Investment Property Forum

Investment Property Forum Educational Trust

Risk Reduction and Diversification in Property Portfolios

Summary Report

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May 2007

This research was commissioned by the IPFET and IPF Joint Research Programme

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This research was commissioned and funded under the auspices of the IPF Educational Trust and IPF Joint Research Programme.

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

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

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

Summary report

This document summarises the findings of the project on risk reduction and diversification in property portfolios. In addition, both a full report that sets out the context, methodology and results, and a separate literature review are available from the IPF.

The IPF invite comments on the findings of this research. Please address comments or suggestions to Louise Ellison, Research Director, IPF, New Broad Street House, 35 New Broad Street, London EC2M INH; lellison@ipf.org.uk, 020 7194 7925

Research team

Mark Callender, Schroders Property
Steven Devaney, Investment Property Databank
Angela Sheahan, Investment Property Databank

Steering group

The IPF appointed a project steering group to guide and assist the Research team. They gratefully acknowledge the contribution from:

Neil Turner – Chairman (Schroders), John Gellatly (BlackRock – Merrill Lynch), Guy Morrell (HSBC), Nick Tyrell (JP Morgan), Ian Cullen (IPD) and Charles Follows (ING Real Estate).

1. INTRODUCTION

The questions and issues surrounding the topics of risk reduction and diversification have been the subject of much interest and research over the past few decades. This is because they are fundamental to investing – they concern how capital should best be invested, the interaction of risk and return and the effectiveness of investment strategies.

Risk reduction and diversification are also widely used terms in property investment, research and management, and refer to policies or objectives that investors might pursue in constructing portfolios. Yet, despite being common currency, these concepts are not always well understood and they are sometimes mistakenly regarded as synonymous. Furthermore, only a limited amount of research has been done with individual asset data into the possibility or practicality of achieving either.

These are key issues for investors in commercial real estate. Individual property investments are relatively heterogeneous compared to equities and bonds and this means that specific risk can have a strong influence on their returns. Assembling portfolios can help to reduce risk and diversify property specific risk. However, the indivisibility of property assets, which leads to large lot sizes and mutually exclusive ownership, makes the assembly of diversified portfolios difficult to achieve. Given this, it is critical for investors to know the suitability and effectiveness of their strategies to manage such risks within the context of their investment objectives.

This study explores risk reduction and diversification in the commercial real estate market. It seeks to clarify these two concepts and it considers to what extent each might be achieved within UK property investment. To do this, the characteristics of individual properties are first examined. Then risk reduction and diversification profiles for different sized portfolios are estimated using both analytical and simulation techniques.

This report summarises the findings of the research project. It sets out the key concepts in section 2. In section 3, the methods used and main findings on individual property risk and portfolio risk are presented. Section 4 then examines risk from a different perspective, looking at how the dispersion of fund returns has changed over time. Finally, the implications of the research for real estate investors are discussed in section 5.

2. KEY CONCEPTS

In order to distinguish diversification from risk reduction, it is helpful to first consider the components of risk for individual properties.

- **Total risk** of an individual property is usually measured by the standard deviation in its total returns, although other measures are also employed in modern financial analysis.[1]
- **Systematic risk** forms part of total risk and refers to volatility caused by general factors that affect the values of all properties. Examples are fluctuations in the economy, movements in interest rates and changes in taxation.
- **Specific risk** refers to volatility caused by unique factors that only affect a single property or a small subset of properties. Examples are physical risks relating to the property or its location and leasing risks, such as expiries, breaks or tenant insolvency.

Combining properties into portfolios can help reduce these risks. In particular, if individual property returns are not perfectly synchronized, then portfolio risk is less than the simple weighted average of those asset risks. It will depend on the asset risks, their weights in the portfolio and the extent to which those assets are correlated with one another.

Total **risk reduction** reflects reduction in portfolio volatility, whether specific or systematic in nature. However, **diversification** is only concerned with the reduction of specific risk in a portfolio. In other words, how well does the portfolio track the overall market?

This distinction can be most easily illustrated with reference to the scenarios depicted in figures 1 and 2 below, where combining properties into a portfolio produces contrasting results with respect to each aim. The theoretical basis for this distinction is discussed in the project literature review.

