UORRs from large swathes of the UK commercial property market, so that their statutory removal does not impact greatly on forward-looking return delivery.

9 Conclusions

The research does record deterioration in the risk-adjusted returns of real estate between the historical and forward-looking series. Whilst still ahead of the other major asset classes this metric fell from around 1.2 historically to 1 going forward. This level of deterioration may have implications for allocations to real estate in the future.

However, it is important to make clear what the research team have not concluded. The reader is not encouraged to take away from this research the conclusion that lease structures do not impact upon property investment return delivery and income growth generation. One might be tempted to conclude with the finding that the results from options 2-4 were very similar to the base case in each separate timeframe. They were similar in the first timeframe because of the high number of legacy leases and they were similar in the second timeframe because the removal of UORRs had occurred through the shortening of lease contracts. There were stark differences in terms of income collected, which were not necessarily reflected in terms of total return calculations.

10 Appendix One – Technical notes

10.1 Performance measures employed

The reader should be aware that all averages used in the report are quoted as arithmetic and not geometric. Both of these measures of average have advantages and disadvantages. Each year, time-weighted returns are calculated according to standard IPD rules, but arithmetic means and standard deviations are also computed. The arithmetic mean does not equate to long-term delivered returns, and will be distorted by volatility, and will not show movement in the same way as compounded returns typically do. Nevertheless, for risk analysis purposes, comparisons between the arithmetic means and standard deviations are technically the right ones to make, are the ones that have been chosen by the research team and are generally used in reporting the investment performance across all asset classes.

The arithmetic mean will always be more than or equal to the geometric mean, and, generally, the difference between the two means increases with the variability between period-by-period cashflows/capital values. Indeed, the relationship between the arithmetic and geometric averages can be approximated by the following expression:

GM = AM – 0.5 x Variance

Within this study, the ODPM options that produce more volatile returns are likely to show a wider disparity between the two types of measure of return. A very basic example of the distorting effect is illustrated below:

Example: two properties were identically valued at the beginning and end of a three-year period, but with one property showing a more volatile capital growth path than the other. Whilst the geometric mean capital growths are the same, the arithmetic mean of the more volatile property is 1% higher than the less volatile property. We have clearly experienced this phenomenon in reporting the increased returns (measured arithmetically) of volatile office markets on a yield-adjusted basis.

Table 10.1: **Example of difference between arithmetic and geometric means**

	Property A		Property B	
	Capital Value £000	Capital Growth	Capital Value £000	Capital Growth
Start Period 1	1,000		1,000	
End Period 1	870	-13.0	1,050	5.0
End Period 2	1,050	20.7	1,103	5.0
End Period 3	1,158	10.2	1,158	5.0
Geometric Mean		5.0		5.0
Arithmetic Mean		6.0		5.0

The same phenomenon goes some way to explain the counter-intuitive results for our index-linked simulations, since a similar effect is observed when returns are accrued in relatively small increments

10 Appendix One – Technical notes

(commonly found where portfolios are governed by index-linked leases). We found that the index-linked simulations generated high levels of income whilst delivering relatively poor performance - as measured by reference to the arithmetic mean average total return through time. Since the index-linked income increased smoothly the volatility of total returns was depressed with a corresponding fall in mean return relative to the more lumpy performance of non-indexed contracts. For illustrative purposes, we outline below the performance of a hypothetical property where the value changes by the same amount each period, relative to an asset where the changes are more 'lumpy'.

	Value			Return	
	A	B		A	B
1	1000	1000			
2	1000	1084		0.0%	8.4%
3	1000	1176		0.0%	8.4%
4	1000	1275		0.0%	8.4%
5	1000	1383		0.0%	8.4%
6	1500	1500		50.0%	8.4%
7	1500	1589		0.0%	5.9%
8	1500	1683		0.0%	5.9%
9	1500	1783		0.0%	5.9%
10	1500	1888		0.0%	5.9%
11	2000	2000		33.3%	5.9%
Total Income Collected	14,500	16,361	**Mean Growth**	8.3%	7.2%
			St. dev	0.18	0.01

Asset B would deliver much more income than Asset A but, assuming identical capitalisation rates, would produce lower returns.

10.2 Defining rents and initial yield profiles for the forecast period 2004 to 2025

At an early stage the group decided to avoid any explicit attempt to produce either an econometric or judgemental forecast to independently underpin the post-2003 simulation. For this reason it was necessary to decide what form of adjustment was required for the segment rental value growth and initial yield series, both of which are crucial to defining the simulation inputs. Rental value growth rates could simply have been left unadjusted and restarted as if at 1981 once more, but in the end it was judged more appropriate to take out the higher rates of price inflation from the original series and simply add back in to the inflation adjusted rates a constant 2.5% per annum to reflect current economic circumstances.

The initial yields could not be adjusted in the same way since for spot measures inflation adjustment was not appropriate, and as such the most important feature was to ensure that the starting yield profile in 2004 corresponded broadly to the end yield profile of the historical period as at December 2003. The group decided to match the historical cyclical patterns of the segment yields as closely as possible – particularly given the rental growth assumptions noted above – subject to this linking constraint across the 2003/04 period.

A simple algebraic adjustment was thus applied to the historical series to pivot them about their segment averages, preserving the overall shape of each series but ensuring that each started in 2004 as at the end 2003 value and delivered the same long term average yield.

10.3 Introducing investor feedback in the historical and forecast yield definition

Each of the stage one simulation runs took the initial yield recorded on the IPD databank, segment by segment, and used that to translate simulated income into adjusted asset value through the introduction of each of the alternative leasing scenarios. Thus in each year a new simulated capital value was produced by applying the appropriate segment yield for that year to the simulated income delivered through the application of a particular new leasing scenario.

This approach enables the computation of a full range of return measures, which are then input into the volatility and asset liability modelling phases of the study. It does however assume - at least with respect to investment demand - that the investors are passive with respect to their reaction to reduction both in current income and income duration as a result of legislatively introduced new leasing scenarios. This is unrealistic and prima facie one would expect investors to demand higher yields in circumstances of reduced income and income security.

