Diversification Effects of Private versus Public Real Estate in the UK

by:

Alastair Adair*, Stanley McGreal* and James R. Webb#,

*University of Ulster, Northern Ireland
Department of Finance, Cleveland State University, USA

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Contact author Professor Stanley McGreal, Centre for Research on Property and Planning, School of the Built Environment, University of Ulster, Shore Road, Newtownabbey Tel: + 44 28 9036 6566; Fax: + 44 28 9036 6826; Email: ws.mcgreal@ulster.ac.uk

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Abstract

This study uses annual data from 1975 through 2003 to construct mean-variance optimal portfolios for the UK. Real estate return data for all UK properties from the Investment Property Databank (IPD), for UK pooled property funds and for UK property shares are used, in addition to UK common stocks and gilts (government bonds). The different mixed-asset portfolio allocations using the different real estate return series are compared/contrasted. Finally, the return series are unbundled for UK IPD real estate, UK common stocks and UK gilts into income and appreciation returns and additional optimal mean-variance portfolios are constructed for income returns, appreciation returns and income and appreciation returns.

I. Introduction

In a mixed asset portfolio, direct investment into real estate is considered to provide diversification benefits and opportunities particularly in large portfolios (Hoesli et al, 2002). Property cannot be considered in isolation but rather placed in the context of other investment opportunities within a mixed asset portfolio notably equities and bonds (and gilts). The key criteria in the investment decision-making process and determining allocations across the asset classes as shown from many studies at a national and international level are expected return, risk and diversification benefits (MacGregor and Nanthakumaran, 1992; Newell and Webb, 1996).

This paper constructs mean-variance optimal portfolios for the UK focussing on the allocation by asset class across low, medium and high risk portfolios. The portfolios are based on the three main asset classes gilts/bonds, equities and property. Where this analysis differs from previous work is firstly a comparative analysis of direct property returns (total return) using IPD data with indirect or securitised property using pooled property fund returns and real estate equities returns. Secondly the analysis considers unbundled returns using the income and capital return components.

The paper is structured as follows. Section two is a literature review examining the role of property within portfolios and diversification strategies and benefits. Section three briefly reviews the research design and the nature of the data used. Section four discusses the optimal portfolios including low, medium and high return scenarios for each portfolio. A summary and conclusions drawn from the paper comprise section five.

II. Literature Review

The theoretical framework for analysing return and risk is well established in the literature, normally focusing on the role of real estate in mixed-asset portfolios and selected via modern portfolio theory (Hoesli and MacGregor, 2000). More specifically, the return and risk for each asset class and the correlation coefficients between the returns on each pair of assets are analysed. The purpose of diversifying an investment portfolio is to reduce risk. The benefits of diversification arise from the less than perfect correlation between the various market segments. As Lee (2003) emphasizes the lower the level of correlation between assets, the greater the potential for portfolio risk reduction and increased returns. The success of a particular diversification strategy consequently depends on the quality of the estimated correlation between assets. Hamelink et al (2000) argue that the classification of property markets defines the dimensions of market risk. This implies that the drivers of property-market performance are influenced differentially by office, retail, and industrial markets. By diversifying efficiently across those property types, commonality in returns is achieved. The same applies for geographical or regional diversification and for combined property type and area classifications. If however, the type or area groupings used do not define the dimensions of market risk then optimal diversification will not be achieved.

One of the key questions in the literature is whether investors should diversify by region or sector. In addressing this issue, Lee and Byrne (1998) indicate that there are two basic approaches to test whether it is more beneficial to diversify by sector or region using real estate data namely, the inspection of intra- and inter-correlation coefficients, and the construction of efficient frontiers. In their 1998 study Lee and Byrne undertook an extensive literature review

highlighting the historical development of research in this area, pointing to two surveys of institutional investors' diversification strategies which found that real estate type and geographical spread are the dominant criteria (Webb, 1984; Louargand, 1992). They also cite the work of Eichholtz et al (1995) who tested the benefits of sector/regional diversification in the UK and USA using a variety of methods comprising correlation analysis, principal components, and mean-variance analysis. The results indicate that in the USA in general retail investment should be diversified across regions while for office diversification across types would be superior. In the UK, the retail sector produced a contrasting result while diversification across both property type and region yielded superior performance for industrial and office property. The authors conclude that property type diversification is more beneficial in reducing portfolio risk than regional diversification. Also highlighted is the difficulties of adequately measuring geographical diversification as most regional data is not only disaggregated but is also the product of an administrative rather than an economic function.

From a study of 392 locations throughout the UK Byrne and Lee (2000) suggested that a diversification strategy across property sectors offers lower risk levels than by region. In developing the analysis further for the UK market, Lee and Stevenson (2005) concluded that staying in only one sector and one region (London) is undesirable in terms of risk and return and that diversification on a naïve basis or in an optimal fashion leads to significant improvements in performance. Their analysis supported the contention that diversification almost always offers increased performance.

