# Chapter 1

## Introduction: property investment analysis in its context

### 1. Property as an investment

In 1977 the index value of the average prime (institutional quality) office in the UK stood at 100 (Investors Chronicle Hillier Parker Market Indicators). By 1985 the index had risen to 208. The average prime office increased in value by 108% over that 8-year period, an average annual increase of 9.6%.

In 1975 a major UK pension fund bought a 10-year old office block in North London for £2.825m. In 1977 the building had increased in value by 23.9% (or 11.3% per annum) and was valued at £3.5m. It was ten years old, and showing some signs of age. Nonetheless, it was performing quite well in a relatively quiet market.

By 1985, eight years later, the building was valued at only £3.2m. Had it kept pace with the index, its value would have been £7.28m. Instead, it had fallen in value by 8.6%, or 1% per annum, and as a result was now worth only 44% of the index value for average prime offices in the UK.

The building was now 18 years old. The relative attractiveness of the location had not changed very much, but 1960's office buildings had become highly unpopular within a very weak market for office investments, and in addition this building had developed structural problems which were not evident at the time. The property had suffered severe depreciation.

The subject of this book is the analysis of property investment depreciation and obsolescence. Analysis in this context means ñthe estimation of the worth of a property investment to an investorò (Baum and Crosby, 1988), where:

> ...worth may be expressed in three forms. Where the price of an investment is known, for example in a retrospective analysis after a sale, or where negotiations for a purchase by private treaty have neared completion, then the worth of the investment must be expressed either as a *rate of return* or as an excess value over the price (*net present value*) at a given target rate. Where the price is unknown, for example where an investment is to be sold by auction, the analysis is aimed at an assessment of the *capital value* of the investment, or the maximum price that can be paid, given a target rate of return.

The subject matter of the research described in this book is focussed on one particular variable, depreciation, for two reasons: firstly, because it is concerned with worth, and secondly because little is known about it. The twin aims of this work are to gain a fuller understanding of the way in which property investments depreciate and to be able to use that information to analyse property investments.

Investment is ña vehicle into which funds can be placed with the expectation that they will be preserved or increase in value and/or generate positive returnsò (Gitman and Joehnk, 1984); it is also described as ñthe sacrifice of something now for the prospect of later benefitsò (Greer and Farrell, 1984).

The generation of returns and benefits can arise in three ways. These are:

i. generating a flow of income, or reducing income tax;
ii. generating a return of capital, whether it be less than, equal to or more than the initial sacrifice, or reducing capital tax; or

iii. producing a psychic income, a positive feeling induced by ownership of an investment which may be incapable of financial quantification.

Investment return is therefore a function of income, capital return and psychic income. Property is now examined in that light.

## 2. The qualities of property

The income produced by a property investment is in the form of rent reduced by operating expenses of various types. While operating expenses will be incurred both regularly (for example, management and the provision of services) and infrequently (for example, repairs), rent will normally be received at regular intervals, quarterly in advance being typical in the UK. In a period of inflation, a freehold property investment may be expected to show a profit upon resale so that capital return is usually in the form of a gain. Finally, a psychic income will often be induced by property ownership.

Consequently, the return from property is generated as follows. First, the investment may produce a return of capital by resale which may differ in amount from the original investment. In freehold investments, there is an effective limit (land value) to any loss; in leaseholds, a decline to nil value must eventually be suffered. Second, the investment provides a varying income depending upon rental values, themselves a product of the demand for use of the property and the supply of alternatives. Variance of the income is reduced by leases and long review periods, and upward-only reviews will ensure, at worst, a level income. Finally, there may be a very high psychic income produced by property investment, associated with pride of ownership of a tangible, visible asset, rights of occupation, relationships with tenants, the opportunity for active management and benefits such as building naming rights.

Institutions dominate the UK property market (McIntosh and Sykes, 1985), and most institutional investment funds are currently exposed to conventional gilts and other fixed interest securities, equities, index-linked gilts, property and cash. Property has therefore to be dealt with in the context of these investment types. In detail, factors relevant to a consideration of the relative attractions of property against these alternatives are income and capital growth, psychic income, operating expenses, liquidity, tax efficiency and risk.

