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Housing investment in an institutional portfolio context

A review of the issues

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Abstract Residential property in a multi-asset portfolio context has been considered from two substantially different perspectives: institutional investor's and the household's perspective. This paper constitutes the first of two related surveys on the role of residential property in a multi-asset portfolio. The paper provides an introduction to housing property investment at a macro level and reviews the main empirical issues related to housing investment in an institutional portfolio context. The literature in this regard generally supports the evidence that residential property is a more effective hedge against inflation than both shares and bonds. Additionally, the reviewed studies generally report that unsecuritised housing investment not only generates risk-adjusted returns comparable to those of bonds and shares, but also exhibits low levels of correlation with classic asset groups of institutional portfolios.

Introduction

Over the past 25 years, several empirical studies have been devoted to understanding the risk-return characteristics of housing property and its contribution to risk diversification within a mixed-asset portfolio according to Modern Portfolio Theory (Markowitz, 1952, 1959, 1987).

The allocation of housing assets in a multi-asset portfolio – consisting of shares, bonds and cash – have been studied from two different perspectives. The first, the household perspective, analyses the household's optimal portfolio problem when owner-occupied housing is included in the list of available assets and is discussed in this paper. The second, the institutional investor perspective, analyses the potential role of housing assets in an institutional investor portfolio, namely the role of housing as a hedge against inflation and its ability to diversify the institutional portfolio investment and the paper dealing with this "Owner-occupied housing and household asset allocation: a review of the issues" will be published in a forthcoming issue of the journal.

The primary purpose of this paper is to review the main empirical issues related to housing investment in an institutional portfolio context. Those empirical issues include residential property effectiveness against inflation and its diversification benefits in a mean-variance Markowitz framework (Ibbotson and Siegel, 1984; Hartzell *et al.*, 1987; Hoesli and Hamelink, 1997).

The institutional allocation towards residential property may be justified by two major financial reasons. First, housing property should help to reduce the risk of a portfolio because as it has a low correlation with the classic asset classes



considered by institutional investors (that is, shares and bonds). Second, residential property appears to provide a hedge against inflation, that is, the correlations between housing returns and both expected and unexpected inflation are substantially higher than zero.

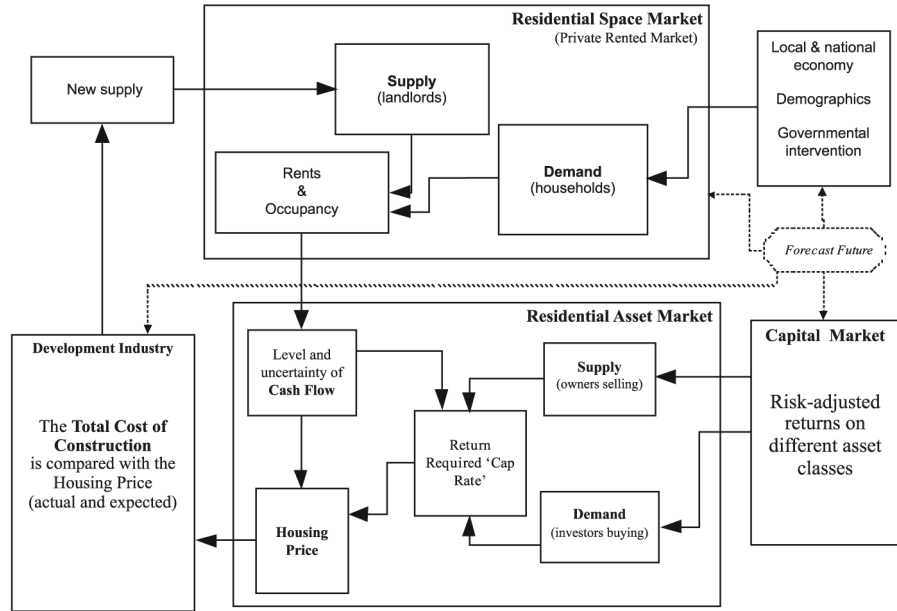
In fact, the existing empirical studies suggest that unsecuritised housing investment not only generates risk-adjusted returns comparable to those on bonds and shares, but also provides low correlations with shares and bonds. This low correlation means that housing property is an effective hedge against fluctuations in the capital markets. Consequently and along with the modern portfolio theory, residential property may be seen as a potential institutional investment class. On the other hand, the empirical evidence about the ability to hedge inflation of unsecuritised housing property has not been so consistent. One possible explanation for this inconsistency could be the lack of standardisation in the measurement of house returns. Despite the research evidence, there are weaknesses with the housing diversification benefits argument. Namely, the lack of reliable time-series data on housing prices and housing returns, and the limitations of the simplistic modern portfolio theory framework that has been used on the reviewed empirical studies.

This paper consists of three major sections. The first section gives an introduction to housing property investment at a macro level, that is, from a perspective encompassing aggregates of many individual residential properties. The section covers topics such as the linkage between the rented housing market and the capital markets, modern portfolio theory, characteristics of housing investment performance data, the portfolio allocation towards unsecuritised and securitised markets and the possible implications of an increase in institutional investment towards rented housing. The next section reviews empirical studies on inflation-hedging characteristics of housing. The third section reviews the literature on risk-return characteristics of residential property and its contribution to risk diversification of institutional portfolios. The final section summarises and concludes.

