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FULL REPORT

Individual Property Risk

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This Programme supports the IPF's wider goals of enhancing the understanding and efficiency of property as an investment. The initiative provides the UK property investment market with the ability to deliver substantial, objective and high-quality analysis on a structured basis. It encourages the whole industry to engage with other financial markets, the wider business community and government on a range of complementary issues.

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Full Report

IPF Research Programme 2011–2015

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Individual Property Risk

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1. EXECUTIVE SUMMARY

- This report measures and explains levels of investment risk at the individual property level in the UK commercial market.
- It does this by analysing the performance records, property characteristics and tenancy records of over 1000 commercial properties held over the period 2002-2013, and through detailed case studies of investment risk in 88 commercial properties.
- The report considers the implications of its findings for pricing individual properties and if the risks faced by individual properties and different types of property have been rewarded.
- The report also examines the relationship between risk in individual properties, risk at the portfolio level, and diversification. This provides insights on how to best structure commercial property portfolios and control their risk.
- The distinction between systematic risk and specific risk is a fundamental underpinning of this research.
- Specific risk is that which is unique to the asset and is independent from one property to another. As it can be diversified away, the primary concern of the investor is to ensure that there are enough assets in a portfolio to diversify away the risk.
- Systematic risk reflects the tendency of assets to move together and to be exposed to the risk of the drivers behind this correlation. The main driver is commonly recognised to be 'market' (for example, IPD All Property or the City Office segment) but there may be additional dimensions (such as relatively high yields), which systematically affect the performance and risk of certain groups of assets.
- Market and other systematic risks are part and parcel of investing in the asset class, inescapable, and, when borne, justify compensation in the form of a premium return.
- IPD PAS segments are used to represent the market in assessing systematic risk in individual properties. These, however, only offer marginally greater explanatory power than IPD All Property; similarly, town only adds marginal explanatory power over segment. The contribution of geography and sector in explaining the performance and risk of individual properties is therefore only marginal.
- Sensitivity to changes in the market's return is the predominant risk in most properties. These sensitivities vary across properties, with some being more sensitive and others less sensitive than average.
- In most properties, the deviation in these sensitivities from the market average is not large, with exposure to the leasing market and short unexpired terms increasing sensitivity and relatively small lot sizes and tenant diversification reducing it. Investors should require a correspondingly higher or lower risk premium from such properties.
- A small proportion of properties face accentuated systematic risks. These are best represented as asset management intensive properties (defined as those with consistently short leases and high capital expenditure needs).
- The importance of market timing and hold periods is well-established for properties in volatile segments (such as City offices) but the research implies that this applies equally to properties that are consistently asset management intensive.
- Risk in the most risky types of property – particularly asset management intensive properties and those with short unexpired terms – does not appear to have been priced ex-ante; their risk-adjusted returns have been negative.
- Other types of asset management – for example, lease re-gearing, engineering change of use – appear, on the basis of the evidence from the case studies, to add value.

2 Individual Property Risk

1. EXECUTIVE SUMMARY

- On the whole, there is neither a relationship between the covenant strength of a property's tenants and the asset's performance, nor is there a relationship between covenant and risk. The few properties badly impacted by tenant default had relatively low yields, suggesting the risk of default was not priced in these assets.
- As a general conclusion, in pricing risk in individual properties, investors and researchers need to focus more heavily on the risks related to tenant default, lease events and asset management.
- The risk profile of assets changes over time as a result of external events as well as the actions taken by managers and aspects such as declining unexpired term. Systematic risks may also only assert themselves in particular environments, for example in 2009 when properties with poor income profiles suffered most and those with stronger income and larger lot sizes did well. Investors need to recognise this by continually reassessing the risk profile of individual assets and portfolios as a whole.
- The research finds that a number of market factors, which have distinct cycles of performance and which might be expected also consistently to differentiate performance within individual assets (for example, yield, size), are not supported by the analysis. Investors need exposure to a large number of such assets to track the performance and risk of such types, making implementation difficult.
- The exceptions might be the existence of an active management or an 'asset management intensity' factor and a 'lease-event' factor.
- Specific risk represents a substantial source of risk in a significant minority of individual properties. At the highest levels, it is predominantly driven by lease events (particularly tenant default and lease expiry) and by asset management. This reflects not only loss in income but volatile sentiment before and after the event.
- Relatively high specific risk is also likely for properties with few tenants, smaller lot sizes and with higher yields.
- Properties badly impacted by tenant default had relatively few tenants (as well as relatively low yields). In other properties experiencing tenant default, the effect was minimised through exposure to a larger number of tenants but not necessarily stronger covenants. Diversification through the number of tenants is therefore important.
- For most properties and, in particular, those that have 'slightly better' attributes (in terms of yield, number of tenants, and exposure to refurbishment expenditure) than the average property, specific risk is of unexceptional magnitude and for the most part seems to be 'truly' idiosyncratic and is very independent from property to another.
- Diversification can be achieved very quickly in portfolios made up of these types of property.
- Portfolios made up of 'asset management-intensive' properties have the highest levels of portfolio risk and also require relatively large numbers of properties to diversify away their high specific risk.
- Investment strategies and portfolio risk control processes have traditionally been defined on the basis of sector and geography but the research highlights the need for a much broader set of metrics. The research in particular identifies 'asset management intensity' as a key factor in structuring portfolios and controlling their risk.

2. INTRODUCTION

2.1 Introduction to the research and the report

This report measures and explains levels of investment risk in individual commercial properties. It considers the implications of the findings for pricing risk in individual properties, how risk in individual properties impacts on risk at the portfolio level, and the lessons for investment and investment research processes.

It does this by analysing the performance records, property characteristics and tenancy records of over 1,000 commercial properties held over the period 2002-2013. This data is described in Section 3 with more details given in the Data Appendix. The research also draws on detailed case studies of investment risk in 88 commercial properties.

The structure of the remainder of the report is as follows: Section 4 considers the total level of risk in individual property and the extent to which their returns are correlated with those of the market as a whole. Section 5 discusses how this risk can be broken down into that related to systematic market movements and those that are related specifically to the individual property. Section 6 quantifies these two types of risk and outlines how they vary across different types of property while Section 7 considers how they feed through into aggregated portfolios of individual properties. The concluding section considers the implications for investment and research processes. More detail is presented in the Data and Technical Appendices.

The section below considers in greater detail the context for this analysis and outlines previous research.

2.2 Context to the research

Previous research published by the Investment Property Forum in 2007, *Risk Reduction and Diversification in Property Portfolios*, quantified levels of risk in individual properties, the correlations in total returns between these properties and with market segments, and levels of risk in portfolios made up of such properties. This earlier research used data up to 2004. Section 4 therefore updates the key aspects of this research to 2013.

This updating provides context for the subsequent analysis. Interestingly, the 2007 IPF report, by its own admission, did not fully investigate "...why returns on individual properties are so heterogeneous." Neither did it offer "...a more compelling explanation of the variation in individual property returns". Providing answers in these respects are key aims of the research.

The Investment Property Forum has a rich history of analysing risk in commercial property, pioneered by its 2000 report *The Assessment and Management of Risk in the Property Investment Industry*. This famously identified '57 varieties' of risk in commercial property. In general, previous practitioner and academic research[1] into the drivers of investment risk and performance in commercial property (including, for example, the IPF's *Risk Web 2.0: An Investigation into the Causes of Portfolio Risk*) has tended to draw conclusions from analyses of portfolios of aggregated properties.

This research differs because it seeks insights from individual properties that, otherwise, might have been hidden in aggregated analyses, and it does this through a unique combination of statistical analysis and qualitative case study.

[1] Academic research includes Fuerst and Marcato (2009); that using individual property returns includes Devaney and Lizieri (2005) while much work into the statistical characteristics of individual property returns has involved Young (e.g. 2006).

2. INTRODUCTION

Building on its first study of risk, the more recent IPF report *Risk Management in UK Property Portfolios: A Survey of Current Practice* concluded "Property managers may still stand accused, at the worst, of incorrectly assessing risk, or at the minimum of failing to address potential biases in their investment decisions introduced by implicit rather than explicit methods of dealing with risk".

One reason for this is that researchers have struggled to identify and quantify the factors that contribute to individual property performance and risk and to develop a common theoretical and practical framework by which such factors can be applied.

Given this, the report aims for a more parsimonious representation of risk that can be easily applied to investment management and research processes.

Central to the report's approach is the distinction, represented in the Capital Asset Pricing Model (CAPM), between systematic and specific risk. Specific risk is that which is unique to the asset and is independent from one property to another. As it can be diversified by combining properties each with their own idiosyncrasies, the primary concern of the investor is to ensure that there are enough assets and that they are sufficiently different to diversify away the risk[2].

Systematic risk, by contrast, reflects the tendency of assets to move together and to be exposed to the risk of the drivers of this correlation, for example 'the property market'. This risk is part and parcel of investing in the asset class, is inescapable, and, when borne, justifies compensation in the form of a premium return. The concern of the investor for this type of risk is ensuring that the asset is priced correctly so that the return commensurate with this risk is delivered.

The concept of systematic risk has developed from its formative days of the Capital Asset Pricing Model (CAPM), when the expected return and risk of an asset could be simply viewed as a function of the sensitivity (i.e. its 'beta') of its return to the overall market, to a more encompassing framework where there may be additional distinguishing characteristics that lead to assets of the type performing differently and/or having a different risk profile over time.

Applied to property, such distinguishing characteristics might include, on the one hand, the distinctive performance and risk profiles of high yielding properties and, on the other, low yielding ones, of big and small and so on. In financial market terminology, these distinguishing characteristics are referred to as 'factors'. Because they incorporate a dimension of risk in addition to the market, these risks also need to be priced in the asset[3].

The extent to which properties are exposed to these additional factor risks and the levels of specific risk is considered and Section 5 illustrates how these concepts can be applied to commercial property.

In quantifying these risks in individual properties and explaining their drivers, Section 6 draws both on statistical analysis and the 88 case studies; the former is described in more detail in the Technical Appendix.

[2] Having previously determined the magnitude and sources of idiosyncratic risk in individual properties, the implications for diversification are addressed in Section 7 of the report.

[3] Interestingly, in other investment classes, such distinguishing factors have not only led to the flexing of traditional portfolio strategies but also to the development of indices that allow new ways of investing and benchmarking beyond traditional market capitalisation based ones.

2. INTRODUCTION

The section also analyses the extent to which the returns commensurate with risk have been delivered. In this respect, given part of the return should reflect systematic risk, it is to be expected that properties subject to higher systematic risks would have higher returns relative to the market (for example IPD). For example, on the basis that they are associated with greater levels of risk, properties that are more exposed to lease events, in the long run, should out-perform. Similarly, in the same way as academic research (Dichev, 1998) has questioned if the shares of companies more exposed to bankruptcy risk deliver higher returns, the same might be true for properties with weak tenant covenants[4]. The section therefore also assesses the extent to which relative returns have actually been higher (lower) for property types characterised by high (low) systematic risk.

Previous IPF research[5] has also analysed the concept of alpha in UK commercial property – i.e. the returns after accounting for systematic risk. As it is not volatile, alpha does not represent a risk but it is of interest because it represents the true measure of an asset's over- or under-performance (and, at the aggregated portfolio level, of investment managers' skill and added-value). Across all properties and portfolios within the market, alpha is a zero-sum game.

The literature by academics and practitioners generally attributes positive alpha not only to superior skill and market timing but also to privileged understanding of and access to markets (or types of asset) that are opaque or have barriers to entry, and to persistent behavioural biases and mistakes on the part of investors. For example, large lot sizes, accessible only to the biggest investors, are found by Esrig et al (2011) to out-perform in the United States. Section 6 therefore also assesses the extent to which various property characteristics are associated with alpha in individual properties.

Section 7 considers how the risks in individual properties feed through into aggregated portfolios of individual properties. Previous research has pointed to how characteristics such as size (Fuerst and Marcato, 2009) and lease term, covenant strength and development exposure (IPF, 2011) affect portfolio performance and risk. This research considers the extent to which variations in systematic risk and specific risk across such characteristics impact on portfolio risk. It also identifies the individual property characteristics that lead to the greatest variation in portfolio risk.

The implications of the findings for property investors are outlined in Section 8. In particular, the implications for pricing risk in individual properties, for portfolio structuring and risk control, and for investment management and research processes are all considered.

[4] In research undertaken for the IPF (2009), Hutchison et al (2011) find that, during the 1st half of the 2000s, the UK commercial property market added only a very small additional risk premium to reflect differences in covenant strength, suggesting that the risk may not have been fully priced.

[5] Alpha and Persistence in UK Property Fund Management (2008).

3. THE INDIVIDUAL PROPERTIES AND THEIR CHARACTERISTICS

3.1 Introduction

This section describes the data used in the analysis of individual property risk. It profiles the segment structure and other characteristics of the sample properties. In addition, the section also dissects and provides interesting insights on a range of property attributes, for example the characteristics of multi-let properties, which may themselves be drivers of risk. Furthermore, the section summarises the aggregated performance characteristics over the last 10 years of the key property characteristics,

3.2 The statistical data

The data provided related to individual properties held continuously as standing commercial property investments for at least 10 years. Eight investors – all participants in the IPF Research Programme 2011-2015 – provided data on over a thousand properties over the period 2002 to 2013. All but one provided performance data directly; in one case, the data related to six-monthly returns to March and September and as a result had to be interpolated to re-base it to a December year-end[6].

Those providing data covered almost all the investor types measured by IPD and related to insurance company funds, managed property funds, pension funds, REITS & listed property companies, unit trusts, limited partnerships, and charities & traditional estates.

Table 3.1 provides details of the composition of properties held at year-end 2013 compared to the IPD UK Annual Index. Compared to IPD, the table shows that the properties in the sample disproportionately comprised Standard Retail and Retail Warehouses, while Other Commercial was under-represented[7].

The average lot size of the non-residential properties, at £15m in 2013, was higher than IPD's £12m, while the median equivalent yield of 7.0% was comparable with IPD's 7.1%. The 10-year tracking error of the sample's unweighted average annual total return relative to the (weighted) IPD Annual Index was 2.0%, mainly reflecting a large divergence from IPD in 2009.

[6] One investor provided data through MSCI/IPD. The six-monthly data accounted for around 5% of total assets. The largest investor accounted for just over a quarter of the properties.

[7] The number of properties in IPD's other commercial sector (excluding leisure) in 2013 was more than three times higher than in 2004, so very few of the current stock will have been held for 10 years, hence the under-representation in the sample.

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Table 3.1: Composition of the individual property sample as at year-end 2013

IPD segment	Number of properties	% of total	IPD % of total
Standard Retail - Central London	37	4%	3%
Standard Retail - South East excluding Central London	114	13%	8%
Standard Retail - Rest of UK	118	14%	11%
Shopping Centre	26	3%	2%
Retail Warehouse	139	16%	10%
Office City	12	1%	2%
Office West End & Mid Town	81	9%	7%
Office Rest of South East	71	8%	8%
Office Rest of UK	44	5%	5%
Industrial South East	122	14%	11%
Industrial Rest of UK	61	7%	12%
Leisure	14	2%	2%
Other Commercial	19	2%	18%
TOTAL	858	100%	100%
Residential	1		

Source: Investors' data, and IPD © 2015 Investment Property Databank Ltd

3.2.1 Data on total returns and property characteristics

The primary focus was on the 10-year window to December 2013 and there were 859 properties with usable total return data[8] for this period. There were 600 properties with a 10-year history to end-2012, 583 to end-2011, and 539 for the 12-year period to end-2013.

In addition to the total return data, information was provided on the properties' characteristics. The following were provided for almost all properties:

- a full history of their equivalent yields;
- 2013 property segment, region and town;
- 2013 capital value;
- 2013 unexpired term;
- 2013 number of tenants;
- 2013 tenant covenants.

In addition, the following were available for over half of the properties:

- retrospective unexpired terms;
- 2013 ERV per square foot;
- 2013 proportion of ERV that is vacant.

[8] A few properties were excluded either because of errors, confirmed by the investors, in the total return data or because they were developments or indirect investments. All the total returns were computed according to IPD conventions.

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Finally, a full history of capital expenditure was available for about two-fifths of the properties. Further details of the data provided are outlined in the Data Appendix.

3.2.2 Tenancy records

Five investors directly provided detailed tenancy records for 2013 and in some cases earlier. In addition, MSCI/IPD – with the investors' permission – provided historic tenancy records for 2004, 2007, 2009 and 2010 for the properties of four investors.

From these tenancy records, it was possible to derive details of the dates of new leases over the 10 years to 2013 for around 600 properties, and historic vacancy rates, tenant covenants, rent review dates, the extent of any over-renting, and lease events for around 500 properties.

3.3 Characteristics of the properties

Table 3.2 details the characteristics of the 859 properties in the sample covering 2004-2013[9]. Each of these characteristics potentially represents a factor affecting the level of risk in a property and so they themselves are analysed below.

Table 3.2: Characteristics of the 2004-2013 sample of properties

	Including ground rent investments		Excluding ground rent investments	
	2013	2004	2013	2004
Average capital value £m	£15		£16	
Unweighted average equivalent yield	7.6%	6.7%	7.8%	6.8%
Average ERV per sqm	£255		£263	
Unexpired term, including breaks (years)	18.2	24.2	6.6	12.4
Proportion of properties multi-let	63%		67%	
Average number of tenants per property	9.8		10.6	
Proportion of properties experiencing a new lease over the 10 years	60%		63%	
Proportion of properties not known whether they experienced a new lease over the 10 years	17%		18%	
Proportion of properties with a 'good' (rental weighted) tenant covenant	52%		53%	
Average vacancy rate (including properties with 0% vacancy)	9%		9%	
Average capex as proportion of annual capital value (including those with £0 capex)	1.9%	0.4%	2.0%	0.4%

Source: Investors' data

[9] As noted earlier, information on these characteristics was in some cases not available for every property.

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3.3.1 Number of tenancies

More tenants in a property potentially provide lease diversification and hence less risk.

Wherever possible, the count of the number of tenancies included vacant units. Almost two-thirds of the 859 properties were multi-let and the average number of tenants across the sample as a whole (including the single-lets) was nearly 10. Of the multi-let properties, two-fifths had 10 or more tenants. Not surprisingly, shopping centres were the most likely to be multi-let and to have the largest average number of tenants but rest of UK offices and London & South East industrials also had an above average proportion of multi-lets; by contrast, standard retail outside central London was characterised by a relatively low level of multi-letting.

Multi-lets tended to have higher capital values although the advantage over single-lets was only substantial for those properties with 10 or more tenants. Otherwise, single-lets tended to have the most favourable characteristics: their yields on average were lower, rental values per sqm higher, unexpired lease terms longer, vacancy rates lower, and tenant covenants stronger. Multi-let properties were subject to higher levels of capital expenditure relative to their lot sizes. All these present a picture of multi-lets, on average, being of 'inferior quality' to single-lets, although the larger shopping centres and the multi-let retail warehouses – whose characteristics were comparatively good – represent important exceptions to this portrayal.

Reflecting both their shorter unexpired terms, a greater number of tenancies and a more active style of management, multi-let properties also were more frequently exposed to the leasing market: excluding ground-lease investments, 75% of multi-lets were known to have experienced a new letting over the 10-year period compared to 39% of single-lets[10].

Obviously, all the income of a single-let property is exposed at the end of a lease. However, shorter lease lengths and the greater frequency of lease events mean that the income of multi-lets with small numbers of tenants (e.g. less than 10) can also be heavily exposed to the leasing market. Using 2010 as an example, the tenancy records reveal that 7% of properties with two to nine tenancies had new leases in 2010 that accounted for more than half their total income; only 2% properties with at least 10 tenants witnessed this. By comparison, 6% of single-lets experienced a new lease in 2010.

3.3.2 Lot size

Lot size is sometimes seen as a characteristic affecting the risk of an individual property. This applies in particular to the larger lot sizes, either unfavourably because of greater illiquidity or favourably on account of their perceived superior quality[11].

The properties in the sample had 2013 lot sizes ranging from under £½m to a number well excess of £200m. The highest value properties were mainly shopping centres and retail warehouses, while half of those in the smallest decile of lot sizes were standard retail outside central London. Even after controlling for segment differences, the largest properties tended to have the highest rents per sqm, the largest number of tenants, the lowest yields, the longest unexpired terms, and had been the least exposed to the leasing market; however, on average, they were characterised by the highest rate of capital expenditure. The opposite applied in all these respects to the smallest properties.

[10] In some cases, it was not possible to identify whether or not a new letting had been experienced.

[11] See, for example, Esrig et al (2011) and Fuerst and Marcato (2009).

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Tenant covenants were more difficult to rate in the smallest properties but where available they were worse than in the biggest properties, which, in turn, only had slightly better covenants than average.

3.3.3 Rental values per square metre

Rental values per sqm – sometimes seen as indicative of building and locational quality – vary considerably across segments, being highest in the central London markets and lowest in the industrial sector. For this reason, rents per sqm were classified relative to their segment averages.

On this basis, the higher-rented properties tended to have lower yields, higher lot sizes and more tenants. The lowest rented properties were over-characterised by tenants with unknown covenants. Otherwise, there were no notable features distinguishing high and low rented properties.

3.3.4 Tenant covenant quality

In its early survey of property risk, the IPF (2000) identified covenant strength as the 2nd most important of its 57 varieties.

Most investors provided details of tenant covenants in 2013, typically from IPD's IRIS. These were rental-weighted to provide an estimate for the overall property and these ratings were then classified on the basis of 'low', 'medium' and 'high' risk, in line with IPD ranges. Properties with an unknown covenant rating included those where the investor had no information at all on tenant covenants, those where the tenant was not rated (typically non-corporate tenants) and those that were wholly vacant.

Properties with the weakest covenants tended to have the lowest rents per sqm but also larger numbers of tenants (possibly offering diversification against default). Properties with the strongest tenant covenants tended to have the fewest tenants. Capital values, on average, were comparable across the covenant rankings, as were unexpired terms.

As noted earlier, historic tenancy information was available for around 500 properties. These indicate that, in about half the properties, the strength of tenant covenants varied over time, thereby indicating that tenant risk in individual properties is not fixed.

3.3.5 Unexpired terms and lease events

Properties close to lease expiry are commonly perceived to be amongst the most risky types of property while those with long unexpired terms are generally seen as the most secure. Unexpired terms – rental-weighted for multi-let properties – were either provided directly by the investor or estimated from tenancy records. For the period 2004-2013, properties were grouped (e.g. 0-5 years, 5-10 years, etc.) according to their annual average unexpired term over this 10-year period.

3. THE INDIVIDUAL PROPERTIES AND THEIR CHARACTERISTICS

Amongst the sample properties, retail warehouses tended to have the longest unexpired terms, offices outside central London and industrials had the shortest. Yields increased as the term shortened, and while the shortest terms - perhaps not surprisingly given their higher yields - had the lowest capital values, rents per sqm were close to the average. Not surprisingly, the properties with the shortest 10-year average terms were the most likely to have experienced a new lease since the beginning of 2004 while those with the longest unexpired terms were the least likely to have done so.

3.3.6 Yield

Yield is widely seen as affecting property risk, albeit in contrasting ways. Some see income as more certain than capital growth and hence less risky. Alternatively, compared to an otherwise comparable property, one with more uncertain income and growth prospects will be priced with a discount and hence have a higher yield, thereby corresponding yield with risk.

The performances of IPD's 'yield quartiles' over the 10 years to 2013 support the latter perspective. Across most segments, the total returns of the highest yield quartiles have shown greater volatility and those of the lowest yield quartiles relatively low volatility, although the differences are not large.

The equivalent yields of individual properties in the research's sample were classified (as 'low, 'mid-ranking' or 'high') relative to their segment's IPD average; this was done for every year and over the 10-year period as a whole.