### Income and capital growth

The current income level may not be a good indicator of future income levels. Consequently, the initial yield may not indicate the continuing income yield that will be produced by an investment over its holding period. Where that yield is expected to increase, the initial yield may be low, indicative of a higher price being paid.

Fixed interest gilts produce a fixed income and the price reflects that fact. There is no prospect of income growth or, conversely, of monetary income loss. The initial yield is a perfect indication of the continuing income yield (*running yield*). Index-linked gilts, on the other hand, produce an index-linked income. As long as inflation is expected to be positive, income growth may be anticipated and the initial yield should therefore be lower, *ceteris paribus*, than for fixed interest gilts.

Ordinary shares produce dividends which depend upon (a) profits and (b) the management's dividend and reinvestment strategy. The latter is often used to smooth away variations in the former, so that a broad relationship between inflation and dividends may be theorised via profit

levels, and in an inflationary era where production grows in line and the company's profit share is not eroded, the profits of an average company might be expected to increase (see Fraser, 1984).

For property, a similar relationship between *inflation* and rents may be discernible. The Investors Chronicle Hillier Parker Rent Index (May 1985) shows that over the period 1977 to 1985 inflation was accurately matched, on average, by rental values (see Table 1)

*Table 1:* Rent indices adjusted for inflation, 1965 - 1985

| Year | ICHP Rent Index | Shops | Offices | Industrials |
|---|---|---|---|---|
| 1965 | 87 | 87 | 86 | 86 |
| 1969 | 106 | 102 | 113 | 98 |
| 1972 | 121 | 123 | 131 | 101 |
| 1974 | 155 | 142 | 188 | 114 |
| 1975 | 155 | 140 | 180 | 127 |
| 1976 | 112 | 110 | 115 | 107 |
| **1977** | **100** | **100** | **100** | **100** |
| 1978 | 103 | 109 | 101 | 101 |
| 1979 | 112 | 123 | 106 | 110 |
| 1980 | 107 | 117 | 100 | 108 |
| 1981 | 105 | 112 | 101 | 101 |
| 1982 | 102 | 110 | 100 | 96 |
| 1983 | 101 | 111 | 99 | 93 |
| 1984 | 101 | 113 | 98 | 91 |
| 1985 | 101 | 119 | 97 | 88 |

Source: Investors Chronicle Hillier Parker Rent Index

Causes of income growth other than inflation may also be considered. There may be prospects for *real growth* so that particular sectors of the market, defined by type or region, may perform particularly well over a particular period (see, for example, offices over the period 1969 to 1974, in Table 1).

One of the major problems of this type of analysis is the quality of the data. There are no definitive rental value indices; and it was not until the mid 1960's that *any* indices of rental value movements were published. A recent study (Crosby, 1985) attempted to remedy this at the local level by constructing a shop rental value index for Nottingham city centre for 1910 to 1981. The results from 1910 to 1960 are set out in Table 2 and show that between 1910 and 1960 a real growth rate of 1.25% per annum was achieved. Theorising simplistically, a supply artificially restricted by planning controls may be set against increasing demand as behaviour patterns change and population increases to cause real rental growth. A similar effect may be translated into real dividend increases for ordinary shares; it is not present for fixed interest (conventional) gilts.

There may also be *monopoly profits* which accrue to property owners. Property interests are unique. Although the impact of heterogeneity will vary according to circumstances, extra gains may be made by exploiting the resulting monopoly position. An extreme example of this is marriage value. The owner of a mid-length leasehold interest will almost certainly be unable to sell to an investor at a price which matches the gain which the freehold reversioner could make by its surrender. Monopoly profits may as a result accrue to both freeholder and leaseholder. Other *special purchasers* (funds which are especially keen to buy a property for portfolio balance, for example) may appear.

Re-zoning or betterment created for example by the siting of a new motorway or by the reallocation of land planned for commercial development may well produce capital gains in excess of inflation. These can also be termed monopoly profits, because they may be the product of the exploitation of monopolistic information or of monopolistic land ownership.

