Original Article

Assessing the valuation implications of the eco-labelling of commercial property assets

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ABSTRACT This article evaluates the valuation issues raised by voluntary and mandatory eco-labelling of commercial property assets. The role of appraisers in property investment markets and the objectives and methods of property valuations are discussed. The difficulties of incorporating the (potential) price effects of sustainable characteristics into property valuations are identified and evaluated. It is concluded that, although the evidence base for the benefits of eco-labelled buildings is robust, the evidence base to estimate price differentials between eco-labelled and non-labelled buildings is lacking. However, as the market penetration of voluntary and mandatory eco-labels increases, valuers are more likely to be able to obtain evidence of price effects.

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INTRODUCTION

In the wider economy, the market for environmentally responsible products has been expanding in response to a willingness-to-pay premium for goods and services, which are considered to have reduced environmental costs. Such goods and services often have labels providing information on their environmental effects. In the commercial property sector, like many other business sectors, a blend of mandatory government regulations, fiscal incentives and voluntary business responses and industry standards has emerged in response to social and political pressure to reduce the environmental impact of the building stock. Part of this blend, has been the emergence of voluntary and compulsory eco-labelling of commercial and domestic property.

Where market-based policies are promoted, although not always perfect, price signals are central to the operation of markets providing the information basis for the allocation of resources. The key market participants in the commercial property sector are developers, occupiers,

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lenders and investors. From the perspective of these property capital providers, higher relative risk-adjusted returns from environmentally responsible investment would provide a financial incentive to allocate resources to reducing the environmental impact of the existing and new building stock. As, in many circumstances, valuations can act as proxies for prices in commercial property markets, the interpretation of markets by valuers can often cause concern.

In this article, the extent to which property valuers can be regarded as a barrier or facilitator to the allocation of capital to environmentally responsible investment in new and existing commercial buildings is analysed. In the first section, the role of appraisers in property investment markets is briefly assessed. In the second section, the objectives and methods of property valuations are discussed. This is followed by an evaluation of difficulties of incorporating the (potential) price effects of sustainable characteristics into property valuations.

THE ECO-LABELLING OF COMMERCIAL PROPERTY

In many markets, a blend of voluntary and compulsory eco-labelling of non-domestic property assets has emerged in an attempt to reduce emissions that contribute to climate change. Voluntary environmental certification systems for buildings include schemes such as Green Star (Australia), LEED (United States), Energy Star (United States), Green Globes (United States) and BREEAM (United Kingdom). These schemes supplement mandatory approaches that can specify minimum environmental standards and the provision of information on environmental effects. Compulsory certification of energy efficiency was introduced in the United Kingdom in 2008 following the EU Energy Performance of Buildings Directive and takes the form of Energy Performance Certificates (EPCs) and Display Energy Certificates (DECs). These certificates are now mandatory throughout the European Union.

The broad objective of eco-labelling is to provide information to market participants about the environmental effects of the production and consumption of products and/or services. The aims are broadly twofold. The first is, by providing information, to encourage a shift towards more environmentally responsible consumption. The second is to stimulate producers and other market participants to improve the environmental standards of products and services. Eco-labels also provide a method of matching producers to eco-consumers who have a higher willingness-to-pay for eco-products.

As a form of eco-label, EPCs and DECs allow comparison of the energy efficiency of buildings. This allows prospective buyers and occupiers to see information on the energy efficiency and carbon emissions so they can consider energy and environmental costs as part of their decision on investment or occupation. It is implied that the linkage between information, market transparency and the price mechanism will produce positive environmental outcomes.

It can be inferred that policy-makers expect market participants to respond to the greater transparency provided by EPCs, DECs and other eco-labels. A range of benefits are attributed to environmentally

responsible buildings or associated with features common in environmentally responsible buildings. Owners, developers and occupiers may obtain benefit from the diverse range of subsidies and tax benefits that are appearing in different markets. For tenants, benefits are related to reduced operating costs of the building (mainly associated with energy and other utility savings), improved productivity of the occupying business (associated with reduced staff turnover, absenteeism *inter alia*) and other competitive advantages linked to marketing and image benefits. It is expected that these benefits will drive increased rental bids from potential tenants. However, it should be noted that the nature of the lease contract will determine whether tenants benefit directly from reduced energy and other utilities. For instance in the United States, tenants with net rental contracts pay these costs directly and therefore should be attracted to lower costs premises, whereas tenants on gross rental contracts will not benefit directly from such savings.

