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## Article

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## Is the higher value of green buildings reflected in current valuation practices?

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**Abstract:** Urban sprawl and economic development brought new ways of correlating the efficiency and performance, and green buildings are spreading at higher levels. In this normative study, we discuss specific issues in how valuation methods could be considered when assessing green buildings. The real estate market is one of the most dynamic sectors, and therefore the commercial market increased in size and spreading. As the economy is growing, more office building investment created the framework for companies to operate and to further develop the economy. Our objective is to present a step-by-step approach in understanding the need of specific correlation between valuation measures and actual financial performance of this type of buildings, relative to value, rent premium, occupancy premium or even increase in productivity. With limited number of green buildings even in major cities, the issue of incorporating the premium in the final value could be challenging for the appraiser, and thus, we raise questions that could lead to further research in this area. Our analysis suggests that appraisers should take into consideration the positive effects of green buildings in their valuations. This paper is a contribution to the emerging literature on the topic of green buildings, with the focus on valuation methods.

**Keywords:** green buildings, sustainable buildings, valuation, sustainability

**JEL codes:** Q51, R30

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## 1. Introduction

According to United Nations, the building sector has a contribution up to 30 percent of global annual greenhouse gas emissions and consumes up to 40 percent of all energy. (United Nations Environmental Programme, 2009). Moreover, 50 percent of the wood that is not used for fuel is consumed in construction. (Eichholtz *et al.*, 2010). Another concern is the risk of doubling the greenhouse gas emission in the next 20 years, as a consequence of increasing construction in emerging economies, with limited outlook on energy efficiency of buildings. At the European Union level, 40 percent of the energy consumption and 36 percent of the total CO<sub>2</sub> emission have the basis in buildings. The age of buildings in EU is also a risk factor, as about 35 percent of the EU's buildings are over 50 years old. (European Union Energy, 2015). Facing this fact, there is an obvious argument regarding the importance of increasing the level of sustainability in real estate.

Sustainability has become increasingly important in the real estate sector both in the academic and business activity, as companies became more focused not only on sustainable products but also on creating organizations that would support this. Thus, words like “green buildings”, “blue/sustainable buildings” and “energy efficient buildings” became part of the current vocabulary in the real estate practice. It has become part of a thinking process of key participants in the real estate market, in which the regulation tends to be more oriented to the dimension of social and economic reality (Anghel & Ionescu, 2011). Following the sustainability principles, European Union has launched several directives in the area of Energy Efficiency of buildings, including the 2010 Energy Performance of Buildings Directive and the 2012 Energy Efficiency Directive. These directives included a set of rules that EU countries must follow in order to increase the energy efficiency of old buildings (to increase energy efficiency of renovation) or new buildings (by new building regulation at the national level and inspection related to heating and air conditioning).

An important impact on the spread of green building have also the international ratings, such as BREEAM (Building Research Establishment Environmental Assessment Method) established by the UK-based Building Research Establishment, and also Energy Star, LEED (Leadership in Energy and Environmental Design) established by the US Green Building Council or DGNB (Deutsche Gesellschaft für Nachhaltiges Bauen) established by the German Sustainable Building Council. These green certifications have increased the awareness on sustainable building and, as further presented in the paper, created the premises for more efficient investment explained by premium rents, lower vacancy rates or higher productivity for companies located in green buildings.

Green building councils around the world played an important role in increasing awareness on sustainable or green buildings. After the establishing of the World Green Building Council (WorldGBC) by 8 countries in 1999, the number of national green building councils expanded to 93 countries in 2013, covering more than 25000 member organizations. One of the major accomplishments of WorldGBC is the current stock of 1 billion square meters of green registered space using various rating systems (WorldGBC, 2015).