Finally, *gearing* or leverage, the use of borrowed funds to exaggerate capital and income growth, is particularly suited to property investment which is regarded as excellent collateral security. Such gains can be maximised by increasing the gearing level in times of high price increases, especially if interest rates are low and taxation rules are favourable. The risk of financial failure resulting from interest rate increases or falling prices is at the same time increased by such a policy.

Nonetheless, the general inflationary trend since the second world war and the particular experience of 1960-1972, when many massive gains resulted from such policies (see Marriott, 1967 and Rose, 1985), provides an example of a sustained period which demonstrated the benefits of gearing. While equities may also be geared (for example by the use of options), property is perfectly placed to benefit from the advantages of leverage, especially when downside risk may be controlled by the use of upward-only rent reviews.

Property income and capital growth are, however, limited by two factors: first, rent review periods of five years; second, and more important, depreciation (see Section 3, below).

*Table 2*: Nottingham city centre retail property: rents, inflation and initial yields, 1910 - 1960

| Years | Prime Rent Index (1) | | Average Rent Index (2) | | RPI (3) | Prime Initial Yields (4) | Gilts (5) |
|---|---|---|---|---|---|---|---|
| 1910 | 100.00 | 43.3( | 100.00 | 38.20 | 94 | 5.00 | 3.10 |
| 1911 | 96.90 | | 96.00 | | 95 | 5.00 | 3.20 |
| 1912 | 95.40 | | 92.90 | | 98 | 5.00 | 3.30 |
| 1913 | 95.40 | | 91.60 | | 100 | 4.50 | 3.40 |
| 1914 | 95.40 | | 91.60 | | 101 | 6.50 | 3.30 |
| 1915 | 95.40 | | 91.60 | | 121 | - | 3.80 |
| 1916 | 95.40 | | 91.60 | | 143 | - | 4.30 |
| 1917 | 96.90 | | 94.60 | | 173 | - | 4.60 |
| 1918 | 99.20 | | 99.30 | | 199 | 6.75 | 4.40 |
| 1919 | 101.50 | | 104.40 | | 211 | 5.00 | 4.60 |
| 1920 | 104.60 | | 109.80 | | 244 | 5.00 | 5.30 |
| 1921 | 106.90 | | 114.80 | | 222 | 4.50 | 5.20 |
| 1922 | 109.20 | | 120.50 | | 179 | 5.50 | 4.40 |
| 1923 | 111.50 | | 125.60 | | 171 | 6.00 | 4.30 |
| 1924 | 118.50 | | 132.30 | | 172 | 6.25 | 4.40 |
| 1925 | 123.10 | | 138.70 | | 173 | 6.00 | 4.40 |
| 1926 | 127.70 | | 148.80 | | 169 | 5.50 | 4.60 |
| 1927 | 133.80 | | 157.60 | | 164 | 5.00 | 4.60 |
| 1928 | 140.00 | | 168.40 | | 163 | 4.00 | 4.50 |
| 1929 | 147.70 | | 180.10 | | 161 | 5.00 | 4.60 |
| 1930 | 153.80 | | 198.70 | | 155 | 6.00 | 4.50 |
| 1931 | 135.40 | | 159.90 | | 145 | 9.00 | 4.40 |
| 1932 | 135.40 | | 158.90 | | 141 | 8.00 | 3.70 |
| 1933 | 135.40 | | 158.20 | | 137 | 6.50 | 3.40 |
| 1934 | 135.40 | | 160.30 | | 138 | 6.50 | 3.10 |
| 1935 | 135.40 | | 161.90 | | 140 | 6.00 | 2.90 |
| 1936 | 135.40 | | 166.70 | | 144 | 6.00 | 2.90 |
| 1937 | 143.80 | | 177.80 | | 152 | 5.50 | 3.30 |
| 1938 | 152.30 | | 187.20 | | 153 | 5.00 | 3.40 |
| 1939 | 146.20 | | 181.50 | | 158 | 5.00 | 3.70 |
| 1940 | 140.00 | | 172.10 | | 179 | 7.50 | 3.40 |
| 1941 | 140.00 | | 170.00 | | 197 | - | 3.10 |
| 1942 | 140.00 | | 170.00 | | 210 | - | 3.00 |
| 1943 | 140.00 | | 170.00 | | 217 | - | 3.10 |
| 1944 | 140.00 | | 170.40 | | 222 | 7.00 | 3.10 |
| 1945 | 161.50 | | 192.80 | | 226 | 6.00 | 2.90 |
| 1946 | 230.80 | 100.0( | 262.00 | 100.00 | 236 | 5.00 | 2.60 |
| 1947 | | 105.60 | | 108.90 | 249 | 4.50 | 2.80 |
| 1948 | | 110.20 | | 116.00 | 268 | 4.50 | 3.20 |
| 1949 | | 111.90 | | 124.10 | 275 | 4.50 | 3.30 |
| 1950 | | 114.10 | | 131.40 | 283 | 4.50 | 3.50 |
| 1951 | | 116.70 | | 138.00 | 311 | 4.50 | 3.80 |
| 1952 | | 123.30 | | 146.30 | 338 | 5.00 | 4.20 |
| 1953 | | 139.80 | | 160.90 | 349 | 5.50 | 4.10 |
| 1954 | | 158.60 | | 170.00 | 355 | 5.20 | 3.80 |
| 1955 | | 179.80 | | 198.30 | 371 | 5.00 | 4.20 |
| 1956 | | 200.00 | | 224.50 | 389 | 5.50 | 4.70 |