In addition to the possible rental premiums, owners may also benefit from reduced holding costs (because of lower vacancy rates and higher tenant retention), reduced operational costs (because of energy and other utility savings), reduced depreciation (linked to the use of latest technologies) and reduced regulatory risks. *Ex ante*, micro-level studies have found that the present value of the reduced operating costs alone is sufficient to cover the construction cost premium (see ECOFYS, 2003; Kats, 2003). In turn, surveys of willingness-to-pay have found that occupiers have stated that they are prepared to compensate owners for the additional costs of green buildings through higher rents (see GVA Grimley (2007) and McGraw Hill Construction (2006) for examples). However, the value of such stated preference studies is limited by the 'cheap talk' problem. It is important to distinguish between what occupiers and investors state that they are ready to pay from what they really pay.

From the perspective of property investors, higher relative risk-adjusted returns from environmentally responsible buildings should provide a financial incentive to allocate capital investment to improving environmental performance. Envisaged (interlinked) outcomes of eco-labelling may include:

- Increases in relative demand for environmentally responsible buildings.
- Increases in relative supply of environmentally responsible buildings.
- Investment by landlords and tenants to improve environmental performance of existing buildings.
- Higher rental pricing and rental growth in environmentally responsible buildings.
- Lower depreciation rates of environmentally responsible new and existing buildings.
- Lower required risk premia for investors, emergence of a price premium on more environmentally responsible properties.

To date, relatively few studies have been able to test the hypothesised market outcomes presented above. Particularly relevant from a valuation perspective is that the principal limiting factor for a rigorous large-scale

assessment is that the required data are not readily available to researchers, proprietary in nature and fragmented across a large number of data-collecting entities.

There have been no studies have attempted to measure the price effects of eco-labels in the United Kingdom. Studies that have identified higher rents and improved returns based on the views and experiences of expert professions have not been subject to empirical verification. Owing to the availability of data from CoStar, much of the work has been carried out in the United States. When attempting to measure differentials between a eco-labelled and non-labelled product, the key methodological issue is to identify an appropriate benchmark to compare labelled and non-labelled products. In some product markets, apart from the label, eco-friendly goods are often indistinguishable from standard goods, for example some timber or food commodities. As a result, there is no problem in identifying a suitable benchmark against which to measure a differential. In contrast, in markets where products are bespoke (such as commercial real estate), the construction and design requirements of obtaining an eco-label may add to inherent product heterogeneity. Thin trading and low market transparency may reduce the amount and quality of available information. The result is that measuring the differential for eco-labelled offices can be problematic because of the difficulties in identifying an appropriate benchmark and limited information linked to thin trading.

There have been a group of studies that draw upon the CoStar database of US properties to identify the effect of environmental certification on sale prices and rents. It is notable that all focus on the office sector. The most common technique for measuring the price effect of individual attributes is hedonic regression and all studies use a variation of this method. However, all studies vary in terms of their model specification, choice of explanatory variables, sample and, not surprisingly, results. To control for differences between their sample of eco-labelled buildings (927 buildings) and a much larger sample of non-labelled buildings, Miller *et al* (2008) included a number of control variables such as size, location and age in their hedonic regression framework. They found that no statistically significant rent premium for Energy Star and LEED labelled offices. Using the same data source, Miller *et al* (2008) reported respective sale price premiums of approximately 6 and 11 per cent for Energy Star and LEED labelled offices.

Wiley *et al* (forthcoming) focused on the effect on rent, occupancy rate and sale price of eco-labelling for Class A buildings in 46 office markets across the United States. Using an hedonic pricing approach, they found rental premia ranging from approximately 15–18 per cent for LEED labelled offices and 7–9 per cent for Energy Star labelled buildings. In terms of sales transactions, they estimated premia of US\$130 per sq feet for LEED certified buildings and \$30 for Energy Star. However, although plausible, these results need to be treated with some caution. A limitation of their hedonic model is their control for location. In essence, they identify rental and sale premia for eco-labelled offices relative to non-labelled offices *in the same metropolitan area*. However, if eco-labelled buildings tend to be in better quality locations within

a metropolitan area, observed premia may include a location as well as a eco-labelling premium.