The data from the investors point to some difficulty in 'typecasting' individual properties on the basis of their yields. Grouped according to whether they were 'low, 'mid-ranking' or 'high' relative to IPD, only half ended-up in 2013 in the same group as they were in 2004. Hence many properties do not retain their 'style' over time[12].

One way round this is to classify properties according to their average yield over the 10-year period. Another approach, which controls for any consequential association between changes over time in yield and variation in returns and, hence, risk, is to classify properties according to their starting yield. The analysis utilised both these approaches.

Many of the characteristics of high and low-yielding properties have already been identified – in a nutshell, there is an inverse relationship between yield and capital value and rent per sqm, while compared to low-yielding properties, high yielding properties have more tenants and experience greater capital expenditure. Given these, yield may just simply be a composite indicator. Regression analysis of equivalent yields in 2013 reveals that half of the variation between properties can be accounted for by differences in their capital values, rents per sqm, number of tenants, their unexpired terms and the prospect of a lease expiry in the coming year; these represent the systematic drivers of yield[13]. However, this analysis leaves half of the variation still to be accounted for; this is either associated with factors other than those above or those that are specific to the property[14]. Hence, a large part of a property's yield may be associated with attributes that are very specific to it.

[12] This has obvious implications for investment strategies based on yield.

[13] After controlling for all the other variables, tenant covenant was not statistically significant as an explanatory variable. This contrasts with the findings from the research, undertaken for the IPF (2009), by Hutchison et al (2011), although this research only controlled for lease length.

[14] In addition to covenant, vacancy rate, capital expenditure, and over-rented – all in 2013 - were tested but found not to be statistically significant.

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Furthermore, such analysis of earlier years reveals that both the combination of the factors driving yields and the magnitude of their impact on yields varies over the cycle, emphasising how the cycle and the changing character of a property over time in addition to its own idiosyncrasies mean that it is difficult to typecast a property by its yield.

3.4 Property characteristics and aggregate performances

As they may be drivers of individual property risk, it is useful to see how the total return performances of the above characteristics have varied over the last 10 years.

MSCI collate, as part of its IPD UK Annual Digest, aggregated details of performance according to yield quartile and property size (in terms of floorspace). Over the last 10 years, these tend to show that:

- in most segments, high yield has tended to under-perform, been comparatively volatile and more sensitive to market movements, and has shown poor risk-adjusted returns. Conversely, low yield in most segments has out-performed, been less volatile than average, and has delivered comparatively good risk-adjusted returns;
- the pattern is less strong with respect to size (as represented by floorspace). However, with the notable exception of shopping centres where large properties both out-performed, showed relatively low volatility and delivered comparatively good risk-adjusted returns, the tendency in most segments was for the smaller properties to perform marginally better than their larger counter-parts, to be less sensitive to market movements, and to deliver superior risk-adjusted returns.

MSCI do not routinely publish IPD indices relating to the other characteristics of interest in this research. Instead, unweighted average returns of the sample properties were used to provide sample indices. On average these show:

- a tendency for high rented properties to out-perform, particularly from 2009;
- that properties with long unexpired terms (in excess of 15 years) have consistently out-performed, while short unexpired terms under-performed most years from 2004. Short unexpired terms on the whole were more sensitive to market movements than longer unexpired terms. These patterns still apply once the very long unexpired term ground lease investments are excluded; and,
- a tendency for the properties with the strongest tenant covenants to out-perform in most years. However, volatility and market sensitivity are comparable across the spectrum.

Taken together, these might be indicative of ‘prime’ property out-performing and of ‘secondary’ under-performing. At the same time, single-let properties tended to out-perform multi-lets, although this pattern varied over time.

3.5 Case study data

In addition to the statistical data, qualitative information – specifically on the sources of high risk – was collected from the investors on 88 of the properties in the sample. This information is described in greater detail in Sections 5 and 6.

4. INDIVIDUAL PROPERTIES: VARIABILITY, DISPERSION AND CORRELATION IN THEIR TOTAL RETURNS

4.1 Introduction

This section updates and compares the key elements of the IPF's earlier research, *Risk Reduction and Diversification in Property Portfolios* (2007). This earlier research focussed on the relationships between individual property risk and property portfolio risk.

This update sets the ground for the more detailed analysis of individual property risk. First, the dispersion in total returns across properties in particular years are presented; this dispersion portrays the risk around an individual property performing like other properties in that year.

Second, it analyses the variability of individual properties' returns over time[15]. This represents the classic approach to measuring risk in assets. It does this for the 10 years to 2013 and compares the results with those for the 1995-2004 period presented in the previous IPF research. This report expands the earlier research by also examining the variability over time of individual properties' returns relative to their segment and to All Property.

Finally, the section explores correlations in the returns of individual properties with each other and with their market segment benchmarks. Such correlations have implications for portfolio risk reduction and diversification – low correlations between assets, for example, make it easier to reduce portfolio risk. They are also important for understanding the drivers of individual property returns and risk; the higher correlation between the return of an individual properties and the market, the more influential the market on the property's performance.

4.2 Dispersion in individual property total returns

As the IPF's 2007 report *Risk Reduction and Diversification in Property Portfolios* explained, one approach to measuring the risk in individual properties is to analyse the dispersion in returns around the average return (commonly calculated as the standard deviation) in a particular year; this represents the risk around an individual property performing like other properties.

Table 4.1 shows the standard deviation across properties in this research's sample, split by segment, in 2004, 2008, 2009 and 2013; the comparable statistics for 2004 from the IPF's previous research are also shown.

It is clear that the smaller sample in the current research and the presence of outliers has led in some segments to some substantial differences across the two samples for 2004, although for most of the segments and across all property the standard deviations are broadly comparable.

As found in the previous IPF research, Table 4.1 shows that the dispersion in returns across properties varies year by year. In particular, there was an unusually wide dispersion in the returns of individual properties in 2009 (that was only partly associated with an abnormal West End & Mid-town office); this is explored further in Section 6. Equally as notable is the relatively narrow dispersion in returns in 2008 – a time when the market fell substantially and when clearly there was comparatively little discrimination in changes in valuations across properties. Over the period as a whole, shopping centres, retail warehouses and industrials outside London and the South East consistently show a relatively narrow dispersion in returns across properties whilst West End & Midtown offices consistently show the greatest dispersion.

[15] The approach in this report, like the earlier IPF study and most other research, uses the standard deviation as a measure of risk. Another IPF report, Risk Measurement and Management for Real Estate Investment Portfolios (2002), reviews and quantifies a range of statistical definitions and measures of risk, in addition to standard deviation.

4. INDIVIDUAL PROPERTIES: VARIABILITY, DISPERSION AND CORRELATION IN THEIR TOTAL RETURNS

Finally, while the previous IPF research noted a tendency for the dispersion of returns across individual properties to tighten between 1988 and 2004, there is no sign of this happening over the last 10 years. The recent pattern appears to be dictated by cyclical conditions, unlike the secular trend between 1988 and 2004.

Table 4.1: Dispersion in individual property returns

	2004 - Previous IPF research	2004	2008	2009	2013
Standard Retail - Central London		*11.4%*	*19.5%*	*18.8%*	*25.0%*
Standard Retail - South East excluding Central London		*21.5%*	*8.6%*	*15.2%*	*12.2%*
Standard Retail - South East	15.4%	19.8%	12.7%	16.2%	19.1%
Standard Retail - Rest of UK	14.5%	33.4%	8.1%	15.6%	12.5%
Shopping Centre	8.0%	8.4%	8.6%	12.4%	8.2%
Retail Warehouse	11.0%	12.5%	6.4%	15.5%	8.0%
Office City	28.5%	9.2%	15.6%	7.6%	19.6%
Office West End & Mid Town	28.7%	15.6%	16.9%	135.8%	22.3%
Office Rest of South East	12.9%	12.1%	12.7%	17.1%	15.5%
Office Rest of UK	10.4%	16.9%	11.2%	18.3%	17.5%
Industrial South East	11.6%	11.9%	9.1%	15.3%	16.9%
Industrial Rest of UK	10.4%	8.4%	8.7%	13.9%	10.3%
Leisure		7.2%	4.1%	35.0%	5.5%
Other Commercial		25.4%	15.8%	19.2%	11.4%
ALL PROPERTY	16.9%	**18.6%**	**11.4%**	**44.5%**	**18.2%**

Source: Investors' data; Table 3.1 of Risk Reduction and Diversification in Property Portfolios.

4.3 Variability in individual property returns over time

The classic approach to measuring risk in assets and markets is to analyse the variability of their returns over time. Table 4.2 calculates the standard deviation over the 10 years to 2013 for each property in the sample and then averages these by segment. These statistics are also compared with those in the previous IPF research covering the 10 years to 2004.

The market context for the 10 years being analysed in this research is the substantial downturn in the property market in 2008, which led to a tripling in the standard deviation (to 12.7%) in the overall IPD All Property return compared to the previous period.

The 10-year standard deviations for the individual properties in this research's sample on average were in the region of 17%, which – as can be seen from Table 4.2 - is around one and a half times the average in the previous IPF research. While clearly reflecting the substantial downturn in the property market in 2008, this increase in volatility at the individual property level is far less than the tripling in volatility for the market as a whole (higher correlations between properties, as identified later in this section, explain this conundrum).

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Furthermore, the differences in average 10-year standard deviations between the segments have become greater than the fairly uniform pattern revealed in the previous research, as can be seen from Table 4.2. It is not known whether or not these changes are indicative of all properties or just reflect the smaller sample of properties in the current research. In line with the earlier research, individual shopping centres on average continue to show the lowest standard deviations.

Table 4.2: Volatility in individual property returns

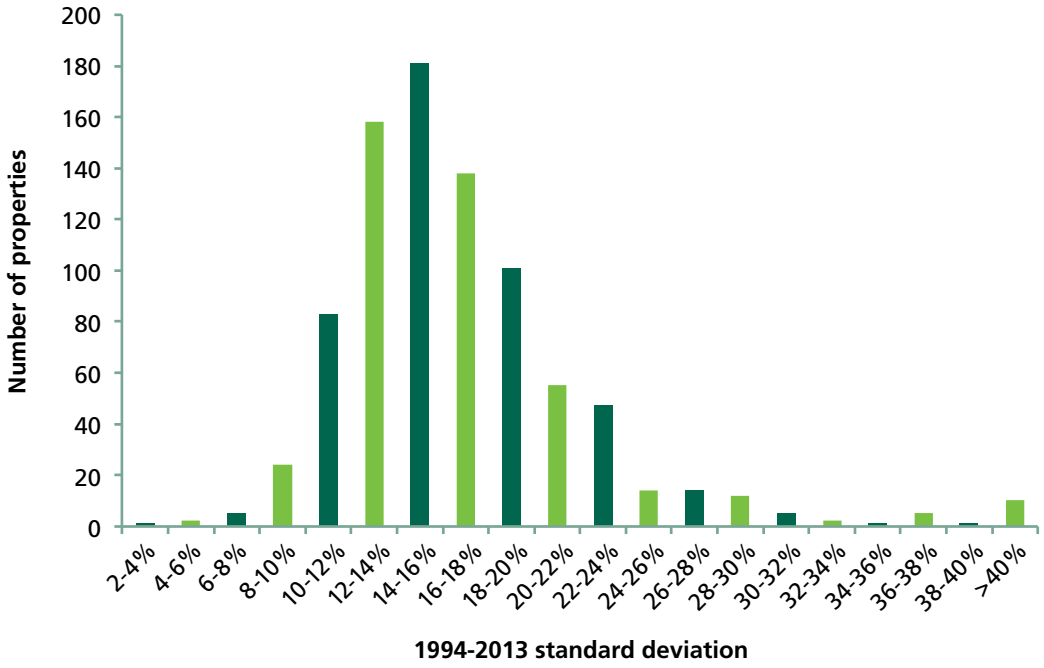
	Average standard deviation in individual property returns	
	2004-2013	**1995-2004 - previous IPF research**
Standard Retail - Central London	*19.5%*	
Standard Retail - South East excluding Central London	*16.4%*	
Standard Retail - South East	17.2%	10.2%
Standard Retail - Rest of UK	16.6%	11.8%
Shopping Centre	14.8%	10.1%
Retail Warehouse	17.6%	11.0%
Office City	18.1%	10.0%
Office West End & Mid Town	22.1%	9.8%
Office Rest of South East	16.9%	10.6%
Office Rest of UK	19.0%	12.8%
Industrial South East	16.2%	11.7%
Industrial Rest of UK	14.5%	11.0%
Leisure	19.1%	11.2%
Other Commercial	22.8%	
ALL PROPERTY	**17.5%**	**11.0%**

Source: Investors' data; Table 4.4 of Risk Reduction and Diversification in Property Portfolios.

Figure 4.1 illustrates how the standard deviations in individual property returns are skewed towards a few large outliers. The majority of properties had a standard deviation below 16% but 3% of the sample properties had standard deviations in excess of 30%.

4. INDIVIDUAL PROPERTIES: VARIABILITY, DISPERSION AND CORRELATION IN THEIR TOTAL RETURNS

Figure 4.1: Distribution of individual property total return standard deviations over the 10 years to 2013



Source: Investors' data

4.4 Correlations across individual properties and with segment benchmarks

Correlations in the returns of individual properties with each other and with their market segment benchmarks have implications for portfolio risk reduction and diversification. They are also important for understanding the drivers of individual property returns and risk. Table 4.3 presents these correlations for the individual properties in the sample, and again compares these with the results in the earlier IPF research for the 10 years to 2004.

Correlations between individual properties and with their market segment benchmarks increased substantially in the most recent decade: in particular, individual properties became highly synchronised with their market segments (the exception being properties in the central London retail and other commercial property segments). Combined with the higher standard deviations reported earlier, these higher correlations have implications for the drivers of individual property risk (a theme that is explored further in Section 6).

That said, these much higher correlations partly reflect the 2008 downturn when most properties fell heavily by similar margins, although Figure 4.2 also highlights how correlations had already been rising ahead of the downturn from their previous low levels. By contrast, Figure 4.2 also reveals that correlations in the years subsequent to 2008 have returned to their historic low levels, although these correlations (in an opposite way to 2008) were dampened by the unusually wide range of experiences amongst individual properties in 2009.

4. INDIVIDUAL PROPERTIES: VARIABILITY, DISPERSION AND CORRELATION IN THEIR TOTAL RETURNS

Table 4.3: Correlations in returns between individual properties and with their IPD segments

	Average correlation in returns between individual properties		Average correlation between individual property returns and their IPD segment return	
	2004-2013	1995-2004 - previous IPF research	2004-2013	1995-2004 - previous IPF research
Standard Retail - Central London	*0.40*		*0.57*	
Standard Retail - South East excluding Central London	*0.62*		*0.78*	
Standard Retail - South East	0.53	0.22	0.73	0.42
Standard Retail - Rest of UK	0.62	0.20	0.78	0.44
Shopping Centre	0.72	0.21	0.84	0.37
Retail Warehouse	0.73	0.27	0.86	0.36
Office City	0.53	0.29	0.75	0.11
Office West End & Mid Town	0.48	0.21	0.69	0.14
Office Rest of South East	0.60	0.22	0.76	0.30
Office Rest of UK	0.59	0.18	0.76	0.11
Industrial South East	0.62	0.16	0.78	0.28
Industrial Rest of UK	0.67	0.16	0.81	0.39
Leisure	0.67	0.23	0.76	0.07
Other Commercial	0.31		0.56	
ALL PROPERTY	0.57	0.18	0.77	0.41

Source: Investors' data; Table 3.5 of Risk Reduction and Diversification in Property Portfolios.

4. INDIVIDUAL PROPERTIES: VARIABILITY, DISPERSION AND CORRELATION IN THEIR TOTAL RETURNS

Figure 4.2: Rolling 10- and 5-year average correlations between individual properties

Source: Investors' data; 10-year data to 2010 and five-year data to 2006 relates to the smaller sample of properties used in the original Nick Tyrrell Memorial Seminar research undertaken by Paul Mitchell Real Estate Consultancy Ltd.

4.5 Variability in the relative returns of individual properties

The increase in the volatility of individual properties over the last 10 years, highlighted in Table 4.2, to some extent reflects the abnormal downturn in 2008. As this research is concerned with understanding the risk specific to individual properties, it makes sense to strip out these market movements and look at the variability in the returns of individual properties relative to the overall market. Table 4.4 presents measures of the variability in individual property returns relative both to their IPD market segment and relative to IPD All Property. These measures are akin to tracking error.

Both relative to segments and all property, there is a wide range across segments in tracking errors. Average tracking errors for properties in the shopping centre, retail warehouse, and rest of the UK industrial sectors tend to be relatively low whilst those for central London retail, West End & Midtown offices, and other commercial are on the high side.

Furthermore, the tracking errors in almost all cases are lower when benchmarked against the IPD segments rather than all property. This suggests that market segment is explaining some of the variation and risk in individual properties. This theme is returned to in Sections 5 and 6.

4. INDIVIDUAL PROPERTIES: VARIABILITY, DISPERSION AND CORRELATION IN THEIR TOTAL RETURNS

Table 4.4: Volatility in individual property relative returns

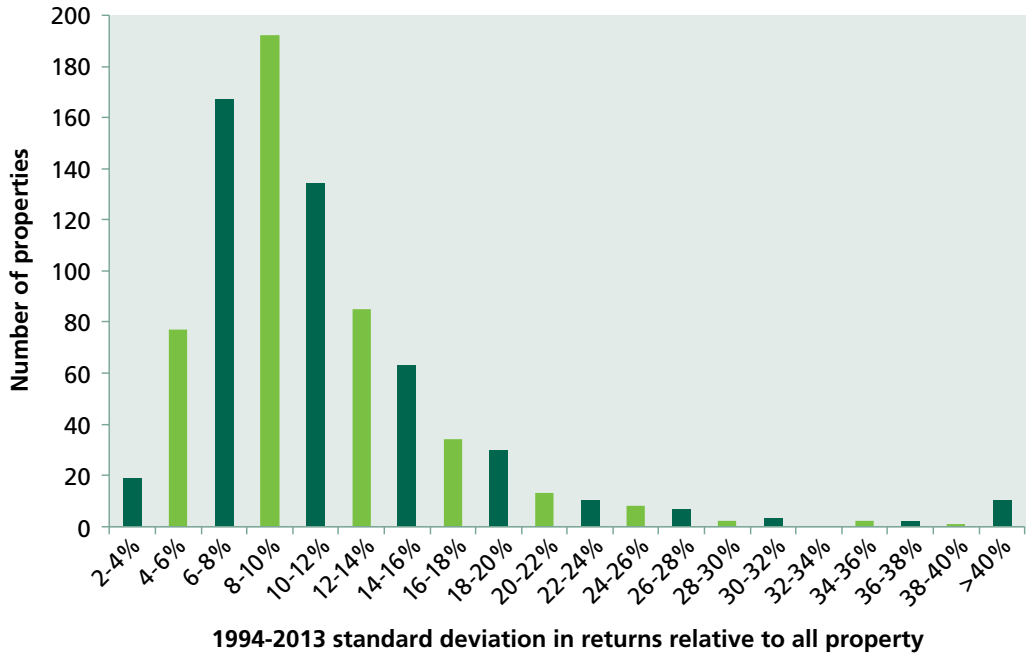
	Average standard deviation in individual property relative returns 2004-2013	
	Relative to segment	**Relative to all property**
Standard Retail - Central London	*16.2%*	*16.6%*
Standard Retail - South East excluding Central London	*10.5%*	*11.1%*
Standard Retail - South East	11.8%	12.3%
Standard Retail - Rest of UK	10.8%	11.6%
Shopping Centre	7.4%	7.7%
Retail Warehouse	9.1%	10.2%
Office City	10.6%	12.1%
Office West End & Mid Town	17.6%	17.7%
Office Rest of South East	11.2%	11.4%
Office Rest of UK	13.0%	13.8%
Industrial South East	10.2%	10.3%
Industrial Rest of UK	8.4%	8.7%
Leisure	13.6%	13.4%
Other Commercial	19.8%	20.1%
ALL PROPERTY		**11.9%**

Source: Investors' data

Figure 4.3 shows, in the same way as for total risk, there is a wide range in the tracking errors of individual properties. For most properties, such relative risk is less than 10%. However, it is twice this level in a substantial minority of properties. Section 5 considers the factors that may lead to such variations across properties, after which Section 6 presents the detailed analysis of such factors.

4. INDIVIDUAL PROPERTIES: VARIABILITY, DISPERSION AND CORRELATION IN THEIR TOTAL RETURNS

Figure 4.3: Distribution of individual property relative return standard deviations over 10 years to 2013



Source: Investors' data

5. PORTRAYING RISK IN INDIVIDUAL PROPERTIES

5.1 Introduction

This section sets out and illustrates the concepts used in this report to define and measure risk in individual properties. It also outlines both the statistical and qualitative methodologies used in the subsequent sections to quantify individual property and portfolio risk.

A fundamental distinction is made between systematic risk and specific risk in individual properties. Understanding and quantifying these divisions in risk in individual properties is important, both for pricing individual properties and for diversifying portfolios.

5.2 De-composing risk in individual properties

Contemporary financial theory decomposes the total risk of an asset, as measured by the variability in returns, according to two basic elements. Systematic risk relates to the tendency of assets – and groups of similar assets – to move in tandem with each other. Specific risk is specific to each property, independent from one asset to another, and unrelated to the systematic movements; in these respects, it is diversifiable.

The distinction between systematic and specific risk is important. The former is inescapable – it is part and parcel of investing in an uncertain property market - and hence represents a risk that should be rewarded through an additional return (i.e. a risk premium) over a riskless asset or less risky types of property.

Specific risk, in being unrelated to the systematic movements, is diversifiable and avoidable, and on this basis should not be rewarded and does not justify a premium return.

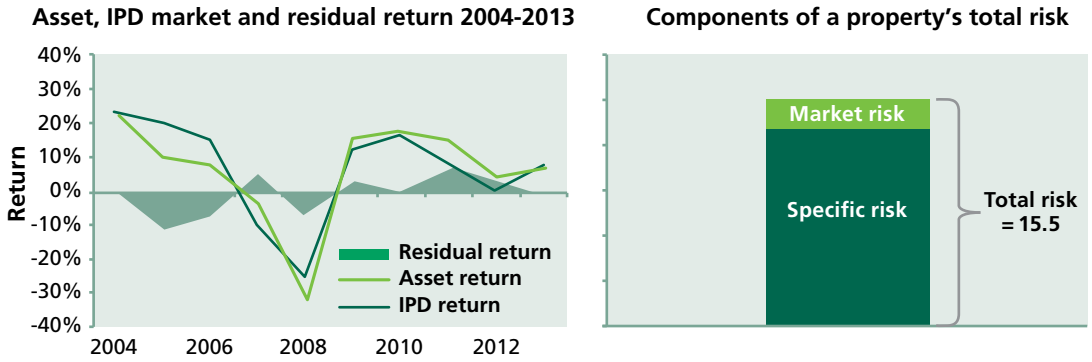
These fundamental differences between systematic and specific risk have implications for how investors should treat risk in individual properties. Systematic risk needs to be priced to ensure that it is compensated for and that the returns are sufficient; however for specific risk, the main concern is that there are sufficient assets in the portfolio (and that these are sufficiently different) to ensure that the risk, to some degree or another, is diversified away.

Section 4 highlighted the wide variation in risk across individual properties, therefore understanding the extent to which these variations arise because of systematic influences and the extent to which they are idiosyncratic to individual assets is important.