*Notes to Table 2:*
(1), (2), (4) Compiled by Crosby from data obtained from a number of sources. Main source: Harlow Shelton & Co., Chartered Surveyors, Nottingham.

(3) National Income Expenditure and Output of the UK 1865 - 1965 (for reference, see Crosby, 1985).

(5) Abstract of British Historical Statistics and Second Abstract of British Historical Statistics (2% Consols, undated stock, gross redemption yields) (for reference, see Crosby, 1985).

**Psychic income**

For many smaller investors property has an appeal unmatched by the alternatives. For some, this may be a prestige or even advertising value: for others, it may be the opportunity for exercising positive management and, while perhaps increasing return, offering self-employment. This may have a marginal downward impact upon the required initial yield.

**Operating expenses**

Once the purchase of an investment has been completed, the investor must face the prospect of continued expense necessitated by ownership. For bank deposits, such operating expenses are nil, apart from the investor's own time spent in checking accounts. For securities, the management of a given investment (rather than a portfolio) is again reduced to reading the financial press. For property, on the other hand, operating expenses derive from several sources. Repair and maintenance costs, insurance premiums, rent review fees, management (rent collection, periodic inspection, service management) fees, shortfalls in service charges, rates (in some circumstances), re-letting fees, refurbishment costs, dilapidations claims, and various legal expenses arising out of disputes with the public, tenants or adjoining owners contribute to a potentially high annual expenditure for the property investment owner, and may increase required yields.

**Liquidity**

Liquidity is the ease and certainty with which an asset can be converted to cash at, or close to, its market value. Bank deposits are almost perfectly liquid; gilts are usually convertible to cash within one day; and equities may be transformed to cash within a week to a month. Property is relatively illiquid. A quick sale will not usually be possible unless a low price is accepted. Even then, the period between a decision to sell and receipt of cash can be as long as three months.

Contributing to property's illiquidity are three factors. Marketability describes the reserve of potential buyers for an investment and the speed and ease with which they may be contacted. For large property investments - buildings worth more than £10m, say - the number of potential buyers may be small. For unusual investments the potential market may be difficult to target and advertising may be highly inefficient. On the other hand, the stock exchange ensures the marketability of most gilts and equities.

The indivisibility of property as an investment contributes to its lack of marketability and therefore to its illiquidity. The possibility of sale of part of an investment reduces the impact of this problem and facilitates flexible financial management. Property can be physically divided, divided

into freehold and leaseholds or split into time shares, but it remains in general a fundamentally indivisible investment, with a high minimum outlay. Until a unitised market becomes established the purchase and sale of small units of property investment will not normally be possible. This is not true of alternatives.

