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The Impact of Energy Performance Certificates on the Rental and Capital Values of Commercial Property Assets: Some Preliminary Evidence from the UK

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Abstract

This paper focuses on the effect of energy performance ratings on the capital values, rental values and equivalent yields of UK commercial property assets. Of which a small number are also BREEAM rated, the study is based upon 708 commercial property assets held in the IPD UK Universe drawn from across all PAS segments. Incorporating a range of controls such as unexpired lease term, vacancy rate and tenant credit risk, hedonic regression procedures are used to estimate the effect of EPC rating. The study finds no evidence of a strong relationship between environmental and/or energy performance and rental and capital value. Bearing in mind the small number of BREEAM rated assets, there was a small but statistically significant effect on equivalent yield only. Similarly, there was no evidence that the EPC rating had any effect on Market Rent or Market Value with only minor effects of EPC ratings on equivalent yields. The preliminary conclusion is that energy labelling is not yet having the effects on Market Values and Market Rents that provide incentives for market participants to improve the energy efficiency of their commercial real estate assets.

Introduction

The focus of this paper is on the effect of energy performance ratings on the capital values, rental values and equivalent yields of UK commercial property assets. As part of a wider objective to reduce greenhouse gas emissions, one of the policy aims of energy labels, such as Energy Performance Certificates (EPC), is to provide information to market participants about buildings' energy performance in order to influence their demand. In turn, it is implied that demand shifts will have effects on prices, supply and, ultimately, on greenhouse gas emissions. Since they constitute the terms on which products are exchanged, prices are a fundamental element of markets and, whilst not always perfect, price signals are central to the operation of markets since they provide the information basis for the allocation of resources. Research on price effects is, therefore, central to identifying the effectiveness of this type of policy intervention.

The particular focus of this research is on the effect of EPC rating on the capital values, rental values and equivalent yields of a sample of UK commercial property assets obtained from IPD. 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 rental and capital values prices of commercial property assets. As such, their interpretation of markets is central to financial reporting, lending decisions and performance measurement. Based on a relatively small sample of UK commercial property assets, this paper investigates whether assets' energy ratings have any significant effect on their rental and capital values and equivalent yields.

Energy Labelling

Energy labels can broadly be interpreted as a form of eco-label. Over the last decade, the commercial real estate sector has seen the introduction of a wide range of, what can be loosely termed, eco-labels. Although there is likely to be a drift towards harmonisation, at the international scale there are competing voluntary labels. Within national real estate markets, there can be a blend of compulsory and voluntary eco-labels. Indeed, as more and more local regulatory bodies make the attainment of a voluntary environmental label a requirement, labels such as BREEAM and LEED are becoming quasi-compulsory as the distinction between voluntary and compulsory becomes blurred.

Measurement of energy use in new and existing buildings has become obligatory as a result of the EU Energy Performance of Buildings Directive. The Directive required all buildings at construction, sale or rent (or every 10 years) to have certificates giving information about their energy performance through a rating of CO_2 emissions. In the UK, certification comprises Energy Performance Certificates (EPCs) and the Display Energy Certificates (DECs). An EPC (and accompanying recommendation report) is an *asset* rating which is intended to inform potential buyers or occupiers about the intrinsic energy performance of a building and its associated services as built. They are similar to the mandatory eco-labels used in many consumer products such as tumble dryers and washing machines. However, compared to consumer products, such as white goods, commercial real estate assets often create more complex issues.

The DCLG (2008) highlighted the problems of defining the unit to which an EPC should be attached. Essentially, there is no straightforward relationship between EPCs and property units. If a building has a common heating system, one EPC may be produced even when parts are sold or let. If there is no common heating system, then separate EPCs must be produced for each part sold or let. This raises the problem of what to do about communal areas. DCLG (2008) suggest that communal areas are ignored when producing EPCs for units within a building. When a whole building containing communal areas is sold or let then an EPC of those areas may be separately produced or included within an EPC for the whole building. Given the division of large commercial real estate assets into different letting units with sub-tenancies etc, there can be significant problems in linking asset, letting unit and EPC unit data.