Our main view in this paper will be commercial buildings, for which energy costs have a direct impact on tenants and building owners. Energy represents 30 percent of operating expenses for a normal office building (Eichholtz *et al.*, 2010). Thus, a more energy efficient building could mean higher return on investment, higher productivity or increased health for employees. Although the number of green labelled buildings in Europe continues to increase, the majority of the studies on the impact of “going green” on the value of buildings have the basis in the U.S. market. Based on these findings, a number of hypotheses could be tested on the European market, which has significant difference in terms of location of green buildings in and out of the Central Business District. Moreover, because of historical and cultural issues regarding buildings in European CBDs, the impact of retrofitting and increase of energy efficiency could be even higher.

The recognition of the influence of a new market force (sustainability) and different new characteristics that a green building could possess represent a key issue for the appraiser (Runde & Thoyre, 2010). Moreover, there is an increased potential regarding green building, especially building retrofits (Yaron *et al.*, 2013). United States offers a \$279 billion dollar investment opportunity in energy efficiency retrofits, with energy savings over 10 years of more than \$1 trillion. The commercial real estate sectors have a \$72 billion of investment potential, from which the mercantile (malls) and office segment is worth \$35.5 billion (DBCCA, 2012). For instance, the size of U.S. green building market increased from 10 billion \$ in 2005 to 85 billion \$ in 2012. Also, between 2003 and 2013, the number of LEED – certified projects in U.S.A. increased from 43 to 5,577 (Green buildings in the United States - Statista Dossier, 2014). There are significant studies that present that retrofitted commercial buildings with improved energy efficiency led to an increase in their asset value, on the basis of lower operating expenses (Marusiak, 2012).

A study on the US market on 10,000 commercial buildings with LEED and/or Energy Star label, divided into 900 clusters, based on their location, showed an increase in selling price of 16 percent. Direct correlation between decrease in energy consumption and higher building value was also assessed, which concluded that a 10 percent decrease in energy consumption will have a 1 percent increase in rent or value premium for a labelled building. Also, the transaction premium for green building is 15.8% to 16.8% higher than non-rated building for a sample of

199 green office building sold between 2004 and 2007, compared with 1,614 non-rated building sold within a quarter mile from green buildings (Eichholtz *et al.*, 2010). Similar studies state a sale price premium of 31% for Energy Star and 35% for LEED labeled buildings (Fuerst & McAllister, 2009). Another study suggests a 9.9% value premium for LEED label and 5.3% for Energy Star (Miller *et al.*, 2008).

So, based on these results, how could an appraiser incorporate the clear evidence of higher impact of green buildings? Moreover, because of limited data regarding green buildings and green building transactions, using market-methods of valuation is inadequate or not even possible. Looking at these issues, we raise the main research question on whether the higher value of “Green Buildings” is adequately reflected in current valuation procedures. To answer the question, we will further assess different scenarios related to owner and tenant occupied buildings, but also the relevance of distinguishing between these categories. These assumptions will create the proper understanding of the complexity of arguing the valuation of green building and will generate proper conclusions and discussion for the paper.

Research related to green buildings is affected by the lack of data on transactions or even constructions of such buildings. As the spread of green building is highly predominant in USA, the effect of such buildings in other part of the world, especially Europe is still subject to ongoing analysis. Our methodology, which has its basis in this normative economics, starts with the assumption that there is a “green” effect of these buildings. This study’s specificity of trying to correlate information provided from other topics, like urban economics, health economics or human resource efficiency, makes it difficult to provide actual data to be analyzed empirically. The appraisers’ current situation of answering the challenge of including different effects of green buildings, makes the reasoning for the future development of valuation methods highly appropriate. The use of the normative methods for the development of this topic is also relevant for the professional and practical application as it could further develop the need of including the green building positive effects in an accurate manner.

The paper makes several contributions, mainly related to the difference between owner and tenant and impact on valuation. In this sense, the paper is structured as follows: Section 2 includes the economic framework on three important issues. First case when there is no need to distinguish between owner and tenant as a method of understanding the actual development of green buildings and possible results. Second, we distinguish between owners and tenants, by emphasizing empirical evidence from the literature regarding the effects of green buildings. Third, we analyze appraisers as actors, which represents the link with the next section. Section 3 discusses the valuation issues related to green buildings, by assessing each method’s opportunity to include green buildings effects.