A simple method was therefore devised to introduce a yield adaptation mechanism so as to model a plausible investor response to changing income circumstances. This was achieved by comparing the newly delivered income under each leasing scenario in each specific year with a corresponding base case value. The initial yields are then adjusted by modifying capital values pro rata to the scale of income movement, whether up or down. Thus a downward movement in income in the context of a combination of adverse lease impacts would be fed back into the yield computation by applying the scale of the income reduction to the capital value as defined initially on the basis of a fixed yield hypothesis.

A back end modelling system was built which allowed the group to vary this feedback mechanism between the two extremes of no feedback at all (in other words the initial yield remains unadjusted), and full adjustment (which means taking the full percentage loss in income and applying that as a percentage degradation to the new capital value).

When this methodology is then tested within the framework of the full simulation results, the impacts all look consistent and plausible. For markets which are subject to significant rental volatility and significant leasing impacts on the year-on-year returns, the introduction of the yield feedback mechanism rebuilds the total return to base case levels through increasing income return (offsetting losses of capital growth), but at the price of hugely increased volatility.

10 Appendix One – Technical notes

10.4 Populating the Property Data

Both the ex ante and the ex post models required 25 hypothetical individual properties for each market segment. These properties were to be extracted from data from IPD end-2003 universe, for which we required lease details, rents, ERV and capital values. Since the model only required a single set of data for each hypothetical property, including the lease information, single-let properties from the actual data provided the best information to work from. For nine of the ten market segments, there were large enough samples of single-let properties to choose from, but Shopping Centres required a different approach, as by definition they are multi-let. Full tenant data was extracted for a sample of three shopping centres – one large, one medium and one small-sized by value. Forward-looking income streams for each unit in the centre were projected, and from these tenant-level capital values were calculated and reconciled with the property-level valuation figures. This created a dataset of shopping centre units, with capital values, that could be treated as individual "properties", and from which could be extracted sample data for the main modelling exercise.

10.5 Calculating the Market Returns

In the ex post simulation model, historic market share percentages were applied to the individual segment returns to produce an all property series. In the ex ante model, market shares were frozen at their end-2003 levels for the entire forecast horizon, and the all property series was derived accordingly.

10.6 Lease Lengths

The ex post simulation model required a history from 1980 to 2003 of average lease lengths. Since IPD holds records of UK tenancy data from only 1997 to the present day, no such series was easily available. At an early stage, it was agreed that a fair assumption would be to fix average sector lease lengths at 25 years from the beginning of the model until 1990, from when leases began to shorten once more flexibility in lease lengths was introduced into the market. Therefore, a series of lease lengths was required covering the years from 1990 to 2003.

There are analyses available on lease lengths using IPD data which have adopted a longitudinal approach, specifically the BPF/IPD (2004) Annual Lease Review. This approach has the advantage of utilising the most recent data held by IPD at any one point, but has limitations if the aim is to compare lease trends through time. This is because there is a natural bias involved in the construction of the series. Whereas the full range of leases can be observed for the last year of any longitudinal analysis, only unexpired leases can be observed for earlier years. So if 1997 leases were being analysed using end 2002 data, any leases granted in that year which were 5 years or less in length will have expired and so would no longer be recorded. Average lease lengths for that year would be calculated from the longer leases that remain and therefore be biased upwards.

The construction of a less biased series of historic data was therefore attempted, using the BPF/IPD data in tandem with cross-sectional analysis of lease terms. To do this, IPD tenancy datasets were obtained for each year between 1997 and 2002 (inclusive). Leases from both December and March datasets were included in the analysis, not only to increase the amount of evidence, but also because they have different characteristics. The larger December databank, upon which the published IPD UK Annual Index is based,

contains most of the institutional (insurance company and pension fund) portfolios and only a few property company portfolios. The March databank contains mostly property company portfolios, so its inclusion increases the amount of evidence on lettings by this sector and broadens overall coverage of the market.

From each respective dataset, leases signed within the most recent 12 months were isolated. Any head leases, licences or leases for the purpose of property development were removed. Leases for properties outside the main commercial sectors were also removed, such as agricultural or car park leases. Leases 50 years or more in length were excluded, as these are unlikely to be market leases and could skew the average lengths. For all leases remaining (which still comprise the majority of new leases recorded by IPD in any one year), full lease terms were calculated, ignoring break clauses.

For each of the ten sectors, as well as for all properties, the average annual weighted lease term was calculated. Each lease term was weighted by its annual rent or by an apportionment of the estimated rental value for leases (we did not use straight ERVs) where a rent-free period was in place at the time of measurement. The use of this approach was important for two reasons. Firstly, longer leases may be more likely to have long rent-free periods than short leases. This, in turn, would make it more likely that their rent-free was still in operation at the data collection date and so mean they are more likely to be excluded from the weighted results. Secondly, in certain market conditions, rent-free periods may be more common in some market segments than others. This could cause more properties from a particular segment to be excluded, creating unknown biases in the weighted results (this of course only matters for the all property numbers).

The resulting series of lease terms for each sector from 1997 to 2002 were regressed against the equivalent series of lease terms taken from the BPF/IPD Annual Lease Reviews (2000 - 2003) to derive the required historic series of sector lease terms.

Whilst these series of average lease terms represented accurate averages, the ex post model still required a distribution of lease lengths per sector per year that would reconcile with these averages. In order to create this distribution, we made the simplifying assumption that all leases would be a multiple of five years (e.g. 5 years, 10 years, 15 years, etc) and constructed a lease length probability matrix that would produce distributions of lease lengths which would reconcile with a chosen overall average. Wherever possible the distribution was based on evidence from IPD, although this was not possible for simulations assuming very short average lease lengths. This whole procedure resulted in a final set of probability distributions of lease lengths per sector per year.

For the ex ante model, we assumed lease lengths per sector would remain unchanged across the forecast horizon, and therefore carried over the sector lease length probability distributions from the end of 2003.