Energy Labelling and the Commercial Property Sector

The direct aim of environmental labels is to provide information to consumers or users about the environmental performance of a product with the indirect aim of influencing their consumption choices, suppliers' production outputs and, as a result, the level of environmentally harmful emissions. If goods with superior energy performance are not being priced efficiently, there may be sub-optimal consumption and production. Whilst the operation of the market pricing mechanism is central to the effectiveness of this type of market-based policy, there has been very little policy evaluation. This is largely because the policy is relatively recently and, as mentioned briefly above, there are well-documented problems of data availability (see Fuerst, McAllister, Van der Wetering and Wyatt, 2010 for a detailed discussion).

Assuming that environmental performance is a salient attribute for consumers, environmental labelling enables consumers to discriminate between products according to their environmental impact. This is implied to produce increased demand for products with reduced environmental impact and price differentials linked to energy performance. Price premiums, in turn, provide an economic incentive for producers to innovate and incur any additional production costs associated with improved energy performance.

For investors, superior risk-adjusted returns from energy efficient assets should provide a financial incentive to allocate investment to assets that are energy efficient. From the occupiers' perspective, operating from a more energy efficient building may increase productivity, reduce running costs, meet corporate social responsibility objectives and attract financial incentives (or help avoid environmental taxes). For suppliers of commercial property space, prices act as the "invisible hand" steering production. When the market price of a product is higher than its cost of production, increasing production should profitable, new producers should have incentives to enter the market and resources should be allocated to sectors where there is the highest willingness to pay.

In practice, there is evidence to suggest that the information provision role of energy labels may not be operating as expected. Firstly, in the UK there is evidence of systematic non-compliance with regulations. Periodic surveys by organisations such as National Energy Services and Quidos have consistently found low (albeit improving) compliance rates with EPC requirements in the commercial property sector. Secondly, where these certificates are provided, it is often after the marketing stage. Anecdotal evidence suggests that Energy Performance Certificates tend to been given to tenants well after Heads of Terms have been agreed and sometimes after completion. This may be indicative of the importance that tenants place on this information rather than any attempt to obfuscate by owners. Nevertheless, it is unlikely that an EPC rating will be a significant price determinant if it is introduced after the price has been determined.

Related Research

There is a considerable body of commentary suggesting that buildings with superior environmental performance deliver a bundle of benefits to occupiers and investors (see Eichholtz, Kok and Quigley, 2010 for a review). Owners and occupiers may benefit from subsidies and tax benefits that have emerged in some markets. For occupiers, benefits may include 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 occupiers.

In addition to possible rental premiums, investors may also benefit from reduced holding costs (due to lower vacancy rates and higher tenant retention), reduced operational costs (due to energy and other utility savings), reduced depreciation (linked to the use of latest technologies) and reduced regulatory risks. There appears to be broad empirical support in the literature for increased willingness-to-pay in the consumption of products with superior environmental performance. Whether a stated preference for these products will actually result in a price premium depends on a number of conditions such as the share relative to that of general consumers, the anticipated payoff period of costs associated with superior energy performance and, obviously, awareness by consumers of superior energy performance. Commercial real estate appears to be an interesting case in point for the broader study of these effects as eco-labeling is a relatively new phenomenon in this market and hence enables researchers to investigate the dynamics of product differentiation by labeling.

In the US, a number of studies have looked at the effect of Energy Star label on the rents and sale prices of office buildings (see Wiley, Benefield and Johnson, 2010, Eichholtz, Kok and Quigley, 2010; Fisher and Pivo, 2010; Jaffee, Stanton and Wallace, 2011 and Fuerst and McAllister, 2011). From these studies, it was notable that Energy Star rated buildings tended to taller, bigger and more concentrated in CBD's relative to the typical office asset. Rental premiums of 2-5% tend to be estimated in the studies where the location control is small scale. Substantial sale price premiums of 13%-18% were also identified[1]. In contrast, Yoshida and Sugiura (2011) estimate that condominiums in eco-labelled developments in Tokyo sell at a discount of 5.5% compared to condominiums in non-labelled developments. When they investigate the effects of individual eco-features such as materials, planting and energy efficiency. The find a strongly negative effect of energy efficiency. They attribute this finding to the use of innovative or unusual technologies in an market where energy efficiency levels are already high.