The studies reported to date have focused upon direct property and diversification by sector (property type) and regions. This paper adopts a wider perspective by generating optimal portfolios using both direct and indirect real estate returns.

III. Research Design

The research design used in this paper develops previous work by the authors on constructing optimal real estate only portfolios using total returns, income returns and appreciation (capital) returns from IPD for office and retail real estate for major cities within the British Isles (Adair et al, 2004). Income returns and appreciation returns were treated as assets streams that could be purchased separately. The modelling process looked at low, medium and high risk portfolios by property type and city.

The current study adopts a differing perspective comparing returns at a UK rather than a city level and for direct property, pooled funds and real estate equities (listed property companies). This study uses annual return data for the years 1975 through 2003. Mean-variance optimal portfolios are constructed for the following data sets:

1. Investment Property Databank (IPD) all UK property returns (sticks and bricks), UK common stock returns, UK gilt (government bond) returns, and the UK retail price index (inflation).
2. Same as #1 except IPD all UK property returns are replaced with UK pooled property fund returns.
3. Same as #1 except IPD all UK property returns are replaced with UK property share returns.

The asset allocations across the different portfolios are compared/contrasted with the return streams for IPD UK property, UK common stocks and UK gilts (government bond) unbundled into their income returns and appreciation returns. Mean-variance portfolios are constructed for income returns, appreciation returns and then for both together.

IV. Results

Exhibit 1 contains the asset allocations for the mean-variance optimal portfolios constructed using UK IPD real estate returns for direct property with common stock, gilts and inflation. The analysis shows that for the low risk portfolio, an asset that just returned the rate of consumer inflation would dominate the portfolio with a 70.1% allocation. The low risk portfolio had a 24.0% exposure to property. For the medium and high-risk portfolios, the hypothetical asset did not enter either of the models suggesting that as risk increases the likelihood of an asset with a return as low as inflation entering optimal portfolios is unlikely. The medium risk portfolio has the highest exposure to (55.4%) to real estate, with a significant allocation to common stock (32.7%) and a lower weighting of bonds (11.9%). The high risk portfolio has 100.0% exposure to common stock. This is not a surprising outcome as previous analysis has shown that over a long time horizon, equities are more volatile but out-perform bonds and direct property (UBS, 2005). Gilts have a low representation across all three optimal portfolios stemming from their low risk/return characteristics.

When the analysis is altered to consider pooled property fund returns, as one form of securitized real estate, the optimal mean-variance portfolio allocations (Exhibit 2) demonstrate a similarly of result, but with somewhat varying allocations. Using the pooled property fund returns, the low risk portfolio is dominated by the hypothetical asset having inflation returns at 60.0%, a lower allocation than in the previous analysis. Correspondingly property takes a higher allocation in the low risk portfolio (33.7%) suggesting that pooled funds provide a better risk shelter than direct property. For the medium risk portfolio, real estate dominates at 54.1% with common stock at 38.8%; allocations not appreciably different than in the first example (Exhibit 1). Once again, for the high risk portfolio common stock is 100.0%.

The third example uses another form of securitized real estate, property share returns to construct the optimal mean-variance portfolio allocations (Exhibit 3). This scenario produces an outcome that is significantly different from Examples 1 and 2 with an asset that just returned the rate of consumer inflation having a 93.7% allocation of the low risk portfolio. The exclusion of property

shares from the low risk portfolio is supportive of the argument that this form of indirect investment has more the characteristics of equities than property. For the medium risk portfolio, gilts (government bonds) dominate at 74.8% of the portfolio, common stock is 16.9% and property shares only 4.0%. This represents the only portfolio option that is dominated by gilts reflecting the higher risk of the other two options which are both equities-based, either common stock or property shares. For the high-risk portfolio, the allocation is 100.0% common stock.

Exhibit 4 compares the optimal allocations to real estate using the three different return sources - IPD all properties (sticks and bricks), pooled property fund returns and property share returns. When the IPD real estate returns are used, there are significant allocations to real estate in the low and medium risk portfolios (24.0% and 55.4%, respectively). The same is true for pooled property funds (33.7% and 54.1%, respectively). However, the allocation for property shares is 0.0% for the low risk portfolio and only 4.0% for the medium risk portfolio. Real estate never enters for any of the return series for the high-risk portfolios. All high-risk portfolios are 100.0% common stock. The results are consistent with the higher risk associated with equities and the lower risk of pooled funds with direct property having a risk profile between these two. The similarity of allocations between direct property and pooled funds reflects the high correlation between the return series (r=0.9372) whereas the difference with property shares is consistent with the lower correlations. The correlation between direct property and property shares is r=0.5331 and between pooled funds and property shares 0.4217.