Housing as an investment asset

To describe the linkages between the private rented housing sector and the capital markets a three-market model, which distinguishes the markets for space, assets and the market for general capital, is used [1]. Figure 1 presents a visual overview of this model, including the major elements in and linkages between these three major components. Studies on property market frameworks include those of DiPasquale and Wheaton (1992), Archer and Ling (1997), and Geltner and Miller (2001).

The space market, where the usage of physical space is traded, determines the current rent for residential space. In this market the demand comes from the households (tenants) [2] that use (consume) residential space. The demand for residential space depends on rent, regional and national economies (e.g. interest rates, credit restrictions, household income, regional employment prospects); demographics (e.g. number of households, household composition, age of household); governmental intervention (e.g. subsidy to the rented sector, direct provision of social housing – public renting could be a close substitute to private renting); and technological factors (e.g. transport and communication network features that change the meaning of distances and urban location).



Source: Three-market model adapted from Geltner and Miller (2001)

Figure 1.
Linkages between the
rented housing sector and
the capital markets

On the supply side of the space market are the landlords (individuals and institutions) [3] that produce housing services using the stock available. The new supply depends on the cost of developing new housing stock, including the land cost, construction cost and the developers' cost of equity capital ("profit"). Consequently, new units will be added to the current housing space market stock when the house values, defined in the asset market, are equal to or exceed the marginal cost of new development and, as a result, developers' shareholder value is increased.

The demand for residential space, together with the existing supply of private rented housing [4], determines current rental levels and the expected cash flows of a property.

The asset market, where the available housing assets are allocated among competing investors, determines the house values. Asset supply comes from actual housing owners (owner-occupiers and investors) willing to sell part or all of their residential stock. On the demand side of the asset market are the investors (individuals and institutions). Examples of institutional investors are the property equity investment vehicles, pension funds, life insurance companies and mutual funds. The types of institutional investors and their involvement in the rented housing sector vary from country to country across Europe. For instance, in countries like Switzerland and The Netherlands, the allocation of institutional funds to private rented housing has been relatively significant. For instance, housing is the main Swiss institutional property asset group, with average property portfolio allocations over 60 per cent (Immo-survey, 2003). In contrast, in countries like the UK and Portugal the involvement of institutional investors with private renting is virtually zero. Hoesli and MacGregor (2000) state that weight allocated to property in institutional portfolios is

usually inversely related to the importance of the residential owner-occupied sector. Besides, Montezuma and Gibb (2003) draw attention to the fact that countries with higher financial institutional ownership tend to have more institutional involvement with the private rented housing (e.g. Switzerland, The Netherlands, the USA, Sweden). Even though the UK has a considerable level of financial institutional ownership, the allocation of British institutional funds towards private renting is virtually nil. The lack of UK institutional involvement in the rented housing sector cannot be explained only by tenure structure. In fact, the British behaviour could be largely due to cultural attitudes to residential property investment. The relatively recent (post 1988) emergence of the necessary conditions for a modern deregulated private sector in the UK and the subsequent reduction in political risk implies that the sector, and corresponding opportunities may only now be emerging (Montezuma and Gibb, 2003). The new Housing Act of 1988 replaced the rigid rent control with a regime of market-related rents for new tenancies. This new system introduced the necessary arrangements for rent setting that were reasonably fair between tenant and landlord, restoring security of tenure to the decontrolled dwellings.

From the investor perspective, housing assets are thought of as consisting of a series of contingent cash flows over time, whose amount and timing, are fundamentally defined in the space market [5]. In that sense, housing assets compete in the capital markets with other contracts promising a stream of future cash flows. Examples are shares that entitle the owners to receive dividend and fixed-income securities such as bonds. The performance of assets in the capital market is determined by the perceptions of potential investors concerning the level and uncertainty of the assets' cash flows.

As mentioned earlier, the housing assets compete with all other assets, real and financial, for an allocation in investors' portfolios. Modern Portfolio Theory states that assets could not be selected only on expected return and risk on each asset [6] but also on the correlation of returns for each and every pair of assets (for example, shares, bonds, cash, housing, other property). Furthermore, taking these co-movements into account results in the ability to form a portfolio that has the same expected return and less risk than a portfolio constructed by ignoring the interactions between assets.

According to Archer and Ling (1997), the risk level of the expected cash flows produced by residential property is shaped not only by the degree of uncertainty about future relative supply and demand for property space, but also by the covariability of the expected cash flows with systematic economic risk factors, which are determined in the capital market [7]. In other words, the risk premium [8] of housing investment depends on the risk profile of the cash flows defined in the space market and its relationship with the general capital markets.

The above relationship depends on the level of integration between two markets [9], housing and general capital markets, which is determined by the extent to which assets in these markets are affected by common economic factors. If the two markets are significantly integrated then it is expected that a large asset substitution will occur, with such substitution having a significant impact on price movements in both markets.

One can speculate that the level of integration between housing and general capital markets depends on the following factors:

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- availability of well-structured residential vehicles, providing a route to indirect investment [10];
 - regulation of lending on housing and specialisation of the housing finance circuit;
 - regulation affecting private rented housing; fiscal treatment of private landlords and tenants relative to other sectors of housing and other forms of investment; and
 - availability and quality of the information on the residential property market.