In the most closely related study to this research, for the Netherlands Brounen and Kok (2010) looked at the relationship between EPC rating and sale price for 18,190 residential sale prices in 2008. Compared to homes rated G, they estimate premiums of 12%, 7% and 4% for

[1] In a working paper, Jaffee *et al* (2011) found that the Energy Star premium disappeared when operating expenses were included in the model i.e. there was no evidence of a pure label effect from Energy Star. However, it is notable that the sample was much smaller due to the limited availability of data on operating expenses.

A, B and C respectively. However, there are potential drawbacks in the study due to limited controls for building quality and location. Higher rated buildings may have been located in higher value locations within urban areas and/or have superior construction and/or specification. For instance, the only quality variable included in one of the models is condition and it is notable that, when it is included in the model, the estimated premium drops substantially.

Isolating the Effect of Energy Efficiency

When attempting to measure a price differential between a highly energy efficient labelled and low energy efficient labelled product, there are also a number of difficult methodological issues. It is important that appropriate benchmarks are specified to compare strong and weak products. For many products, apart from the label, energy efficient products may be indistinguishable from conventional products. A good example is electronic goods. As a result, it is straightforward to identify a suitable benchmark against which to measure a price differential. Another example is food products. It may be extremely difficult to distinguish between an organic and non-organic apple. However, identifying the price difference is straightforward. Whereas, since each one is unique, it is straightforward to tell different buildings apart and to identify price differences. However, it is much more difficult to measure the contribution an individual attribute to identified price differences.

In order to answer the question "Does the energy performance of assets have any effect on rental or capital values?" researchers require information on three key variables associated with assets

- Asset (rental and capital) values and prices
- Asset environmental/energy performance or rating
- Other asset attributes influencing rental and sale values/prices (e.g. age, size, location, height, lease terms, unexpired lease length, letting incentives, tenant quality, building quality, etc)

The most well-established method to measure what market participants actually pay (as opposed to what they say they will pay) models rental or capital prices as dependent upon the assets' attributes listed above. Econometric hedonic modelling is used to identify and quantify the price effect of each variable or a change in each variable on the rental or sale price. Essentially, environmental/energy performance is included as one of a number of

attributes in the model specification so that its effect on price can be isolated and measured. However, the robustness of any modelling exercise is dependent on the data inputs in terms of their scope (in terms of coverage) and scale (in terms of sample size).

One of the main concerns about this type of econometric modelling is that a variable that is having an effect on the prices of energy labelled buildings has not been included in the explanatory models. Perhaps, getting a strong energy score is only one element of a bundle of 'extras' that a developer has used to create a superior product - so that energy labelled buildings are more likely to have a higher quality of interior design. Alternatively, buildings with better energy performance may be of a higher quality of construction. Alternatively, developers may use superior energy performance as a marketing device to 'compensate' for an inferior location. By omitting these variables from the model, all else will not be equal. An apparent price premium for energy efficiency can be partially, or even mainly, a premium for better building specification e.g. double glazing, modern heating system, better materials etc.

Usually, the most important control in this type of hedonic pricing study is for location. What buildings are the buildings with strong energy performance being compared against? Other buildings in the same city? Other buildings in the same neighbourhood? This is important because observed price premiums may be due to the fact that buildings with good energy performance may be concentrated in the best locations. If this potential confounding factor is not taken into account, we may be mis-attributing a location effect as an energy efficiency effect. Generally, the larger in geographical terms the location control, the more likely that location effects are being mis-attributed as energy label effects. However, it is only likely to be a factor if there are large intra-regional differences and unequal distribution of EPC ratings within these regions.