As portfolios increase in size, their risk tends to converge towards that of the market. The extent to and speed at which this occurs depends on the characteristics of the assets concerned. The following general points can be made:

- Low average correlations among assets in a market present much scope for risk reduction, but it will be difficult to construct highly diversified portfolios.
- High levels of correlation may mean less risk reduction in absolute terms owing to the greater role of (common) systematic factors in explaining returns, but diversification will be easier.

So, before empirically measuring risk reduction and diversification for the UK real estate market, it is important to analyse individual properties, as this will reveal reasons for the results that are generated.

[1] The IPF report *Risk Measurement and Management for Real Estate Investment Portfolios* (2002) provides a comprehensive review of alternative definitions and measures of risk.

Figure 1: Combining the properties greatly reduces the total risk of the portfolio, but does not necessarily improve diversification.

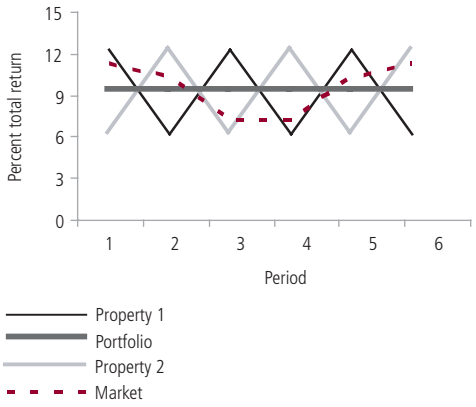
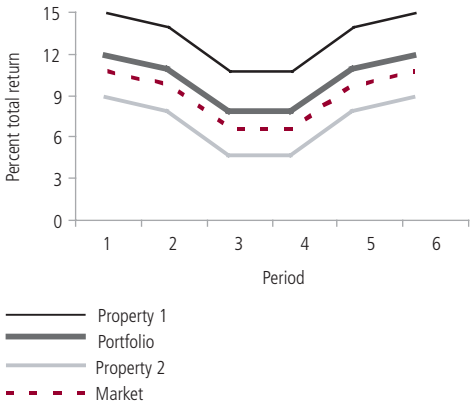


Figure 2: Combining the properties does not reduce the total risk of the portfolio. Yet the portfolio is well diversified and tracks the market.



3. PROPERTY AND PORTFOLIO RISK

To examine the characteristics of individual property investments, a sample of 1,728 properties held in the IPD database over the 10 years to end-2004 was constructed[2]. The standard deviations (risk) and the correlations between the total returns of these properties were then computed.

The results from the held sample study are shown, at the all property level, in Table 1. Similar results for each of 10 market segments (the IPD PAS segments) were also computed and these are presented in the main report.

Table 1: The risk and correlation of individual property returns 1995-2004

	Number of properties	Average std. deviation in individual property returns %	Average correlation between individual properties	Average correlation between properties and benchmark*
All property	1,728	11.0	0.18	0.41

* IPD All Property managed standing investment benchmark

- The correlations show that the returns on different property investments are only weakly related to one another. There is a high degree of heterogeneity in the market.
- Within segments, correlations between properties are only slightly higher, with most averages lying between 0.2 and 0.3. Risk levels did not show any major variations either, though this may be related to the time period selected.
- A cross-sectional analysis of segment returns[3] did reveal differences, with shopping centre and industrial returns the most uniform and City and West End offices the least uniform. Variations between years and segments seem to reflect a number of factors, including the general rate of capital growth, the mix between single and multi-let properties, and lease events.

These features indicate that major gains in risk reduction could be achieved through assembling a portfolio, but that it will be difficult to assemble a portfolio that tracks the market closely. Such relationships for different size portfolios can be modelled using formulae. However, previous studies have shown that this does have drawbacks, as assumptions such as equal weighting in different assets are necessary, something not realistic for the commercial real estate market.

Therefore, a simulation program was used to model different sized portfolios, drawing upon the cash flow data of the 1,728 sample properties. Details of the simulation are contained in the methodology section of the main report. The risk reduction profile for different sized portfolios is shown in figure 3, opposite:

[2] The potential impact of survivor bias in a held sample is analysed in the methodology section of the main report.
[3] This measured dispersion, which reflects the extent to which properties in a particular year matched the benchmark return.