Whether the housing market and general capital markets (including other property assets) are segmented or integrated and to what extent they are causally related, has significant implications for effective portfolio diversification strategies. Modern Portfolio Theory suggests that the greater the degree of integration of markets, then the property price changes should be more closely and promptly related to the general economic fundamentals and therefore, the less important are the benefits from diversification. However, if the drivers are different or inefficiency exists [11] in the markets, there will be profitable arbitrage [12] opportunities for multi-asset portfolio investment. That is, the investors have the opportunity to exploit differences in the risk-adjusted returns (or price of risk) across different asset classes (e.g. residential property and shares) and capital will flow accordingly across market segments until price discrepancies are corrected. In spite of this, frictions such as, illiquidity [13] and information costs in the housing sector tend to decrease the profitability of the arbitrage opportunities. Additionally, the degree of integration of housing markets and general capital markets is also important for public policy issues related to market efficiency and regulatory impediments to capital flows among two markets (Ling and Naranjo, 1999).

One can argue that the differences in the roles of institutional investors [14] in the rented housing sector across countries are related to the different levels of integration of housing markets and general capital markets in each of these countries. To put it another way, the institutional investors start to consider housing investment as a candidate for their portfolios once the degree of integration between these two markets exceeds a minimum level.

From the above, housing markets can be viewed as an extension of capital markets. This is not only due to the fact that housing is an alternative portfolio choice available to investors but also because financing terms available on capital markets have a significant effect on the return on housing. Even so, housing markets diverge from capital markets in a number of ways. They face high governmental intervention [15], investments are illiquid, indivisible and heterogeneous (both structural and locational), information is expensive and they have a negotiated pricing process.

These special housing attributes make it impossible to have an accurate housing market value at any given time. Thus, there will always be differences between the housing asset's observable valuations and the unobservable true contemporaneous market values Geltner and Miller (2001). Those differences or errors are of two types. The first type of error is a purely random noise in the index value levels caused by estimation error. This type of error increases the volatility of the returns over time, decreases positive first-order autocorrelation and reduces the apparent cross-correlation between the noisy series. Thus, random noise error could make it appear as if housing property is less correlated with commercial property than

it actually is. Finally, this type of error does not affect the theoretical covariance between returns and any exogenous series. The random noise will be more important when the returns are based on transaction prices indices and when the size of the portfolio is small.

The second type of error, the temporal aggregation error, results from the fact that the value of the index in each period is derived from transactions taking place during the index period; in other words, the value is a weighted average over the period instead of a spot price at any given time. The temporal lagging does not have a significant effect on the long-term returns but has an impact on the short-term returns. Additionally, the temporal lag reduces the volatility of the observable returns (smoothing returns) and increases the positive first-order autocorrelation. According to Geltner and Miller (2001), it is plausible that temporal lag error will cause only a minor bias in the cross-correlation between two similarly lagged property series. The temporal lag error will be dominant in large portfolios or when the returns are based on appraisal price indices. This type of error could also be important if the regression estimated is based on pooled transaction price data. Given this, the type of housing price index used and the portfolio dimension (that is, the sample's size dimension) will have an effect on the quality and characteristics of the housing returns and thus, influence the volatility of the housing property times series as well as the correlation between housing returns and returns on other type of assets (e.g. commercial property, shares, bonds). Aside from this, a number of empirical studies indicate that share returns are excessively volatile over small periods of time (Shiller, 1981; and Fama and French, 1992). If so, one must be cautious about results of empirical studies on the correlation between the return on housing and those on shares. According to Quan and Titman (1999) a possible way to overcome this problem is to use share and property price time series over longer holding periods.

One of the consequences of the difficulty of having a true contemporaneous housing market value is the diminishing attractiveness of residential property in a portfolio context.

There are two major ways in which institutional investors can allocate their financial resources in the private rented housing sector: through unsecuritised or securitised markets. In the unsecuritised market, residential property is traded directly and its income stream is received directly by the institutions and is taxed in accordance with the institutions' individual tax liability. Internal staff with housing management expertise or external property specialists manage the unsecuritized property. The utilisation of internal staff has the advantage of achieving returns at a lower cost and with better control (Ward, 1999). In any case, selecting and managing residential assets requires knowledge of and competency in a wide range of residential-related issues, including investment analysis, property performance management, reporting techniques, appraisal procedures and property disposition.

In the securitized markets, residential property is traded indirectly, by the use of investment vehicles, which specialise in investing in, and often actively developing and managing, portfolios of property equity. For example, the property investment vehicles can take a variety of organisational forms such as, residential property companies, real estate investment trusts (REITs) [16], property unit trusts and single property securitized investments. The structure of investment vehicles varies from country to country and for each country it has changed over time. For instance, in the USA,

open-end funds [17], the earliest vehicle, gave way to closed-end funds [18] in the early-1980s, as investors desired more specialised portfolios and became disillusioned with open-end funds' lack of liquidity. In the 1990s, direct investment through separate accounts, including co-investments, became the vehicle of choice, especially among large investors.