10.7 Void Period/Rate estimates

The ex post model required a history of void rates and average void periods for the period from 1981 to 2003.

IPD has time series for void rates from 1993 onwards. A set of estimates for earlier years from 1981-1992 were compiled by assuming that void rates are inversely related to rental growth in real terms, adjusted for inflation. This relationship was tested for each sector over the period 1993-2003 and real rental growth was found to be a significant independent variable, typically explaining around 80% of the

variation in void rates. The resulting equations were then applied to IPD's historic real rental growth series to produce a series of estimated void periods from 1981-1992.

IPD's time series for estimated average void periods is based on modelling the relationship between void rates and void periods between 1998 and 2003. Research published in IPD Lease Events Review 2003 suggests that the relationship between the two is not linear and that void periods are probably a lagged function of void rates. (For example, a sudden downturn in the market will lead to a jump in the void rate, but the average void period will initially still be quite short, because many units were occupied until recently). Using IPD's actual void rates between 1993-2003 and estimated void rates between 1981-1992 (see above), it was possible to derive an estimated time series for average void periods.

The ex ante model appled the average void period estimates to all leases upon expiry, and so needed to factor in the probability of a lease being renewed by the existing tenant. Therefore, the series derived above required a "renewal adjustment factor". Using lease renewal rates from IPD Lease Events Review 2003, the historic average void period series assumed that an appropriate proportion of lease upon expiry were immediately renewed, thus incurring a zero vacancy period.

The ex ante model reapplied the historical void rates and void periods to the forecast period.

10.8 Break Rates

In the base case and options 2, 3 and 4 we assume a break exercise rate of 24.0% (applied only to all leases from 1990 in the first three options just listed). This figure is derived from IPD Lease Events Review 2003, and represents the percentage of market value in leases that were due a break clause in 2002, and by the end of the year had subsequently exercised it. Units seeing a break clause exercised are assumed to go through a void period, as specified in the previous section, before a new lease starts.

In option 5 we use different break exercise rates, as follows:

For break clauses due five years from the lease start, IPD 2002 percentage by market value that subsequently exercised was 32%; this figure was used to represent the probabilities of leases breaking after 5 years for leases due to expire within both 5 and 10 years;

for break clauses due five years after the lease start, IPD constructed a hybrid of breaks exercising in year ten of the lease along with leases expiring after ten years and not subsequently renewing. This produced a percentage of "breaks" exercised at year 10 of 45%.

Accordingly option 5 includes a further assumption. If, at the date of the break, for the percentage of leases that we assume do not break, any overrented leases are assumed to move into negotiation and it is assumed that rent is revised to halfway between rent and ERV (ie Rent1 = (Rent0+ ERV1)/2 where Rent0>ERV). In contrast for those breaks where the tenant is reversionary, the rent simply moves up to market value. The percentage of breaks assumed to be exercised follows the typical pattern of going through a void period as specified in the previous section, before a new lease can begin.

11 Appendix Two – Performance Measurement Tables

Table 11-1: **Historic Data**

	Historic Data – Yield Unadjusted					Historic Data – Yield Adjusted				
	Total Return Mean	Total Return S Dev	Capital Growth Mean	Income Return Mean	Income Collected Sum	Total Return Mean	Total Return S Dev	Capital Growth Mean	Income Return Mean	Income Collected Sum
Standard Retail – South East										
Base case	11.15	8.50	5.06	6.09	35.52	11.15	8.50	5.06	6.09	35.52
Option 2	11.13	8.74	5.05	6.08	34.68	11.27	9.20	5.05	6.22	34.68
Option 3	11.12	8.68	5.04	6.08	34.77	11.24	9.05	5.04	6.20	34.77
Option 4	11.00	8.62	4.92	6.08	34.60	11.07	8.95	4.85	6.22	34.60
Option 5 -10	9.78	8.85	3.74	6.04	28.61	9.94	9.58	2.60	7.35	28.61
Option 5 w/out ind	9.69	8.68	3.65	6.03	28.89	9.61	9.22	2.35	7.26	28.89
Option 5 with ind	9.50	8.63	3.46	6.04	31.47	8.61	9.57	2.00	6.61	31.47
Rental Value Growth	**Mean:**	**5.16**	**Sdev:**	**7.20**						
Standard Retail – Rest of UK										
Base case	11.36	7.22	5.25	6.11	50.34	11.36	7.22	5.25	6.11	50.34
Option 2	11.37	7.22	5.27	6.11	50.27	11.39	7.23	5.28	6.12	50.27
Option 3	11.36	7.24	5.25	6.11	50.28	11.37	7.25	5.25	6.11	50.28
Option 4	11.35	7.31	5.24	6.11	50.23	11.38	7.48	5.26	6.12	50.23
Option 5 -10	10.30	7.71	4.23	6.08	43.43	10.25	8.59	3.35	6.90	43.43
Option 5 w/out ind	10.22	7.40	4.14	6.08	43.88	9.92	7.88	3.11	6.81	43.88
Option 5 w/out ind	9.94	7.81	3.86	6.07	47.40	8.80	9.02	2.57	6.23	47.40
Rental Value Growth	**Mean:**	**5.22**	**Sdev:**	**5.08**						
Shopping Centres										
Base case	10.86	7.54	4.18	6.68	45.95	10.86	7.54	4.18	6.68	45.95
Option 2	10.85	7.55	4.17	6.68	45.88	10.85	7.56	4.17	6.68	45.88
Option 3	10.87	7.54	4.19	6.68	45.90	10.88	7.53	4.19	6.68	45.90
Option 4	10.85	7.61	4.17	6.68	45.88	10.90	7.81	4.21	6.69	45.88
Option 5 -10	9.35	7.91	2.74	6.61	35.99	9.62	8.99	1.48	8.14	35.99
Option 5 w/out ind	9.27	8.03	2.66	6.61	35.80	9.44	9.17	1.27	8.17	35.80
Option 5 with ind	8.95	8.11	2.35	6.60	38.87	8.07	9.84	0.66	7.41	38.87
Rental Value Growth	**Mean:**	**5.94**	**Sdev:**	**5.52**						
Retail Warehouses										
Base case	14.58	9.62	7.06	7.52	56.45	14.58	9.62	7.06	7.52	56.45
Option 2	14.59	9.61	7.07	7.52	56.46	14.60	9.61	7.08	7.52	56.46
Option 3	14.59	9.62	7.06	7.52	56.46	14.59	9.62	7.07	7.52	56.46
Option 4	14.59	9.63	7.07	7.52	56.47	14.60	9.62	7.08	7.52	56.47
Option 5 -10	13.98	10.18	6.45	7.53	53.09	13.84	10.68	5.97	7.88	53.09
Option 5 w/out ind	14.08	9.99	6.54	7.54	54.55	13.76	10.24	6.07	7.68	54.55
Option 5 with ind	13.75	9.77	6.21	7.54	58.82	12.39	10.36	5.42	6.97	58.82
Rental Value Growth	**Mean:**	**6.14**	**Sdev:**	**3.69**						