The best known empirical study is by Eichholtz *et al* (2009) who use an hedonic framework to investigate the effect of the LEED and Energy Star eco-label on the asking rents of 694 office buildings. Using GIS techniques, they control for location effects by identifying other office buildings in the CoStar database within a radius of 0.2 miles of each labelled building. The authors identify a statistically significant rent premium on the asking rents per square feet of 3.3 per cent for Energy Star certified buildings. Surprisingly, they find no significant rent premium for LEED labelled buildings. However, when they use 'effective' rents which reflect the effect of different occupancy levels in the rental income of properties (nominal asking rent multiplied by the occupancy rate), the premium increased to around 10 per cent for Energy Star labelled buildings and they find a 9 per cent premium for LEED labelled buildings (although it is not significant at the 5 per cent level). They also report similar results for 199 sales that took place between 2004 and 2007. They find a substantial 19 per cent sale price premium for Energy Star labelled buildings but no statistically significant sale price premium for LEED labelled buildings.

Fuerst and McAllister (2009) estimated the hedonic rental regression for a sample of 197 LEED and 834 Energy Star as well as over 15 000 benchmark buildings. The results suggested that eco-labelled offices have an average rental premium of 4–5 per cent with a LEED labelled offices having a slightly higher premium than Energy Star. Furthermore, based on a sample of sale prices for 559 Energy Star and 127 LEED labelled offices, they found substantial price premia of 26 and 25 per cent respectively with higher ratings, for example Silver, Gold, Platinum achieving higher premia.

These empirical studies provide a cross-sectional snapshot of price differentials for a specific sample in a specific time period. However, it is expected that price differentials for eco-labeled buildings should vary over time and between buildings. Essentially, these studies are of a niche market with (unavoidably) small sample sizes. Over time, data availability is likely to improve, the price effects of sustainable buildings will become more apparent. However, the limitation of such macro-level studies is that they provide broad averages that reflect historic supply and demand conditions.

ECO-LABELLING AND VALUATION

The focus of this article is on Market Value (MV), that is the estimated exchange price of eco-labelled buildings. In this context, the 'target' that the value is trying to hit is quite clear. Essentially, they must estimate how much a property will sell for. It is a single point estimate of what the price of an asset would be if it exchanged in the market place. This estimate may be incorrect for any number of reasons¹ producing appraisal uncertainty. Typically property owners and investors may require valuations of their property assets when they need to know the expected exchange price. MV is, therefore, equivalent to a spot price. For shares,

the equivalent is the current share price of a company. Depending on the trading environment and the level of liquidity, spot prices (and hence quoted companies' values) tend to change continuously.

In the absence of continuously traded, deep and securitised markets, commercial property valuations perform a vital function in commercial property markets by acting as a surrogate for prices. Valuers act as key information providers about the estimated trading prices of commercial property assets. As such, their interpretation of markets is central to financial reporting, lending decisions and performance measurement. Biased (essentially conservative or negative) interpretation can reduce investment interest from capital sources and increase the costs of market entry.

However, it is a contested issue whether valuers simply attempt to track market trends by applying market-derived data to estimate market prices or whether they autonomously bias valuations and, consequently, constrain the behaviour of market participants. Although both depictions are caricatures to some extent, in the first portrayal, valuers are characterised as neutral agents who simply attempt to record market prices as accurately as possible. In the second, valuers may affect the operation of the market because of their inability and/or deliberate unwillingness to recognise the price effects of market change and to apply these price effects in valuations. Alternatively, there may be institutional pressures or behavioural biases (for example *status quo* bias) that influence valuation formation. For instance, reflecting the frustration of some commentators, Lutzkendorf and Lorenz (2005, p. 231) suggest that

... it seems that valuers are not yet interested in issues of sustainability because they traditionally tend to respond to market need rather than drive it.

The question of whether it should be the role of the valuation profession to drive market need is left moot.

Nevertheless, there is some anecdotal evidence to suggest that valuation can act as an impediment to innovation in property markets. There are a number of precedents which shed some light on how valuation methodologies influence market change and are, in turn, influenced by market change. An oft-cited example is the valuation of flexi-leases. One of the factors hindering the valuation of flexi-leases has been perceived to be the lack of transactions providing evidence of MVs. Valuers are faced with the task of attempting to adjust market data, which do not incorporate flexi-lease characteristics. Further, previous experience of turnover rents, short leaseholds, over-renting, lease inducements and abnormal rent review periods has illustrated how market changes tend to be associated with uncertainty surrounding valuations and adjustments to valuation techniques. Typically, as established valuation approaches are unable to reflect reliably the financial consequences of new problems, issues of valuation reliability have emerged.