3. PROPERTY AND PORTFOLIO RISK

Figure 3: Standard deviation in total returns for simulated portfolios

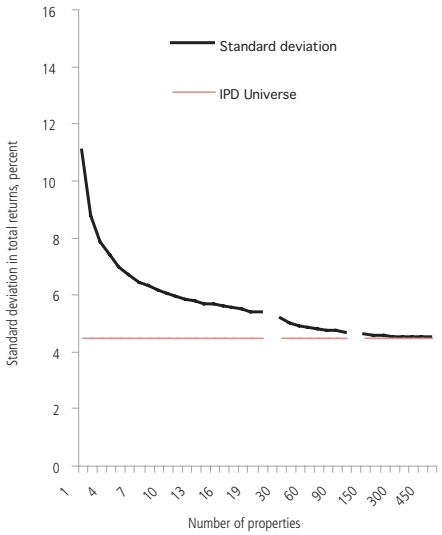
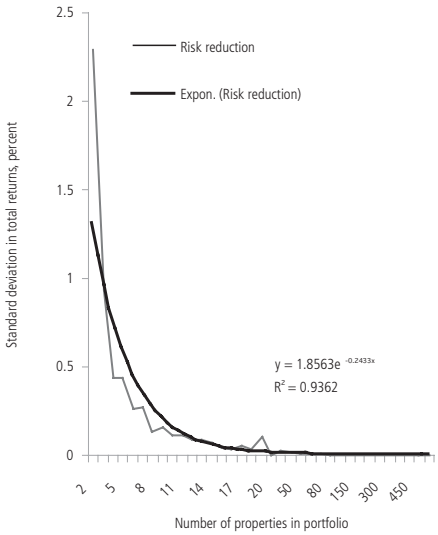


Figure 4: Rate of risk reduction – the change in standard deviation



Note: Gaps in the lines reflect changes in the intervals at 20 and 100 properties

From figure 3, it can be seen that the single biggest reduction in risk comes from adding a second property to create a two property portfolio. This changes the average standard deviation in total returns for the period from 11.0% to 8.8%. By the time 250 properties are in the portfolio, the average standard deviation in total returns is 4.5%, equal to that of the IPD Universe, although returns could still differ from the benchmark in individual years, so that the funds still recorded a tracking error. Figure 4 shows that, although the marginal rate of risk reduction diminishes, adding another property is always beneficial.

Table 2 presents the results of measuring diversification for the same hypothetical portfolios. It shows both the R^2 coefficient and the tracking error relative to the IPD Universe. The market typically explains 69% of the variation in returns on a portfolio with 20 properties and 89% of the variation in returns on a portfolio with 100 properties, with the latter having a tracking error of roughly half the former.

Table 2: Diversification at the All Property level 1995-2004

	Number of properties in hypothetical portfolios								
	1	**5**	**10**	**20**	**50**	**100**	**200**	**400**	**500**
R-squared[1]	0.17	0.45	0.57	0.69	0.82	0.89	0.94	0.96	0.97
Average tracking error[2]	–	5.35	4.06	3.06	2.09	1.54	1.14	0.86	0.78
Cost of assembly (£m)[3]	13.4	67	134	268	670	1340	2680	5360	6700

[1] The R-squared value is the proportion of the variance in portfolio returns that is explained by the market. The R-squared can range from 0 to 1.

[2] Tracking error measures the standard deviation in the differences in returns between a fund and its benchmark. The data show the average annual difference in percentage points per year.

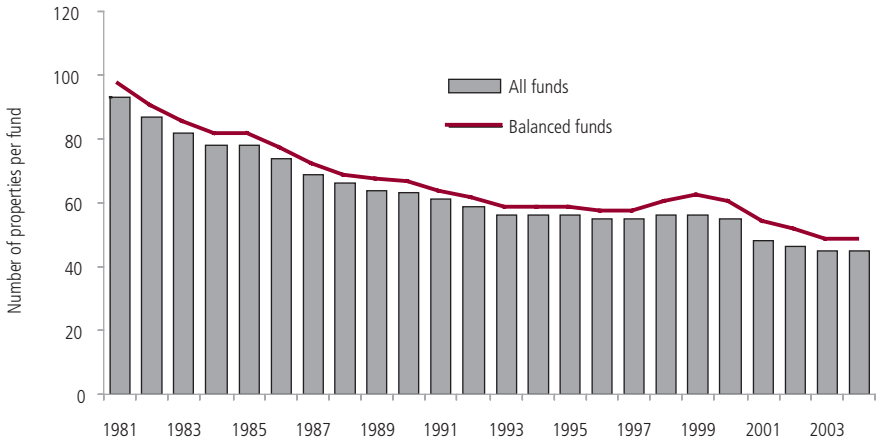
[3] Based on the average capital value of properties in the IPD databank at end-2005.