Data

This study is based upon 708 commercial property assets held in the IPD UK Universe drawn from across all PAS segments. It is important to acknowledge that this sample is quite small. Given that the assets are distributed across the three main UK sectors and across the main UK regions, there are likely to be relatively small quantities within each category. As a result, observing statistically significant differences between different sub-groups is likely to be problematic. As we can see from Table 1, the spread broadly reflects the IPD weightings with retail having the highest number of assets and industrial having the lowest. Although not part of this study, a relatively small number of assets (24) in the sample were also BREEAM-

rated. The vast majority of the BREEAM-rated assets were in the office sector. Details of ???? EPCs were collected for the assets. Where a range of different EPC ratings were collected for a single asset e.g. a shopping centre, the average (mode) EPC rating was allocated to that asset. As of Quarter 3 2010, information at asset level was available on:-

- Market Rent
- Market Value
- Equivalent Yield
- EPC rating
- BREEAM rating
- PAS segment
- UK region
- Capital expenditure (average in previous three years)
- Weighted credit risk score
- Weighted unexpired lease term
- Vacancy rate
- Number of tenants
- Rentable space
- Year of construction

There are a number of potential omitted variable problems that should also be acknowledged. Firstly, the location control is typically the region[2] in which the asset is located. Hence, the study is addressing the question "*Compared to assets in the same region* and all else equal, does an asset's EPC rating have any significant effect on its rental, capital value or equivalent yield?" If there are systematic differences between the locations within regions of assets with good and poor energy performance, then the study may be affected by omitted variable bias. For instance, if buildings with superior energy performance tend to be in the best locations *within a region*, a location price effect may be attributed to energy performance. We have no reason to suspect that this is the case. In addition, and as noted above, superior energy performance may be associated with a higher construction and fitting-out specification. Information on these variables was not available[3].

The Econometric Model

[2] There were 16 'regions' – City, Mid-Town, West End, Inner London, Outer London, South East, South West, Eastern, East Midlands, West Midlands, Yorkshire and Humberside, North West, North East, Scotland, Wales and Northern Ireland.,

[3] The authors are not aware of any comparable study that has this type of data.

Hedonic regression modeling is the standard methodology for examining price or value determinants in real estate research. We use this method in our study primarily to isolate the effect of EPC rating. The quintessential log-linear hedonic rent model takes the following form:

$$\ln R_i = \alpha_i + \beta x_i + \phi Z_i + \varepsilon_i \tag{2}$$

Where R_i is the natural log of average Market Rent (or Market Value or equivalent yield) per square metre in a given building, x_i is a vector of the natural log of several explanatory locational, lease and physical characteristics, β and φ are the respective vectors of parameters to be estimated. Z_i is a vector of time-related variables and ε_i is a random error and stochastic disturbance term that is expected to take the form of a normal distribution with a mean of zero and a variance of . The hedonic weights assigned to each variable are equivalent to this characteristic's overall contribution to the value or price (Rosen 1974). For the purpose of this study, we specify three types of hedonic models. The first type explains Market Value per square metre, the second explains equivalent yield and the third explains Market Rent per square metre.

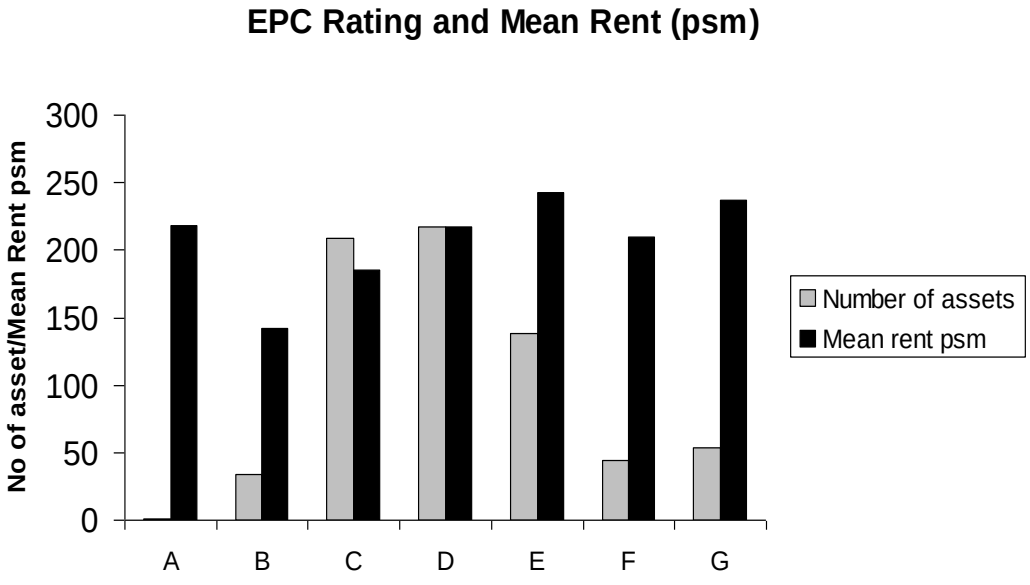
To capture the effects of energy labels on these variables, we use dummy variables to indicate whether a building has an EPC rating of A, B, C etc. The expected coefficient is dependent upon which rating is omitted. If assets with EPC rating A are omitted, we expect a negative coefficient. If assets with EPC rating G are omitted, we expect a positive coefficient. In addition to mitigating the effects of extreme values, the log-linear specification of the hedonic model allows us to interpret the coefficients in terms of average percentage premiums. A summary specification of the log –linear model is as follows