Figure 5.1, using the return for an individual property, illustrates these two components of risk. The property moves closely in line with the IPD market return but not exactly, such that each year there is an outstanding, relative (or 'resdiual') return. The variability of this residual return represents the property's specific risk, while that in the IPD market return represents the property's systematic risk. These two elements of risk are illustrated in the right hand chart. In this particular example and because the property's return closely tracks the market, the residual (i.e. specific) risk effectively corresponds to the tracking errors summarised in the final part of Section 4 and Table 4.4.

5. PORTRAYING RISK IN INDIVIDUAL PROPERTIES

Figure 5.1: Portrayal of market and specific risk in an individual property



5.3 Systematic risk

5.3.1 Market risk and benchmarking

Systematic risk relates to the tendency for assets to move together as a result of a common influence or set of influences. The earliest contemporary model, the Capital Asset Pricing Model (CAPM), which was pioneered in the 1960s by Sharpe (1964) and Lintner (1965), took such influences simply as the 'the market'.

While this report abstracts from understanding market risk (e.g. as reflected in MSCI's IPD indices), it is obvious from Figure 5.1 that the definition of market risk is important: the division between market and specific risk will depend on the choice of the benchmark to represent the market. In Figure 5.1, the market benchmark is the property's IPD PAS segment but had it been All Property (whose volatility tends to be less than the market segments) the property's specific risk would have been much higher. This raises questions over the most appropriate choice of the market benchmark.

The principle underlying the segmentation – and hence benchmarking - of financial markets and, in particular, commercial property in the UK is that, in the movement of their returns, the constituent properties should be as synchronised as much as possible within each segment but as little as possible with the properties in the other segments.

In practice in the UK commercial property investment industry, benchmark segments tend to be based on a combination of property type and a central London, rest of London and the South East, and rest of the UK regional classification, a classification most commonly manifested in IPD's PAS segments. The debate around such a property type/regional classification tends to be over how aggregated both the regions outside central London and 'business space' (offices and industrials) should be (see, for example, Devaney and Lizieri (2005)). This research uses the IPD PAS segmentation as the basis for its market benchmarks; the justification is outlined in Section 6.

5.3.2 Market sensitivity

The property in Figure 5.1 tightly tracked the market benchmark and hence its market risk corresponded exactly to its benchmark's. Given this, the property's specific risk was simply its 'tracking error' (standard

5. PORTRAYING RISK IN INDIVIDUAL PROPERTIES

deviation of relative return), as tabulated earlier in Table 4.4. These relationships implicitly rest on the assumption that the property's underlying return moves uniformly with the market.

The Capital Asset Pricing Model (CAPM), however, includes the possibility that some properties may be more or less sensitive to market movements than the average property. On the one hand there may be 'high beta' properties, whose returns increase relatively sharply when the market is strong and fall equally as badly in weak markets and, on the other, there may be 'low beta' properties whose performances tend to be comparatively muted in both strong and weak markets. Such properties have, respectively, correspondingly higher and lower market risk by comparison to the average property.

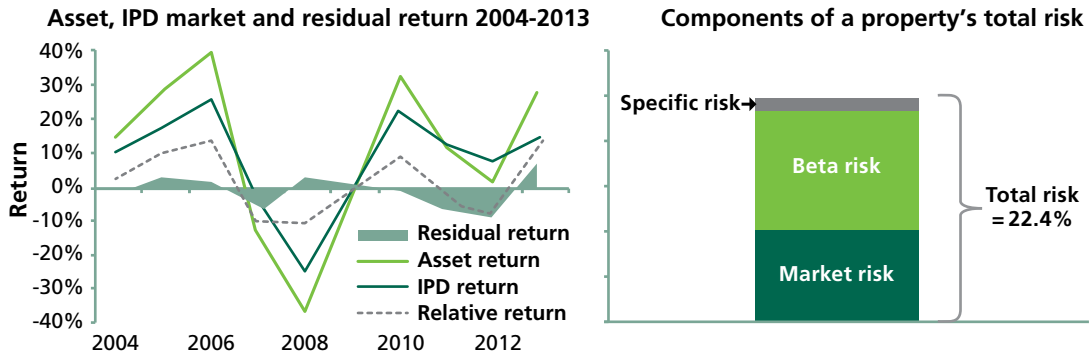
The distinction is important for two reasons. First, reflecting these differing market risks, properties that are relatively sensitive to market movements (i.e. high beta assets) should – because their market risk is greater - be priced with a correspondingly higher risk premium, with low beta properties priced with a lower risk premium than the market average.

Furthermore, it has implications for the measurement of specific risk. Where beta is above (or below) the market average of 1, measuring a property's specific risk simply on the basis of its relative return would lead to an over- (or under-) statement and hence would be inappropriate. Figure 5.2 illustrates this for a 'high beta' property[16].

This property's return rises and falls relatively sharply with the market and hence has greater market (and total) risk than the asset portrayed in Figure 5.1; this means that its residual, specific risk is less than its simple relative return would indicate. Failing to account for this extra, 'beta-related' market risk would substantially over-state the property's specific risk, as indicated in the chart on the right hand side of Figure 5.2.

This research therefore eschews using the individual property's relative return as a measure of risk but, in using a CAPM type approach, allows the market sensitivities of the properties to vary.

Figure 5.2: Portrayal of market and specific risk in a 'high beta' individual property



Strictly speaking, 'beta risk' is part of market risk; the two are separated in the chart in order to illustrate the concept of beta and its contribution to market risk.

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5.3.3 Factor risk

The above analysis related systematic risk entirely to the market (represented by the property's segment). However, the concept has developed from its formative days of the Capital Asset Pricing Model (CAPM), when the expected return and risk of an asset could be simply viewed as a function of its 'beta' (sensitivity to the overall market), to a more encompassing framework where there may be additional distinguishing characteristics (for example, a relatively high or low yield) that lead to assets of the type performing differently and/or having a different risk profile over time, in addition to that simply captured by the asset's beta. In as far as these additional dimensions add to (or detract from) the risk of the asset, the risk also needs to be priced and reflected in a higher (or lower) return than justified by the asset's beta.

In financial market terminology, these distinguishing characteristics are referred to as 'factors'. They not only relate to fundamental factors related to the characteristics of the asset but also extend to macro-economic variables such GDP and inflation surprises.

Applied to property, an example of such distinguishing characteristics might be high and low yielding properties, while macro-economic factors might reflect differing sensitivities across properties to changes in gilt yields, etc. Academic research has already examined the existence of such factors in UK commercial property[17]. Those considered in this research are outlined later.

Figure 5.3 illustrates an asset that is exposed to a yield factor and how this influence impacts on its specific risk. The charts on the left hand side portray the asset in exactly the same way as in Figure 5.2; it is notable that the relationship between the property and its IPD segment is less clear and, also, that the property's residual return and, hence, risk are a lot greater. Specific risk (as shown in the bottom left hand chart) appears to be very high.

In trying to understand this property's unusual performance, the top right-hand chart in Figure 5.3 plots the property's residual return (as identified in the top left hand chart) against the relative return of IPD's high yield quartile[18]. It is clear that, in this case, the property's residual return is highly correlated with the relative return of high yield property.

In effect, this property – which is high-yielding - faces two forms of systematic risk, the first through its exposure to its market segment and the second through its exposure to a (high) yield factor. The latter reflects the risk inherent in the factor – in this case the comparatively volatile high yield property market – and the property should, in theory, also earn a premium return associated with this characteristic (note that had the property had been low-yielding, it would have shown relatively low volatility on this count and on this basis would have justified a discounted return).

The final (bottom rght) chart in Figure 5.3 highlights how, once this yield factor risk is taken into account (see the Technical Appendix for an explanation of the approach), the magnitudes of the property's specific risk and also its beta risk are much reduced and become barely recognisable. Accounting for this factor presents the property's risk in a very different (and more accurate) light.

[17] Fuerst and Marcato (2009), using simulated portfolios of actual properties, analyse the property's size, yield, tenant diversification, and lease term as factors and find that property size is particularly influential.

[18] To be more explicit, it is the IPD high quartile return (for the property's segment) less the overall IPD return for the segment.

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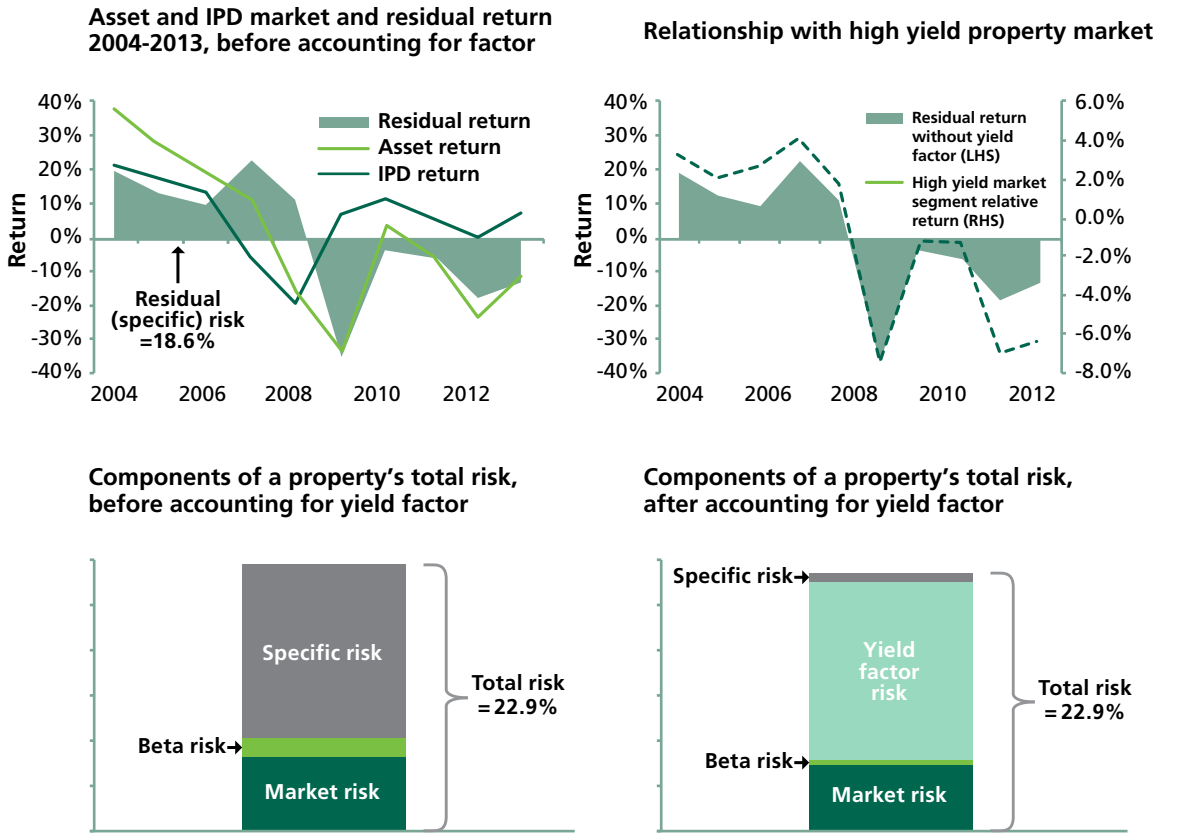
Figure 5.3: Portrayal of a property having a yield factor



The analysis in Section 6 therefore considers the extent to individual properties' returns and risk are driven by such factors. Table 5.1 details the factors that are considered in the research.

The property factors are generally intuitive. The macro-economic factors consider the possibility that some properties may be more or less sensitive than average to stronger or weaker than expected occupational market conditions, property market performance or sentiment, and to stronger or weaker inflation than expected; the gilt factor considers the possibility that some properties may be more or less 'gilt-like' and, hence, correspondingly sensitive to changes in the gilt market.

5. PORTRAYING RISK IN INDIVIDUAL PROPERTIES

Table 5.1: Fundamental and macro-economic factors tested in the analysis

Property factors	Macro-economic factors
Large/small size (sq metre)	Rental growth surprises*
Low/high equivalent yield	Total return surprises*
Long/short unexpired term	GDP growth surprises*
Single versus multi-tenanted	Inflation surprises*
High/low ERV per sqm (quality indicator)	Gilt total return/yield
Good/poor tenant covenant quality	

* - Surprises are measured as the difference between the outcome and the forecast one year earlier. One year GDP and inflation forecasts are sourced from the February version of HM Treasury's Forecasts for the UK economy, one-year rental growth and total return forecasts are derived from the February version of the IPF's UK Consensus Forecast. Rental growth surprises are analysed at the segment level, total return surprises relate to All Property.

5.4 Specific risk

Specific risk relates to the deviations around the market (and factor) return that are independent from one property to another. As such, it – according to financial theory - is diversifiable and, hence, not worthy of a return. For example, a small single shop unit should not be viewed as more risky than a larger multi-tenanted one given that diversification could be achieved through an exposure to a number of single shops.

Figure 5.3 highlighted the importance of identifying all the systematic factors affecting the property's return before accounting for specific risk. In particular, failure to do so would most likely overstate specific risk, as well as failing to portray important drivers of the property's risk.

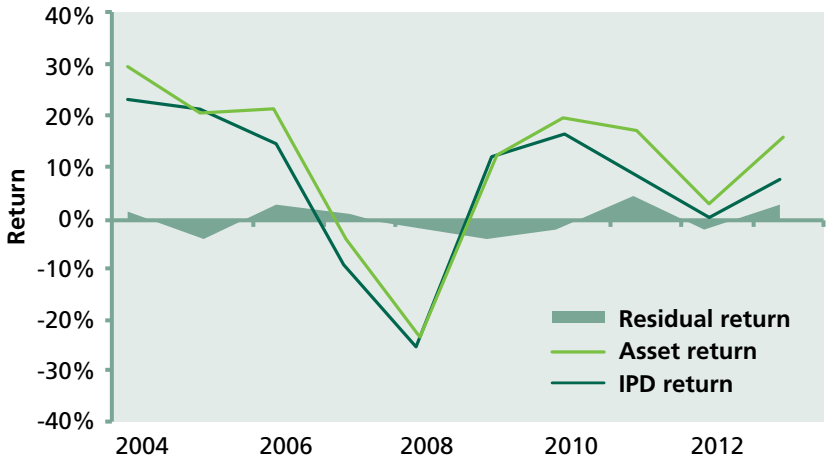
5.5 Alpha

Alpha relates to the tendency for an asset or portfolio to consistently out- (or under-) perform. As it is not volatile, it does not represent a risk but it is of interest because it represents the out- or under-performance of a property (or portfolio) once all its risks are accounted for.

An example of a property delivering alpha is illustrated in Figure 5.4. In this case, the property consistently returns around 4% per annum more than its IPD segment but otherwise moves in sync with the benchmark (in particular it has a beta of 1.00); coincidentally, it also has comparatively low specific risk.

5. PORTRAYING RISK IN INDIVIDUAL PROPERTIES

Figure 5.4: Portrayal of a property delivering alpha



Alpha is typically hard to deliver, and across all properties (or portfolios) in the market it is a zero sum game. The literature by academics and practitioners generally attributes positive alpha not only to superior skill and market timing but also to privileged understanding of and access to markets (or types of asset) that are opaque or have barriers to entry, and to persistent behavioural biases and mistakes on the part of investors. Furthermore and in the same way as illustrated for specific risk in Figure 5.3, alpha may be mis-represented and actually be associated with exposure to a risk factor (see Fuerst and Marcato 2009 for property and more generally Bender et al 2014).

Previous IPF research (Investment Property Forum 2007, and Bond and Mitchell 2010) into alpha in property portfolios, which used data up to 2005, found that persistent alpha amongst portfolios was rare and that yield was a good predictor of future alpha.

5.6 Risk in individual properties – portfolio implications

Risk in a portfolio – whether in absolute terms or relative to a benchmark (i.e. tracking error) – will basically reflect a number of features. First, it will reflect the (weighted) average level of the specific risk of the constituent properties. Secondly, however, this risk tends to decline as assets with their own unique specific risks are added to the portfolio. Thirdly, the portfolio's risk will reflect the average market (i.e. beta) and factor sensitivities of the constituent properties. Finally, as a general rule, diversification can be achieved most effectively by combining assets that are lowly correlated and hence that are exposed to different types of risk.

Understanding the nature of risk at the individual property level and how it differs across assets is therefore important for portfolio risk. This aspect is explored further in Section 7 by simulating hypothetical portfolios made up of assets from the sample of properties.

5. PORTRAYING RISK IN INDIVIDUAL PROPERTIES

5.7 Statistical approach to quantifying systematic and specific risk in individual properties

The analysis focuses on the performance of individual properties over the 10 years to 2013; as a check, supporting analysis is also undertaken with a smaller set of data for the 10 years to 2012 and 2011, and also for the 12 years to 2013.

All analysis is undertaken at the individual property level over this period. For each property, market sensitivities (betas) and the corresponding residual returns and specific risk (all as illustrated in Figure 5.2 and as summarised in Box 5.1) are derived by through linear regression. The regression analysis is then extended, with each of the factors outlined in Table 5.1 tested in turn one-by-one.

Box 5.1: The components of an individual property's return; single factor model

$Return_{asset}$	The asset's return	*An individual property's return comprises:*
=	=	
$\beta asset$	The asset's beta, i.e. market sensitivity	*The return for its risk*
*	*	
$Return_{market}$	The market's return	
+	+	*The return for the skill applied to it*
$\alpha asset$	The asset's alpha	
+	+	*The random element of its return*
$\varepsilon asset$	The asset's specific (or idiosyncratic) risk	

5.8 The case studies – objectives and approach

The purpose of the case studies is to understand the sources of high specific risk in individual properties. Having estimated their specific risk using the statistical analysis outlined above, the properties with the highest levels in two respects are identified. First, those experiencing large deviations in performance from their benchmarks more than three times over the 10-year period; these are properties experiencing 'persistently high specific risk'. Second, those experiencing, at any point during the 10-year period, a very large deviation in performance from the benchmark; these experience 'one-off high specific risk'[19].

Out of the 859 properties, 157 (18%) were identified as having 'persistently high specific risk' and 34 (4%) as having 'one-off high specific risk'. A sample of these properties was then selected for further case study. Investors were asked to identify and describe, in their own words, the reasons for such annual deviations in performance away from the benchmark.

Requests for information on 115 assets were sent out and usable replies for 88 were received[20].

[19] More specifically, the first group are those whose residual returns were more than +/-11% (this being the average standard deviation across all properties) on more than three occasions, while the second group were those whose residual return was more than +/-33% (i.e. 3 standard deviations) at least once. The two groups are not necessarily mutually exclusive; precedence was given to the former.

[20] Elght of which related to requests for information on the sources of high and low beta.

6. LEVELS OF RISK IN INDIVIDUAL PROPERTIES

6.1 Introduction

This section details and explains the magnitudes of risk in individual properties according to the three components outlined previously.

To recap on these components, systematic risk arises on account of individual assets – and groups of similar types of assets – moving in tandem with each other. The common influences driving these patterns most often are market-related, and in this respect some assets may be more or less sensitive to these market movements (and hence correspondingly riskier) than the average property. Market risk is part and parcel of investing in property, is inescapable and hence justifies a premium return proportionate to how sensitive the asset is to market movements (i.e. according to its beta); furthermore, this risk directly feeds through to the portfolio. The first part of this section quantifies these betas and explains variations across properties.

Factor risk is also systematic. Factors relate to those common characteristics, other than the market, that lead to assets of the type performing in a synchronised way and having a different risk profile to other types of asset in the broader market. Compared to the 'average property', such factors may add to or detract from risk (and justify a corresponding premium or discounted return relative to the average property).

The most intuitive example of a factor in property is yield and in particular the differences in risk and return between high- and low-yielding properties. Again, exposure to these types of risk justifies either a premium return (in the case of high-yielding property that has tended to be more volatile than average), or a discounted return (for the relatively low volatility low-yielding segment). Such risks will also directly feed through into the portfolio. The second part of this section therefore assesses the extent to which individual properties are exposed to the array of factors outlined in Section 5.

The third element is the property's residual, specific risk. This is specific to each property, independent from one asset to another, and – being the risk that remains after accounting for all the systematic ones – is independent of systematic movements. It also feeds through to the portfolio level but diminishes and is diversified away as different assets are added; as it is diversifiable, it does not justify a return.

The magnitude of such specific risk may vary across individual properties according to their characteristics – for example, it is often suggested small or single-let properties have relatively high levels – and this will have implications for the number of properties required to achieve a given level of portfolio risk. Hence, in addition to quantifying variations in specific risk across individual properties, the reasons for these differences are also explored; there is a particular focus on understanding the highest levels of specific risk.

Finally, it is worth mentioning alpha. Alpha is the underlying out- (or under-) performance after accounting for all the systematic risks; across portfolios and the universe of properties, it is a zero sum game. It can reflect the superior (or inferior) skill and market timing of the asset or investment manager, privileged understanding of and access to markets, and persistent behavioural biases in market pricing and valuation.

As alpha is not volatile, it is not a risk but is of interest to this research as it will represent the extent to which a property has delivered a return commensurate with its risks, positive alpha indicating that returns in excess of those justified by risk have been delivered and negative alpha indicating that they have not been sufficient.

6. LEVELS OF RISK IN INDIVIDUAL PROPERTIES

The analysis of the market sensitivities and the factor risks is primarily based on statistical analysis. However, that of specific risk relies on both statistical analysis and the qualitative case studies.

6.2 Market risk

6.2.1 The market benchmarks

The choice of market benchmark, as outlined in Section 5, will impact on the division of the estimates between systematic market risk and specific risk.

The statistical analysis behind the choice of market benchmark is detailed in the Technical Appendix. In comparing segment-based benchmarks with a single All Property one, more variation in individual properties' total returns was explained by the asset's IPD PAS segment[21] than the IPD All Property return. That said, the advantage in using PAS segment was neither substantial (on average, only about 3% more variation was accounted for in using segment, as can be seen from Technical Appendix Table 1) nor was it universal; in 40% of the properties, All Property was the superior benchmark, substantially so in many cases. The conclusion is that in a significant minority of properties, it is commercial property generally that is the driver of an individual property's return and not its segment.

Using the town's segment return as a market benchmark, in preference to the broad regional segment, offered some further advantage (see Technical Appendix Table 1) but on average it was marginal and, again, in two-fifths of cases segment was superior to town[22]. Furthermore, there was no great consistency across properties in the same town - for some properties, town explained more of the variation, while in others the broad regional segment was stronger. In essence, town does not consistently add much, if anything, to explaining a property's return.

Given also that town returns are only available for a proportion of properties, IPD PAS segments were used to represent the market benchmark.

6.2.2 Individual property market sensitivities (betas)

Market sensitivities were estimated by regressing each property's annual total return on its segment return (see Section 5 and in particular Section 5.7 for further details of the methodology). The primary analysis was over the 10-year period to end-2013 and drew on the returns of 859 properties. As detailed in the Technical Appendix Table 2, the statistical qualities of these regressions on the whole were good.

On average, movements in the segment return explained 63% of the variation in the properties' returns; excluding assets that were known to be ground-rent investments (where explanation was low), the market accounted more than 70% of the variation in half of the properties. Across all properties, the average level of market risk was 12.8%.

Market sensitivities ('betas') were mainly clustered around 1, as can be seen from Figure 6.1[23].

This means that the systematic risk in most properties is close to market levels and that such properties' risk should be priced broadly in line with the market level. However, there was still a sizeable minority of

[21] Because the statistical explanation was stronger, South East standard retail was broken down into separate segments for central London and for the rest of London and the South East. Leisure and the remainder of the other commercial property segment were also separated.

[22] Town returns were only available for half of the properties.

[23] Similar patterns in market sensitivities and other metrics were recorded in analysis of the smaller sample of properties with a 12 year history.