11 Appendix Two – Performance Measurement Tables

Table 11.1: **continued**

	Historic Data – Yield Unadjusted					Historic Data – Yield Adjusted				
	Total Return Mean	Total Return S Dev	Capital Growth Mean	Income Return Mean	Income Collected Sum	Total Return Mean	Total Return S Dev	Capital Growth Mean	Income Return Mean	Income Collected Sum
Office – City of London										
Base case	9.09	12.39	2.16	6.93	77.95	9.09	12.39	2.16	6.93	77.95
Option 2	8.21	13.45	1.40	6.81	64.60	9.30	17.13	0.94	8.36	64.60
Option 3	8.37	12.65	1.53	6.84	67.64	8.96	14.45	1.05	7.91	67.64
Option 4	8.04	12.70	1.21	6.83	66.20	8.49	14.45	0.44	8.04	66.20
Option 5 -10	6.91	13.48	0.20	6.71	56.30	8.26	18.36	-1.33	9.59	56.30
Option 5 w/out ind	6.84	13.43	0.12	6.72	57.50	7.96	18.57	-1.44	9.40	57.50
Option 5 with ind	6.63	13.23	-0.09	6.72	63.39	6.83	18.64	-1.75	8.58	63.39
Rental Value Growth	**Mean:**	**2.98**	**Sdev:**	**15.44**						
Office – West End of London										
Base case	10.66	14.60	3.82	6.83	84.58	10.66	14.60	3.82	6.83	84.58
Option 2	10.46	16.21	3.70	6.77	74.82	11.52	19.76	3.85	7.67	74.82
Option 3	10.45	15.78	3.68	6.78	76.36	11.22	18.36	3.72	7.50	76.36
Option 4	10.14	15.45	3.37	6.77	75.32	10.62	17.31	3.10	7.52	75.32
Option 5 -10	8.40	14.59	1.78	6.62	59.11	9.29	17.07	0.01	9.28	59.11
Option 5 w/out ind	8.26	14.59	1.64	6.62	60.11	8.84	17.06	-0.26	9.10	60.11
Option 5 with ind	7.98	14.51	1.35	6.62	65.00	7.72	17.56	-0.71	8.43	65.00
Rental Value Growth	**Mean:**	**4.28**	**Sdev:**	**15.61**						
Office – Rest of South East										
Base case	8.49	9.42	0.88	7.62	71.53	8.49	9.42	0.88	7.62	71.53
Option 2	8.28	10.08	0.70	7.58	66.74	8.72	11.83	0.60	8.12	66.74
Option 3	8.29	9.86	0.70	7.58	67.45	8.60	11.08	0.57	8.03	67.45
Option 4	8.16	9.84	0.58	7.58	67.33	8.38	11.20	0.36	8.02	67.33
Option 5 -10	6.51	9.05	-0.93	7.44	55.87	6.82	10.91	-2.60	9.41	55.87
Option 5 w/out ind	6.54	9.10	-0.91	7.45	57.37	6.59	10.61	-2.57	9.17	57.37
Option 5 with ind	6.30	9.43	-1.16	7.45	62.01	5.49	11.75	-3.00	8.49	62.01
Rental Value Growth	**Mean:**	**2.53**	**Sdev:**	**9.44**						
Office – Rest of UK										
Base case	10.61	11.73	2.65	7.96	121.02	10.61	11.73	2.65	7.96	121.02
Option 2	10.58	11.85	2.63	7.95	117.90	10.75	12.13	2.62	8.13	117.90
Option 3	10.58	11.81	2.63	7.96	118.23	10.72	12.03	2.61	8.11	118.23
Option 4	10.54	12.22	2.59	7.95	118.13	10.71	13.01	2.59	8.12	118.13
Option 5 -10	8.89	9.99	1.08	7.81	97.69	9.07	10.08	-0.33	9.41	97.69
Option 5 w/out ind	8.85	9.82	1.03	7.81	100.81	8.61	9.07	-0.49	9.10	100.81
Option 5 with ind	8.49	9.66	0.68	7.81	107.30	7.34	9.57	-1.12	8.46	107.30
Rental Value Growth	**Mean:**	**4.38**	**Sdev:**	**7.97**						