According to Goetzmann and Ibbotson (1990), the risks and the returns of securitised commercial investment are higher than those of unsecuritised commercial investment and the correlation between those two return series is low. Other studies (e.g., Giliberto, 1988) also suggest that returns on direct property investment are weakly correlated with the returns on indirect property investment. Furthermore, Geltner and Miller (2001) argue that property markets are characterised by a unique dual market situation. In other words, the trading of property assets could be done in two parallel markets: the unsecuritised market (for trading individual properties directly) and the securitised market (for trading property investment vehicles). The property valuations in the two parallel markets are not consistent every time. Normally, the price behaviour in the securitised market tends to be ahead of the direct investment in time

The securitised residential asset presents several advantages over the direct investment for the institutional investors. They provide quality and efficient management delivered by professional teams, a higher degree of liquidity and geographic diversification benefits. Additionally, the indirect investment ensures distance between the investor and the tenants, minimising the potential poor publicity that could occur. However, the indirect investment also presents some drawbacks. For instance, it provides weak investor control and, usually, poor tax efficiency, the risks and the returns tend to be higher than those of direct investment, and it tends to be more correlated to shares and bonds than the direct investment.

According to Crook and Kemp (1999) the UK institutional investors that have already allocated funds in the private rented sector, preferred direct investment. The reasons given for that preference include tax efficiency, control over the investment and synchronisation of investment returns with the property market. Conversely, the institutional investors that are not yet involved in the residential rented sector identified securitized property as the more promising way to allocate their funds in the sector. The reasons given for that choice include liquidity, efficient and quality management and protection against potential poor publicity.

An increase of the institutional funds' allocation to private rented housing may have implications for housing tenure patterns, the risk-return characteristics of residential property and private rented stock and service quality. The reinforcement of private rented provision that is likely to result from a higher institutional involvement may contribute to satisfying the growing needs of special housing tenants groups, particularly for new households, those who need to be more mobile and the elderly (Priemus and Maclennan, 1998). According to Maclennan (1998), European socio-economic trends such as "growing global economic competition", "the ageing of population", "monetary union" and "the renaissance of city cores", are likely to increase housing demand in those special household segments.

One can anticipate that the stronger participation of institutional investors in the rented sector will lead to an improvement of housing market efficiency. In fact, the degree of market efficiency tends to rise since institutional investors will intensify

the availability of systematic information about housing markets and will improve the ability to incorporate relevant information on residential property values. Therefore, the impacts of economic, demographic and policy trends will be more quickly reflected in house prices.

Institutional activities such as large-scale trading and diversification are likely to contribute to a higher liquidity of residential market, which in turn should further increase efficiency and lead to a reduction in house price volatility (that is, the housing investment risk).

The size of institutions allows them to invest in large residential portfolios, and hence, to benefit from better quality management and economies of scale (that is, lower operating costs per amount of residential investment), which result in higher returns on housing investment. Size also facilitates the geographical diversification across regional housing markets in the same country as well as across national markets, which in turn should permit further risk reductions. Altogether, it appears that the strengthening of institutional investors' participation in the rented housing market leads to an increase in residential risk-adjusted returns.

A natural consequence of institutional involvement in the rented sector is the development of new financial products, such as derivatives based on underlying house price indices, which allow for the pricing and trading of residential investment risk. These derivative products may not only assist institutions in hedging against their residential investment, but also would allow households to hedge the risks associated with homeownership.

A further suggestion is that institutional housing investment growth may lead to an improvement in the private rented stock and service quality. The latter could be achieved by establishing an industry-wide code of practice setting out minimum standards for the management and maintenance of privately rented properties (Crook and Kemp, 1999).

Despite these advantages, institutional investors' participation in the rented housing market may also have some drawbacks, one of which results from possible institutional investors' herd behaviour [19]. The concentration of residential property in the hands of a few institutional investors, who may react similarly and simultaneously to news, could cause an increase in volatility of the housing market, and/or liquidity failures at specific periods of time. Additionally, herding by institutions may entail a loss of diversification benefits (as the market moves together) and expose investors (households and institutions) to major losses as house prices deviate from the fundamentals. However, empirical evidence is lacking that institutional investment managers do in fact exhibit significant herd behaviour (Bikhchandani and Sharma, 2000). One can additionally argue that potential negative effects of herd behaviour are less likely in the housing market than in the capital market. That is because significant proportion of the housing stock is owner-occupied and thus a high concentration of housing assets in the hands of institutions is less probable.

Inflation-hedging characteristics of housing investment

The empirical studies on housing investment in a portfolio context have not always been consensual, particularly in relation to housing inflation-hedging effectiveness. One possible reason for this divergence could be related to the fact that those empirical

studies use different housing total return estimation procedures [20]. First, the measurement of housing returns may or may not incorporate risk premiums (e.g. illiquidity premium and marketability premium). Second, the income return component could be estimated under different assumptions (e.g. using a residential rent index or using a constant rent-to-value ratio), which provide different approximations of the income component. Next, the measure may rely on securitised or unsecuritised housing property. Finally, and particularly in regards to unsecuritised investment, the measurement could be based on distinct types of housing price indices (e.g. appraisal, repeated sales, hedonic) to calculate the appreciation return component. Thus, the procedure used has considerable implications for the quality and characteristics of the returns measured.

An early study on housing inflation hedging ability was by Fama and Schwert (1977). The authors rely upon Treasury bill rates as a measure of expected inflation from 1953 to 1971, to test the inflation-hedging effectiveness of private housing property, government bonds, corporate bonds, shares and labour income. The authors conclude that US residential property returns (capital appreciation returns based on an appraisal index) have a strong positive relationship to both expected and unexpected inflation [21]. However, one should recognise the limitations of the data used. The only type of housing property contemplated in the price index is insured single-family homes Federal Housing Association (FHA). In addition, there is a time lag between when the FHA collects the data and when the data is reflected in the consumer price index (CPI).