## **2. The economic framework**

### **2.1 The naive market approach**

Quality of buildings drives the company value, while the investment feedback creates the proper environment for improvement of quality of buildings. Our main assumption in this case was that the value is known, there is no appraisal or appraiser and there is no distinction between owner and tenant.

Quality of buildings is developed from the planning stage, starting from the design planning, construction planning and finishing with the operational planning. The design process sets the final outcome in terms of energy efficiency, affordability for construction, features and final usage. The construction stage creates the use of new technologies to undertake the project and brings new solutions that would lead to higher energy efficiency and sustainability of the project. The operational stage enables the return on investment through cost economies, low vacancy rate and better productivity which creates the proper investment feedback needed to further continue investment in similar or even better buildings.

### **2.2 The importance of distinguishing between owner and tenant**

Our second set of assumption starts from distinguishing between owner and tenant, on the basis of how benefits are allocated. In this sense, there are two types of renting: gross renting, where the owner pays the utilities and net renting, in which tenant pays the utilities. The structure of the lease will have an impact on the process of valuation. If there is a gross rent, then the owner of the building will benefit on the increase of energy efficiency. If there is a net lease, the actual economy of costs will be directed to the tenant, who actually pays utilities (Anghel & Onofrei, 2009).

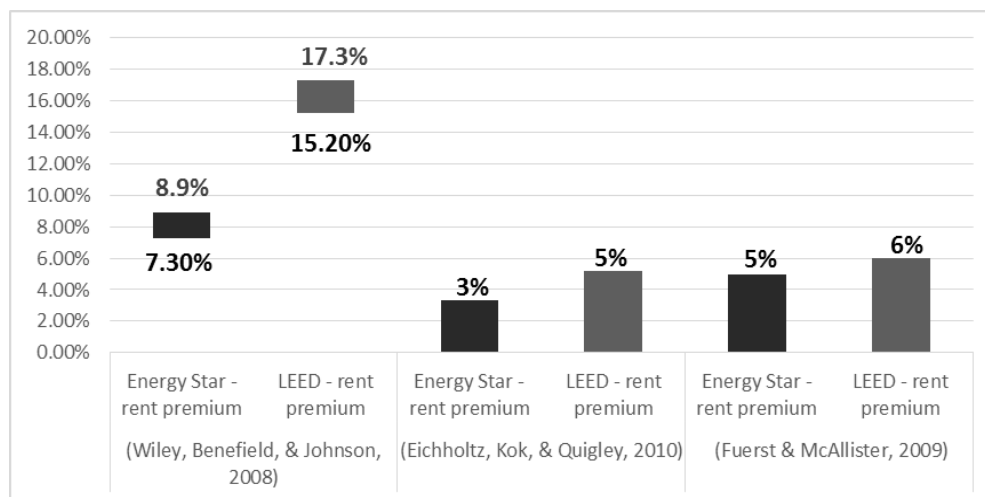
In the past period, both academic and professional studies have emphasized the added value of green label buildings on different area. The owner's benefit is in the form of "green premiums" (Building Efficiency, 2012) for increased resale value, increased rental rates, higher occupancy rates, lower operating rates, higher net operating income, lower capitalization rates while the tenant could also benefit from the lower operating rates, productivity gains or increased reputation.