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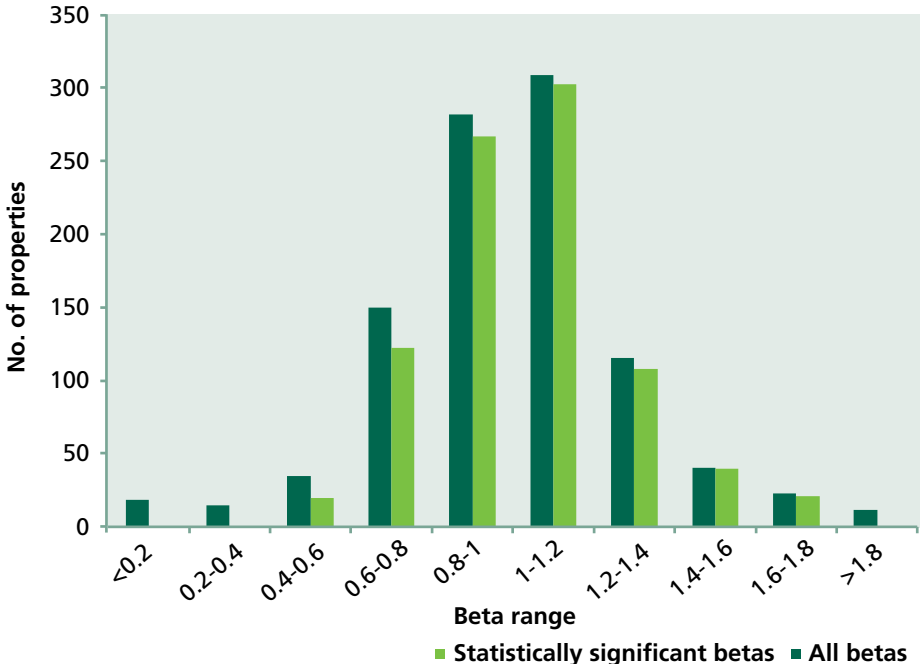
assets with market sensitivities in excess of 1.25 (which would justify, according to financial theory, an extra 62.5bps or more on top of a market risk premium assumed to be 2.5%) and, to a lesser extent, with market sensitivities of less than 0.75 (justifying a reduction of at least 62.5bps in the risk premium relative to the average property).

Figure 6.1: Distribution of individual properties' betas



Source: Analysis of investors' data

For a tenth of the properties in the sample, the market had no statistically significant influence on the property's return, meaning that these properties do not provide a property type return. Such properties were widely spread, encompassing most characteristics and segments, but were disproportionately represented by ground rent investments and otherwise by small lot sizes, lowly rented properties and those from the "other" commercial segment.

These variations in market sensitivities across properties are difficult to explain, as Table 6.1 indicates[24]. Higher yields add to sensitivity. Market sensitivity is also higher in those properties that experienced a new lease at some point during the 10-year horizon, and is lower the longer the unexpired term. More tenants reduce market risk, perhaps indicating a benefit from lease diversification. Surprisingly but nevertheless consistent with the evidence at the market level, smaller lot sizes are relatively insensitive to market movements[25] while larger ones are more sensitive (though large shopping centres were an important exception in this respect). Analysis of a smaller set of properties for which data is available suggests that relatively high capital expenditure also increases market sensitivity (while at the same time indicating a lesser influence from yield and lot size). By contrast, characteristics such as rent per sqm (a proxy for locational and building quality) and tenant covenant quality do not have an effect on market sensitivities.

[24] Note that as the betas are calibrated against the property's segment return, any variations in beta attributed to the segment in Table 6.1 reflect the performance of the specific properties in the sample relative to their segment. The coefficient attached to the City office dummy variable in Table 6.1 therefore indicates that the City offices in the sample had higher betas than the average IPD City office. This also applies to the analysis of alpha in Table 6.6.

[25] Compared to other properties with significant betas, the proportion of the variation in returns explained by the market was similar for the smaller properties, so their low betas do not reflect a weak statistical relationship.

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Table 6.1: Cross-section regression of individual property betas on the property's characteristics

Property characteristic	All properties	Properties with significant betas	Interpretation of significant betas equation
Constant	0.61**	0.45**	The constant applies equally to all assets
Low value relative to segment	-0.055*	-0.10*	Compared to mid-sized properties, those with a low capital value have a beta 0.1 lower
High value relative to segment		0.071*	Compared to mid-sized properties, those with a high capital value have a beta 0.07 higher
New lease during 10-year horizon (dummy variable)	0.053*	0.040*	Those experiencing a new lease have a beta 0.04 higher
Number of tenants (logged)		-0.021*	A 1% increase in the number of tenants will reduce beta by 0.021
10-year average unexpired term		-0.0040*	A 1 year increase in the unexpired term will reduce beta by 0.004
2004 yield relative to segment	0.0038**	0.0063**	A 1% increase in the yield (e.g. from 10.0% to 10.1%) will increase beta by 0.006
City office dummy variable	0.20*	0.25*	City offices in the sample have a beta 0.25 higher
R-squared	16%	39%	
Number of observations	750	361	

Source: Analysis of investors' data
* Statistically significant at the 10% level; **Statistically significant at the 5% level.
Notes: Equation also includes a dummy variable for one investor's properties;
Number of observations in the regressions is reduced because property characteristic variables are not available for every property. This applies in particular to equations that include unexpired term where information was available for around half of the properties.
See also footnote 24.

Seven case studies provide some further insights on properties with high market sensitivities. All of them pointed to the properties performing well in strong markets and poorly in weak ones on account of either:

- their location, either as within the region or the local market. This was the most common attribution;
- the poor quality of the building; or,
- worries over the weak tenant covenant.

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In summary, most individual properties over the last 10-12 years have tended to vary in line with their market segment. A corresponding implication – discussed further in Section 7 – is that risk in most properties should be priced in line with their market segments. However, around a quarter of properties have market sensitivities that are considerably higher or lower than average. There is a suggestion that properties that have experienced lease events, those that are high yielding, and possibly those experiencing high capital expenditure are more sensitive to market movements, and vice versa. However, by far the largest part of the variation is inexplicable and hence may reflect individual property idiosyncrasies.

6.3 Factor risk

Factor risk reflects the tendency for different types of property to have distinct cycles of performance and different risk profiles. For example, IPD indices show different profiles for high and low yielding property, and for small and big properties; accordingly, these indices are used to represent the yield and size factors in Table 6.2. For the other property factors, IPD indices are not readily available, so proxy indices are constructed from the sample properties (see the Technical Appendix for further information).

The influence of the property and macro-economic factors on individual properties is summarised in the table. It indicates that the 'styles' manifested at the market level rarely pass through to individual properties[26]. Furthermore, there are perverse relationships – for example, some low-yielding properties behaving like high-yielding ones. The conclusion is that few properties behave like and experience risk like their type.

There are a number of possible reasons for this surprising conclusion. Most importantly, the idiosyncratic variations in returns in properties are much larger than those in the property factor returns, leading to any underlying property type effect in the asset being swamped; as will be detailed in Section 7, diversifying this specific risk is required in order to get an exposure to type. Similarly, there also may be other, unaccounted for factors that make it difficult to identify underlying patterns. Thirdly, properties' characteristics in some respects change over time (for example, in Section 3 it was reported that only half of properties that started as high-yielding ended-up being so at the end of the period), making it unlikely that they will continuously follow a particular style. Finally, the 10-year horizon may be insufficiently long to derive statistically significant inferences (that said, extending the analysis to 12 years does not change the picture).

Most of the macro-economic factors in Table 6.2 are designed to capture any tendency for properties to be affected differently by unexpectedly strong or weak occupational market conditions, investment sentiment or unexpected inflation. For example, it might be expected that short-let properties benefit more from an unexpectedly strong economy and occupational market (and possibly better sentiment over future letting prospects), while properties with inflation-linked rents might be affected more by unexpected inflation. However, few properties are affected by these factors and, other than some tentative indications that larger lot sizes and higher rented properties are more likely to be impacted by surprises in GDP growth, there is no strong suggestion that different types of property are affected in different ways.

[26] Note that the relatively large proportion of properties that are sensitive to the tenant covenant quality factor is deceptive, reflecting in particular the corresponding large number of properties that have 'low risk' tenant covenants.

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Table 6.2: Proportion of properties with statistically significant factor coefficients, 2004-2013, excluding ground rent investments

Property factors	% of properties affected	Macro-economic factors	% of properties affected
Large/small size (sq metre)	15%	Rental growth surprises (segment level)*	7%
Low/high equivalent yield	15%	Total return surprises (all property level)*	16%
Long/short unexpired term	17%	GDP growth surprises*	16%
Single versus multi-tenanted	5%	Inflation surprises*	6%
High/low ERV per sqm (quality indicator)	7%	Gilt total return (lagged)	8%
Good/poor tenant covenant quality	20%		

Source: Analysis of investors' data
*See footnote to Table 5.1 for description of the 'surprise' variables.

One way round the statistical limitations associated with the short time horizon is to combine (or 'pool') all the properties and analyse them collectively (see Technical Appendix for further details).

This approach in particular enables a more robust analysis of the impact on individual properties from the gilt market. The expectation is that properties with long unexpired terms (because their income is more bond-like) will be most sensitive to changes in gilt returns but those with short unexpired terms are unlikely to be. This perspective is combined with an analysis examining the effect of the year-by-year changes in the unexpired terms of the properties. The results are summarised in Table 6.3.

According to the table, the annual return of an individual property declines as its unexpired term reduces; furthermore, this reduction in return is greater for properties with short unexpired terms. This theme is explored further in Section 6.5 (which considers if returns commensurate with risk have been delivered) and also in the concluding section to the report. The more extensive analysis also indicates that individual properties are affected by changes in the (previous year's) gilt return and furthermore that the effect is greater the longer the unexpired term (and is insignificant for properties with short unexpired terms). This pattern is in line with the expectations outlined earlier.

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Table 6.3: Effect on individual property returns of changes in gilt market total returns and the property's annual unexpired term.

Properties with a 10-year average unexpired term of:	Effect on the property's return of a 1% change in the previous year's gilt total return (% points)	Effect on the property's return of a reduction of 1 year in its unexpired term (% points)
0-5 years	-0.06	-1.05**
5-10 years	0.15**	-0.48**
10-15 years	0.20**	-0.25**
15-25 years	0.43**	-0.48**

Source: Analysis of investors' data
**Statistically significant at the 5% level

In conclusion, the analysis provides mixed evidence of factors affecting individual property returns in addition to market segment. A particularly interesting observation is that returns decline year-by-year as the unexpired term shortens, most so as expiry approaches. Movements in the gilt market have a noticeable (lagged) effect on properties with long unexpired terms. There is some evidence of high and low yield properties being influenced – albeit moderately – by movements in their types, and of short and long unexpired term properties being similarly affected. However, such relationships are typically modest by comparison to the much greater magnitude of idiosyncratic variation in individual properties, and only in a few cases do these factors impact substantially on levels of specific risk.

6.4 Specific risk

Specific risk is the element left after accounting for all systematic risks[27]. In theory, it is specific to each asset and is independent from asset to asset. It is diversifiable and on this basis does not, according to financial theory, justify a premium return. The risk of a portfolio of assets will reflect the average level of specific risk in its constituent properties but the magnitude will diminish and diversified away as the number of assets, each with their own idiosyncrasies, increases.

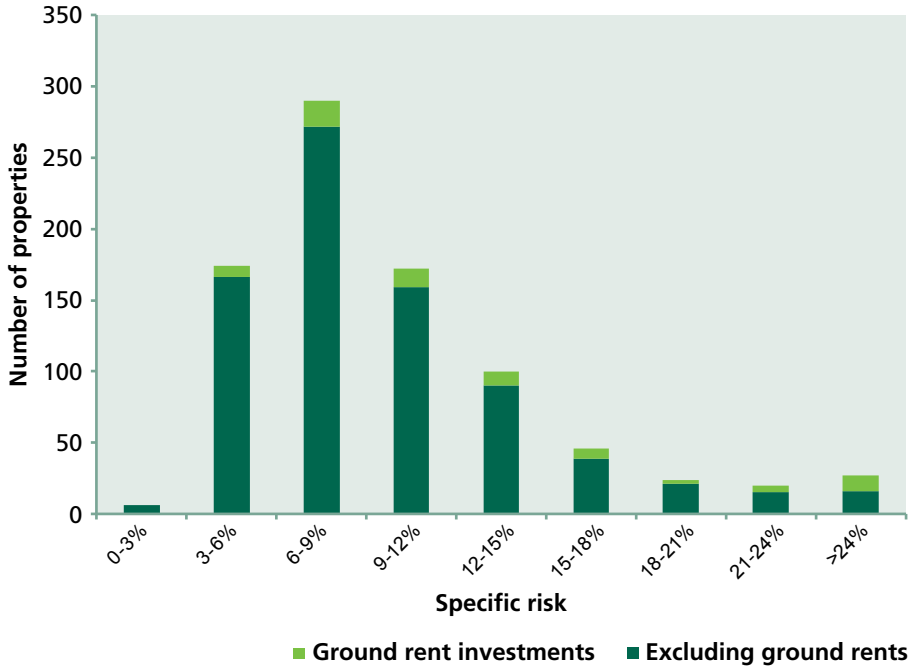
Before accounting for any factor risk, the average level in the sample of 859 properties was 10.7% and 9.7% after excluding the ground rent investments. Where apparent, sensitivity to factors such as high or low yield, long or short unexpired term invariably reduced specific risk (on average by around 2%) but as few assets were affected the overall impact was negligible. Given that Section 6.2.2 attributed, on average, 63% of the variation in an individual property's return to its market segment, the remaining 37% can be attributed to specific risk.

Specific risk in individual properties, however, ranges considerably, as illustrated in Figure 6.2. Excluding the ground rent investments (which, on average, had relatively high levels of specific risk given their weak relationship with the market), the median was 8.4%, with three-quarters of properties clustered between 6% and 12%. These levels emphasise the general conclusion that risk in the vast majority of properties is mainly related to the market.

[27] In the way described earlier in Section 5.7, it was estimated as the standard deviation of residual returns from the regression of the asset's return on its market segment.

6. LEVELS OF RISK IN INDIVIDUAL PROPERTIES

Figure 6.2: Distribution of individual properties' specific risk



Source: Analysis of investors' data

Looking at how specific risk varied across market segments, the average for most of the segments was typically in the range 7 to 10%, with shopping centres at the lower end; however, 'other commercial', central London retail and rest of the UK offices averaged in excess of 12%. These variations, of course, may just reflect the properties in the sample, rather than the overall market.

Specific risk, according to the statistical analysis detailed in Table 6.4, tends to be greater for properties with fewer tenants, for relatively high yielding properties, for properties that had a new lease at some point during the 10-year horizon, and for those that have experienced relatively high levels of refurbishment expenditure (and lower for those that did not).

The interpretation of these results is important and is set out in text Box 6.1. The key point is that the characteristics above do not relate to systematic risks (while the characteristics associated with specific risk may also feature as systematic drivers, this is co-incidental).

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Table 6.4: Cross-section regression of individual property specific risk on the property's characteristics

Property characteristic	All properties	Properties with low specific risk	Interpretation of all properties equation	Standard deviation in relative return - all properties
Constant	6.9%**	5.5%**	The constant applies equally to all assets	3.3%**
Relatively high 10-year capex as % of value (dummy variable)	3.2%**		Compared to a property with capex around the IPD average, the specific risk of one with high capex will be 3.2% points higher	2.4%**
Relatively low 10-year capex as % of value (dummy variable)	-1.6%*	-1.3%**	Compared to a property with capex around the IPD average, the specific risk of one with low capex will be 1.6% points lower	-1.7%*
Capital expenditure unknown (dummy variable)	-1.8%*	-1.6%**	Compared to a property with capex around the IPD average, the specific risk of one with unknown capex will be 1.8% points lower	-1.9%*
Tenant covenants unknown (dummy variable)		1.2%**		2.4%**
New lease during 10-year horizon (dummy variable)	2.1%**	1.2%**	Compared to a property not experiencing a new lease, one that did has specific risk 2.1% points higher	2.3%**
Number of tenants (logged)	-0.011%**	-0.0032%**	A 1% increase in the number of tenants compared to the average level will reduce specific risk by 0.011% points	-0.011%**
10-year average unexpired term	-0.10%**		A 1 year increase in the 10-year average unexpired term reduces specific risk by 0.10% points	-0.079%*
2004 yield relative to segment	0.044%**		A 1% increase in yield (e.g. from 10.0% to 10.1%) increases specific risk by 0.044% points.	0.080%**
Central London retail dummy variable	2.2%*		Compared to other properties, the specific risk of central London retail properties is 2.2% higher.	
Rest of UK industrial dummy variable	-1.7%*	-0.69%*	Compared to other properties, the specific risk of rest of UK industrial properties is 1.7% lower.	
R-squared	28%	13%		38%
Number of observations	395	603		395

Source: Analysis of investor data

*Statistically significant at the 10% level; **Statistically significant at the 5% level.

Notes: Equation also includes a dummy variable for one investor's properties;

The number of observations in the regression is reduced because property characteristic variables are not available for every property. This applies in particular to equations that include unexpired term, where information was available for around half of the properties.

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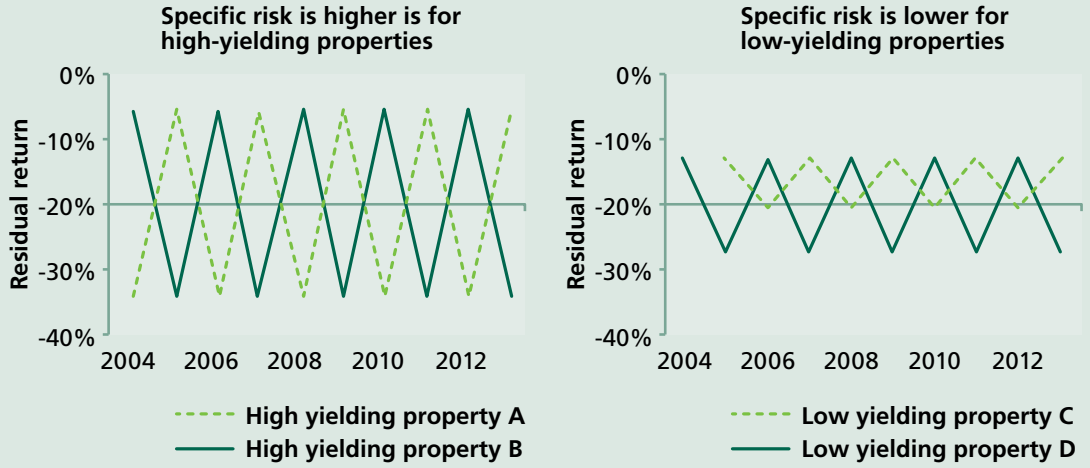
Box 6.1 Interpretation of characteristics associated with variations in specific risk

Table 6.4 indicates, for example, that specific risk is higher for high-yielding properties than for low-yielding properties. What this means is that, in any particular year, high yielding properties tend to show a greater dispersion of under- and over-performance. This is illustrated in the charts below.

Furthermore, these over- and under-performances balance each other out (and hence can be diversified away). This balancing-out means that the effect is not a systematic risk. The same patterns could be illustrated for properties with few tenants (compared to those with many tenants), etc.



There is also a suggestion that specific risk tends to increase progressively as expiry nears (meaning that it is low for long unexpired terms). The absence of any effect from rental levels (a proxy for building and locational quality) is notable. Neither does tenant covenant quality influence specific risk, other than it being higher where it is unknown[28]; in this respect, the effect is particularly large for retail warehouses.

The drivers of specific risk show some variation across segments although in most segments the amount of variation explained is low. Shopping centres are the exception – the risk reducing effects of increasing lot size and unexpired term explain half the variation in specific risk between the properties in the sample.

As a general rule, however, the above characteristics explain only a small part of the variation across properties, suggesting that specific risk in individual properties is for the most part truly idiosyncratic.

The variation in tracking error – i.e. in the simple relative return - was also analysed. As Table 6.4 shows, the property characteristics explaining variation in tracking error were similar to those for specific risk. As the tracking errors across properties reflect variations in both specific risk and systematic risk, it is not surprising that the amount of variation explained by the property characteristics is higher than for specific risk.

6.4.1 Differences in specific risk over time

Further insight can be derived by analysing the variations in residual risk across properties year-by-year. In particular, such analysis might provide indications of whether or not there are systematic drivers of risk that:

[28] Unknown covenants include both those where the information was not supplied by the investor, those where all of the property is vacant, and, more importantly, those whose tenants who are not rated by the agencies (which tend to be small and other non-incorporated businesses).

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- are an influence only periodically, for example in particular years or at different points of the cycle;
- have been excluded from the analysis, for example systematic risk factors.

2009 is of particular interest in these respects because there was an unusually wide dispersion across properties not only (as detailed earlier in Table 4.1) in their simple relative returns but also in their residual risk. The analysis draws on a more comprehensive set of historic tenancy and lease data for four investors, provided by MSCI. This covered 2004, 2007, 2009 and 2010, and complemented the tenancy and lease data directly provided by these investors for 2013.

The analysis is summarised in Table 6.5, with the approach explained in the Technical Appendix. It uses the residual returns that do not take any factor risk into account.

If the estimated residual risk is truly idiosyncratic, there would be few, if any, characteristics explaining the variation across properties. On the other hand, characteristics featuring consistently would be indicative of a systematic influence that has not been accounted for. The table indicates:

- lease events, in some form or another, are a persistent influence. In most years, this is a beneficial influence; however, in 2009, the effect is negative - those properties where a lease was due to expire the following year were very detrimentally impacted. The significance of these findings is explored further in Section 6.4.2. Overall, the observations suggest there is a systematic, 'lease-event' factor affecting individual property risk and performance;
- vacancy has an influence in most years, being beneficial in 2007[29] but detrimental in 2009, 2010 and 2013; the impact was particularly detrimental in 2009. Again, this is indicative of systematic risk related in some way or another to lease events;
- yield has a significant influence in three out of five years, with relatively high yields being a favourable influence on performance in 2004 and 2007 but a negative one in 2010. This provides some tentative support for the existence of a systematic yield factor;
- similarly, unexpired term has a significant, favourable influence in three out of five years (i.e. the longer the unexpired term, the greater the upside). Again, this is indicative of a systematic, unexpired term factor; and,
- lot size has a periodic effect, being detrimental in 2004 but extremely favourable in 2009 when the biggest properties were well protected. Hence, as a systematic factor, lot size seems to matter only now and then.

This analysis therefore provides evidence that yield and unexpired term are systematic factors that periodically affect individual property risk and that there may be a more fleeting factor associated with lot size; it provides somewhat stronger evidence of a more persistent 'lease events' systematic factor.

To recap, the conclusions so far on specific risk are as follows. Because of the exclusion of some persistent systematic factors (such as lease events) and possibly some periodic ones, the estimates of specific risk are likely to be overstated for some types of property. The overall effect across all properties, however, is marginal. The conclusion remains that risk in individual properties is mainly systematic. Specific risk is the smaller element of risk – and is truly idiosyncratic - in most properties but is higher the fewer the number of tenants, the shorter the unexpired term, and the higher the yield; lease events and relatively high capital expenditure also inflate specific risk (note that it is co-incidental that yield, unexpired term, and lease events also appear to be systematic risks). Little more can be said about these properties with low specific risk.

[29] Such a positive impact from vacancy is not surprising. It was also found for Q4 2013 in MSCI/IPD's *Asset Management Report*.