11 Appendix Two – Performance Measurement Tables

Table 11.1: **Continued**

	Historic Data – Yield Unadjusted					Historic Data – Yield Adjusted				
	Total Return Mean	Total Return S Dev	Capital Growth Mean	Income Return Mean	Income Collected Sum	Total Return Mean	Total Return S Dev	Capital Growth Mean	Income Return Mean	Income Collected Sum
Industrial – South East										
Base case	13.00	10.51	4.19	8.81	66.03	13.00	10.51	4.19	8.81	66.03
Option 2	12.95	10.83	4.16	8.79	63.13	13.33	11.71	4.18	9.15	63.13
Option 3	12.96	10.75	4.17	8.79	63.43	13.31	11.50	4.20	9.11	63.43
Option 4	12.88	10.56	4.09	8.79	63.58	13.20	11.09	4.11	9.08	63.58
Option 5 -10	11.86	10.37	3.19	8.67	52.30	13.25	11.87	2.45	10.81	52.30
Option 5 w/out ind	11.80	10.51	3.12	8.67	53.15	12.91	12.11	2.27	10.63	53.15
Option 5 with ind	11.54	10.85	2.87	8.68	57.89	11.48	13.07	1.82	9.66	57.89
Rental Value Growth	**Mean:**	**3.76**	**Sdev:**	**8.06**						
Industrial – Rest of UK										
Base case	13.30	11.81	3.89	9.41	50.50	13.30	11.81	3.89	9.41	50.50
Option 2	13.30	11.82	3.90	9.41	49.96	13.39	11.84	3.91	9.48	49.96
Option 3	13.29	11.82	3.89	9.40	50.00	13.37	11.85	3.89	9.48	50.00
Option 4	13.28	11.89	3.88	9.40	49.99	13.44	12.22	3.95	9.49	49.99
Option 5 -10	12.46	10.41	3.16	9.30	42.50	13.69	10.84	2.75	10.94	42.50
Option 5 w/out ind	12.44	10.33	3.14	9.30	43.39	13.30	10.24	2.60	10.70	43.39
Option 5 with ind	12.10	10.59	2.79	9.31	46.69	11.75	11.41	1.97	9.79	46.69
Rental Value Growth	**Mean:**	**3.39**	**Sdev:**	**6.27**						
All Property										
Base case	11.03	9.10	3.94	7.09	651.60	11.03	9.10	3.94	7.09	651.60
Option 2	10.85	9.33	3.79	7.06	619.06	11.11	9.98	3.71	7.41	619.06
Option 3	10.88	9.23	3.81	7.07	624.68	11.06	9.65	3.72	7.33	624.68
Option 4	10.77	9.18	3.70	7.06	622.21	10.90	9.58	3.55	7.35	622.21
Option 5 -10	9.52	8.70	2.55	6.98	520.44	9.94	8.98	1.33	8.61	520.44
Option 5 w/out ind	9.47	8.70	2.49	6.98	530.21	9.65	8.93	1.18	8.47	530.21
Option 5 with ind	9.18	8.80	2.20	6.98	574.31	8.43	9.80	0.67	7.76	574.31
Rental Value Growth	**Mean:**	**4.26**	**Sdev:**	**8.12**						

11 Appendix Two – Performance Measurement Tables

Table 11-2: **Data Varied Market Share**

	Forecast Data Varied Market Share – Yield Unadjusted					Forecast Data Varied Market Share – Yield Adjusted				
	Total Return Mean	Total Return S Dev	Capital Growth Mean	Income Return Mean	Income Collected Sum	Total Return Mean	Total Return S Dev	Capital Growth Mean	Income Return Mean	Income Collected Sum
Standard Retail – South East										
Base case	9.49	10.29	3.62	5.86	15.57	9.49	10.29	3.62	5.86	15.57
Option 2	9.40	10.28	3.55	5.85	15.24	9.47	10.55	3.50	5.97	15.24
Option 3	9.43	10.08	3.57	5.86	15.41	9.48	10.09	3.56	5.91	15.41
Option 4	9.48	10.19	3.62	5.86	15.43	9.56	10.40	3.66	5.91	15.43
Option 5 -10	9.25	9.52	3.38	5.88	15.21	9.18	9.78	3.19	6.00	15.21
Option 5 w/out ind	9.30	9.31	3.42	5.88	15.50	9.16	9.45	3.27	5.89	15.50
Option 5 with ind	-	-	-	-	-	-	-	-	-	-
Standard Retail – Rest of UK										
Base case	9.20	8.11	3.34	5.86	23.15	9.20	8.11	3.34	5.86	23.15
Option 2	9.17	7.96	3.31	5.86	23.02	9.18	7.90	3.29	5.89	23.02
Option 3	9.13	7.94	3.27	5.86	23.06	9.10	7.84	3.22	5.88	23.06
Option 4	9.33	8.48	3.46	5.87	23.13	9.46	9.06	3.59	5.88	23.13
Option 5 -10	9.33	7.26	3.43	5.90	23.01	9.50	8.51	3.56	5.94	23.01
Option 5 w/out ind	9.35	7.14	3.44	5.91	23.51	9.43	8.63	3.62	5.82	23.51
Option 5 with ind	-	-	-	-	-	-	-	-	-	-
Shopping Centres										
Base case	8.31	9.33	1.93	6.38	19.63	8.31	9.33	1.93	6.38	19.63
Option 2	8.36	9.38	1.98	6.38	19.59	8.43	9.49	2.03	6.40	19.59
Option 3	8.32	9.27	1.93	6.38	19.60	8.32	9.25	1.93	6.39	19.60
Option 4	8.37	9.14	1.97	6.39	19.70	8.41	9.15	2.03	6.38	19.70
Option 5 -10	8.20	8.70	1.78	6.41	18.92	8.52	10.06	1.88	6.64	18.92
Option 5 w/out ind	8.26	8.60	1.84	6.42	19.10	8.55	9.92	1.96	6.59	19.10
Option 5 with ind	-	-	-	-	-	-	-	-	-	-
Retail Warehouses										
Base case	8.20	10.52	1.07	7.13	29.97	8.20	10.52	1.07	7.13	29.97
Option 2	8.22	10.78	1.09	7.13	29.92	8.25	11.03	1.10	7.15	29.92
Option 3	8.21	10.83	1.08	7.13	29.95	8.22	11.13	1.08	7.14	29.95
Option 4	8.24	10.91	1.11	7.13	29.98	8.33	11.71	1.20	7.13	29.98
Option 5 -10	7.88	9.58	0.73	7.15	28.88	7.99	11.08	0.58	7.41	28.88
Option 5 w/out ind	8.14	9.93	0.97	7.17	29.49	8.27	11.33	0.98	7.29	29.49
Option 5 with ind	-	-	-	-	-	-	-	-	-	-