Unbundled Returns

The unbundled returns examine income and appreciation returns. Exhibit 5 contains the optimal mean-variance portfolio allocations using only the income returns for real estate (IPD), common stock and government bonds. The low risk portfolio is dominated by real estate income returns (80.9%) and not by gilts (10.9% allocation). While this outcome may initially seem surprising, previous analysis by the authors (McGreal et al, 2005) has indicated that the income return component for UK direct property is virtually risk-free. The medium risk and high-risk income portfolios are dominated by income from government bonds (gilts) at 58.6% and 100.0%, respectively. However, income real estate returns are a significant part of the medium

risk portfolio (41.4%). The income return component for common stock only enters the optimal portfolios as a small allocation in the low risk portfolio (8.2%). It does not enter the medium or high-risk income portfolios.

For the appreciation return portfolios (Exhibit 6) a different perspective is apparent highlighting the significant differences between the elements within total return. The real estate returns again dominate the low risk portfolio (65.5%) though the allocation is lower than for the income portfolio and gilts also take an appreciable percentage of the allocation of this portfolio (34.5%). A significant part of the medium risk portfolio is allocated to property (47.7%). However, common stock is the dominant asset class in the medium risk capital appreciation portfolio (52.3%) and the only asset class in the high risk portfolio (100.0%).

When income and appreciation are considered in the same portfolio, but as separate return streams, the result is Exhibit 7. The low risk portfolio is dominated by property (IPD) income returns (80.9%). Income returns in general, dominate the low risk portfolio with capital appreciation (property, common stock, gilts) not entering the portfolio. The medium risk portfolio is dominated by government bond income returns (71.6%), but common stock capital appreciation is also a significant part of the portfolio (28.4%). The high-risk portfolio is dominated by common stock appreciation (100.0%) with none of the income returns from any other asset class entering.

V. Conclusions

For the UK, real estate would seem to be a good portfolio diversifier for only low and medium risk portfolios. This held true for non-securitized real estate returns from the IPD (sticks and bricks), as well as real estate returns from pooled property funds (securitized real estate). When property shares were included in the mixed-asset portfolio optimization (Exhibit 3), they seemed to have virtually no impact on the allocations for common stocks, government bonds (gilts) and inflation.

When return streams were unbundled into income returns and appreciation returns and optimal portfolios constructed, real estate was a significant part of both the low and medium risk portfolios. This was true for the income returns portfolio (Exhibit 4) and the appreciation returns portfolio (Exhibit 5). But for the high risk income returns portfolio and the high risk appreciation returns portfolio, real estate did not enter. For the joint income returns and appreciation returns portfolio, real estate only entered in the low risk portfolio and only income returns entered. The income return is undoubtedly more stable than the appreciation return and the appreciation returns for common stocks are, undoubtedly, higher than those for property and government bonds, resulting in 100.0% in common stocks for all high risk portfolios in this study.

VI. References

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Exhibit 1. Total Return Portfolio Allocations Using U.K. IPD Stick and Brick Returns

Risk Level	Property	Common Stock	Gilts	Inflation
Low	24.0%	0.0%	5.9%	70.1%
Medium	55.4%	32.7%	11.9%	0.0%
High	0.0%	100.0%	0.0%	0.0%

Exhibit 2. Total Return Portfolio Allocations Using U.K. Pooled Property Fund Returns

Risk Level	Property	Common Stock	Gilts	Inflation
Low	33.7%	0.0%	6.3%	60.0%
Medium	54.1%	38.8%	7.1%	0.0%
High	0.0%	100.0%	0.0%	0.0%

Exhibit 3. Total Return Portfolio Allocations Using U.K. Property Share Returns

Risk Level	Property	Common Stock	Gilts	Inflation
Low	0.0%	0.0%	6.3%	93.7%
Medium	4.0%	16.9%	74.8%	4.3%
High	0.0%	100.0%	0.0%	0.0%

Exhibit 4. Summary of Real Estate in the Mixed-Asset Portfolios

Risk Level	Sticks/Bricks (IPD)	Pooled Property Funds	Property Shares
Low	24.0%	33.7%	0.0%
Medium	55.4%	54.1%	4.0%
High	0.0%	0.0%	0.0%

Exhibit 5. Income Return Portfolio Allocations Using U.K. IPD Stick and Brick Returns

Risk Level	Property	Common Stock	Gilts
Low	80.9%	8.2%	10.9%
Medium	41.4%	0.0%	58.6%
High	0.0%	0.0%	100.0%

Exhibit 6. Appreciation Return Portfolio Allocations Using U.K. IPD Stick and Brick Returns

Risk Level	Property	Common Stock	Gilts
Low	65.5%	0.0%	34.5%
Medium	47.7%	52.3%	0.0%
High	0.0%	100.0%	0.0%

Exhibit 7. Income and Appreciation Unbundled Portfolio Returns Using U.K. IPD Stick and Brick Returns

Risk Level	Property Income	Common Stock Income	Gilt Income	Property Appreciation	Common Stock Appreciation	Gilt Appreciation
Low	80.9%	8.2%	10.9%	0.0%	0.0%	0.0%
Medium	0.0%	0.0%	71.6%	0.0%	28.4%	0.0%
High	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%