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Table 6.5: Cross-section regression of individual properties' annual residual returns on the property's characteristics

Property characteristic	2004	2007	2009	2010	2013	Interpretation of 2009 equation
Constant	-6.4%**	-4.5%**	1.8%	9.1%**	-1.8%**	The constant applies equally to all assets
Year's capex as % of capital value						
2013 capital value (logged)			1.7%**			An asset with 1% higher capital value than the average would have had 1.7% points higher residual risk in 2009 (N.B. in this and the other contexts below, higher/ more positive residual risk is favourable)
Capital value relative to the segment	-0.016%**					
New lease during the year (dummy variable)	2.4%*	2.0%**		3.0%**		
Lease expired during the year (dummy variable)					2.7%*	
Lease expiry the following year (dummy variable)			-4.7%**			An asset with an expiry scheduled in 2010 would have had 4.7% points lower residual risk in 2009.
Over-rented (dummy variable)		-1.8%*				
Vacancy rate		0.070%**	-0.37%*	-0.093%**	-0.12%**	An asset with a 1% point higher vacancy rate than the average would have been associated with 0.37% points lower residual risk in 2009.
Unexpired term between 5 & 15 yrs (dummy variable)	3.8%**					
Unexpired term (years)			0.29%**		0.26%**	An asset with an extra year on its 2009 unexpired term compared to the average would have had 0.26% higher residual risk in 2009.
2004 yield relative to segment	0.052%**	0.026%*		-0.090%**		
R-squared	10%	6%	25%	10%	6%	
Number of observations	387	412	440	459	505	

Source: Analysis of investors' data

*Statistically significant at the 10% level; **Statistically significant at the 5% level.

6. LEVELS OF RISK IN INDIVIDUAL PROPERTIES

There is, however, still a substantial minority of properties – those on the right hand side of Figure 6.2 – whose specific risk appears to be very high. The analysis in Section 6.4.2 considers these properties.

6.4.2 Sources of high specific risk

Properties with high specific risk were classified in two ways:

i. properties exhibiting ***persistently high specific risk***. These were properties experiencing annual deviations from their benchmark of greater than +/-11% more than three times over the 10-year horizon. These accounted for 18% of the 859 properties, including the ground rent investments.

   They were disproportionately made up of South East and rest of the UK offices and under-represented in the shopping centre and retail warehouse segments; single-lets were also over-represented. They tended to comprise relatively small lot sizes and unknown tenant covenants, were high yielding, and had relatively short unexpired terms but had rental levels around the overall average. They also had been exposed to relatively high levels of capital expenditure. Finally ground rent investments were also over-represented, reflecting in particular their weak relationship with the market;

ii. those characterised by high one-off specific risk. Accounting for 4% of properties, these were identified as properties experiencing annual deviations in excess of +/-33% up to three times over the 10 years to 2013[30]:

   Segment wise, properties experiencing ***high one-off specific risk*** were a mixed bag – over-represented also by rest of the UK offices but comprising relatively few South East offices and industrials. They were more likely to be multi-lets but overall had relatively few tenants. Rental levels and yields were close to the sample average but lot sizes and unexpired terms were marginally lower. Again, such properties experienced relatively high levels of capital expenditure and were over-represented by ground rent investments.

A sample of 80 properties from these two groups was subjected to detailed case study with the purpose of understanding the sources of such specific risk. Across these 80 properties, there were a total of 215 'abnormal' deviations in return away from the benchmark over the 10-year horizon. Investors were asked to explain in their own words the reasons behind each of these deviations. An example of these is shown in Box 6.2.

[30] The criteria for these definitions of persistently high risk and high one-off risk reflect the average 11% value of idiosyncratic risk in the sample; this is derived as the standard deviation of each property's residual return. Statistical theory indicates that 68% of annual deviations in the residual return should be within 1 standard deviation (i.e. +/-11%) and that 99.7% of annual deviations should be within 3 standard deviations (i.e. +/-33%); properties outside these ranges clearly have exceptional levels of risk and hence are defined as such.

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Box 6.2: Synopsis of Selected Case Studies

Case study property 1: Standard retail with two units and now with residential above; lot size <£2m, ERV psf relatively low and yield around average.

10-year standard deviation of total return: 31%

Year	Investors' explanation	Return relative to segment
2008	Permission granted to convert vacant upper floors to residential	75%
2009	Residential completed; value substantially in excess of valuation	84%
2010	Expenditure on converting basement	-30%
2013	Basement let in excess of valuation	31%

Case study property 2: Single unit standard retail; lot size £8-10m with a low yield. Tenant covenants currently good.

10-year standard deviation of total return: 22%

Year	Explanation	Return relative to segment
2009	Strong rental growth in town	20%
2010	Strong rental growth in town	19%
2011	Tenant failed at end of year	-17%
2012	Unit void and ERV psf reduced	-26%
2013	Re-letting	20%

Case study property 3: Retail warehouse/park with eight units; lot size £12-14m with average ERV psf and yield. Mixture of tenant covenants.

10-year standard deviation of total return: 23%

Year	Explanation	Return relative to segment
2009	One tenant vacated on expiry and another failed	-42%
2010	Two units amalgamated and let to new tenant	17%
2011	Amalgamated unit trading well	17%

Case study property 4: Retail warehouse/park with two units; small lot size £0-2m with low ERV psf and high yield. Poor tenant covenant. Property subject to significant refurbishment expenditure over 10-year horizon.

10-year standard deviation of total return: 21%

Year	Explanation	Return relative to segment
2006	Tenant went through a CVA and remained in unit	-13%
2009	Tenant failed again	-23%
2010	Unit split and re-let	20%
2012	One tenant failed and unit became void	-25%
2013	Second tenant went into administration	-41%

6. LEVELS OF RISK IN INDIVIDUAL PROPERTIES

Box 6.2: Synopsis of Selected Case Studies, continued

Case study property 5: Multi-let West End & Midtown office with two tenants; lot size £14-16m, relatively high ERV psf and low yield.

10-year standard deviation of total return: 18%

Year	Investors' explanation	Return relative to segment
2005	Lease expired and tenant did not renew	-35%
2006	Part re-let, more quickly and at higher ERV than assumed in valuation	12%
2007	Property fully re-let; rent frees expired	11%
2010	Significant capital expenditure	-17%
2013	Upcoming expiry and void risk discounted in valuation	-13%

Case study property 6: Multi-let West End & Midtown office with seven units; lot size £6-8m, with average yield but a mix of tenants with significant proportion of income associated with 'at risk' tenants.

10-year standard deviation of total return: 27%

Year	Explanation	Return relative to segment
2008	Became largely vacant	-16%
2009	Underwent substantial refurbishment, improving quality	-29%
2010	Let more favourably than assumed in valuation; yield tightened	31%

Case study property 7: Single-let South East UK office; lot size range £4-6m, average ERV psf but with a relatively high average yield and a high risk tenant covenant. Property subject to comparatively high refurbishment expenditure.

10-year standard deviation of total return: 22%

Year	Explanation	Return relative to segment
2009	Property became vacant after tenant exercised lease break	-29%
2010	Substantial refurbishment expenditure	-25%
2011	Property re-let above ERV previously in valuation	16%

Case study property 8: Multi-let Rest of UK office with seven tenants; lot size range £2-4m, relatively low ERV psf and high yield, mixed tenant covenants. The town is substantially over-supplied.

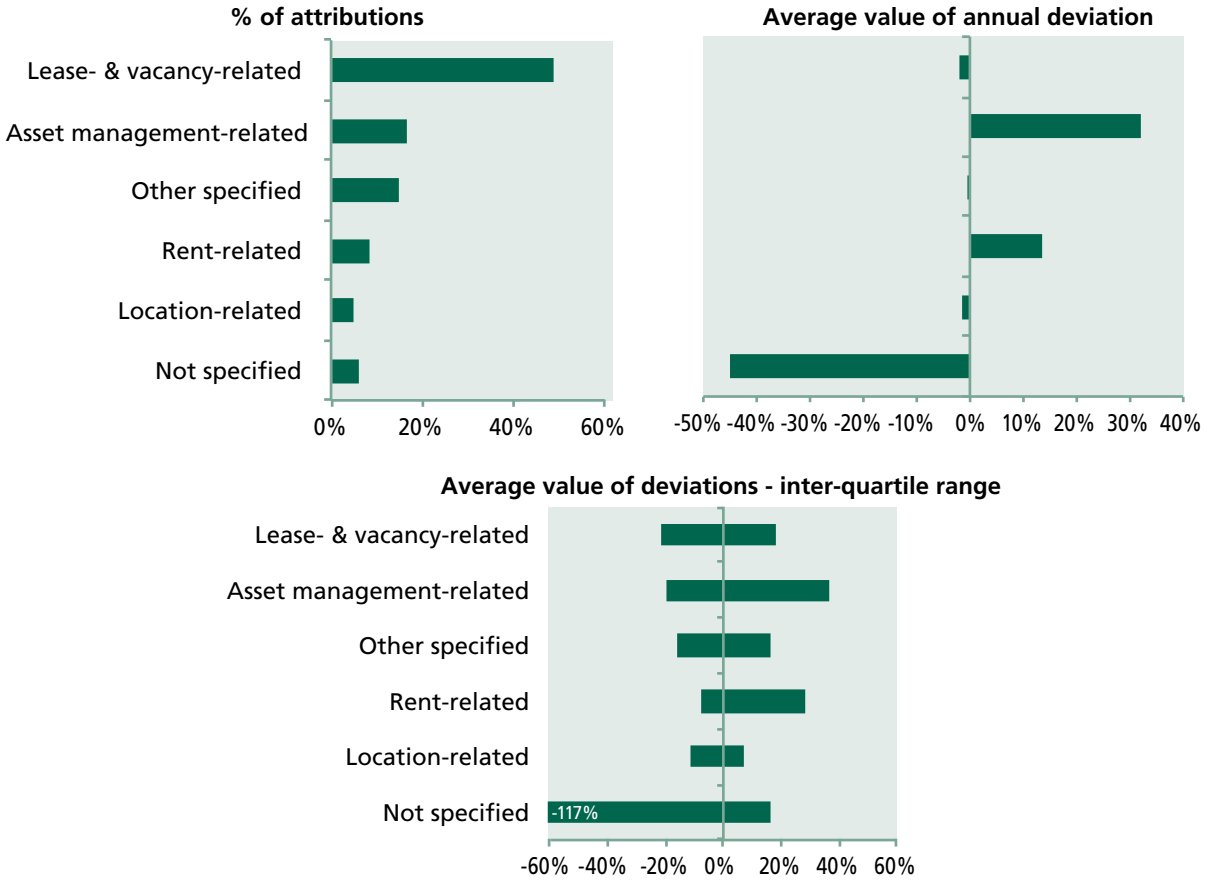
10-year standard deviation of total return: 25%

Year	Explanation	Return relative to segment
2011	One-fifth of income became void; ERV psf reduced substantially	-31%
2012	Small re-letting, further substantial reduction in ERV psf. Valuation assumed significant voids on lease expiry and that tenant breaks would be exercised	-47%
2013	New lettings and re-lettings on more favourable terms than assumed in valuation; ERV psf significantly improved	14%

6. LEVELS OF RISK IN INDIVIDUAL PROPERTIES

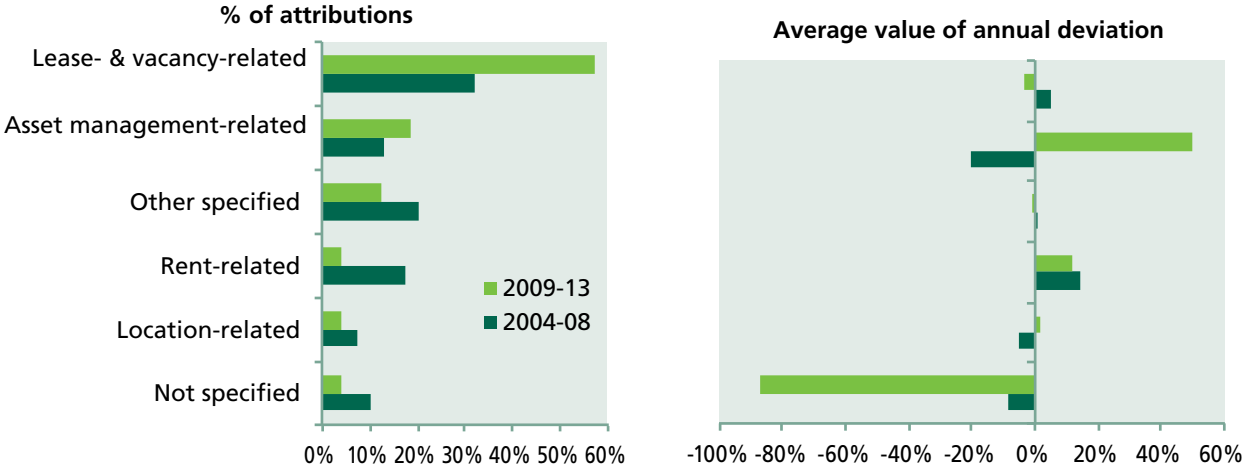
The responses were classified and a high level summary is presented in Figures 6.3 and 6.4. More detail is presented in Figures 6.5 to 6.8. The tables show the number of attributions attached to the source of risk and their average net impact across properties and over time.

Figure 6.3: Broad sources of high specific risk



Source: Investor case studies

Figure 6.4: Broad sources of high specific risk: first versus second half of 10-year period



Source: Investor case studies

6. LEVELS OF RISK IN INDIVIDUAL PROPERTIES

Lease-related causes were the primary source of abnormally large deviations in return from the benchmark (they accounted for almost half the total); however, on balance, the net effect across properties and over time was more or less neutral.

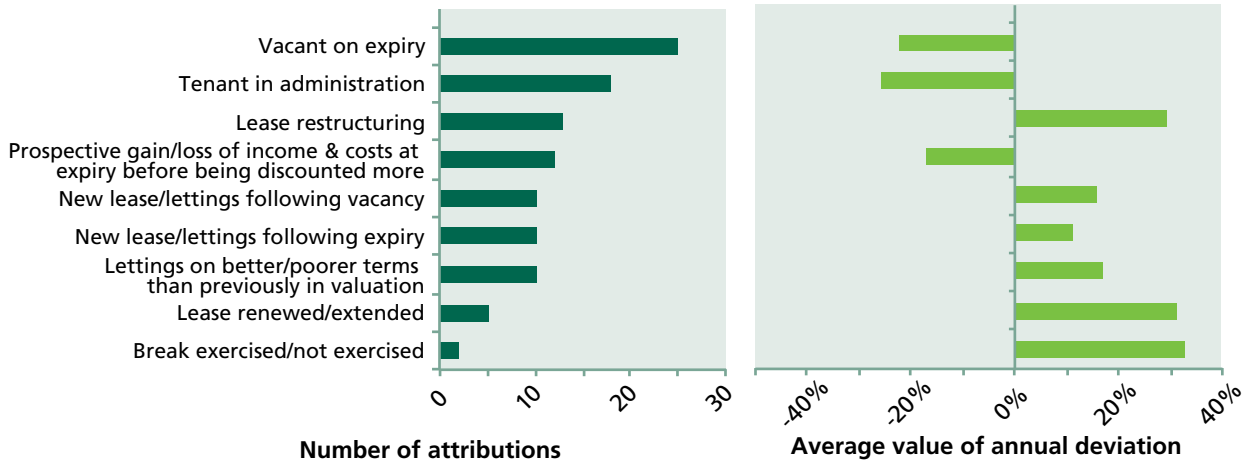
Lease-related causes were more common in the second half of the 10-year period but overall the average impact was comparable over the two periods and broadly neutral. It is difficult to detect a cyclical pattern, with the deviations tending to be positive in 2004, 2006 and 2013, and negative in the other years. The suggestion, therefore, is that lease-related risks are diversifiable, at least over time.

Asset management initiatives were the second largest source of high specific risk, albeit – in accounting for less than a fifth of instances - well behind lease-related causes[31]. Overall, their effect was strongly positive. However, the effect in 2008 (the height of the downturn) was very negative but then heavily positive in 2009 (when the market started to recover); reflecting this, and as Figure 6.4 shows, the average impact from asset management was very positive in the second half of the period but negative in the first half. These patterns might be indicative of some beta-like market sensitivity. As Figure 6.3 shows, asset management-related deviations (along with miscellaneous ones) were the most variable source of risk.

A more detailed perspective on lease-related risk is provided in Figure 6.5. Vacancy was the largest lease-related source of risk, followed by tenant administration; both, not surprisingly, tended to be heavily negative.

It is notable that average yields were relatively low in those case study properties where high specific risk was attributed to tenant administration. This suggests that the risk of tenant administration was not priced in these assets[32]. These properties also had relatively few tenants. By contrast, analysis of the other properties with the same tenants as the adversely affected case study assets shows that their specific risk was much lower and that their returns were better, i.e. they were not impacted in the same way; they also had more tenants (across the covenant spectrum). This suggests that the risk and impact of tenant default can be diversified away.

Figure 6.5: Lease-related sources of specific risk



Source: Investor case studies

[31] This means that lease-related and asset management-related sources account in total for two-thirds of the reasons.

[32] Recall that the analysis in Section 3.3.6 found that in general there was no relationship between the property's yield and its tenant covenants; this further strengthens the view tenant default is not priced in individual properties.

6. LEVELS OF RISK IN INDIVIDUAL PROPERTIES

Lease restructuring (for example, re-gearing), in the same way as was illustrated for the broad asset management category in Figure 6.3, tended to be an upside source of risk (see below for further discussion).

The remaining sources of lease-related risk collectively present a powerful perspective on the dynamics individual property risk; this perspective is based on a careful review of the evolution of risk in the case studies. In the run-up to lease expiry, valuations, expectations, and/or investment sentiment become conservative, inducing greater variability in returns and undermining performance (see, for example, the category "Prospective gain/loss of income & costs at expiry being discounted more"). Such sentiment on future prospects might, to some extent, also be behind the very negative impact from vacancy and tenant administrations, i.e. the detrimental impact is over-discounted.

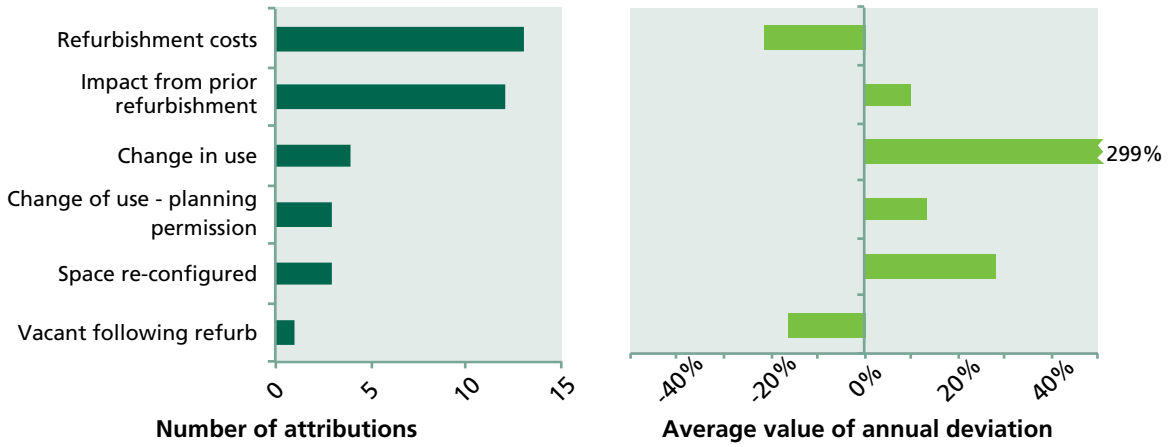
Relative to such conservative expectations, new leases and renewals – when they eventually occur – can be viewed extremely positively, thereby generating upside in variability and returns. This dynamic is reflected in the bottom five categories in Figure 6.5, for example, the impact of the category 'Lettings on better/poorer terms than previously in valuation/than previously expected' is, on balance, very favourable.

These observations are consistent with the findings from the statistical analysis that new leases (as opposed to expiries) in certain years are associated with upside risk (refer, for example, to Table 6.5).

The detail on asset management, presented in Figure 6.6, portrays a similar dynamic to the effect of lease expiry and renewal. Refurbishment expenditure has a contemporaneous negative impact (over and above that directly factored into the valuation) but there are positive effects subsequently. Changes in use, while not frequent, are positive and the most substantial source of high specific risk in individual properties.

It is arguable if such asset management (including lease re-gearing, etc.) should be seen as a 'risk'. Kaiser (2005) contends that such variations in performance should not be seen as 'risk' but as 'gamma' - the change in value due to actions under the investor's control. The counter-argument is that both upside and down side volatility – and hence risk - is nevertheless induced by these actions, and that the value of such asset management beyond that associated with risk will be captured in alpha. The extent to which alpha arises from such activities is addressed in Section 6.5.

Figure 6.6: Asset management-related sources of specific risk

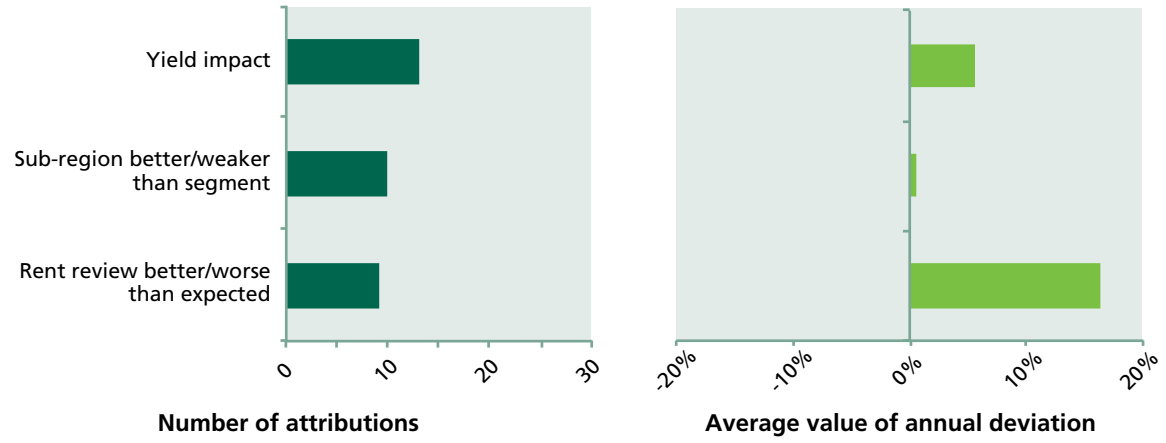


Source: Investor case studies

6. LEVELS OF RISK IN INDIVIDUAL PROPERTIES

Figure 6.7 presents details of the most frequent miscellaneous sources of high specific risk. The largest category relates to yield shifts of unknown source. Other than when manifested as capital expenditure, there is no indication that depreciation is a substantial source of high specific risk. While at odds with the practitioner sentiment expressed in the IPF's 2000 report *The Assessment and Management of Risk in the Property Investment Industry*, this would be in line with the findings in research by the Dixon et al (College of Estate Management, 1999) that large one-off impacts from depreciation are uncommon.