$$LNVALUE_i = C_0 + \beta_1 \sum_{n=1}^{N} EPC\ \text{var}iables + \beta_2 \sum_{n=1}^{N} AGE\ \text{var}iables + \beta_3 \sum_{n=1}^{N} Quality\ \text{var}iables +$$
$$\beta_4 \sum_{n=1}^{N} Physical\ \text{var}iables + \beta_5 \sum_{n=1}^{N} Lease\ \text{var}iables + \beta_6 \sum_{n=1}^{N} Sector\ \text{var}iables + \beta_7 \sum_{n=1}^{N} \text{Re}gion_i +$$
$$\beta_8 \sum_{n=1}^{N} BREEAM_i + \varepsilon_i$$

Table 1

Summary Statistics[4]			
	Retail	**Office**	**Industrial**
N	293	226	173
Mean age (years)	45.36	35.04	23.43
Three year mean capex (psm)	£106.49	£165.99	£30.68
Mean rentable area (sq. m.)	8837	7180	16767
Mean Market Rent (psm)	£264.96	£256.38	£64.16
Mean equivalent yield (%)	7.45%	8.97%	9.78%
Mean no. of tenants	19.36	10.91	11.04
Mean weighted unexpired lease term (years)	11.03	5.33	5.55
Mean weighted credit risk score	72.89	73.31	60.84
Mean vacancy rate (%)	4.09	15.66	17.03

Figure 1



[4] 16 assets were classified as "other commercial". They are included in the sample but details are not reported here.

A full list of the independent variables was presented above.

Results

Summary statistics are reported in Table 1. The average age of the assets is quite high. However, it needs to be borne in mind that the simple averages may have been affected by a small number of very old assets. Not surprisingly, industrial assets tend to be the youngest and have the lowest average rent per square metre. Reflecting their low vacancy rate and long unexpired lease terms, it is not surprising that the retail assets have the lowest average equivalent yield. For this sample, vacancy rates in the office and industrial assets are quite high. However, it should be borne in mind that, since EPCs are triggered by a letting or sale, assets which have or have had empty space may have been more likely to have an EPC. As we can see from Figure 1, only one property achieved an EPC A rating. Over 60% of the assets obtained EPC ratings C and D with just over 14% in the F and G bands. Whilst bearing in mind the potential of 'eye-conometrics' to mislead, at first sight it appears that the EPC rating does not affect the Market Rent. EPC B and C rated assets tend to have the lowest Market Rents. However, given the potentially high number of confounding factors[5], this relationship needs to be investigated more robustly.

Market Value

The results of econometric models are displayed in Tables 1-3. Focussing first on (appraised) Market Value, the first model includes the whole sample with a range of controls to take into account location, sector effects and a range of asset-specific attributes. The aggregate model has a relatively high explanatory power. However, when disaggregated by sector, the model has much more explanatory power for the office sector compared to retail and industrial. Overall, the results are plausible and consistent with many prior expectations. In terms of age, compared to buildings aged 0-3 years[6], assets fall in value as they become older. The effect of age changes reduces significantly when buildings become 'vintage' i.e. 70 or more years old. However, it is notable that this depreciation is statistically significant mainly in the aggregated model. This is probably because of the effects of relatively small samples created by disaggregation into sectors. As expected, the coefficient on vacancy rate is negative. Put simply, an increase in vacancy rate is associated with a decrease in appraised value. Again as

[5] For instance, higher rated buildings could be over-represented in lower value PAS segments or to have shorter unexpired lease term.