In order to understand some of the problems faced by valuers in the valuation of eco-labelled buildings, it may be worth going back to the fundamentals of valuation formation. In property appraisal models for

income generating assets, asset value represents the discounted sum all future net incomes. *Assuming constant growth*, the value (V) can be expressed as

$$V = \sum_{t=0}^T \frac{(R_t - C_t)(1+g)^t}{(1+i)^t} \quad (1)$$

where V is the current capital value, R_t is rental income, C_t is the periodic costs of owning the asset (management, vacancy, refurbishment and so on – so that $R_t - C_t$ = Net Operating Income (NOI)), g is a constant growth rate, i is the target rate of return (composed of the risk-free rate of return plus a risk premium) and t is the life of the asset. As freehold ownership is unlimited, this can be taken as a perpetuity and approximates to

$$V = \frac{NOI}{i - g} \quad (2)$$

where $i - g$ is a capitalisation rate. So

$$V = \frac{NOI}{CAPRATE} \quad (3)$$

When used in practice, capitalisation rates are usually estimated from analysis of transactions involving the sale of comparable assets rather than by estimating target rates of return and constant growth rates. Although this approach is linked to the discounted cash flow method, it is fundamentally a comparison method. However, where a constant growth rate is not assumed, the cash flow can be set out explicitly. Individual income flows are projected and discounted at a target rate of return. This tends to occur where capitalisation rates cannot be estimated because of the absence of transactions involving comparable properties.

As indicated above, the attributes of environmentally responsible buildings have the potential to affect many of the variables in the appraisal model:

R_t	Assuming a well-functioning market and that the positive attributes outweigh negative attributes associated with eco-labelled buildings, occupiers should be willing to pay higher rents owing to expected lower total occupancy costs and the benefits to occupiers of improved image and business performance.
C_t	It is also expected that the increased attractiveness to occupiers should reduce the costs of ownership owing to reduced vacancies and potentially reduced capital expenditure.

Table 1: The effect of eco-label attributes on capital value: A hypothetical example

<i>Base case</i>	
Gross rent	£1 000 000
Capitalisation rate	6.00%
Average void rate	15.00%
Void costs (% rent paid)	60.00%
Average void costs (p.a.)	£90 000
Average capex p.a. (% of rental income)	3.00%
<i>Eco-label adjustments</i>	
Adjustment to gross rent	5.00%
Adjustment to capitalisation rate	-0.20%
Adjusted void costs (% rent paid)	50.00%
Adjusted average void costs (p.a.)	£52 500
Adjustment to void rate	-5.00%
Adjustment to capex	-0.50%
<i>Base case</i>	
NOI	£734 500
Cap rate	6%
MV (gross)	£12 241 667
<i>With eco-label</i>	
NOI	£868 875
Cap rate	5.8000%
MV (gross)	£14 980 603
Capital value premium	22.37%

i – g The risk premium (and, therefore, capitalisation rate) may also be affected. Although speculative, it has been claimed that the reductions in regulatory risk associated with eco-labelled buildings and the (implied) reductions in uncertainty of income may mean that investors apply a lower risk premium. However, on the other hand, there is the possibility that the less established technologies associated with environmentally responsible buildings may attract counteracting increases in risk premium. Central to this valuation method is that the key variables that need to be estimated are the Market Rent and capitalisation rate. These tend to be obtained from analysis of transactions involving comparable properties.

A hypothetical example is presented in Table 1. It is a simplified example of using the income approach to value a multi-tenanted office building. The important point is that the adjustments made to estimate the capitalisation rate and NOI for the eco-labelled building are, at best, estimates based upon existing research on rent, occupancy rate and operating cost effects of eco-labelling (see Miller *et al*, 2008; Fuerst and McAllister, 2009). At worst, they are arbitrary. Valuers can only make these types of adjustments when there is a sufficient evidence base to support them. The extent of the *potential* capital value premium generated by incorporating environmentally responsible attributes in buildings and obtaining the appropriate eco-label is notable. The cumulative effect of fairly conservative individual adjustments to

capitalisation rates, occupancy rates and void costs can potentially produce large capital value premiums.