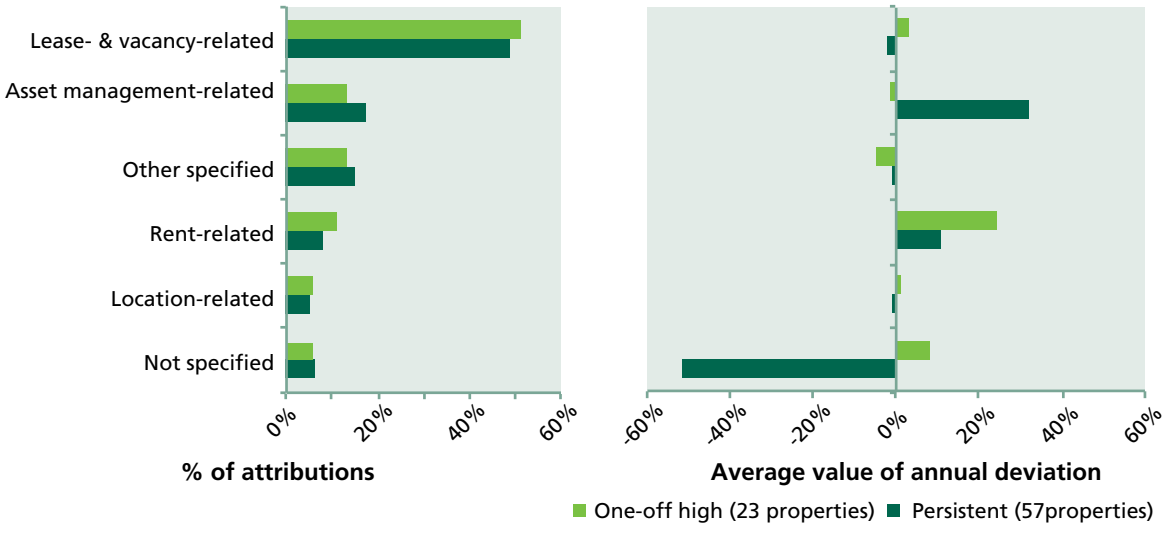
Figure 6.7: Most common miscellaneous sources of specific risk



Source: Investor case studies

Finally, it is difficult to draw any distinction between the sources of persistently high specific risk and of one-off high specific risk, according to Figure 6.8. Based on their respective property characteristics as outlined earlier, the fundamental differences appear to relate to yield and lot size – with those prone to persistently high risk more likely to be smaller and higher yielding properties and those affected by one-off high risk more characteristic of the average property. However, greater exposure to above average capital expenditure and to lease events binds them both together.

Figure 6.8: Broad sources of high specific risk, by risk type



Source: Investor case studies

6. LEVELS OF RISK IN INDIVIDUAL PROPERTIES

In conclusion, management intensive properties – i.e. those routinely exposed to the leasing market and to refurbishment expenditure - have the highest levels of specific risk. Such properties' risk is also accentuated by their relatively high betas, something that partly reflects the dynamic of sentiment in the run-up to lease events and in response to their outcome and similarly with respect to asset management initiatives.

6.5 Alpha

Alpha relates to the tendency for an asset or portfolio to consistently out- (or under-) perform after accounting for the return associated with an asset's or portfolio's systematic risks[33]; it can be positive or negative.

Positive alpha is typically hard to deliver, and across all properties (or portfolios) in the market it is a zero sum game. The literature by academics and practitioners generally attributes positive alpha not only to superior skill and market timing but also to privileged understanding of and access to markets (or types of asset) that are opaque or have barriers to entry (including, but not restricted to, illiquidity), and to persistent behavioural biases and mistakes on the part of investors.

Because it is not volatile, alpha does not represent a risk. However, it is interesting to assess the extent to which the systematic risks identified in this research may be over- or under-rewarded, beyond the return justified by these risks.

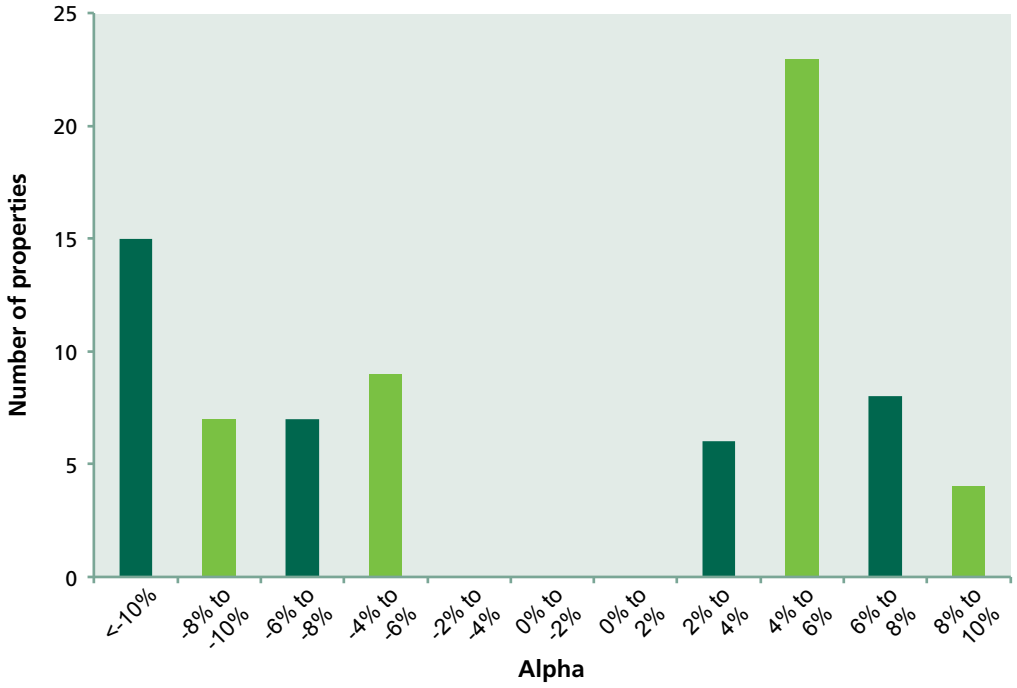
Overall and after accounting for market risk[34], the average alpha in the sample of properties was 1.1% (meaning that alpha would, on average, have been negative in the much larger set of IPD Universe properties not covered by this research). Most alphas, however, were clustered around 0 and statistically insignificant. Figure 6.9 shows the distribution of the alphas that were statistically significant; the alphas tend to be very substantial, both on the upside and the downside.

[33] Hence for an asset with a beta of 1, any alpha will simply correspond to its annual average return relative to its benchmark. For an asset with a beta greater than 1, any alpha will less than its relative return (because part of the asset's return will be compensation to account for its greater beta risk/ market sensitivity); the opposite will apply to assets with a beta of less than 1.

[34] The point was made earlier that alpha will be misrepresented if not all systematic risks are accounted for. Hence, the exclusion of possible systematic risk associated with factors such as yield, unexpired term, etc., may bias the estimates of alpha presented in Figure 6.9 and Table 6.6.

6. LEVELS OF RISK IN INDIVIDUAL PROPERTIES

Figure 6.9: Distribution of statistically significant alphas (excluding ground rent investments)



Source: Analysis of investors' data

The property characteristics associated with alpha (and also with relative performance) are outlined in Table 6.6. Considering properties with significant alpha, the table indicates that lot size was associated with positive alpha but larger numbers of tenants offset this. However, the combined effects meant that almost all properties with a lot size in excess of £100m delivered alpha irrespective of the number of tenants, while those with lot sizes under £40m but with substantial numbers of tenants (e.g. over 50) had negative alpha. The suggestion, therefore, is that secondary properties with numerous tenants showed poor returns in relation to their risk over the last 10 years.

High capital expenditure over the 10-year horizon detracted from alpha, perhaps indicating that some forms of asset management have not been worth the extra risk. There is also a suggestion that – having controlled for the other characteristics – alpha is greater the higher the yield.

Interestingly, there is no indication of any alpha – either positive or negative – from a property having a new lease (and by implication a lease expiry). This suggests that the extra systematic risk from a lease event, identified in Table 6.1, is neither under- nor over-rewarded.

The characteristics associated with alpha in general (i.e. including statistically insignificant alpha) are largely the same, other than the absence of an effect associated with yield and the inclusion of a positive one associated with unexpired term. The latter, in indicating that risk-adjusted returns increase with unexpired term, is consistent with the earlier observations in Table 6.3 (namely that return increased with unexpired term).

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Not surprisingly given most betas are close to 1, the characteristics associated with relative performance are also comparable to those for risk-adjusted alpha. It confirms that large lot sizes, a bigger number of tenants and higher yields are rewarded for their greater systematic risks identified in Table 6.1, and that properties subject to relatively high refurbishment expenditure are not rewarded for their greater risk.

Table 6.6: Cross-section regression of individual properties' alpha on the property's characteristics

Property characteristic	All properties	Properties with statistically significant alpha	Interpretation of all properties equation	Return relative to segment - all properties
Constant	-2.0%**	-14.7%**	The constant applies equally to all assets	-4.4%**
2013 capital value (logged)	1.3%**	4.4%**	A property with a value 1% above the average will have 4.4% points higher alpha	1.4%**
Relatively high 10-year capex as % of value (dummy variable)	-5.2%**	-6.4%*	Compared to a property with capex around the IPD average, alpha will be 6.4% points lower	-5.5%**
Number of tenants (logged)	-0.83%**	-3.2%**	A 1% increase in the number of tenants compared to the average level will have 3.2% points lower alpha	-0.88%**
10-year average unexpired term	0.11%**		A 1 year increase in the 10-year average unexpired term relative to the average property will have 0.11% points higher alpha	0.061%*
2004 yield relative to segment		0.11%**	A 1% increase in yield (e.g. from 10.0% to 10.1%) increases alpha by 0.11% points.	0.026%**
Central London retail dummy variable		13.8%**	Compared to other properties, the alpha of central London retail properties is 13.8% points higher.	
R-squared	27%	58%		25%
Number of observations	398	84		394

Source: Analysis of investors' data

*Statistically significant at the 10% level; **Statistically significant at the 5% level.

Notes: Number of observations reduced because property characteristic variables not available for every property. This applies in particular to equations that include unexpired term where information was available for around half of the properties.

7. INDIVIDUAL PROPERTY RISK AND THE IMPLICATIONS FOR PORTFOLIO RISK

7.1 Introduction

This section has a number of objectives. First, it continues its updating of the earlier IPF research and in particular uses the data on individual property returns to construct portfolios and assess the relationship between portfolio size and portfolio risk over the last 10 years.

Second, it draws on this report's analysis to address some of the unanswered questions from the earlier IPF research. These questions largely related to understanding the property characteristics that led to variations in its estimates of portfolio risk; for example, was it one-off events, or enduring characteristics that volatile properties tended to share and similarly characteristics that stable properties tended to share?

Third, it aims to relate the analysis in Section 6 of systematic and specific risk at the individual property level to portfolio risk and in particular to illustrate how each of the two types of risk (systematic and specific) impact on portfolios; for example, how do properties with high specific risk affect portfolio risk? As well as being useful in its own right, such a perspective also helps firm up some of the tentative conclusions on the drivers of systematic risk in individual properties

Finally, it seeks to answer another question raised by the previous IPF research, specifically is there a better way of classifying and segmenting portfolios than the conventional approaches based on some form or another of property sector and geographic region?

The first part of this section updates the earlier IPF research's analysis of the relationship between portfolio size and risk. The second part uses the conceptualisation of property risk in Section 5 and the detailed analysis of property risk in Section 6 to develop new insights on portfolio risk. The final part draws some conclusions on alternative ways of structuring portfolios.

7.2 Risk reduction and diversification – updating the earlier IPF research

This report uses the data from its sample of properties to update the key parts of the IPF's 2007 report *Risk Reduction and Diversification in Property Portfolios*. Such information is useful to practitioners in order to understand how to control portfolio risk and structure portfolios.

The approach involves using the sample properties to create portfolios of different sizes through random simulations[35]. Having randomly selected the assets for each portfolio, the total returns of each constituent property are used to calculate the portfolios' returns for each of the 10 years to end-2013. Measures such as the 10-year standard deviation and tracking error (relative to the overall sample's return) of each portfolio's returns are then derived from these returns. The results are illustrated in Figure 7.1.

Compared to the previous IPF research, which covered the period 1995-2004, the portfolio standard deviations are now much higher. The previous study, for example, reported that the average standard deviation for a portfolio of 50 properties was 4.9% compared to 12.7% now. This, of course, reflects the much greater market volatility over the last 10 years.

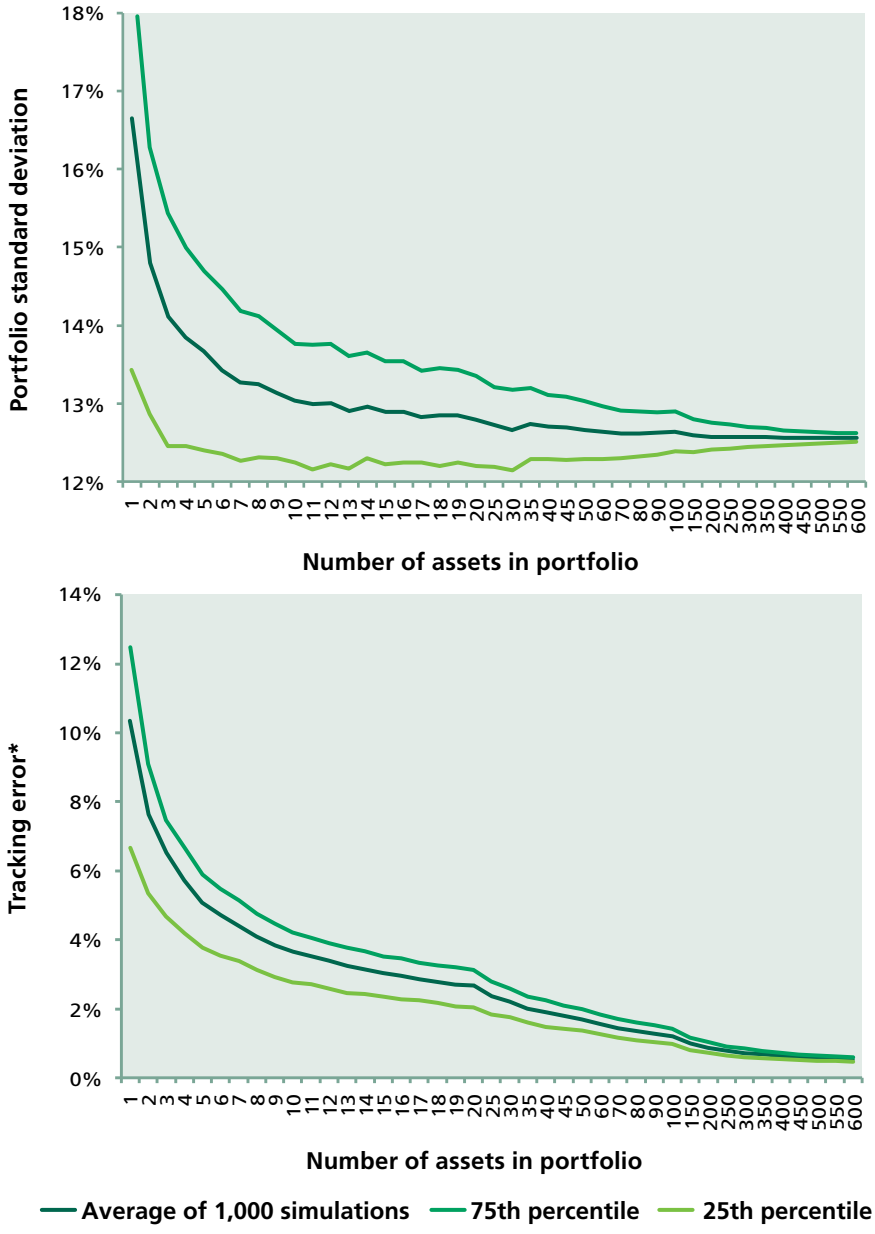
Of greater interest is the rate at which portfolio risk declines as more properties are added to the portfolio. A single asset portfolio (excluding ground rent investments) on average has a standard deviation of 16.7%; adding a second property reduces the portfolio's standard deviation to 14.8% whereas a portfolio of 20 assets on average has a standard deviation of 12.8%.

[35]The portfolios ranged from two to 600 properties. Each size-band was simulated one thousand times. To limit the complexity of an exercise that is secondary to the main thrust of the research, the analysis did not capital-value weight the properties in the portfolios (i.e. each property's return had equal weight), while sampling was undertaken 'with replacement' (meaning that a property could feature in more than one portfolio). Ground rent investments, accounting for 75 assets, were not included in the simulations.

7. INDIVIDUAL PROPERTY RISK AND THE IMPLICATIONS FOR PORTFOLIO RISK

Notably, the 20 property portfolio's standard deviation is very close to that of the overall market and represents a much sharper reduction of risk than estimated in the earlier IPF research. This highlights again the point that risk in portfolios over the last 10 years has been much less associated with the risks inherent in individual properties and more associated with market risk than previously. Adding further properties to a 20 property portfolio results only in marginal reductions in portfolio risk.

Figure 7.1: 10-year standard deviations and tracking errors of simulated portfolios



Source: Simulations using investors' data.
Note: Simulations and sample average returns exclude ground rent investments.
* Relative to the overall sample.

7. INDIVIDUAL PROPERTY RISK AND THE IMPLICATIONS FOR PORTFOLIO RISK

There is, as can be seen from the metrics for the 25th and 75th percentile portfolios in Figure 7.1, much variation in risk across portfolios of the same size – the 25th percentile portfolio shows it is possible to construct portfolios that are much less risky than the overall market with fewer than 10 properties.

With portfolio risk reflecting both the systematic and the specific risk characteristics of each of its constituent assets, the importance of understanding individual properties' risk characteristics is highlighted. The 25th percentile's 10 property portfolio, for example, was made up of properties with a combination of low market sensitivities (i.e. low betas), (beneficial) low yield factors, and low specific risk. By contrast, the 75th percentile was characterised in particular by mainly high beta properties. The impact of variations in such characteristics is returned to later.

Figure 7.1 also shows the tracking errors of the simulated portfolios. Tracking errors measure the risk relative to a benchmark. (Note that because the properties are not capital-weighted in the same way as IPD's indices, the tracking errors are calculated relative to the unweighted sample average.) In contrast to its impact on portfolio standard deviations, tracking error in principle should be less affected by the absolute level of market risk; rather, it is influenced by the extent to which the risk characteristics of its constituent properties differ from the benchmark's.

Hence, it is not surprising that despite the much greater market volatility over the last 10 years, the updated estimates of tracking error are broadly comparable to those in the previous IPF research – for example 3.7% in a portfolio of 10 assets compared to 4.1% before and 1.7% compared to 2.1% in a portfolio of 50 assets. It is not clear if these small reductions compared to last time reflect a fundamental change or just the particular property characteristics and calculation approach of this research.

Differences in the tracking errors across portfolios of comparable size are, as can be seen from the 25th and 75th percentile portfolios, meaningful and again reflect the differing risk characteristics of the constituent assets.

7.3 Characteristics varying portfolio risk

The potential impacts of market sensitivity (beta), of other systematic risks and of specific risk have been emphasised throughout this report. To recap, the risk of a portfolio will reflect the average of the systematic risks and the specific risk embedded in each of its constituent properties. Furthermore, specific risk, as long as it is truly independent from property to property, will diminish as properties are added, up to a point at which the portfolio is so large that specific risk is diversified away and is virtually non-existent. In this respect, the analysis above, as highlighted in Figure 7.1, suggested that (over the last 10 years) such diversification could be nearly reached with as few as 20 properties.

The analysis below therefore analyses the extent to which portfolio risk is affected by the different property and risk characteristics of the assets used in this report.

7.3.1 Portfolio risk: the effect of market and other systematic risks

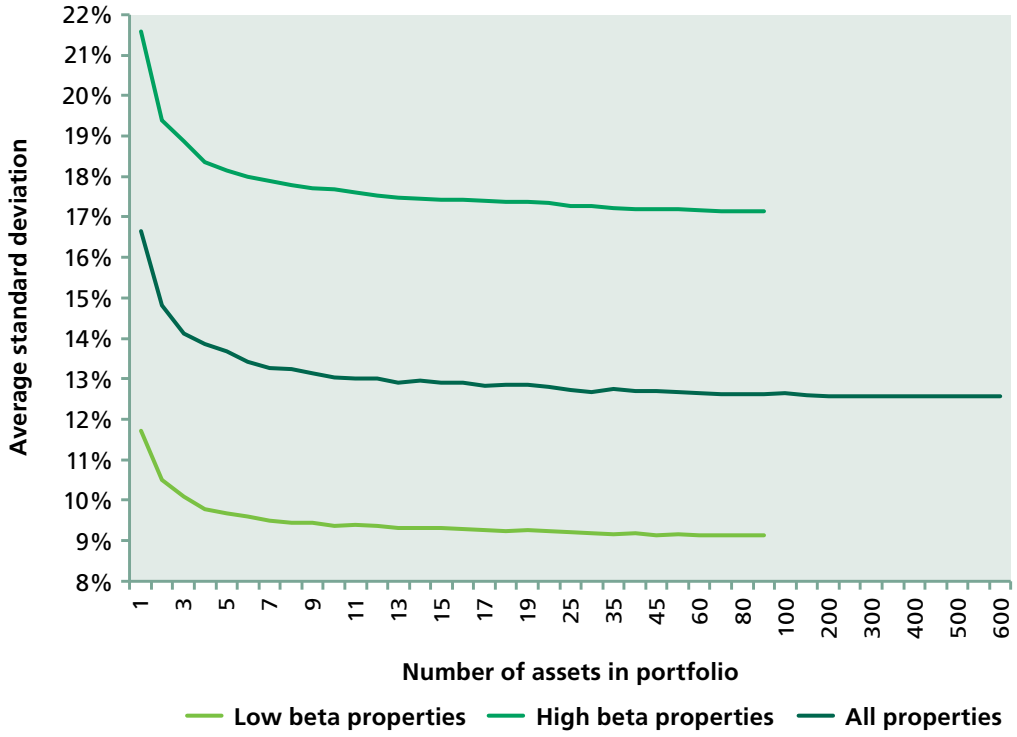
Market and systematic risk is undiversifiable and hence inescapable. It will directly feed through to portfolio risk. Assets and - through these – portfolios need to be rewarded so as to compensate for such higher risk. The risk in portfolios made up of properties that are, respectively, very sensitive and relatively insensitive to market movements (i.e. 'high' and 'low' beta properties) is illustrated in Figure 7.2. Across all such assets, their average betas are 1.35 and 0.70 respectively.

7. INDIVIDUAL PROPERTY RISK AND THE IMPLICATIONS FOR PORTFOLIO RISK

In the high beta portfolio, although levelling out, portfolio risk is well above average levels. Diversification – i.e. the rate at which portfolio risk is reduced as extra properties are added – occurs at a comparable rate to portfolios made-up of the average property[36]. Although not shown, it should be noted that tracking errors are also relatively high in the high beta portfolios, as is expected for a set of assets whose risk characteristics are very different to the average property.

For portfolios made-up of properties that have a muted sensitivity to the market (i.e. low beta), portfolio risk is substantially lower. Diversification also occurs at a comparable rate to portfolios comprising 'average' properties. However, while portfolio risk is low, tracking errors are higher than average, echoing the earlier point that this metric depends on how similar the assets' risk characteristics are to the average property's.

Figure 7.2: 10-year standard deviations of simulated portfolios, high and low beta properties



Source: Simulations using investors' data.
Note: Simulations and sample average returns exclude ground rent investments. High beta are statistically significant betas with a value in excess of 1.2, low betas are the statistically significant ones below 0.8.

Portfolios with assets exposed to factor risks will be affected in a similar way. Section 6, however, concluded that few properties showed firm signs of being exposed to factor risk over the 10 years to 2013.

Figure 7.3 helps explains why this has been the case. It shows the correlation between the returns of simulated portfolios of high-yielding properties and the market returns of IPD's high-yield quartile over the period 2004-2013; both sets of return are relative to All Property so as to exclude the effect of the overall market on the correlations. Because the constituent assets of the simulated high-yield portfolios are exposed to specific risk

[36] This is measured by the square of the correlation coefficient (i.e. the R-squared) between the portfolio's returns over time and those of the benchmark.