Likewise, Fogler *et al.* (1985) report a positive relationship between US housing appreciation returns based on a transaction price housing index and inflation for the period 1952-1983. Hartzell *et al.* (1987), using US commingled real estate fund (CREF), find that a well-diversified portfolio of real estate provides a complete hedge against both expected and unexpected inflation. Rubens *et al.* (1989) also test the hedging effectiveness of various financial and real estate assets (including housing) against actual, expected and unexpected inflation over the 1960-1986 period.

The total returns for housing property in this study are estimated according to the following procedure. The appreciation returns are calculated as the annual change in the home purchase component of US CPI and the income returns are obtained from a rented index. They conclude that residential property is a complete positive hedge against actual and unexpected inflation and an indeterminate hedge against expected inflation.

Bond and Seiler (1998), using the added variable regression methodology (AVRM), also report that US residential property (using appreciation returns based on a transaction price index) is a significant hedge against both expected and unexpected inflation. Similarly, Ben-Shahar (2001) using appreciation returns based on a transaction price index over the period 1990-2000 in 25 Israeli cities, finds that housing provides an effective hedge against expected and unexpected inflation. In contrast, such authors as Hoesli and Hamelink (1997) using the Fama and Schwert (1977) methodology, conclude that Swiss housing investment (measured by a total return based on a hedonic price index) was not a good short-term hedge against the inflation during the 1978-1992 period.

Concerning the ability of commercial securitized property to hedge inflation, Liu *et al.* (1997), among others, report evidence that property securities (Property Trusts,

Real Estate Mutual Funds, Shares of Real Estate Operating/Development Companies) provide a bad hedge against inflation. According to Liu *et al.* (1997), since there is evidence that the unsecuritized property is an effective hedge against inflation, it is reasonable to expect that security design should have some impact on the inflation hedgeability of securitized property. Moreover, they suggest that those property securities that better reflect the underlying property in a country (e.g. Swiss Real Estate Mutual Funds and the French *Societes Immobilieres d'Investissement* [22]) should provide a superior hedge against inflation. In contrast, property securities that behave in a similar way to that of common shares (e.g. Japan and UK) should provide an inefficient inflation hedge.

Recent multi-country studies that have addressed the issue of the inflation hedging effectiveness of property also conclude, however, that this type of investment is a poor short-term hedge against inflation. For instance, using cross-countries data over the period 1983-1996, Quan and Titman (1999) find that commercial property is a good long-term hedge against inflation but a poor year-to-year hedge. However, since Quan and Titman's empirical study was based on commercial property data instead of housing property data, the results cannot be extrapolated, without further empirical evidence, to the residential situation.

Anari and Kolari (2002), using house prices and the prices of nonhousing goods and services, rather than housing returns series and inflation rates as in previous studies, examine the US residential inflation hedge from 1968 to 2000. The study utilises both autoregressive distributed lag (ARDL) models and recursive regressions to investigate the relationship between housing prices and inflation. The authors' findings confirm earlier evidence that residential assets are a good hedge against inflation in the long-run. Additionally, they report that house prices are a stable inflation hedge over time.

According to Geltner and Miller (2001), private property (commercial and residential) is not a "perfect" hedge against inflation. The returns in the private property market tend to be positively correlated with inflation but not perfectly correlated.

Divergent theoretical explanations are offered for the empirical results on the inflation hedgeability of property investment. Fisher and Sirmans (1994) have presented a number of reasons why property would be an inflation hedge when supply and demand are in equilibrium. In the first place, construction (building replacement) costs have a tendency to increase with inflation. Second, market rents can be increased as the asset value rises [23]. Thirdly, when supply and demand are in equilibrium, market forces tend to equate asset value with building cost. Finally, special lease contracts (e.g. gross leases with CPI adjustments) allow rents to move with inflation [24]. Fogler *et al.* (1985) further claim that the positive relationship between housing returns and the inflation rate is the result of changing investor expectations concerning the inflation hedgeability of property.

Conversely, Titman and Warga (1989), following Geske and Roll (1983), argue that stock returns, inclusive of property investment vehicles, are the catalyst to changes in fiscal and monetary policy, which in turn cause an opposite change in the rate of inflation.

From the empirical literature and the theoretical arguments offered one cannot accept, without prudence, the hypothesis that residential property is a perfect,

short- and long-term, hedge against both expected and unexpected inflation. Despite this, there is strong empirical evidence that housing returns tend to be positively correlated with inflation, and residential property is a more effective hedge against inflation than both shares and bonds.