The transfer costs necessitated when a decision to sell is finally translated into cash are higher than those associated with the alternatives. Stamp duty, conveyancing fees and agents' fees on purchase and sale may total 3% and 2.5% of price respectively. A more likely transfer cost for equities is around 0.5% for a reasonable volume, and the analogous costs are likely to be less for gilts.

Illiquidity and its associates may therefore be said to be highest for property in comparison with the chosen alternative. It has been argued (Fraser, 1985) that the infrequency of property trading as compared with trading frequency in the stock market reduces the importance of this factor, but infrequency of trading probably *results* from illiquidity. The fact remains that cash tied up in property is, pound for pound, less liquid than cash tied up elsewhere. This has two implications: firstly, it increases the chances of a company becoming financially embarrassed and put out of business by lenders; secondly, it decreases the chances of attractive alternatives being acquired. For property companies, the illiquidity of property may be said to be more of a problem than it is for the larger institutions, but in general illiquidity should increase required initial yields for property.

**Tax efficiency**

The tax efficiency of an investment refers to the degree to which a gross return is reduced to a net return for the individual investor. Given the different and complex tax positions of individuals, institutions and companies alike, it is impossible to make generalisations about the relative tax efficiency of a real estate investment. However, tax warrants thorough attention in each individual appraisal, and is consistently under-rated as a factor in property investment analysis.

**Risk**

Most investments are traded in an atmosphere of uncertainty, so that it is not possible to predict with accuracy what the level of return will be. Even fixed interest gilts held to redemption produce a return which is uncertain in real terms and dependent upon future inflation levels for purchasing power.

Some finance texts view risk as the major determinant of return. Modern portfolio theory contributes to this importance by regarding the investment decision as a trade-off between expected returns and risk (see Branch, 1985).

Reilly (1985) defines risk simply as 'uncertainty regarding the expected rate of return from an investment'. While there is nothing intrinsically unattractive about uncertainty when the expected rate of return may be much higher or much lower than expected, conventional wisdom is (as suggested above) that investors are on average risk-averse. For example, Brigham (1985) states:

> Most investors are indeed risk-averse. Since this is a well- documented fact, we shall assume risk aversion throughout the remainder of the book.

Downside risk is typically of more practical concern than its upside equivalent. Risk aversion therefore implies that a normal but narrow distribution of possible returns from an investment is preferable to another with greater spread, because upside and downside risk cannot be said to

cancel. While upside risk may imply super-performance of an investment or a portfolio in any one year, and this is usually (but not always) welcome, downside risk may imply liquidation of a company or fund through insolvency, the effects of which cannot be matched by equal chances of high returns.

There are many sources of property risk, some unique to this investment form (see Baum and Crosby, 1988). They include, in particular, the chance that the tenant will affect return adversely by his actions and the chance of changes in the law, in taxation rules or in planning policy which directly or indirectly affect investment returns. More relevant to the subject matter of this book, however, are sector risk and structural risk.

*Sector risk*

Sector risk is the chance that differential sectoral price movements affect the subject investment. Such a risk is present in the ordinary share market, where the choice of sector may be vital. Electricals may underperform industrials and chemicals; within that sector, micro-electronics may underperform household goods.

A property's sector risk is more sharply focused than this. Given the *lumpiness* of property investment, property is particularly prone to sector risks in two dimensions. First, there is a risk of a performance differential between office, shop and industrial sectors. For example, in the period 1977 to 1985 industrials, on the whole, performed poorly in relation to shops (see Table 1).

Second, the locational factor provides a dimension of risk which is not exactly parallelled elsewhere. To illustrate this, Table 3 shows regional variations in rental value and capitalisation rates between 1977 and 1985.