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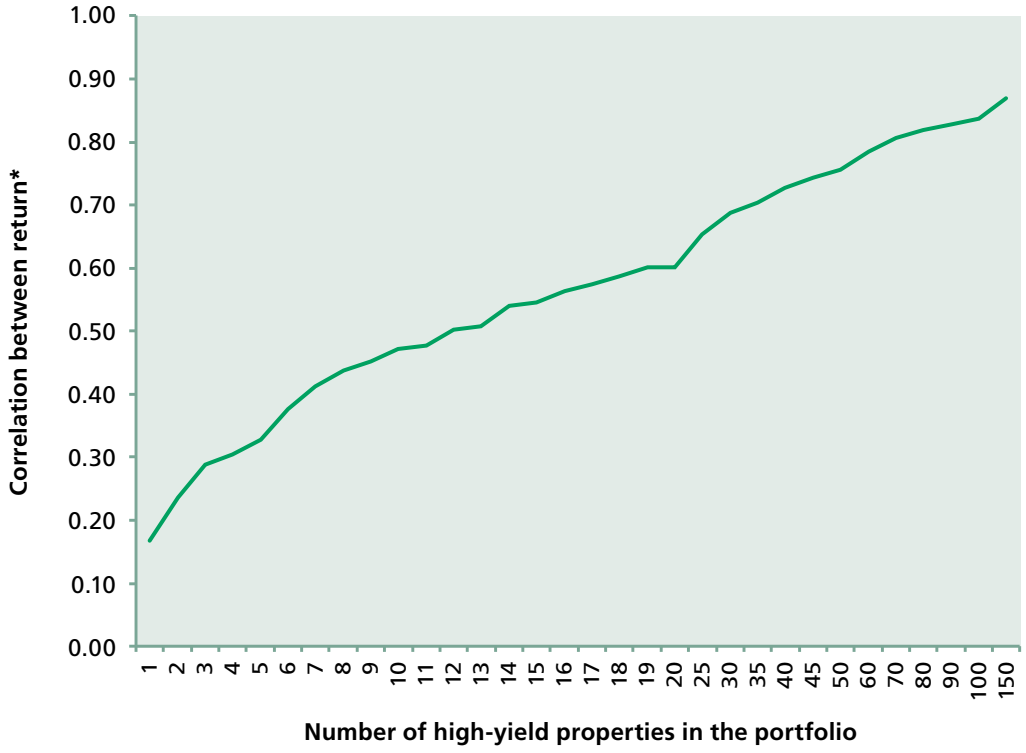
(and possibly other systematic risks), a large number of high-yielding properties are required to ensure that the portfolio is highly correlated with the underlying performance of the high-yield market. The same applies to low-yield properties. This suggests that investors seeking to construct portfolios following an investment 'style' will require substantial numbers of assets to ensure that they are truly following the strategy.

Figure 7.3: Correlation between relative returns of simulated portfolios of high-yielding assets and of IPD's All Property high-yield quartile, 2004-2013



Source: Simulations using investors' data.
Note: Simulations and sample average returns exclude ground rent investments. High yield properties are defined on the basis of their average yield over the 10-year period and in particular where this was 15% or more higher than the average for their IPD segment over the same period.
* Relative to All Property.

7.3.2 Portfolio risk: the effect of differences in specific risk

Differences in specific risk in individual properties also feed through to the risk of the portfolio. However, this effect will be increasingly dampened as the number of assets in the portfolio increases - i.e. as specific risk is diversified away – and, with a sufficiently large number of assets, it will become negligible. Because specific risk can potentially be diversified away, financial theory asserts that it is a risk that should not be rewarded.

Section 6 noted how specific risk could vary according to property characteristic, for example large numbers of tenancies were associated with low specific risk. This is illustrated in Figure 7.4. The average level of total risk in a portfolio comprising 1 single-let asset is higher than that in a portfolio of 1 property with 20 or more units. However, by adding another property to the single-lets portfolio, portfolio risk falls to a level comparable with that of a portfolio made up of a single asset with 20+ units.

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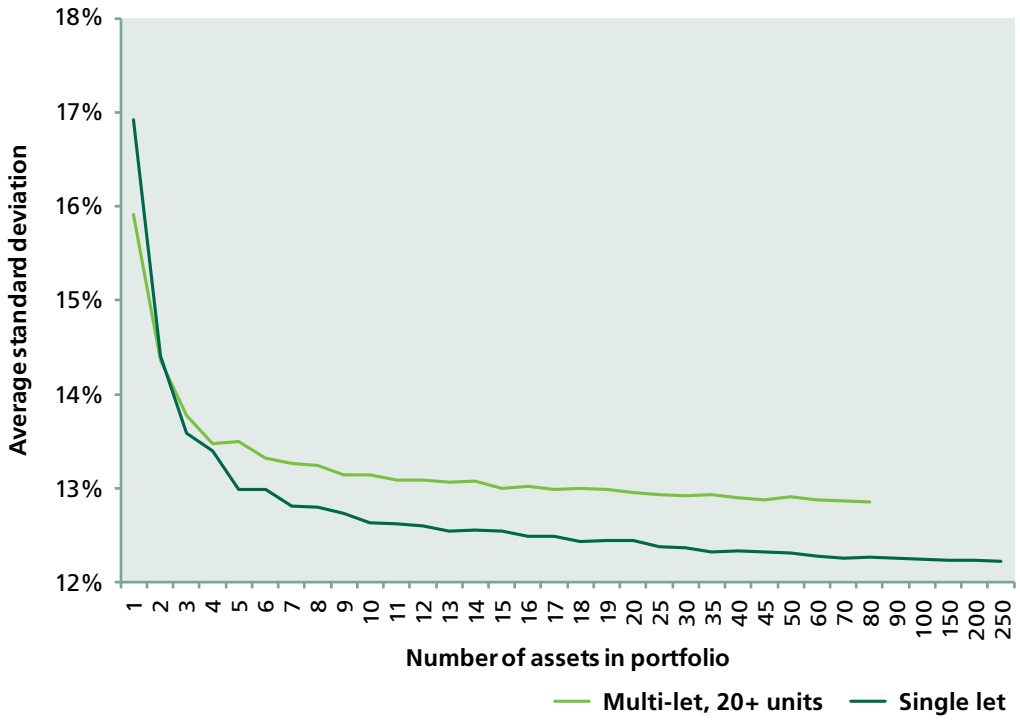
Interestingly, the risk of a single-let portfolio quickly falls below that of a multi-let portfolio. This is because, on average, single-let properties have lower market sensitivities (betas) than multi-lets. This at first sight looks at odds with the conclusion in Section 6 that market sensitivity falls as the number of tenancies increases. However, the higher betas and portfolio risk of multi-lets is a manifestation of the multi-dimensional nature of individual properties - multi-lets tended to be larger, have higher yields, and are more likely to be exposed to the letting market and high capital expenditure, all of which on average (according to Section 6) are associated with higher market sensitivities/betas. These multi-dimensional aspects of multi-let properties offset the fundamental beneficial impact on beta of a large number of tenants.

Figure 7.4: 10-year standard deviations of simulated portfolios, single-let properties and those with 20+ units



Source: Simulations using investors' data.

7.3.3 Portfolio risk and high specific risk in individual properties

The analysis in Section 6 analysed high specific risk in individual properties, distinguishing between those exhibiting persistently high specific risk and those showing one-off high persistent risk. Figure 7.5 illustrates the total risk of simulated portfolios made-up of such assets. It also shows the betas of the largest portfolios for each type of specific risk; these will reflect the betas of the underlying properties.

Total portfolio risk in Figure 7.5 is always greater for assets with either type of high specific risk. This is particularly the case in portfolios made up of properties exhibiting persistently high specific risk, even in portfolios with large numbers of assets. By contrast, portfolios comprising the remaining properties, characterised by low specific risk, always have low portfolio risk in Figure 7.5.

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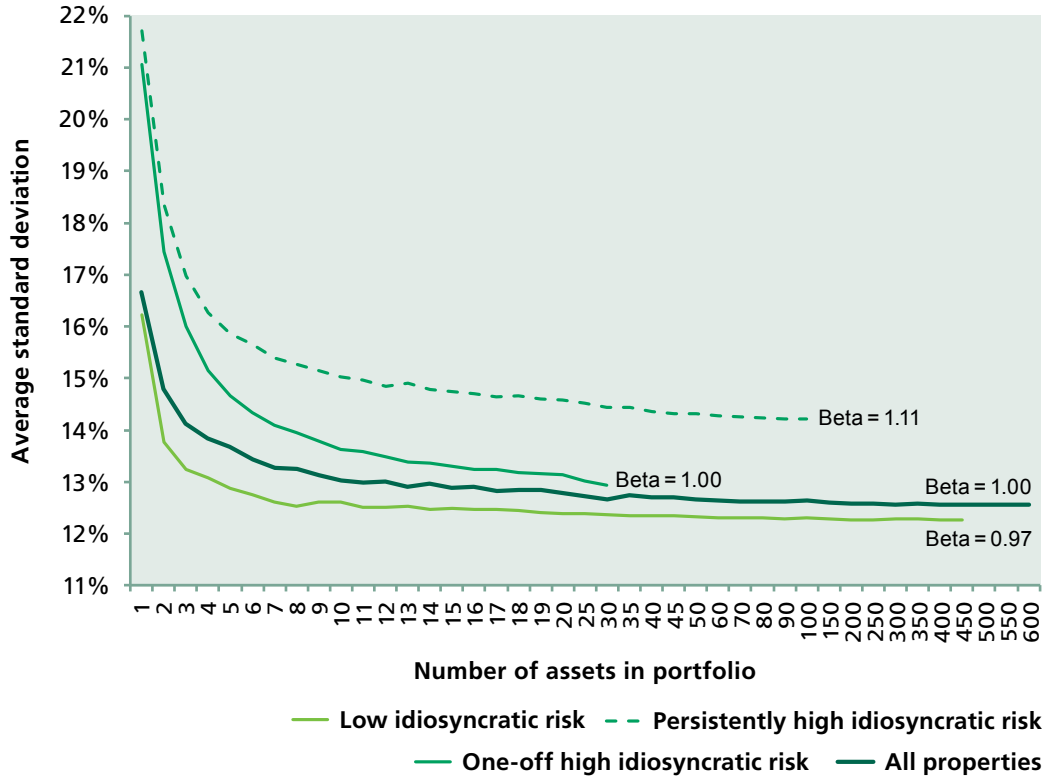
In portfolios with small numbers of properties (in particular with less than 20 assets), these patterns reflect specific risk. Importantly, this is less the case in large portfolios, by which point the high levels of specific risk have been mostly diversified away. Instead, the high levels of risk in large portfolios made up of properties experiencing persistently high specific risk mainly reflect their constituent properties higher market sensitivities (betas). That said, Figure 7.6, which illustrates how well diversified the various portfolios are, shows that diversification occurs more slowly for portfolios made up of properties characterised by high levels of specific risk[37].

These high market sensitivities themselves reflect the high beta embedded in properties with relatively high yields and few tenants and with greater exposure to lease events and to high capital expenditure. Collectively, these characteristics are indicative of systematic, lease-related and asset management-related 'factors'.

By contrast, properties characterised by one-off high specific risk do not have such high market sensitivities (betas). As their high levels of specific risk are diversified away as properties are added, portfolio risk closes in very quickly on the levels experienced by 'normal' properties. These properties' specific risks therefore look 'truly' idiosyncratic.

Figure 7.5: 10-year standard deviations of simulated portfolios, properties exhibiting persistently high specific risk and one-off persistent risk



Source: Simulations using investors' data.

[37] Diversification – the reduction in idiosyncratic risk – can be measured by the square of the correlation coefficient (i.e. R-squared in Figure 7.6); if all the variation in a portfolio's return is associated with the market, meaning that all the idiosyncratic risk has been diversified away, then the R-squared would equal 100%.

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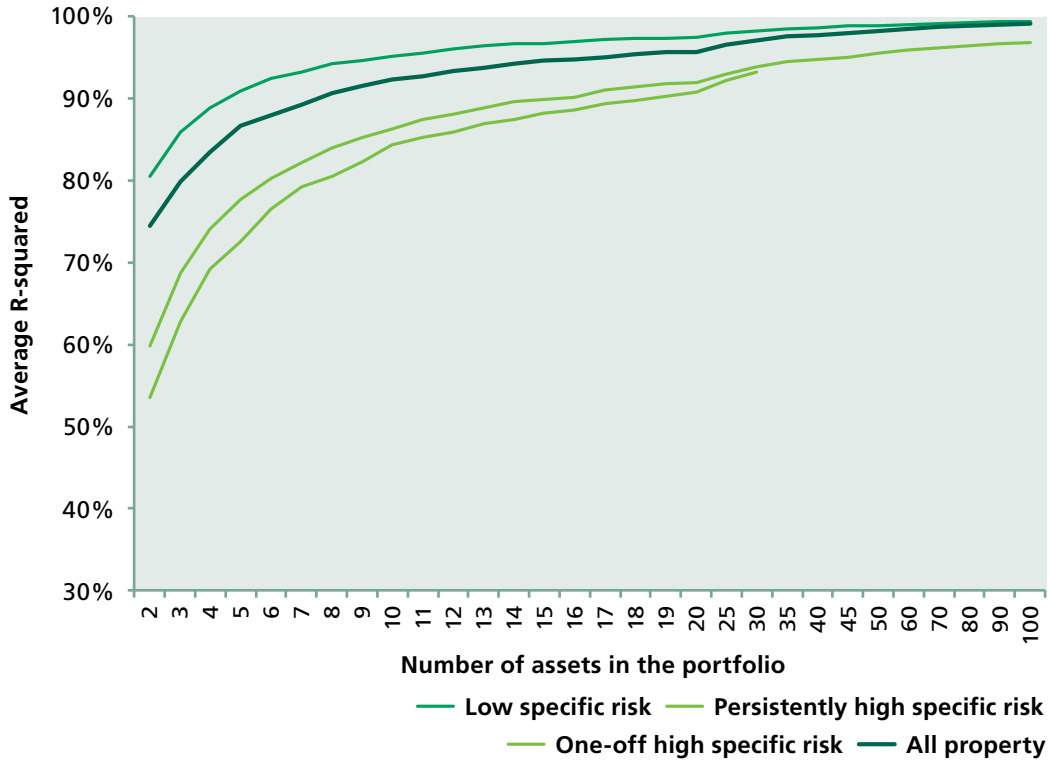
Figure 7.6: Diversification in simulated portfolios, properties exhibiting persistently high specific risk and one-off persistent risk



Source: Simulations using investors' data.

7.4 Implications for structuring portfolios

The differences in risk between portfolios comprising properties with persistently high specific risk and those with low specific risk are the largest of all the criteria (e.g. lot size, single versus multi-lets, yield, etc.) tested in this research. The classification therefore potentially represents a very powerful way of structuring portfolios. The challenge, however, is to identify ex-ante those properties likely to be exposed to persistently high specific risk.

The characterisation of properties with persistently high specific risk as those more exposed to the letting market and to high levels of capital expenditure provides a useful indicator. Figure 7.6 therefore simulates the risk of portfolios comprising properties that had:

i. been exposed to the letting market and to high capital expenditure; and those that had,

ii. had no such exposure to the letting market and had recorded no or very little capital expenditure.

The latter are termed 'stabililsed', whereas properties exposed to the letting market and to high capital expenditure could be seen as 'asset management-intensive' properties.

7. INDIVIDUAL PROPERTY RISK AND THE IMPLICATIONS FOR PORTFOLIO RISK

These classifications provide close approximations respectively to the risk of portfolios with persistently high specific risk and those with low specific risk. They represent strong criteria for structuring portfolios and are far superior to other criteria, such as yield and size. As Table 7.1 shows, other property characteristics do not generate such wide divergences in portfolio risk as the distinction between 'asset management-intensive' properties and 'stabilised' properties (specifically those not exposed to the letting market and refurbishment expenditure).

Identifying in advance those properties likely to fit such criteria would represent a valuable element of the asset management process and a powerful classification in defining investment strategy.

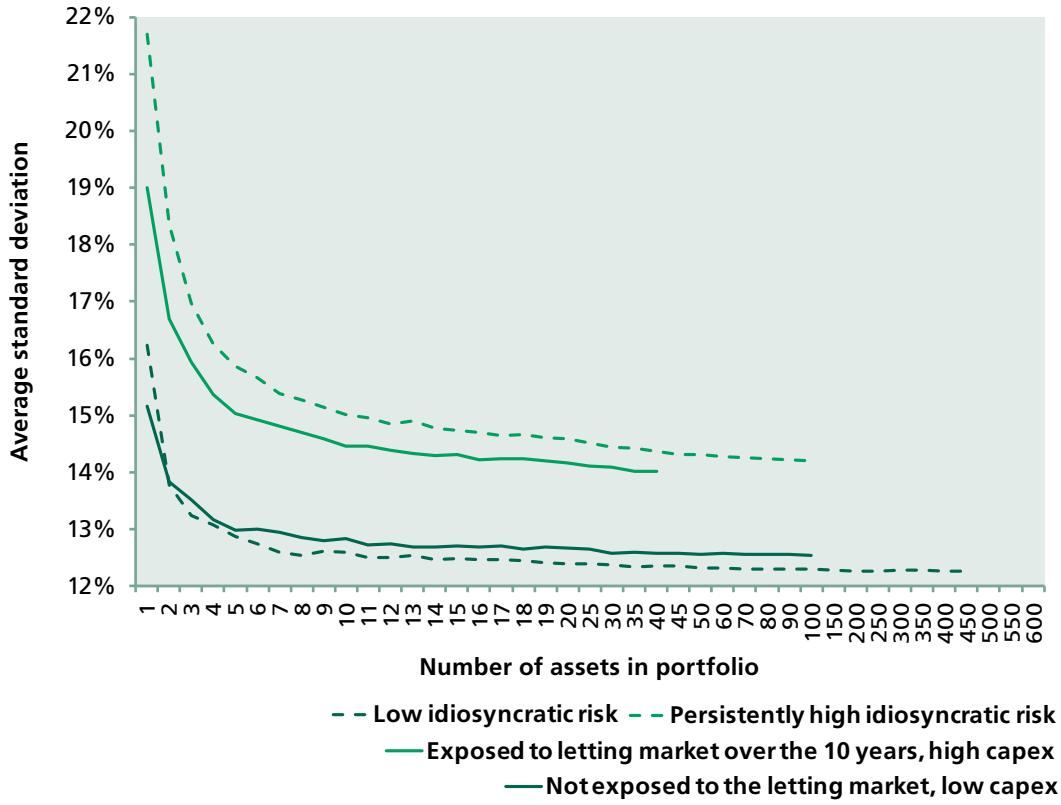
Table 7.1: 10-year standard deviations of simulated portfolios by type of property

	Number of properties in portfolio				
	2	**5**	**10**	**20**	**40**
ALL PROPERTY	14.8%	13.7%	13.0%	12.8%	12.7%
By asset management intensity					
High asset management intensity properties	16.7%	15.0%	14.5%	14.2%	14.0%
Very low asset management intensity properties	13.8%	13.0%	12.8%	12.7%	12.6%
Difference	*2.9%*	*2.0%*	*1.6%*	*1.5%*	*1.4%*
By 2004 yield (relative to segment)					
High yield	15.2%	13.8%	13.3%	13.0%	12.8%
Low yield	14.3%	13.3%	13.0%	12.8%	12.7%
Difference	*0.8%*	*0.5%*	*0.3%*	*0.2%*	*0.1%*
By lot size (relative to segment)					
Small lot size	14.8%	13.4%	12.8%	12.5%	12.4%
Large lot size	14.1%	13.0%	12.7%	12.6%	12.5%
Difference	*0.7%*	*0.4%*	*0.1%*	*-0.1%*	*-0.1%*
By 10-year average unexpired term					
0-5 years	14.9%	13.5%	12.9%	12.6%	12.5%
15+ years	13.4%	12.6%	12.3%	12.1%	12.1%
Difference	*1.5%*	*0.9%*	*0.6%*	*0.5%*	*0.4%*

Source: Simulations using investors' data.

7. INDIVIDUAL PROPERTY RISK AND THE IMPLICATIONS FOR PORTFOLIO RISK

Figure 7.7: 10-year standard deviations of simulated portfolios, properties exposed to the letting market and to high capital expenditure versus those with no exposure to letting market and low capital expenditure



Source: Simulations using investors' data.

It is also interesting to note that the diversification of specific risk in portfolios made up of low risk, 'stabilised' properties can, as Figures 7.5, 7.6 and 7.7 indicate, be rapidly achieved – on average, 95% diversification can be achieved with just 10 properties. By contrast, such a level of diversification in portfolios of high risk, 'asset management-intensive' properties would require 40.

These contrasting merits of low risk, 'stabilised' properties and high risk, 'asset management-intensive' properties also apply to tracking errors. For the low risk, 'stabilised' properties, tracking errors are very close to those for all property. A tracking error of 2.0%, for example, would have been achievable with about 22 properties. With this number of assets, the tracking error for a portfolio of 'asset management-intensive' properties would – given in particular their higher beta - be around 4%; aiming for a tracking error of 2% would require over a hundred properties.

Finally, reflecting in particular the detrimental influence of high capital expenditure, 'asset management-intensive' properties on average recorded negative risk-adjusted returns over the 10 years to 2013. Such properties have not delivered the returns commensurate with their risk.

8. CONCLUSIONS

8.1 The multi-dimensional character of property

It is often said that risk in property is multi-dimensional. This was most famously represented in early IPF research as '57 varieties of risk'. This report finds that risk in individual properties can be represented in a more parsimonious way but that equally individual properties' heterogeneity means that their risk cannot be reduced to a single formula.

The research has unearthed some important dimensions by which individual properties can (and cannot) be characterised. It should be emphasised that these relate to a small sample of the commercial property investment universe and hence that they do necessarily apply to property as a whole. Furthermore, the analysis relates to a period both of extra-ordinary market volatility and when many previously well established patterns within the market were reversed. The conclusions below should be interpreted in this context.

That said, there are two notable insights relating to the characterisation of commercial property. First, an important conclusion is that it is inadvisable to typecast properties according to yield and to use yield as a proxy for prime, secondary, etc. The fundamental reservation is that a near-majority of properties do not retain their status as high- or low-yielding, etc., over time. While characteristics affecting yield such as (relative) lot size typically do not change much over time, the weight attached to them does and, more importantly, other important characteristics (for example, unexpired term) do change over time; furthermore, half the variation in yields across properties seems to be related to assets' own idiosyncrasies, rather than widely spread characteristics that define a property - lot size, unexpired term, building quality, etc. This represents an area for further research at the individual property level.

Second, the insights on multi-let properties are particularly helpful in understanding risk in this type of property. While less income is at stake than for a single-let property, multi-lets are exposed much more frequently to the letting market; furthermore, the proportion of income at stake can still be substantial, especially for those with a small set of units. Multi-lets are also subject to more capital expenditure than their single-let counterparts. While there are important exceptions (such large shopping centres and retail parks) where the label does not apply, multi-lets - given also shorter unexpired terms, poorer tenant covenants, lower rents, etc. - can on balance be characterised as being both of 'inferior quality' to single-lets and more asset management intensive. This characterisation explains a lot about their risk.

8.2 The importance and not of specific risk

The distinction between systematic risk and specific risk is a central and fundamental underpinning of this research. Specific risk represents a substantial source of risk in a significant minority of individual properties. At the highest levels, it is predominantly driven by lease events and by asset management. Relatively high specific risk is also likely for properties with few tenants, smaller lot sizes and with higher yields. By contrast, there is no (or at best little) evidence of commonly cited aspects such as covenant strength, location and depreciation (other than when manifested as refurbishment expenditure) being associated with high risk, specific or otherwise.