Diversification benefits of residential property for institutional investors

One of the earliest studies of the relative ability of housing to diversify institutional portfolio investment is that of Ibbotson and Siegel (1984). The study compares the US property returns (commercial, farm and residential) with those of shares, corporate and government bonds, short-term bills and inflation over the 1947-1982 period. The residential total returns are estimated according to the following procedure. The capital appreciation component is calculated as the annual change in the home purchase component of the CPI, not seasonally adjusted, and the income returns are net of operating expenses. The paper reports that the housing returns have been between those of shares and bonds and that housing returns are lowly correlated with the returns on the financial assets analysed. Furthermore, they accept as 'probable' that those small correlations with shares and bonds make residential property a diversification opportunity for portfolios concentrated in shares and bonds. However, there are at least two problems related with such housing return measurement: the procedure used to estimate the appreciation component and according to the authors, the imperfect marketability [25]. The finding that residential property returns are lowly correlated with those of shares is consistent with the theoretical explanation raised by Summers (1981). Summers argues that the non-neutral effect of inflation on the US tax system, through the differential change on house and share prices, can justify much of this low statistical relationship between the housing market and the share market.

Hartzell *et al.* (1986) use a capital appreciation return, based on an appraisal price index, to evaluate the diversification benefits of US residential property investment in a portfolio context for 1973 to 1983. The authors' findings confirm earlier evidence that housing assets offer attractive diversification opportunities for stock and bond portfolios along with considerable inflation hedging. Additionally, they report that residential property is weakly correlated with the non-residential property (e.g. industrial, office, hotel, and, to a lesser extent, retail). Thus, housing investment seems to provide a property diversification opportunity. That is to say that housing investment could play a potential role within portfolios of different property types. However, since all of the property segments analysed can offer diversification benefits to financial assets and, since diversification across property segments involves high cost and the administrative burden of selecting and managing the investment, the former conclusion is not clear.

Goetzmann and Ibbotson (1990) analysed residential property using two different types of indices. The first is the Home-Purchase Index of the US Government, which is an appraisal index. The second is a hypothetical well-diversified portfolio of residential assets. The later index, estimated by Case and Shiller (1990), is based upon repeated transaction sales during the period 1970-1996 in four US housing markets (San Francisco, Atlanta, Denver, and Chicago). Once again, the authors report that residential investment total returns outperformed long-term government bonds but underperformed the stock market, and that the volatility of housing investment are considerably lower than the volatility of the share and long-term government bonds [26].

The authors find that returns on residential property have a strong negative correlation with the returns on long-term government bonds and on shares, and a strong positive relationship with inflation. Additionally, they report that returns on housing are only slightly correlated with the returns on commercial property. The authors argue that, given the low correlation between residential property and financial assets; housing assets are a potential candidate in optimal mixed-asset portfolios, even if housing returns are expected to be relatively low and the volatility to be relatively high. Goetzmann and Ibbotson (1990) also demonstrate that substantial reductions in risk may be achieved by diversifying regionally in residential property.

Hutchison (1994) analyses the performance of UK housing assets in short-to-medium holding periods, both in absolute terms and in comparison with financial assets (shares and government bonds) over the 1984-1992 sample period. The residential total return is estimated according to the following procedure. The appreciation component is calculated as an annual change in a housing price index, and the income return is assumed to be a constant percentage of the capital value. The housing price index used is based upon opinions of the district valuers derived from sales information in their possession. The author reports low levels of correlation between the return on housing and those on shares and government bonds. In contradiction to previous studies, the computed data suggest that the returns adjusted for risk on housing investment underperformed those on both shares and government bonds during the sample period. However, the housing series used does not extend through a complete housing market cycle, including boom and bust. Thus, the data could not be sufficient to draw definitive conclusions about long-term historical risks and returns of housing investment in UK. Conversely, since the housing price index is based upon opinions, the time series probably suffers from smoothing problems.

Liang *et al.* (1996) investigate the performance of apartments in a context of optimal multi-asset portfolios, using US housing real estate investment trusts (REITs) instead of unsecuritised housing investment. This approach carries two problems. First, the percentage of US REITs that invest exclusively in housing is low. Second, the behaviour of securitised and unsecuritised property does not always exhibit the same pattern. In order to overcome the problem, Liang *et al.*, construct a “double hedge” apartment REIT index for the sample period between 1982 and 1993. This index removes the return components of market share in general and non-apartment equity REITs from REITs that invest in apartment property. They report a weak relationship between unsecuritised housing and stocks and bonds, and a strong, positive relationship between direct and indirect housing investment. In addition, they suggest that there are potential benefits of housing (securitised and unsecuritised) allocation on efficient mixed-asset portfolios.

Hoesli and Hamelink (1997) analyse the residential property diversification benefits to multi-asset portfolios during the period between 1981-1992, in two Swiss housing markets (Geneva and Zurich). The housing total returns are estimated according to the following procedure. The appreciation returns are calculated as the annual change in a hedonic price index, and the income returns are computed on the basis of a constant rental return, in which a 150 basis points for operating expenses were then subtracted. The authors confirm earlier evidence that housing assets provide diversification benefits for multi-asset portfolios even though the illiquidity of residential property is

accounted for (they use illiquidity premiums of 50, 100 and 150 basis points). Additionally, they find that an investor who holds housing in one Swiss housing market would also gain benefits from investing in another Swiss housing market when only the housing investment asset's class of the portfolio is considered.

Ben-Shahar (2001) relying on a capital appreciation return based on a transaction price index over the period 1990-2000, finds that the returns adjusted for risk on housing investment in Israel outperformed those on both the shares and bonds according to both Jensen and Treynor indices and slightly under-performs according to the Sharpe Index. Furthermore, the study shows evidence that housing assets' allocation has potential benefits on optimal mixed-asset portfolios. This result is due primarily to the weak correlation between residential property returns and financial assets over the period.