*Table 3*: Shop rents and yields, 1977 - 1985

| | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 |
|---|---|---|---|---|---|---|---|---|---|
| **Rent index** | | | | | | | | | |
| All shops | 100 | 117 | 147 | 170 | 181 | 195 | 203 | 219 | 244 |
| North | 100 | 119 | 166 | 187 | 202 | 224 | 230 | 255 | 282 |
| South East | 100 | 109 | 138 | 171 | 196 | 206 | 222 | 236 | 265 |
| Midlands | 100 | 115 | 137 | 161 | 176 | 202 | 210 | 221 | 250 |
| Scotland | 100 | 121 | 152 | 188 | 192 | 191 | 194 | 200 | 221 |
| London | 100 | 121 | 147 | 159 | 157 | 160 | 165 | 184 | 203 |
| **Average yields (%)** | | | | | | | | | |
| All shops | 6.1 | 5.3 | 4.8 | 4.8 | 4.7 | 4.7 | 5.0 | 4.8 | 4.8 |
| North | 5.9 | 5.1 | 4.5 | 4.5 | 4.4 | 4.4 | 4.6 | 4.5 | 4.5 |
| South East | 5.6 | 4.8 | 4.3 | 4.3 | 4.1 | 4.1 | 4.4 | 4.1 | 4.1 |
| Midlands | 6.1 | 5.3 | 4.7 | 4.7 | 4.6 | 4.6 | 4.8 | 4.6 | 4.6 |
| Scotland | 5.9 | 5.4 | 5.3 | 4.9 | 4.8 | 4.8 | 5.3 | 4.8 | 4.7 |
| London | 6.8 | 5.9 | 5.4 | 5.4 | 5.4 | 5.4 | 5.7 | 5.7 | 5.7 |

Source: Investors Chronicle Hillier Parker Rent Index and Average Yields

To illustrate this more simply, the annual rate of return on shop property in the North and London performing in line with the regional rent movements and yield fluctuations would be as shown in Table 4.

*Table 4*: National property performance, North and London, (%) 1978 - 1985

| | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | Average |
|---|---|---|---|---|---|---|---|---|---|
| North | 37.6 | 58.1 | 12.6 | 10.5 | 10.9 | -1.8 | 13.3 | 10.6 | 17.75 |
| London | 39.4 | 32.7 | 8.2 | -1.3 | 1.9 | -2.3 | 11.5 | 10.3 | 11.68 |

Source: Table 3
Note: Assumes annual reviews

Although shop average yields have fallen since 1977, industrial and office yields have risen. The average industrial yield shows a greater variation than shops by region. The south east industrial average yield was 8.8% in 1977 and by 1985 had returned to the same figure. The industrial yield in the north was also 8.8% in 1977 but had risen to 11.9% by 1985 (May) and rents had remained static since 1980 with corresponding real declines in value. An industrial property in the north bought in 1977 and having performed like the index would show an eight year average annual average return of just 1.4% between May 1977 and 1985. A property in the south east would have an annual average return of 10.4% over the same period. Sectoral risk clearly applies to both property region and property type.

*Structural risk*

Structural risk is the chance of high repair costs, maintenance costs, refurbishment and, eventually, rebuilding becoming necessary. Such risks are not parallelled in other markets other than indirectly, and even then in a highly diversified manner. (For example, there may be structural risk attached to the performance of ordinary shares in a heavy industry company with one old manufacturing plant, but this type of risk would be much reduced in the case of a chain of retail shops where a spread of units (if owned freehold) would diversify such risk and reduce its impact on performance.)

It is not currently easy to generalise about the life of building types. However, freehold interests in prime shop units are much less prone to structural risk than are modern industrial units. Shops are often simple cubes, the responsibility for much of the renewal of which is passed to tenants, while for industrial buildings the type of construction, the nature of occupation and the impact of technology upon industry reduce economic life. It is also clear that land is less likely to *depreciate* in normal circumstances, so that property investments with a proportionately larger land value are less prone to structural risk. Office buildings in the City of London are thus less prone to structural risk than are similar buildings in Houston, Texas where land values are less protected by physical boundaries and planning restrictions, and are in any event lower due to the relative eminence of the City of London as a financial centre.

Other structural risks may be passed on to tenants through full repairing and insuring leases, but the ultimate responsibility for obsolescence and fundamental defects rests with the property owner who consequently shoulders a risk unique to this form of investment.