These findings are of critical importance for small portfolios (e.g. with less than 20 or so properties). Small portfolios overly made up of properties that are highly exposed to lease events and refurbishment expenditure, and that have high yields and few tenants will face relatively high portfolio risk. Avoiding properties like these is therefore an important way of keeping portfolio risk and tracking error down in small portfolios.

8. CONCLUSIONS

While these characteristics distinguish the magnitude of risk from one property to another, such specific risk can be diversified away; this applies equally to the high specific risk associated with lease events and asset management[38]. These are risks that all but small investors need not worry about and where the only significant consideration for the investor is to ensure that there are enough properties to ensure diversification.

For most properties and, in particular, those having 'slightly better' attributes than the average property, specific risk is of unexceptional magnitude and, for the most part, seems to be truly idiosyncratic and to be very independent from property to another. This, as noted later, means that diversification can be achieved very quickly in portfolios made up of these types of property.

8.3 Systematic risk in property – issues in market segmentation

Systematic risk relates to the tendency of assets with similar characteristics to move (roughly) in tandem. Systematic risk is typically associated with an exposure to a market and in particular the underlying risk of that market.

In commercial property, such market risk varies according to the definition of the market – the City office market, for example, has been more volatile over the last 10 years than the All Property 'market' and it has been also less correlated with All Property than other segments. The division in a property between systematic market risk and specific risk is therefore sensitive to the definition of its market benchmark. Benchmarking a City office against All Property would lead to its specific risk being mis-represented.

However, as a general rule, using segments as market risk benchmarks over the last 10 years would typically have only offered marginal advantage over a benchmark based on All Property. For a significant minority of properties, segments would actually have represented an inferior benchmark for quantifying market risk. Similarly, many of the finer sectoral disaggregations – such as retail parks and solus retail warehouses – would also have offered little, if any, advantage (the key exception in recent years being the separation of supermarkets from standard retail). These observations apply to towns too.

All this is consistent with previous academic research indicating that the conventional segmentations based on property sectors and geography are not helpful criteria for classifying individual properties. By contrast, this research has highlighted how exposures to lease events and asset management and the truly independent idiosyncrasies of many properties are far more influential in explaining divergences in return from one property to another.

8.4 Systematic risk in property – pricing and impact on portfolios

Systematic risk is part and parcel of investing in a market or type of asset, it is a risk that is inescapable and hence one that, if it is to be borne, justifies a premium return. As noted, it is most commonly thought of as an exposure to a market and the underlying risk of that market.

When judged against their segment (e.g. shopping centres, City offices, etc.), the research finds that market risk in the majority of properties is roughly in line with the market. A minority of assets, however, have above or below average sensitivities to movements in their market, i.e. they are 'high' or 'low beta'. This is a finding with significant implications, as discussed below. Whether heightened by high beta, dampened by low beta, or just in line with their market, the market is the predominant risk in most properties.

[38]This type of specific risk, however, does require more assets to achieve diversification.

8. CONCLUSIONS

The observation that some properties are more or less sensitive than average to market movements has implications for pricing. Properties with such acute (or dampened) sensitivities are proportionately more (or less) riskier than their market and hence should be priced with a correspondingly higher or lower risk premium than their market segment[39]. The criteria by which such pricing can be implemented are outlined later. Furthermore, these varying sensitivities translate directly into the risk in a portfolio and are invariant to the number of properties in the portfolio.

The report has considered the possibility that there may be further dimensions, in addition to the market, that lead properties of a certain type performing in a synchronised, systematic way. For example, according to the IPD indices, high-yielding properties in aggregate have tended over the last few years to display a different performance and risk profile to low-yielding properties; the intuition is that individual high yielding properties would mimic these profiles. Other examples of what are termed systematic risk 'factors' might be a distinction between big and small properties, properties with short or long unexpired terms, etc.

In the same way that these factors bring an additional dimension to the performance of a property, they also add to (or detract from) the risk that the property faces. These are also risks that require a premium return and that also carry directly through to the risk in a portfolio.

Interestingly, in other investment classes, such distinguishing factors have not only led to the flexing of traditional portfolio strategies but also to the development of indices that allow new ways of investing and benchmarking beyond traditional market capitalisation based ones. The concepts involved clearly present opportunities for property.

The analysis, however, does not find strong evidence of individual properties being affected by such systematic factors. The idiosyncrasies of individual properties are much more influential and as a result overwhelm any systematic effects associated with the factors. The implication is that large numbers of properties are required to get an exposure to any such factors; the numbers required in many cases look impractically large. This may limit in property the development of the factor-based investment strategies that have characterised the equity market in recent years.

Furthermore, such factors may not operate all of the time and only manifest themselves in certain environments. In particular, there is evidence that lot size was extremely influential in 2009 (at the height of the economic recession) but not at other times.

The conclusion is that systematic risk in individual properties is best represented through market sensitivity, i.e. beta. The indications are that low beta (i.e. less than 1) is associated with relatively low lot sizes and yields and with larger numbers of units; conversely, high beta (greater than 1) is associated with relatively high yields, high capital expenditure, and fewer tenancies. 'Asset management-intensive' properties - characterised by high refurbishment expenditure, above average yields, below average lot sizes, few tenants and/or small lot sizes, relatively short unexpired terms and frequently exposed to the leasing market – portray the type of asset with the highest levels of beta[40]. This said, the analysis indicates that a lot of the variation in market sensitivities is property specific – and hence will require corresponding judgement to ascertain the asset's exposure to market risk and its risk premium.

[39]Strictly speaking, betas applied this way should be calibrated against returns net of the risk-free rate.

[40]Some may not immediate recognise asset management as a 'risk' However, given that the activity is to some extent a choice and empirically generates greater volatility in return than in other types of property, the activity should be rewarded in a correspondingly higher return, in addition to any 'value-added'. Furthermore, the analysis questions if such asset management has added risk-adjusted value.

8. CONCLUSIONS

To ensure that returns are (prospectively) commensurate with such risk, properties need to be priced with risk premia that are proportionate to their market sensitivities (betas). Given the clustering of betas around 1, most properties should be priced to deliver a return in line with their segment.

Considering those property types (as characterised above) with high beta and assuming a risk premium of 2.50% for property as a whole, an additional premia typically in the range 25-75bps (rarely higher) would be justifiable in most cases.

The important flip side is that properties that are less sensitive to market movements would justify a below average risk premium; the analysis suggests that (given a risk premium of 2.5%) that the discount should rarely be greater than 60bps. The (intuitively uncomfortable) implication is that some properties should be priced to deliver a return that, in simple terms, would lead to them under-performing the market; this, of course, would be commensurate with their lesser risk.

To what extent have the returns, for the different types of property, over the last 10 years been commensurate with their risks? The most notable conclusion is that 'asset management-intensive' have delivered returns that are poor both relative to other properties and even more so relative to their greater risk. In explaining this, the poor tenant market conditions in recent years may have led to defensive refurbishment expenditure whose expected benefits have not been realised or that was perceived to be worth the sacrifice. Furthermore, other types of asset management – for example, lease re-gearing, engineering change of use – appear, on the basis of the evidence from the case studies, to add value. Further research is needed in these respects.

Second, and possibly linked to the phenomenon affecting asset management intensive properties, returns have systematically declined as lease expiry has closed in. As a result, returns have not been commensurate with such assets' greater risk. This is a longstanding phenomenon that might reflect a behavioural bias in valuation or market pricing. It may be that the return for risk is received later after expiry when a new lease is in place but this does not seem rational as there may be times or circumstances when the property has to be sold beforehand and similarly because strategies based on short unexpired terms would be persistently under-performing (and those based on long unexpired terms persistently out-performing) – something that is unlikely to be sustainable.

Finally, larger lot sizes have, relative to all property, delivered returns in excess of their risks. This may reflect an illiquidity premium or an episode where prices have been under constant upward pressure on account of global investors' appetite for such properties.

8.5 Portfolio risk, control and strategy

Portfolio risk has been assessed by using the individual properties to simulate hypothetical portfolios. This analysis shows that total risk in property portfolios has been substantially higher over the 10 years to 2013 than reported in the previous IPF report covering the 10 years to 2004. However, diversification – i.e. the reduction of specific risk in the portfolio – has been achievable at a faster rate than before.

8. CONCLUSIONS

Portfolio tracking errors, however, have not increased. This is to be expected as they reflect the extent to which the risk characteristics of the portfolio and its constituent properties differ from the benchmark's; hence, they should not be affected by changes in general market volatility.

There remain big divergences in total risk (and, to a lesser extent, in tracking errors) between portfolios of comparable size. In small portfolios, these reflect variations in both specific and systematic risk in the constituent properties. In large portfolios, specific risk – including, to a large extent, the high levels identified by this report in some properties – is mainly diversified away. For such portfolios, differences in total portfolio risk and tracking error predominantly reflect differences in the market sensitivities (betas) in the constituent properties.

Exposure to 'asset management-intensive' properties is one of the most important characteristics varying portfolio risk and tracking error. This mirrors their significance as drivers of individual property risk. In small portfolios, such high portfolio risk and tracking error reflects both the high systematic (beta) risk and the high specific risk of asset management intensive properties. Keeping portfolio risk and tracking errors low in small portfolios would, therefore, involve avoiding such properties.

In large portfolios, variations in portfolio risk mainly reflect differences in the systematic risk of individual properties and in this respect 'asset management intensity' – specifically its role as a driver of high systematic risk – is particularly influential.

Asset management intensity - and more generally exposure to lease events and the requirement to actively manage and refresh properties, particularly those that are multi-let – therefore is an important criterion by which portfolios should be structured and monitored for the purpose of risk control. Given also the evidence from academic studies, it is arguably a better approach than the traditional segmentations based on property sector and geography.

The research also suggests limited opportunity in the property investment industry for the factor-based strategies that have characterised the equity market in recent years. The heterogeneous nature of individual properties and in particular their specific risks mean that many properties will be required to get a true exposure to such factors.

The exception might, again, relate to an active management factor; in particular, 'asset management intensity' could be seen as a proxy for a 'value-added style'. Consideration should be given to developing performance indices that capture such a factor. This research has raised questions over whether or not such a style has added investment value but this may just be a characteristic of an exceptional decade. Further research into the longer term performance of such asset management intensive properties would be useful.

8.6 Implications for investment and research processes

The analysis and conclusions drawn from it have a number of implications for how investment decisions are made on individual properties, how portfolios are structured and the focus of the research that supports such decisions.

8. CONCLUSIONS

The first is that risk in individual properties needs to be priced more systematically. The observation that 'asset management-intensive' properties and those closing in on lease expiry have, on average, delivered poor risk-adjusted returns is testimony that their higher risks have not been recognised or, at best, priced.

Similarly, such a process has also to accept – and reflect in pricing – that low risk properties should be priced to under-perform an All Property benchmark. Corresponding to this, performance attribution should recognise the underpinnings of such under-performance and not label it as 'poor' stock selection. Similarly, out-performance in high risk properties should not necessarily be attributed to 'good' stock selection.

The focus of research supporting property investment decisions has long been based on property sectors and geography. The latter has extended to towns; such analysis requires substantial time and resource.

More influential systematic risk factors and specific risk within individual properties, however, mean that geography and in particular town has a marginal influence on individual properties' performances, particularly in the short term but, to albeit a lesser extent, the longer term too.

More weight in the research supporting investment decision-making therefore needs to be given to characterising the intrinsic risks within individual properties and in particular their vulnerability to lease events and asset-management intensity risk. Similarly, a better understanding of the risk and pricing of tenant default is required, given on the one hand the low yields of the properties adversely affected by tenant administration and, on the other, the better experiences of other properties with the same tenants (and also the observation that there is no relationship between a property's yield and the strength of its tenant covenants).

These conclusions, of course, apply equally to the structuring of portfolios and in particular to the processes designed to quantify and control their risk. A similar shift away from a segmentation based on property sectors and geographies towards one based on exposure to lease events and asset management intensity is inferred.

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DATA APPENDIX

Data Appendix Table 1: Information on property characteristics and group totals

	Number of properties with data	Ranked groupings - number of properties*		
		Best	Mid-ranking	Poorest
TOTAL NUMBER OF PROPERTIES	859			
Capital value 2013	859	160	468	211
Equivalent yield:				
Full history	766	142	446	178
2004	832	145	560	122
ERV per sqm 2013	445	118	186	137
Unexpired lease term:				
Full history	460			
2013	797			
Number of units/tenants 2013	858			
Tenant covenant 2013	733	446	138	149
Capital expenditure - full history	316	226	54	36
Vacancy rate 2013	546			
Town (if IPD Key Centre)	454			

* 'Best', for example, relates to the highest lot sizes, highest ERVs per sqm, lowest yield, etc. See definitions below.

Definitions

In some of the analyses and in constructing the total return indices based on the sample properties, properties were sometimes characterised according to their attributes as 'high', 'low', etc. The numbers in these categories are shown above in Table 1 (with 'best' referring to the superior group and 'poor' to the inferior group); for example, there were 160 properties with a (relatively) high capital value and 145 that had a relatively low yield in 2004.

Most of these criteria were based on the segment (meaning a shopping centre was judged relative to shopping centres, etc., rather than All Property) and the ranges on which these characterisations are based are shown in Table 2 below.

For tenant covenant, the best category ('low risk') corresponds to what approximates as an IPD IRIS rating of 'negligible' or 'low', and the worst ('high risk') relates to the 'maximum' or 'high' ratings.

Data Appendix Table 2: Ranges for property characteristic definitions

IPD segment	High lot size 2013 £m>	Small lot size 2013 £m<	Low yield 2004 <	High yield 2004 >	Low yield 10-year average <	High yield 10-year average >	High ERV 2013 £ psqm >	Low ERV 2013 £ psqm<	Low 10-year capex (as % of CV) <	High 10-year capex (as % of CV) >
Standard Retail - Central London	£19.5	£5.0	5.2%	6.6%	4.7%	6.0%	£1,001	£386		
Standard Retail - South East excluding Central London	£7.5	£2.0	5.4%	6.9%	5.7%	7.2%	£478	£180		
Standard Retail - Rest of UK	£5.5	£1.5	5.3%	6.8%	5.6%	7.1%	£317	£142		
Shopping Centre	£196.5	£12.5	5.7%	7.3%	6.2%	7.9%	£311	£150		
Retail Warehouse	£43.0	£7.0	5.2%	6.6%	5.6%	7.1%	£215	£129		
Office City	£64.0	£6.5	6.0%	7.7%	5.9%	7.5%	£438	£328		
Office West End & Mid Town	£83.0	£8.5	5.9%	7.5%	5.3%	6.8%	£548	£291		
Office Rest of South East	£23.0	£2.5	6.7%	8.6%	7.1%	9.1%	£245	£150		
Office Rest of UK	£14.0	£1.5	6.9%	8.8%	7.4%	9.5%	£190	£114		
Industrial South East	£20.0	£3.0	6.7%	8.5%	6.8%	8.7%	£96	£62		
Industrial Rest of UK	£12.0	£1.5	7.2%	9.2%	7.6%	9.7%	£55	£38		
Leisure	£21.5	£3.5	6.2%	7.9%	6.4%	8.2%	£204	£102		
Other Commercial	Not available	Not available	6.1%	7.8%	6.2%	7.9%	£307	£153		
ALL PROPERTY									0.5%	1.5%

TECHNICAL APPENDIX: THE STATISTICAL ANALYSIS

The single-factor (beta) model

The single-factor model involves regressing each individual property's total return on the 'market' total return (so, given the 859 properties with returns for the period 2004-13, there will be 859 independent regressions). The regression calibrates the sensitivity of the property's return to movements in the market's return, represented by the estimated coefficient of the explanatory variable (i.e. the market return). The estimated constant term of the regression represents 'alpha' and the standard deviation of the residual (unexplained) return represents the property's specific risk.

Regressions were undertaken with 'the market' alternatively represented by the IPD All Property total return, the property's IPD PAS segment return (albeit with South East standard retail split between Central London and the rest of London and the South East, and similarly for Leisure and Other Commercial), and (where available) the property's IPD Key Centre return. For the 10 years to 2013, Table 1 shows the corresponding 'R-squareds' (which measure the proportion of the variation in the property's return explained by the variation in the market return), averaged across all the properties.

Similar regressions were undertaken for the 10 years to 2012 and to 2011, and for the 12 years to 2013.

TECHNICAL APPENDIX: THE STATISTICAL ANALYSIS

Technical Appendix Table 1: Amount of variation in a property's total return explained by the total return of IPD All Property and the property's segment and town returns.

	Mean R-Squared			% of properties	
IPD segment	IPD All Property	IPD Segment	IPD Key Centre Town (where available)	where segment the stronger of All Property	where town the stronger of segment
Standard Retail	56%	60%	62%	55%	58%
Shopping Centre	69%	75%		65%	
Retail Warehouse	69%	74%	72%	55%	55%
Office City	72%	70%	87%	50%	60%
Office West End & Mid Town	48%	55%	66%	59%	56%
Office Rest of South East	59%	61%	63%	56%	61%
Office Rest of UK	57%	60%	62%	50%	79%
Industrial South East	63%	64%	67%	47%	56%
Industrial Rest of UK	67%	69%	71%	64%	59%
Leisure	63%	61%		29%	
Other Commercial	43%	43%		53%	
TOTAL	**60%**	**63%**	**65%**	**60%**	**59%**
			Excluding ground rent investments		
Standard Retail	57%	61%	63%	56%	58%
Shopping Centre	69%	75%		65%	
Retail Warehouse	69%	74%	72%	55%	55%
Office City	71%	83%	87%	60%	60%
Office West End & Mid Town	50%	60%	66%	64%	56%
Office Rest of South East	59%	60%	63%	56%	61%
Office Rest of UK	57%	59%	62%	50%	79%
Industrial South East	63%	64%	67%	46%	56%
Industrial Rest of UK	67%	69%	71%	65%	59%
Leisure	70%	68%		33%	
Other Commercial	43%	43%		53%	
TOTAL	**61%**	**65%**	**65%**	**55%**	**59%**

TECHNICAL APPENDIX: THE STATISTICAL ANALYSIS

Given the overall superiority of the segment return over All Property and also that Key Centre return data is available only for about half the properties, segment was chosen to represent the market return.

Figure 2 below shows the distribution of R-squareds for the regressions of the individual property return on its segment return, while Table 2 presents the results of statistical tests for each of the regressions. In almost half of the regressions excluding ground rents the R-squareds were in excess of 70%. Only a tenth or so showed signs of mis-specification as manifested in serial correlation, and similarly as manifested in non-normality amongst the residuals.

Technical Appendix Figure 1: Single-equation of property return on its segment return: distribution of R-squareds

Technical Appendix Table 2: Single-equation of property return on its segment return regression test statistics

	All properties	Excluding ground rents
Total number of properties	859	784
Mean R-squared	63%	65%
Number with statistically significant betas	720	674
Number with statistically significant alphas	76	71
Number with serial correlation (Durbin Watson test)	92	92
Number with non-normal residuals (Jarque-Bera test, 5% level)	69	50

TECHNICAL APPENDIX: THE STATISTICAL ANALYSIS

Systematic factor approach

The property factors tested directly related to equivalent yield (capturing a difference between 'value' and 'growth' types of property), property size, 10-year annual average unexpired term, number of tenants (capturing any divergences between properties with a diversified set of leases and those without), rental value per sqm (a proxy for building and locational quality), and tenant covenant quality.

The factor variables used, broadly speaking, corresponded to those used by Fuerst and Marcato (2009), a key difference being that they were applied to the individual property returns rather than portfolio returns. The approach was originally developed for the equity market by Fama and French (1992, 1993).

The factors distinguish between the 'high-' and 'low-end' of the property characteristics. For example, the yield factor is measured as the difference between the market return of high yielding property and that of low-yielding property. This concentrates the measure on the fundamental divergences between the two ends of the spectrum, with those in-between (in this case, the mid-yielding property market) representing – and performing as - average property. Calibrating the measure this way means that if a high-yielding property is exposed to the yield factor, this will be indicated through a positive sign on the yield factor coefficient, the sign being negative in the case of a low-yield property.

The specific factors used were as follows:

Yield: the difference between the IPD return for highest yielding quartile and the lowest yielding quartile, by PAS segment;

Size: the difference between the IPD return of smallest band of floorspace category and the largest band of floorspace, by PAS segment. If there were relatively small numbers of properties in these size-bands, the next smallest or highest bands were included;

10-year unexpired term: the difference between the unweighted sample average return for properties with a 10-year annual average unexpired term of 0-5 years and those with an annual average unexpired term of 15-25 years. This was done at the All Property level only;

Lease concentration (number of tenants): the difference between the unweighted sample average return of properties with a single tenant/unit and those with10+ tenants. This was done at the All Property level only;

Rental value per sqm (a proxy for poor versus good quality buildings): the difference between the unweighted sample average return of properties with 'relatively low' ERVs per sqm and with 'relatively high' ERVs per sqm (see Data Appendix for definitions of relatively low and high ERVs). This was done at the All Property level only; and,

Tenant covenant quality: the difference between the unweighted sample average return of properties with 'high risk' tenants and with 'low risk' tenants (see Data Appendix for definitions of low and high risk tenants). This was done at the All Property level only.

These factors were, one-by-one, rather than together, used as an explanatory variable in addition to the market total return in the individual property return regressions.

Technical Appendix Figure 2 shows the pattern of performance for the ERV/poor versus good quality factor. It indicates that poor quality properties performed relatively well up to 2008 but poorly afterwards, especially in 2009 and 2010. If a 'poor quality' property was influenced by the poor/good quality factor, its return would be positively affected by this pattern, whilst if it was a 'good quality' property it would be inversely affected.

TECHNICAL APPENDIX: THE STATISTICAL ANALYSIS

Technical Appendix Figure 2: Poor minus good quality factor return

Pooled regressions

Pooled regression were undertaken to assess the sensitivity of individual property returns to changes in the property's unexpired term and to variations in the gilt market return (inversely related to changes in its yield). 'Pooling' involves estimating some or all of these coefficients using, in a combined way, the returns of all the individual properties. The approach in particular was to allow the market sensitivity coefficient (i.e. the beta) and the constant term (i.e. the alpha) to vary for each property but to be the same for the annual unexpired term and gilt return variables (to estimate the latter two separately for each property would defeat the purpose of the pooling, which is to enable a regression - otherwise infeasible statistically - to be undertaken.)

These pooled regressions were undertaken in four separate groups, i.e. according to the property's 10-year average unexpired term (0-5 years, 5-10 years, 10-15 years and 15-25 years). The results were shown in Section 6 in Table 6.3.

Cross-section regressions: beta, alpha and specific risk

These were the basis of the results presented in Tables 6.1, 6.4, and 6.6.

The betas, specific risk levels (i.e. standard deviation of the annual residual return) and alphas estimated for each property using the single-factor model (for 2004-13) were themselves regressed as a cross-section against the corresponding property's characteristics. The full range of property characteristics were tested with statistically insignificant variables (i.e. characteristics) being dropped.

TECHNICAL APPENDIX: THE STATISTICAL ANALYSIS

The cross-section regressions: annual residuals

These were the basis of the results presented in Table 6.5. They also draw on the outputs from the single-factor model for each individual property but this time the variable being analysed is the residual (or unexplained) return for a specific year (2004, 2007, 2009, 2010 and 2013).

The residual return (e.g. in 2004) for each property is regressed as a cross-section against the corresponding property's characteristics. The full range of property characteristics were tested with statistically insignificant variables being dropped. As these residual returns are supposed to be independent from one property to another, there should be no underlying characteristic that binds them together, hence the a priori expectation is that none of the explanatory variables (i.e. the property characteristics) will be significant and that they will account for a negligible proportion of the variation in the residual returns. Table 6.5 indicated that this was largely the case, other than in 2009.

This analysis was undertaken with a sub-set of, depending on the year, up to 609 properties for which annual tenancy information was available.

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