11 Appendix Two – Performance Measurement Tables

Table 11.2: **continued**

	Forecast Data Varied Market Share – Yield Unadjusted					Forecast Data Varied Market Share – Yield Adjusted				
	Total Return Mean	Total Return S Dev	Capital Growth Mean	Income Return Mean	Income Collected Sum	Total Return Mean	Total Return S Dev	Capital Growth Mean	Income Return Mean	Income Collected Sum
Office – City of London										
Base case	7.32	15.20	0.71	6.60	33.34	7.32	15.20	0.71	6.60	33.34
Option 2	6.90	16.24	0.43	6.47	28.43	8.43	21.31	0.69	7.73	28.43
Option 3	7.38	15.21	0.79	6.58	32.10	7.83	16.18	0.99	6.85	32.10
Option 4	7.20	15.32	0.67	6.54	30.05	8.04	17.32	0.76	7.27	30.05
Option 5 -10	7.21	14.16	0.73	6.48	28.09	9.64	21.80	1.79	7.85	28.09
Option 5 w/out ind	7.09	13.85	0.61	6.48	29.11	9.03	20.82	1.46	7.57	29.11
Option 5 with ind	-	-	-	-	-	-	-	-	-	-
Office – West End of London										
Base case	7.82	16.75	1.40	6.42	31.57	7.82	16.75	1.40	6.42	31.57
Option 2	8.31	19.75	1.94	6.37	29.19	10.01	25.15	2.99	7.02	29.19
Option 3	8.15	17.82	1.73	6.42	31.16	8.72	19.40	2.15	6.57	31.16
Option 4	8.25	19.02	1.84	6.40	30.18	9.21	22.06	2.45	6.76	30.18
Option 5 -10	7.61	16.09	1.28	6.33	30.21	8.83	22.18	2.15	6.68	30.21
Option 5 w/out ind	7.43	16.10	1.11	6.32	30.84	8.68	24.41	2.15	6.53	30.84
Option 5 with ind	-	-	-	-	-	-	-	-	-	-
Office – Rest of South East										
Base case	6.87	10.53	-0.35	7.22	28.50	6.87	10.53	-0.35	7.22	28.50
Option 2	6.99	12.16	-0.20	7.19	26.98	7.70	14.72	0.05	7.65	26.98
Option 3	6.88	11.20	-0.33	7.21	27.83	7.11	12.09	-0.29	7.40	27.83
Option 4	7.02	12.24	-0.19	7.21	27.45	7.52	14.19	-0.01	7.53	27.45
Option 5 -10	6.72	10.69	-0.44	7.16	27.85	7.18	14.47	-0.17	7.35	27.85
Option 5 w/out ind	6.74	10.57	-0.43	7.17	28.66	7.07	15.21	-0.07	7.14	28.66
Option 5 with ind	-	-	-	-	-	-	-	-	-	-
Office – Rest of UK										
Base case	7.32	9.54	-0.25	7.57	48.78	7.32	9.54	-0.25	7.57	48.78
Option 2	7.30	9.98	-0.26	7.55	47.24	7.54	10.58	-0.26	7.80	47.24
Option 3	7.40	9.82	-0.16	7.57	47.98	7.66	10.21	-0.06	7.72	47.98
Option 4	7.74	10.25	0.15	7.59	48.13	8.36	11.55	0.62	7.74	48.13
Option 5 -10	7.42	10.10	-0.11	7.52	47.96	8.05	14.14	0.39	7.66	47.96
Option 5 w/out ind	7.36	10.03	-0.16	7.52	49.59	7.67	13.95	0.27	7.40	49.59
Option 5 with ind	-	-	-	-	-	-	-	-	-	-

11 Appendix Two – Performance Measurement Tables

Table 11.2: **continued**

	Forecast Data Varied Market Share – Yield Unadjusted					Forecast Data Varied Market Share – Yield Adjusted				
	Total Return Mean	Total Return S Dev	Capital Growth Mean	Income Return Mean	Income Collected Sum	Total Return Mean	Total Return S Dev	Capital Growth Mean	Income Return Mean	Income Collected Sum
Industrial – South East										
Base case	9.25	15.25	0.87	8.38	28.94	9.25	15.25	0.87	8.38	28.94
Option 2	9.27	15.83	0.91	8.36	28.08	9.62	16.75	0.98	8.63	28.08
Option 3	9.24	15.62	0.87	8.37	28.53	9.36	16.00	0.87	8.49	28.53
Option 4	9.23	15.19	0.86	8.37	28.21	9.49	15.70	0.89	8.60	28.21
Option 5 -10	8.93	11.93	0.59	8.34	27.92	9.77	13.17	1.10	8.67	27.92
Option 5 w/out ind	8.93	11.27	0.58	8.35	28.60	9.68	13.72	1.21	8.47	28.60
Option 5 with ind	-	-	-	-	-	-	-	-	-	-
Industrial – Rest of UK										
Base case	9.67	15.23	0.64	9.03	23.21	9.67	15.23	0.64	9.03	23.21
Option 2	9.72	15.75	0.69	9.03	22.79	9.97	16.44	0.76	9.22	22.79
Option 3	9.78	15.75	0.75	9.03	22.94	10.05	16.42	0.88	9.17	22.94
Option 4	9.76	15.94	0.72	9.04	22.81	10.08	16.96	0.86	9.21	22.81
Option 5 -10	9.21	12.38	0.25	8.95	23.02	9.38	13.24	0.38	9.00	23.02
Option 5 w/out ind	9.19	11.42	0.23	8.96	23.69	9.08	11.52	0.34	8.74	23.69
Option 5 with ind	-	-	-	-	-	-	-	-	-	-
All Property										
Base case	8.14	8.38	1.38	6.76	275.83	8.14	8.38	1.38	6.76	275.83
Option 2	8.30	9.33	1.57	6.73	261.09	9.09	11.38	1.96	7.13	261.09
Option 3	8.22	8.68	1.47	6.75	271.62	8.47	9.24	1.61	6.86	271.62
Option 4	8.31	8.94	1.57	6.75	266.62	8.81	10.01	1.83	6.98	266.62
Option 5 -10	8.10	9.08	1.38	6.72	262.28	9.00	11.66	1.90	7.10	262.28
Option 5 w/out ind	8.08	9.18	1.35	6.73	268.96	8.83	11.95	1.90	6.93	268.96
Option 5 with ind	-	-	-	-	-	-	-	-	-	-