Often the major problem for valuers themselves is a lack of information. The reliability of conventional valuation techniques is contingent upon the quality of market information. As immature, thin markets tend to generate few (if any) reliable market signals of trading prices, valuers can be faced with significant problems in estimating MVs. These causes and consequences of valuation uncertainty seem to be particularly prevalent for eco-labelled buildings.

The efficiency and reliability of the standard valuation method is dependent upon the availability of transaction evidence. Where asset characteristics are similar, for instance, when all assets have similar levels of operational costs, capitalisation rates derived from transactions involving comparable assets with similar operational costs will provide a good indication of MV. Relative homogeneity in operational costs is, therefore an important variable. A comparison approach requires that there is sufficient market activity to provide signals of market pricing *and* that such signals are relevant to the asset to be valued. The main valuation problem with eco-labelled buildings is the absence of sufficient transaction activity to generate such price signals that provide information on the price effect of the eco-label.

As we have seen, where there is a large quantity of transactions involving assets with similar characteristics, the role of the valuer is essentially to interpret market signals and apply them to the subject property. Assets which are let on institutional leases to operators on standard lease terms would fall within this category. At the other extreme, some types of leisure property in the not-for-profit sector can often be unique, customised buildings without any alternative use that does not involve major expenditure. For these types of assets, there will be little, if any, transaction activity and consequently, little, if any, market signals. In between, there are commercial leisure assets. They exhibit some of the characteristics of conventional investment properties in that they generate profit flows. Markets for these leisure properties can be less mature with lower trading and poorer information flows.

At the time of writing, the RICS has been consulting on a draft Valuation Information Paper to guide valuation professionals on the valuation effects of sustainability issues in commercial buildings. A central tenet of sound advice is the solidity of the information base on which it is founded. However, as Lutzkendorf and Lorenz (2005) argue, there is a lack of evidence on the nature of the value effects of including sustainable features in buildings and the linking of these attributes to their different sources (marketing benefits, energy savings and so on). As Lorenz (2008, p. 129) points out

... it will take years to accumulate the informational data basis necessary to empirically underpin a valuer's decision to provide a 'valuation bonus' for a sustainable building or a 'valuation reduction' for a conventional one.

Almost certainly owing to the absence of data, until recently, much of the research of the pricing effect of sustainable features in commercial

property assets has been normative, analysing what the price effect should be rather than positive, what the price effect actually has been (see, for example, Sayce *et al*, 2004; Lutzkendorf and Lorenz, 2005).

CONCLUSION AND DISCUSSION

Similar to many other product markets, both mandatory and voluntary eco-labels have become increasingly prevalent in the commercial property sector. One of the objectives of their introduction is, by increasing transparency and awareness, to change the relative demand for buildings with poor environmental performance. This is, in turn, expected to affect market prices. There are good reasons to expect differences in occupier demand for eco-labelled buildings relative to non-labelled buildings. It is widely accepted that there are benefits associated with environmentally responsible buildings. Occupiers can gain tangibly from lower utility costs and incentives or subsidies and, perhaps less tangibly, from improvements in business performance and marketing benefits. In addition, from an investor's perspective there are a number of ways in which superior environmental performance can influence the financial performance of the asset. These are mainly associated with higher incomes (rental premiums, higher occupancy levels), costs reductions (lower operating expenditure, lower vacancy rates) and reduced risk premia.

Although the issue of reducing the environmental impact of the building stock is increasingly accepted as being of major societal importance, it needs to be acknowledged that very little is known about the relationship between the sustainability related attributes of buildings and their incomes and values. Much of the material on this topic infers expected relationships from deduction rather than observation. This places valuers in a difficult position with regard to estimating the effects of sustainability related attributes and values. Large-scale macro-studies of typical price effects of the eco-label attribute would be helpful. While, it is notable that no studies have been done of retail and leisure properties specifically, such studies in the US office sector have found large price effects for the Energy Star label in particular. However, valuers are still faced with the issue of assessing whether typical price effects are appropriate for the specific asset. It is important to bear in mind that the proportion of voluntary labelled buildings is still extremely small and that evidence is likely to become available as market penetration rates increase.