*Money or real risk?*

Risk is typically measured by volatility, and may be analysed in terms of the volatility of money income (the possibility of variations in the actual income and capital returns from the expected) or in terms of the volatility of real income (the possibility of variations in the real value of actual and capital returns from the expected). The choice is a significant one and depends greatly upon the liabilities of the investor. A predictive comparison of property with (for example) fixed interest

gilts is simpler on the former basis, while a comparison with index-linked gilts is simpler when predicated on the latter basis.

Real risk is arguably a preferable basis for investment comparison. However, property investment analysis is likely to be more capable of comparable interpretation against other capital market investments in a monetary, rather than real, framework, and this is the assumption underlying this work.

*Individual asset or portfolio risk?*

Markowitz developed a portfolio model (Markowitz, 1959) which showed how risk may be reduced within a portfolio by combining assets whose returns demonstrate less than perfect positive correlation. Given that the typical investor is risk-averse, the combination of two or more investments whose returns fluctuate over time and in different conditions but in opposite directions can reduce risk without at the same time reducing return. Thus, if it can be shown that as industrial properties decline in value shops increase in value and *vice versa*, a two-asset property portfolio is superior to a portfolio comprised exclusively of either individual asset. The investor de-values a risky asset; two negatively correlated risky assets in combination would therefore be worth more than the sum of the two individual values.

Sharpe (1964) showed that it is unnecessary to compute correlations between all asset types where investors hold large diversified portfolios, in other words market portfolios. Volatility in relation to the market becomes the only risk type which will be compensated by high return. Beta (ß) is the measure of systematic risk, the volatility of an investment in relation to the market portfolio (that is, a portfolio comprising every known asset weighted in terms of market value). A beta of 1.0 implies that, as the market increases in value by 10%, the expected value of the investment increases by 10%. A beta of 2.0 implies that as the market increases in value by 10% the expected value of the investment increases by 20%; a beta of 0.5 implies that as the market increases in value by 10% the expected value of the investment increases by 5%; and so on.

The return on a risky investment should comprise the risk free rate plus a risk premium (Rp) which reflects the systematic risk of the investment relative to the market. Where an investment is twice as risky as the market, the expectation is that it should earn twice the risk premium. The measure of this relative riskiness is beta (ß). Thus (where Rm is the return on the market) the return on a risky investment (Ra) is given by the following:

$$Ra = RFR + ß(Rm - RFR)$$

$$Rm - RFR = Rp$$

Therefore, $$Ra = RFR + ß(Rp)$$

Empirical studies in the UK have shown that Rp has in recent years been close to 9% (Brown, 1985). The risk free rate is estimated in nominal terms and is based on the return on short-term Treasury Bills, or the redemption yield on short-dated government bonds. Assuming a nominal risk-free rate of 10%, the expected return on the market can be estimated as follows:

$$\begin{aligned} Rm &= RFR + Rp \\ &= 0.10 + 0.09 \\ &= \underline{19\%} \end{aligned}$$

The required return on risky investments can then be calculated given a value for beta of the individual asset against the market. Brown (1985) made an attempt to estimate betas for the three

major sectors of the property market. However, there are three major difficulties in such an approach.

1. Data which enables the estimation of beta against a market is artificially smoothed by the use of valuation, rather than trading price, data.
2. The estimation of beta against the market requires a market index which includes property, but no such index exists.
3. Property investors cannot hold the market, so that it cannot be assumed that the market is dominated by fully diversified investors for whom the relevant risk measure is beta.

Baum (1989b) presents a fuller discussion of the problems inherent in a CAPM approach. In summary, it appears that the absolute downside variability of the property asset continues to be relevant, and that CAPM is not applicable in a property context. For example, Hargitay (1983) and Ward (1979) confirm the caution which must be exercised in applying the capital asset pricing model to the property market given current data and index constraints. This book therefore applies traditional risk measures.

## 3. The importance of depreciation and obsolescence

Property is an investment class which competes for the allocation of institutional funds with cash and securities, including equities and both conventional and index-linked gilts. Its appeal lies in its ability to enhance portfolio returns and/or to reduce portfolio risk.