The only absolute answer to the question of how many properties are required to track the market is the entire population of all investment properties. In practice, the 'right' size for a portfolio depends on the risk tolerance of the fund's investors and the degree of importance they place on tracking the benchmark average return. The cost of assembling a certain size portfolio will also be an important factor.

4. DISPERSION IN RETURNS THROUGH TIME

Despite the risk reduction and diversification benefits associated with having a large number of assets, there has been a steady decline in the number of properties held directly in portfolios. The average number of direct properties in funds covered by the IPD Databank halved from 93 in 1981, to 45 in 2004. In part, this decline is related to the growth of specialist limited partnerships and PUTs over the past 10 years. Yet if only balanced funds are considered, the same pattern emerges, with the average falling from 97 properties in 1981 to 48 properties in 2004.

Figure 5: Average number of direct properties per fund in IPD



This decline must be seen in the context of the growth of indirect investment and the fact that many balanced funds now have indirect interests. Indeed, some of the new specialist vehicles were created by the transfer of assets from large balanced funds, which then retained an interest.

Overall, the range in fund returns has narrowed over the last 20 years. This could be due to the greater role of indirect investment, but was also shown by the project to be true for hypothetical portfolios comprised only of direct property assets. Six possible reasons for this finding were then explored, of which the following four appear to give the best explanation:

1. The fall in the weighting of offices in portfolios
2. A shift away from smaller lot sizes
3. Greater uniformity in market segment returns.
4. Greater market transparency

Little relationship was found with the property cycle or with the level of inflation, which might be thought to create greater market uncertainty.

5. CONCLUSIONS

This project has generated a large number of findings relating to the risk of individual property investments and of property portfolios. This summary report has attempted to highlight the key results, but, in doing so, has had to omit a large amount of results and discussion on particular years, types of fund and segments of the market, which can be found in the main report.

However, given the widespread use of the terms 'risk reduction' and 'diversification', this summary report has sought to indicate the distinction between them, a topic elaborated in much more detail in both the main report and the separate literature review. This distinction can be very briefly restated as follows:

- Total **risk reduction** is the decline in total portfolio risk that can occur as properties are added to a portfolio, whether that risk is from specific or systematic sources. The potential for risk reduction is likely to be of particular interest to fund managers with an absolute return benchmark.
- **Diversification** is only concerned with the reduction of specific risk from a portfolio. It is classically measured by the proportion of total portfolio risk that is explained by movements in the market. The potential for diversification should be of particular interest to fund managers with a relative benchmark.

The results show that there is a high level of heterogeneity within the UK commercial property market. This allows potentially large gains in risk reduction to be made through constructing a portfolio, but it will be very difficult for investors to track the market.

However, these analyses form a base case since the hypothetical portfolios are constructed through random selection (naïve diversification). In practice, many fund managers will take an informed (sometimes termed efficient) approach and consider the structure and risk exposure of their existing portfolio before making further acquisitions. So the results may understate the risk reduction achieved by adding more properties to an actual portfolio, where fund managers deliberately avoid choosing too many properties that share the same characteristics. Nonetheless, the results do indicate what characteristics different sized portfolios might be expected to show and whether this is consistent with their investment objectives.

Future research following on from this study could follow two routes. First, at the investor level, further work could examine the diversification potential from assembling stakes in specialist funds, and the likely critical mass for a fund of funds. Second, at the asset level, there is a pressing need to more clearly understand the factors driving individual property performance. This, in turn, may highlight the limitations of conventional market classifications and reveal stronger common factors that drive returns, with benefits for both portfolio construction and real estate market analysis.

Investment Property Forum
New Broad Street House
35 New Broad Street
London EC2M 1NH

Telephone: 020 7194 7920
Fax: 020 7194 7921
Email: ipfoffice@ipf.org.uk
Web: www.ipf.org.uk