11 Appendix Two – Performance Measurement Tables

Table 11-3: **Forecast Data Fixed Market Share**

	Forecast Data Varied Market Share – Yield UnadjustedForecast					Data Varied Market Share – Yield Adjusted				
	Total Return Mean	Total Return S Dev	Capital Growth Mean	Income Return Mean	Income Collected Sum	Total Return Mean	Total Return S Dev	Capital Growth Mean	Income Return Mean	Income Collected Sum
Standard Retail – South East										
Base case	9.49	10.29	3.62	5.86	15.57	9.49	10.29	3.62	5.86	15.57
Option 2	9.40	10.28	3.55	5.85	15.24	9.47	10.55	3.50	5.97	15.24
Option 3	9.43	10.08	3.57	5.86	15.41	9.48	10.09	3.56	5.91	15.41
Option 4	9.48	10.19	3.62	5.86	15.43	9.56	10.40	3.66	5.91	15.43
Option 5 -10	9.25	9.52	3.38	5.88	15.21	9.18	9.78	3.19	6.00	15.21
Option 5 w/out ind	9.30	9.31	3.42	5.88	15.50	9.16	9.45	3.27	5.89	15.50
Option 5 with ind	-	-	-	-	-	-	-	-	-	-
Rental Value GrowthMean:	**3.33**	**Sdev:**	**6.57**							
Standard Retail – Rest of UK										
Base case	9.20	8.11	3.34	5.86	23.15	9.20	8.11	3.34	5.86	23.15
Option 2	9.17	7.96	3.31	5.86	23.02	9.18	7.90	3.29	5.89	23.02
Option 3	9.13	7.94	3.27	5.86	23.06	9.10	7.84	3.22	5.88	23.06
Option 4	9.33	8.48	3.46	5.87	23.13	9.46	9.06	3.59	5.88	23.13
Option 5 -10	9.33	7.26	3.43	5.90	23.01	9.50	8.51	3.56	5.94	23.01
Option 5 w/out ind	9.35	7.14	3.44	5.91	23.51	9.43	8.63	3.62	5.82	23.51
Option 5 with ind	-	-	-	-	-	-	-	-	-	-
Rental Value GrowthMean:	**3.38**	**Sdev:**	**3.97**							
Shopping Centres										
Base case	8.31	9.33	1.93	6.38	19.63	8.31	9.33	1.93	6.38	19.63
Option 2	8.36	9.38	1.98	6.38	19.59	8.43	9.49	2.03	6.40	19.59
Option 3	8.32	9.27	1.93	6.38	19.60	8.32	9.25	1.93	6.39	19.60
Option 4	8.37	9.14	1.97	6.39	19.70	8.41	9.15	2.03	6.38	19.70
Option 5 -10	8.20	8.70	1.78	6.41	18.92	8.52	10.06	1.88	6.64	18.92
Option 5 w/out ind	8.26	8.60	1.84	6.42	19.10	8.55	9.92	1.96	6.59	19.10
Option 5 with ind	-	-	-	-	-	-	-	-	-	-
Rental Value GrowthMean:	**4.10**	**Sdev:**	**4.74**							
Retail Warehouses										
Base case	8.20	10.52	1.07	7.13	29.97	8.20	10.52	1.07	7.13	29.97
Option 2	8.22	10.78	1.09	7.13	29.92	8.25	11.03	1.10	7.15	29.92
Option 3	8.21	10.83	1.08	7.13	29.95	8.22	11.13	1.08	7.14	29.95
Option 4	8.24	10.91	1.11	7.13	29.98	8.33	11.71	1.20	7.13	29.98
Option 5 -10	7.88	9.58	0.73	7.15	28.88	7.99	11.08	0.58	7.41	28.88
Option 5 w/out ind	8.14	9.93	0.97	7.17	29.49	8.27	11.33	0.98	7.29	29.49
Option 5 with ind	-	-	-	-	-	-	-	-	-	-
Rental Value GrowthMean:	**4.35**	**Sdev:**	**4.27**							