Montezuma and Gibb (2003) evaluate direct residential as an institutional asset group in three European countries (Switzerland, The Netherlands and Sweden) where the involvement of institutional investors in the private rented sector is significant compared with other countries in Europe. The three criteria used to evaluate residential property as an institutional group include:

- (1) private rental market value relative to institutional wealth;
- (2) mean-variance performance; and
- (3) hedge against inflation.

Regarding the first criteria the authors find that the value of the potential private rental market is sufficiently large to provide institutional diversification benefits. Additionally, they find, using a bootstrap analysis, that the risk-averse institutional investor may obtain significant diversification benefits from investing in housing. Finally, the paper reports that housing appears to be a good hedge against inflation in Switzerland and Sweden.

One must be conscious that a variety of factors other than those considered in the simplistic modern portfolio theory framework drive the strategic asset allocation decisions of institutional investors.

First, the classic mean-variance framework ignores the presence of liabilities in the decision process [27]. This is not completely realistic since one of the major institutional investment policy objectives is to ensure sufficient assets to meet liabilities. In other words, the institutional investors must also tailor their asset holdings to hedge their liabilities. Accordingly, Chun *et al.* (2000) following Sharpe (1990) argue that the maximisation of risk-adjusted future surplus value (equal to assets minus liabilities) can imply that pension funds' allocations are different to those suggested by the simplistic mean-variance framework. Thus, the institutional allocation can be best seen in an asset-liability context, where the net wealth portfolio (present value of future liability obligations minus present value of asset holdings) is optimised, rather than in an asset-only context.

Second, the overall market for an investment opportunity must be sufficiently large in order to provide significant diversification benefits (Muralidhar, 2001). Since the private rented sector in most of the developed countries represents a small percentage of total housing stock and the vast majority of privately-rented houses are let by individual landlords, the proportion of the stock available for the institutional investors allocation is usually minor. It appears that this fact may possibly be an explanation for

the low institutional investment towards private rented sector. However, one can argue that this fact is more a result of the lack of institutional interest in the rented housing than a cause of that disinterest.

Third, institutional investment strategies are established in relation to a benchmark portfolio [28] against which the investment manager performance is measured (Hoesli and MacGregor, 2000). Since the benchmark portfolio, due to the small-scale portfolio effect, tends to have a low proportion of funds allocated to property, the investment managers are reluctant to allocate significant proportions of funds to property classes.

Fourth, the empirical studies reviewed do not include international shares (and international property) as an asset class, despite the fact that foreign-based equities are usually considered eligible assets by institutional investors. Some studies (e.g. Gordon *et al.*, 1998) have shown evidence that when international shares are included in the portfolio optimisation, the allocation towards property becomes less important.

Finally, the hypothesised ability of housing to generate improved portfolio risk-adjusted returns may be modified when the multi-asset portfolio already includes other segments of property investment (e.g. office, retail, industry), as the diversification across property segments is costly.

Conclusions and further research

The reviewed empirical studies on inflation and residential property returns have not provided a consistent answer about the degree of inflation protection which can be afforded towards housing investment. In particular, tests using total returns (appreciation and income components) have obtained weak results. Conversely, most of the empirical studies that rely on appreciation returns as proxy for total returns (based on transaction or appraisal price indices) report a complete hedging against both expected and unexpected inflation. From this literature review one can argue that the housing hedging effectiveness conclusions are more dependent on the way in which housing return is constructed than on the nature of the underlying housing price index. This argument is corroborated by the study of Rubens *et al.* (1989).

Inconsistent empirical evidence on the ability of housing to provide a hedge against inflation could simply be a consequence of the lack of standardisation in the measurement of housing returns and methodologies used to compute expected inflation. Nevertheless, the literature reviewed suggests that residential property is a more effective hedge against inflation than both shares and bonds.

With regards to potential benefits of diversification across regional housing markets in the same country, the empirical studies again have not been consistent.

For instance, the diversification benefits of holding a multi-regional portfolio within the UK and Switzerland, appear to be higher than those within Sweden. In addition, the reviewed empirical studies suggest that there are diversification benefits from holding a multi-state portfolio within the USA.

The positive, while small, correlations between housing returns and those of commercial property, suggests that residential property could have a potential allocation role within multi-property portfolios.

The reviewed studies, though based on return series constructed using different procedures and data sources, generally report that unsecuritized housing investment not only generates risk-adjusted returns comparable to those of bonds and shares, but also exhibits low levels of correlation with the classic asset classes of the institutional

portfolios. As a consequence, residential property seems to provide an alternative allocation to institutional investors looking for ways to hedge against changes in the shares and bond markets. Moreover, since the correlation between housing and commercial property is low, housing may well provide within-property diversification opportunities. Therefore, residential property may still occupy a position in an institutional multi-asset portfolio, even when the investment portfolio already includes other property segments. However, since the different property segments are able to offer diversification benefits to bonds and shares and since diversification across property segments is expensive, the latter conclusion is not clear.