### Return

The ability of property to enhance portfolio returns is dependant upon its reaction to inflation, its potential for producing a real return, its occasional monopoly rewards and its suitability for leverage. This ability is, however, constrained by rent review patterns and, more importantly, by a factor which, for the moment, shall be called depreciation and obsolescence. In the early 1980's the perceived attractiveness of property as a growth asset was somewhat checked, and it is argued in Chapter 3 that the major factor in this re-assessment was a growing fear of depreciation and/or obsolescence, with little attempt made to distinguish the two. Chapters 1 and 2 of this book follow a similar practice, whereby the terms are used interchangeably. In Chapter 4 a distinction is derived, and the remainder of the work maintains that definitional distinction.

To state the matter simply, buildings wear out, and in the 1980's they were probably wearing out more quickly than at any time previously. Realisation of this caused yields in the more sensitive areas of the market (provincial offices and all industrials) to respond by moving upwards, and the result was extremely poor, and even negative, property performance in the context of a strong equity market performance in the early and mid 1980's. Table 4 contrasts the performance of shops and industrials in the period 1980 to 1984, and raises the possibility that a special factor affected the latter. This prompts an interest in property depreciation and obsolescence and raises one of the two major questions addressed in this book. That first question is: is it possible to find out more about the causes of depreciation and obsolescence, so that its impact may be limited by developers and property managers?

### Risk

Property may reduce portfolio risk because it is poorly correlated with other assets and because it exhibits low volatility, especially in real terms (see Appendix A). However, this argument for holding real estate in a portfolio is questioned when property risk is further examined. Firstly, sector risk has been higher in recent years. Arguably due to depreciation and obsolescence, the performance of offices and industrials together moved significantly away from the performance of shops in the early and middle 1980's. Secondly, as a result of rapid technological change and severe changes in the structure of the UK economy, the structural risk of property investment has increased considerably in recent years. This increase in the potential and actual volatility of property, arguably depreciation-led, creates inefficiencies and uncertainties, so that the return on an investment may prove to be higher or lower than expected, creating (by definition) a risk which has to be taken into account. It is stated in Chapter 2 that this is typically achieved by means of a risk-adjusted discount rate, but this raises the second major question which is addressed by this research. The question is: can property investment decisions be improved by a framework which, while acknowledging that depreciation is a risky variable, attempts an explicit estimation of its impact upon cash flow?

**The CALUS report and beyond**

Two major questions are posed immediately above. They concern the causes of depreciation and the possibility of making an explicit allowance for depreciation in property investment decision models. Each question needs to be posed, because there has been little examination of the impact of depreciation and obsolescence on property investments to date.

The major exception to this is the CALUS report (Salway, 1986), the first major UK work to be devoted to building depreciation and its various effects. While not specific to property investment, this work made considerable reference to it, and is therefore more fully referred to later in this book, especially in Chapter 3.

The CALUS report identified the two areas within which further advances were most urgently needed. These were:

i. to expose the forces behind depreciation; and
ii. to set up analytical models which enable decision makers to make due allowance for it.

These questions broadly equate with the two questions posed earlier in this section. They are the two basic questions which drive the research described in this book.

These two aims require two pieces of work. First, probably most important and certainly involving the expenditure of the greater time and resource, this research sets up a model for classifying the forces behind depreciation (Chapter 4) and describes two empirical studies of offices and industrials which measure the influence of these forces on property investment worth (Chapters 5, 6 and 7). Second, it is necessary to establish a framework for the analysis of property investments which can accommodate an informed anticipation of depreciation. This is dealt with by establishing a basic model in Chapter 2 and later by building on this work by developing a depreciation- sensitive model.

Chapters 1 to 4 are grouped by their contextual nature and form Part 1 of this book (Context). The central empirical work is described in Chapters 5 to 7, which form Part 2 (Analysis). The analytical model is constructed in Chapter 8 and conclusions are drawn in Chapter 9. These form Part 3 (Models and Conclusions).