11 Appendix Two – Performance Measurement Tables

Table 11.3: **continued**

	Forecast Data Varied Market Share – Yield UnadjustedForecast					Data Varied Market Share – Yield Adjusted				
	Total Return Mean	Total Return S Dev	Capital Growth Mean	Income Return Mean	Income Collected Sum	Total Return Mean	Total Return S Dev	Capital Growth Mean	Income Return Mean	Income Collected Sum
Office – City of London										
Base case	7.32	15.20	0.71	6.60	33.34	7.32	15.20	0.71	6.60	33.34
Option 2	6.90	16.24	0.43	6.47	28.43	8.43	21.31	0.69	7.73	28.43
Option 3	7.38	15.21	0.79	6.58	32.10	7.83	16.18	0.99	6.85	32.10
Option 4	7.20	15.32	0.67	6.54	30.05	8.04	17.32	0.76	7.27	30.05
Option 5 -10	7.21	14.16	0.73	6.48	28.09	9.64	21.80	1.79	7.85	28.09
Option 5 w/out ind	7.09	13.85	0.61	6.48	29.11	9.03	20.82	1.46	7.57	29.11
Option 5 with ind	-	-	-	-	-	-	-	-	-	-
Rental Value GrowthMean:	**1.19**	**Sdev:**	**15.15**							
Office – West End of London										
Base case	7.82	16.75	1.40	6.42	31.57	7.82	16.75	1.40	6.42	31.57
Option 2	8.31	19.75	1.94	6.37	29.19	10.01	25.15	2.99	7.02	29.19
Option 3	8.15	17.82	1.73	6.42	31.16	8.72	19.40	2.15	6.57	31.16
Option 4	8.25	19.02	1.84	6.40	30.18	9.21	22.06	2.45	6.76	30.18
Option 5 -10	7.61	16.09	1.28	6.33	30.21	8.83	22.18	2.15	6.68	30.21
Option 5 w/out ind	7.43	16.10	1.11	6.32	30.84	8.68	24.41	2.15	6.53	30.84
Option 5 with ind	-	-	-	-	-	-	-	-	-	-
Rental Value GrowthMean:	**2.45**	**Sdev:**	**15.06**							
Office – Rest of South East										
Base case	6.87	10.53	-0.35	7.22	28.50	6.87	10.53	-0.35	7.22	28.50
Option 2	6.99	12.16	-0.20	7.19	26.98	7.70	14.72	0.05	7.65	26.98
Option 3	6.88	11.20	-0.33	7.21	27.83	7.11	12.09	-0.29	7.40	27.83
Option 4	7.02	12.24	-0.19	7.21	27.45	7.52	14.19	-0.01	7.53	27.45
Option 5 -10	6.72	10.69	-0.44	7.16	27.85	7.18	14.47	-0.17	7.35	27.85
Option 5 w/out ind	6.74	10.57	-0.43	7.17	28.66	7.07	15.21	-0.07	7.14	28.66
Option 5 with ind	-	-	-	-	-	-	-	-	-	-
Rental Value GrowthMean:	**0.71**	**Sdev:**	**8.50**							
Office – Rest of UK										
Base case	7.32	9.54	-0.25	7.57	48.78	7.32	9.54	-0.25	7.57	48.78
Option 2	7.30	9.98	-0.26	7.55	47.24	7.54	10.58	-0.26	7.80	47.24
Option 3	7.40	9.82	-0.16	7.57	47.98	7.66	10.21	-0.06	7.72	47.98
Option 4	7.74	10.25	0.15	7.59	48.13	8.36	11.55	0.62	7.74	48.13
Option 5 -10	7.42	10.10	-0.11	7.52	47.96	8.05	14.14	0.39	7.66	47.96
Option 5 w/out ind	7.36	10.03	-0.16	7.52	49.59	7.67	13.95	0.27	7.40	49.59
Option 5 with ind	-	-	-	-	-	-	-	-	-	-
Rental Value GrowthMean:	**2.51**	**Sdev:**	**6.54**							

11 Appendix Two – Performance Measurement Tables

Table 11.3: **continued**

	Forecast Data Varied Market Share – Yield UnadjustedForecast					Data Varied Market Share – Yield Adjusted				
	Total Return Mean	Total Return S Dev	Capital Growth Mean	Income Return Mean	Income Collected Sum	Total Return Mean	Total Return S Dev	Capital Growth Mean	Income Return Mean	Income Collected Sum
Industrial – South East										
Base case	9.25	15.25	0.87	8.38	28.94	9.25	15.25	0.87	8.38	28.94
Option 2	9.27	15.83	0.91	8.36	28.08	9.62	16.75	0.98	8.63	28.08
Option 3	9.24	15.62	0.87	8.37	28.53	9.36	16.00	0.87	8.49	28.53
Option 4	9.23	15.19	0.86	8.37	28.21	9.49	15.70	0.89	8.60	28.21
Option 5 -10	8.93	11.93	0.59	8.34	27.92	9.77	13.17	1.10	8.67	27.92
Option 5 w/out ind	8.93	11.27	0.58	8.35	28.60	9.68	13.72	1.21	8.47	28.60
Option 5 with ind	-	-	-	-	-	-	-	-	-	-
Rental Value GrowthMean:	**1.93**	**Sdev:**	**7.19**							
Industrial – Rest of UK										
Base case	9.67	15.23	0.64	9.03	23.21	9.67	15.23	0.64	9.03	23.21
Option 2	9.72	15.75	0.69	9.03	22.79	9.97	16.44	0.76	9.22	22.79
Option 3	9.78	15.75	0.75	9.03	22.94	10.05	16.42	0.88	9.17	22.94
Option 4	9.76	15.94	0.72	9.04	22.81	10.08	16.96	0.86	9.21	22.81
Option 5 -10	9.21	12.38	0.25	8.95	23.02	9.38	13.24	0.38	9.00	23.02
Option 5 w/out ind	9.19	11.42	0.23	8.96	23.69	9.08	11.52	0.34	8.74	23.69
Option 5 with ind	-	-	-	-	-	-	-	-	-	-
Rental Value GrowthMean:	**1.57**	**Sdev:**	**5.19**							
All Property										
Base case	8.32	8.32	1.35	6.98	268.78	8.32	8.32	1.35	6.98	268.78
Option 2	8.35	8.82	1.40	6.96	259.76	8.75	9.78	1.54	7.20	259.76
Option 3	8.35	8.56	1.38	6.97	265.66	8.50	8.92	1.44	7.06	265.66
Option 4	8.42	8.64	1.45	6.97	263.25	8.72	9.29	1.60	7.12	263.25
Option 5 -10	8.14	8.58	1.18	6.96	258.54	8.65	9.99	1.42	7.23	258.54
Option 5 w/out ind	8.18	8.65	1.21	6.96	264.59	8.59	10.12	1.51	7.08	264.59
Option 5 with ind	-	-	-	-	-	-	-	-	-	-
Rental Value GrowthMean:	**2.88**	**Sdev:**	**6.12**							

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Investment Property Forum
3 Cadogan Gate
London SW1X 0AS

Telephone 020 7334 3799
Fax 020 7334 3872
Email ipfoffice@ipf.org.uk
Web www.ipf.org.uk