Notes

1. This three-market model is applicable to the income-producing housing (rented housing sector). However, when the owner and the occupant of the space are the same, as is the case of the owner-occupier sector in the housing market, the notion of two separate markets is no longer applicable. In the owner-occupier sector acquisition of the residential asset and acquisition of the use of residential space become a combined decision.
2. The tenants are competing with homeowners for consumption of residential space. In that sense, the variables that determine the homeowner user cost (mortgage interest rate, residential depreciation, maintenance and expected appreciation rates, housing tax treatment) also have an indirect influence on the demand of residential space. However, and as Geltner (1989) argues, the consumption benefit of housing ownership requires ownership *per se*. Therefore, the assets traded in the owner-occupier and rental sectors should be treated separately.
3. On the supply side of the residential space market we also find the owner-occupiers that are simultaneously producers and consumers of housing services.
4. One note of caution in using this framework is that the three-market model ignores the social rented sector.
5. Recall here that for the owner-occupiers the purchasing of a house and the purchasing of the use space is one combined decision.
6. We use "return" to indicate the return on an investment over a particular span of time called holding period return. Return will be measured by the sum of the change in the market price plus any income (rent deduced from operational costs) received over a holding period divided by the price of the asset at the beginning of the holding period. On the other hand, risk or dispersion of the returns around the mean is measured either by the standard deviation or by variance.
7. Systematic (non-diversifiable) economic risk factors such as interest rates, inflation, market portfolio.
8. The risk premium is determined by the difference between the riskless interest rate and the expected rate of return on the asset.
9. There are several studies about the integration/segmentation between commercial real estate and capital markets. Unfortunately, the conclusions about this discussion are not clear. See for example Ling and Naranjo (1999), Barkham and Geltner (1995) and Liu *et al.* (1990).
10. According to Jones Lang LaSalle (2000) the US institutional residential investment experience suggests that it is the structure and management of vehicles that is key to performance rather than the vehicle itself.
11. The studies in general conclude that the housing market is informationally inefficient. Future excess returns to housing assets are partly predictable on historic information. In spite of this, it is not possible to establish consistently a profitable trading rule because of

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- high transaction costs in the housing markets. See Case and Shiller (1989, 1990), Poterba (1991), Abraham and Hendershott (1996), Clayton (1998).
12. Arbitrage profit-making by buying an asset at low price in one market and simultaneously selling in another market at a higher price.
 13. According to Davis (2000) liquidity is the ability to transact a large volume of assets without moving the price against them, anonymously and at low transaction costs. Silber (1970) points out that if two assets are identical in all respects except that one has a well-organised secondary market while the other has a poor secondary market, an investor in the latter runs the risk of being able to liquidate his asset holdings only at a low price (compared with the price offered for the security with the better market conditions).
 14. According to Davis (1996) "Institutional investors may be defined as specialised financial institutions which manage savings collectively on behalf of small investors, towards a specific objective in terms of acceptable risk, return-maximisation and maturity of claims".
 15. The intervention of government in the housing sector has occurred through diverse instruments, namely, taxation, subsidy, regulation and provision; intervention, which entails some political risk. Political risk here is defined as the possibility that changes in policy affecting the private rented sector (e.g. rent control) will influence a property's investment return.
 16. The British Government announced recently the introduction of investment property trusts, tax-friendly vehicles.
 17. An open-end fund consists of a commingled fund that does not have a finite life and accepts new investor capital (selling new participation units) and carrying out new property investments. The liquidity of these types of investment vehicles is far from being completely adequate for all situations that might arise, and redemption is usually subject to certain restrictions and conditions. Property open-end funds have an additional problem with establishing the current value of their assets, that arises from the fact that their properties are sold infrequently. Normally, the participation units are priced based on appraisals.
 18. Closed-end funds consist in a commingled fund that has a targeted range of investor capital and a finite life. The units of these type of funds are traded over-the-counter or on stock exchanges and may trade at a premium or discount from the net asset value per unit.
 19. According to Bikhchandani and Sharma (2000) herding results from an obvious intent by investors to copy the behaviour of other investors.
 20. The period-by-period total return has two components known as the income return (income paid out by the asset during the period) and the appreciation return (change in the capital value of the asset during the period).
 21. The expected rate of inflation is the difference between the nominal interest rate and the forecast real interest rate. On other hand, unexpected inflation is the difference between the realised inflation during the period and expected inflation at the beginning of the same period.
 22. According to Liu *et al.* (1997) the Societes Immobilières d'Investissement invest more than 75 per cent in residential property.
 23. This could not be always true for the housing market because of government actions in order to restrict rental increases in the private rented sector.
 24. Once more, this type of arrangement is more typical in commercial property leasing than in housing leasing contracts.
 25. The authors argue that marketability costs (information costs, search and transaction costs, and heterogeneity costs) must be considered when property returns are compared with those of financial assets.

26. As Goetzmann and Ibbotson (1990) point out, for the individual homeowner, who does not have a well-diversified portfolio of residential properties, the risk is much higher. The risk of investment in an individual home over a year is closer to 12 per cent than the 3 per cent for a large portfolio of houses.
27. According to Muralidhar (2001), the pension fund equation determines that the sum total of present assets, future contributions (funding policy), and future asset returns (investment policy) must equal present and future liabilities.
28. The benchmark portfolio is the strategic long-term asset allocation of the investor that is described by listing the various asset classes in which the plan is invested and the long-term target allocations. Thus, the benchmark includes both large and small portfolios. Because there are significant barriers to property investment (that is, cost and administrative burden of selecting and managing the investment), the small-scale portfolios usually do not have a propensity to invest in property (Ciochetti *et al.*, 1999).

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