[6] In the model, where a variable is stated to be 'omitted', the regression is estimating the effect of being in an included category compared to the omitted category. For instance, for the regional effects, all regional effects are estimated in relation to the City. Hence, the estimate is that the Market Value psm are 71% higher in the West End than the City. Where '-' is specified, this variable has not been included in the model.

expected, the coefficient on the tenant credit risk variable is positive. However, it is only statistically significant in the aggregated model. The results for the unexpired lease term variable are strong. There is a statistically significant positive coefficient in all models. In other words, long unexpired lease terms are associated with higher appraised values. Perhaps less expectedly, there is clear evidence of a 'discount for size'. In all models, the size

Table 2 Hedonic Regression Results – Market Values

Market Value (psm)								
	All		**Retail**		**Office**		**Industrial**	
Constant	10.37	***	9.68	***	9.66	***	8.93	***
BREEAM	0.00		-		0.00		-	
EPC A	Omitted		-		Omitted		-	
EPC B	-0.59		0.10		-0.53		-0.07	
EPC C	-0.54		0.10		-0.62		0.18	
EPC D	-0.53		0.15		-0.58		0.17	
EPC E	-0.47		0.26		-0.52		0.05	
EPC F	-0.51		Omitted		-0.42		-0.04	
EPC G	-0.72		0.18		-0.55		Omitted	
Age 0-3	Omitted		Omitted		Omitted		-0.40	
Age 4-9	-0.35	*	-0.78		0.46		-0.35	
Age 10-19	-0.38	*	-0.68		-0.27		-0.40	
Age 20-29	-0.50	**	-0.75		-0.40	*	-0.49	
Age 30-69	-0.65	***	-0.91		-0.60	***	-0.58	
Age 70+	-0.79	*	-0.47		-0.42	*	-	
Vacancy rate (log)	-0.01	***	0.00		-0.01	***	0.00	
Weighted credit risk score (log)	0.08	**	0.10		-0.02		0.03	
Weighted unexpired lease term (log)	0.14	***	0.09	*	0.09	**	0.19	***
Rentable area (log)	-0.14	***	-0.13	**	-0.08	**	-0.24	***
Single tenant	-0.08		-0.07		0.17		-0.08	
Capex (log)	0.00		0.01		-0.01		0.00	
SEGMENT DUMMIES								
REGION DUMMIES								
R-squared	0.74		0.40		0.72		0.51	
F Test	31.65		5.65		15.24		6.92	
F Prob	0.00		0.00		0.00		0	
No of obs	606		256		192		145	

*** indicates significant at 1% level

** indicates significant at 5% level

* indicates significant at 10% level

coefficient is significantly negative. All else equal, larger assets tend to be valued at a lower rate per square metre. Whilst acknowledging the extremely small number and the fact that the vast majority are office assets, the effect of being BREEAM rated has no statistically significant effect on appraised value. In addition, we find no significant effect of an asset being let to a single tenant or having had capital expenditure in the preceding three years. Turning to the variable of interest, compared to the omitted category, there are no significant effects on appraised value associated with differences in the EPC rating. All else equal, there is no evidence to support the argument that appraised Market Value is affected by EPC rating.

Equivalent Yield

Moving on to equivalent yields, it is possible to identify similar patterns of explanatory power. Again, the results seem plausible and are generally consistent with many prior expectations. As expected, the coefficient on vacancy rate is positive. An increase in vacancy rate is associated with an increase in equivalent yield. Again as expected, the coefficient on the tenant credit risk variable is negative. However, it is only statistically significant in the aggregated model and in the office sector. The results for the unexpired lease term variable remain strong. Once again, there is a statistically significant negative coefficient in all models. Long unexpired lease terms are associated with lower equivalent yields. In terms of size effects, the findings are less consistent with the Market Value models and there is little evidence that size has a significant effect on equivalent yield. In addition, we find no significant effect of an asset being let to a single tenant. Surprisingly, for the office market, the level of capital expenditure in the preceding three years has a positive effect on equivalent yield. Whilst once again re-iterating the small sample and the fact that the vast majority are office assets, the effect of being BREEAM rated has small but statistically significant negative effect on equivalent yields. Turning to EPCs, compared to the omitted category, there is very little evidence of differences in equivalent yields associated with differences in the EPC rating. In the retail sector, the coefficient for asset with an EPC rating of E is significantly negative in relation to assets rated G. This is the only instance where a statistically significant (albeit weak) effect is observed for EPC rating to support the argument that equivalent yield is affected by EPC rating.