As intermediaries, valuers are often perceived to act as 'gatekeepers'. It is implied in some of the commentary that valuers are acting as barriers to the adoption of voluntary eco-labels by their refusal or inability to reflect the propagated benefits of environmental responsible buildings. This type of criticism has been a common theme in valuation when innovation or changes in market conditions create a new, price-determining feature in the property asset, for example a turnover rent provision, over-renting. The emergence of groundbreaking property features creates problems for valuers. As there are limited price signals from thinly traded markets, valuers have little evidence on which to estimate price effects. Often they have no alternative but to make what are, at best, informed

inferences of what price effects should be or, at worst, arbitrary and subjective estimates. However, past experience shows that techniques and practice often adapt as new information emerges.

In the United Kingdom, there is no empirical evidence to suggest that eco-labelling is having price effects. It is obvious that, where market evidence exists of differential pricing of buildings because of their sustainability related attributes, then valuers should be able to (must) reflect this differential pricing in their valuations. However, if sustainable attributes are not generating rental and sale price premiums, as it is the valuer's goal is to estimate the MV, the valuer should reflect the market's (lack of a) price signal in the valuation. The valuer is not responsible for, what may be, a market failure. When estimating MV, the valuer is attempting to measure the market price not to judge it. Valuers could engage in a normative approach to estimating the price effect, that is, analysing what the price effect should be; rather than a positive approach, that is, what the price effect actually has been. When estimating MV, it is unlikely to be acceptable that valuers estimate the hypothetical price effect of an attribute in the absence of a pricing signal.

Although this article has focussed on estimates of MV, the incorporation of the effects of eco-labels or superior environmental performance may prove even more difficult when estimating Investment Value. The incorporation of cash flow variables such as expected rental growth, exit yield, depreciation, holding costs *inter alia* are likely to be affected by sustainability related attributes of a building. As a result, projections should attempt to reflect their effects. However, there are significant practical difficulties of estimating quantitative adjustments to these variables. The models involved in forming projections of future rental growth, depreciation, exit yield can be both complex and prone to substantial uncertainty. It is likely to be extremely difficult to adjust or 'tweak' these already uncertain estimates to account for sustainability related attributes. To do so, could involve spurious precision.

This article grew out of a frustration with commentators who have criticised the valuation profession for their perceived failure to adjust valuations to reflect the professed benefits of environmentally responsible buildings. Although the evidence base for the benefits is reasonably robust, the evidence base for price effects has been lacking. This cannot be attributed to the valuation profession. Although the tone of this article may seem negative in emphasising the practical difficulties of incorporating the environmentally responsible attributes of buildings in valuations, it is also clear that these difficulties are likely to reduce. As the market penetration of voluntary and mandatory eco-labels increases, if there are price effects, it is extremely likely that evidence will emerge. This evidence base is the *sine qua non* of reliable and robust valuations of buildings with superior environmental performance.

NOTE

- 1 It is clearly unrealistic to expect valuers (unless informed of the agreed price in advance) to be able to estimate with precision the exact price at which an asset will transact.

REFERENCES

- ECOFYS. (2003) Cost Effective Climate Protection in the EU Building Stock. Report for EURIMA.
- Eichholtz, P., Kok, N. and Quigley, J. (2009) Doing Well by Doing Good? Green Office Buildings, Fisher Center for Real Estate and Urban Economics, UC Berkeley. Working Paper, January.
- Fuerst, F. and McAllister, P. (2009) New evidence on the green rent and price premium. Paper presented at the American Real Estate Society Annual Meeting; April, Monterey, CA.
- GVA Grimley. (2007) Towards Sustainable Offices. Research Bulletin, Spring.
- Kats, G. (2003) *The Costs and Financial Benefits of Green Buildings – A Report to California's Sustainable Building Task Force*. Washington, DC: Capital E.
- Lorenz, D. (2008) *Sustainable Property Investment & Management: Key Issues and Major Challenges*. London: RICS.
- Lutzkendorf, T. and Lorenz, D. (2005) Sustainable property investment: Valuing sustainable buildings through property performance assessment. *Building Research & Information* 33(3): 212–234.
- McGraw Hill Construction. (2006) Green Building Smart Market Report 2006, McGraw Hill Construction.
- Miller, N., Spivey, J. and Florance, A. (2008) Does green pay off? *Journal of Real Estate Portfolio Management* 14(4): 385–399.
- Wiley, J., Benefield, J. and Johnson, K. (forthcoming) Green design and the market for commercial office space. *Journal of Real Estate Finance and Economics*, (in press).
- Sayce, S., McIntosh, A. and Walker, A. (2004) Building sustainability in the balance: Promoting stakeholders dialogue. Estates Gazette, UK.