Table 3 Hedonic Regression Results – Equivalent Yields

Equivalent Yield

	All		Retail		Office		Industrial	
Constant	1.92	***	2.68	***	1.83	***	2.17	***
BREEAM	-0.002	*	-		-0.003	**	-	
EPC A	Omitted		-		-		-	
EPC B	0.04		-0.04		-0.24		0.01	
EPC C	0.02		-0.05		-0.03		-0.05	
EPC D	0.02		-0.08		-0.04		0	
EPC E	0.04		-0.10	*	-0.03		0.01	
EPC F	0.06		0.01		-0.09		0.10	
EPC G	0.08		Omitted		Omitted		Omitted	
Age 0-3	Omitted		Omitted		Omitted		Omitted	
Age 4-9	0.09		-0.01		0.01		-0.01	
Age 10-19	0.11		-0.02		0.11		0.00	
Age 20-29	0.15		0.01		0.18	*	0.00	
Age 30-69	0.18		0.03		0.30	***	0.01	
Age 70+	0.06		-0.12		0.15		0.07	
Vacancy rate (log)	0.003	***	0.004	***	0.004	***	0.004	***
Weighted credit risk score (log)	-0.03	**	-0.05	**	0.01		-0.01	
Weighted unexpired lease term (log)	-0.09	***	-0.08	***	-0.08	***	-0.10	***
Rentable area (log)	0.00		-0.03	*	0.01		0.03	
Single tenant	0.00		-0.05		-0.03		0.06	
Capex (log)	0.00		0.00		0.01	***	-0.08	
SEGMENT DUMMIES								
REGION DUMMIES								
R-squared	0.57		0.36		0.68		0.41	
F Test	17.15		4.64		14.28		5.01	
F Prob	0.00		0.00		0.00		0.00	
No of obs	601		255		188		145	

*** indicates significant at 1% level

** indicates significant at 5% level

* indicates significant at 10% level

Market Rent

Turning to Market Rent, similar to the other results, the aggregate model has a relatively high explanatory power. Again, the model has much more explanatory power for the office sector compared to retail and industrial. Similarly, the results are plausible and consistent with many prior expectations. In terms of age, compared to buildings aged 0-3 years, assets have a lower Market Rent as they become older. However, similar to the Market Value models, this tends to be statistically significant mainly in the aggregated model. It is notable that for offices the coefficient on vacancy rate is negative. Office assets with higher vacancy rates tend to have lower estimates of Market Rent. It was not expected that assets' tenant credit risk variable or the unexpired lease term would be a significant driver of Market Rent. Whilst this is the case for tenant credit risk, there is a significantly positive relationship between unexpired lease term and Market Rent in the aggregated model and for the industrial sector. Again, there is strong evidence of a 'discount for size'. In all models, the size coefficient is significantly negative. All else equal, larger assets tend to be valued at a lower Market Rent per square metre. Consistent with the Market Value models, the effect of being BREEAM rated has no statistically significant effect on Market Rent. In addition, we find significant effects for an asset being let to a single tenant or having had capital expenditure in the preceding three years. Turning to the variable of interest, compared to the omitted category, there are no significant effects on Market Rent associated with differences in the EPC rating. All else equal, there is no evidence to support the argument that appraised Market Rent is affected by EPC rating.

Conclusion

In the wider economy, the market for environmentally responsible products has been growing. Often, this is a consequence of a willingness-to-pay premium for goods and services considered to have less environmental impacts. Increasingly, goods and services have labels that provide information on their environmental effects. Similar to other business sectors, the commercial property sector has seen the emergence of a blend of mandatory government regulations, fiscal incentives and voluntary business responses and industry standards largely in response to social and political pressure to reduce the environmental impact of the building stock. Part of this policy mix has been the compulsory energy labelling of commercial and domestic property.

Table 4 Hedonic Regression Results – Market Rents

Market Rent (psm)

	All		Retail		Office		Industrial	
Constant	7.90	***	7.78	***	6.89	***	6.51	***
BREEAM	0.00		-		0.00		-	
EPC A	Omitted		-		Omitted		-	
EPC B	-0.62		0.04		-0.51		Omitted	
EPC C	-0.55		0.05		-0.49		0.17	
EPC D	-0.52		0.07		-0.49		0.21	
EPC E	-0.49		0.18		-0.41		0.09	
EPC F	-0.54		Omitted		-0.38		0.10	
EPC G	-0.61		-0.08		-0.34		0.05	
Age 0-3	Omitted		Omitted		Omitted		Omitted	
Age 4-9	-0.34	**	-0.84		-0.27	*	-0.37	
Age 10-19	-0.34	**	-0.76		-0.18		-0.31	
Age 20-29	-0.42	***	-0.80		-0.24		-0.37	
Age 30-69	-0.53	***	-0.94	*	-0.31	**	-0.43	
Age 70+	-0.29	*	-0.64		-0.22		-0.47	
Vacancy rate (log)	0.00		0.00		-0.01	*	0.00	
Weighted credit risk score (log)	0.04		0.05		-0.01		0.01	
Weighted unexpired lease term (log)	0.05	**	0.02		0.01		0.08	**
Rentable area (log)	-0.15	***	-0.16	***	-0.08	***	-0.23	***
Single tenant	-0.09	*	-0.11		0.05		-0.02	
Capex (log)	0.01	*	0.01	*	0.00		0.00	
REGION DUMMIES								
SEGMENT DUMMIES								
R-squared	0.74		0.42		0.64		0.49	
F Test	36.16		5.8		12.16		6.58	
F Prob	0.00		0.00		0.00		0.00	
No of obs	606		256		192		145	

*** indicates significant at 1% level

** indicates significant at 5% level

* indicates significant at 10% level

It is increasingly accepted that there are benefits associated with energy efficient buildings. Tenants can benefit most directly from lower utility bills. Less directly, there can be financial incentives, perhaps less tangibly, they may benefit from improvements in business performance and marketing benefits. Further, from investors' perspective, there is a number of ways in which superior energy efficiency can influence the financial performance of the asset. These are mainly associated with higher incomes (rental premiums, lower void costs), costs reductions (lower operating expenditure, lower vacancy rates) and reduced risk premia. However, there is still little hard evidence on the extent of these benefits.

This fairly small-scale study confirms what many market participants may regard as obvious. Assets with long unexpired lease terms tend to be more valuable. All else equal, assets with higher vacancy rates tend to be less valuable. Assets tend to lose value as they get older. Perhaps, less expectedly there is strong evidence of a discount for size. All else equal, there is a negative relationship between size and Market Rent and Market Value per square metre. The evidence on the effect of tenant credit rating is less strong. However, it is supportive of the expected positive relationship between tenant credit rating and Market Value.

The study finds no evidence of a strong relationship between environmental and/or energy performance and rental and capital value. Bearing in mind the small number of BREEAM rated assets, there was no evidence of an effect from being BREEAM rated on Market Rent and Market Value. However, there was a small but statistically significant negative effect on equivalent yield. There was no evidence that the EPC rating had any effect on Market Rent or Market Value. There was only a small amount of evidence that EPC ratings were having an effect on equivalent yields. Hence, the preliminary evidence from this study is that energy labelling is not yet having the effects on Market Values and Market Rents that provide incentives for market participants to improve the energy efficiency of their assets.

In terms of future research, it must be borne in mind that the sample size for this study was relatively small especially considering that assets were spread across all sectors and regions of the UK commercial property market. Given the relationship between sample size and strength of effect on statistical significance, it is possible that weak relationships may have been 'missed'. In particular, it should be noted that coefficients for EPCs were close to being statistically significant in a number of cases. In order to distinguish much more robustly between the absence of price effects and weak price effects, a much larger sample is required.

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