Several studies have focused on different energy efficiency labels on the issues presented above. For instance a study on more than 8.500 properties for Energy Star and LEED label buildings, with data collected in 2008, obtained premium rents between 7.3% to 8.9% for Energy Star labeled properties and 15.2% to 17.3% for LEED labeled (Wiley *et al.*, 2008). Related to occupancy rates, the same studies obtained than Energy Star label have 10-11% higher occupancy compared

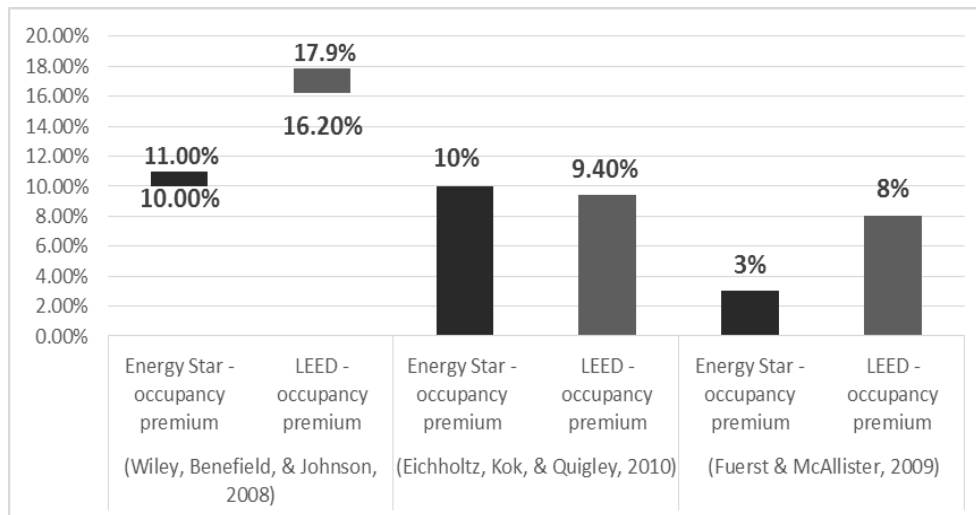
with similar properties, while LEED certified properties have a 16.2 to 17.9% higher occupancy rates. Other studies suggest that an Energy Star labeled building will have a rent higher with 3 percent per square foot.

Based on the findings, rent in green building is higher by 2.8% to 3.5% percent than a non-rated building, and looking further on types of green labels, LEED indicates a premium of 5.2%, while Energy Star is correlated with 3.3% higher rents (Eichholtz *et al.*, 2010). In terms of occupancy rate, this study suggests that the occupancy rate of green buildings is 11% higher compared with non-rated buildings (10% for Energy Star labeled buildings and 9.4% for LEED buildings).

Fuerst and McAllister (2009) found, for a sample of 200 LEED labeled and 800 Energy Star in a control group of 10, 000 buildings, that there is a rental premium of 6% for LEED and 5% for Energy Star. The same authors suggest an 8% occupancy premium for LEED and 3% for Energy Star, but there are significant differences between the two types of labels regarding the median occupancy rate and also the effects are limited to buildings with high occupancy rates or variation in percentage of multi-tenant and single tenant. Kok and Marteen (2011) analyzed 1,100 rental transactions in the Netherlands and found out that non-green buildings have 6.5% lower rent compared with similar green energy label buildings.



**Figure 1. Value of rent premium in different studies**



**Figure 2. Value of occupancy premium in different studies**

So, there are significant evidences that the owners have higher performance indicators if the subject of the analysis is a green labeled building. In this case, the valuation should consider these aspects. Moreover, there are also, evidences regarding lower operating expenses in green labeled buildings that could impact the owner and the tenant. Miller *et al.* (2008) suggest that operating expenses based on energy costs are 1.27\$ per square foot in 2006 for Energy star-labeled buildings compared with non-labeled ones that had a value of 1.81\$ per square foot. So, there is a 42.51% lower operating expenses for green buildings. Depending on how the lease contract is structured, these expenses could be economies for tenant or owner.

The tenants have also a series of benefits related to productivity or reputation. Related to productivity several studies have argued a 4.88% higher productivity (Miller *et al.*, 2008) leading to 2.88 average fewer sick days for employees. Lower sick days per employee generate reduction in expenses. The annual absenteeism rate in the US is 3% per employee in the private sector and 4% in the public sector, leading to cost between 2.074\$ to 2.502\$ per employee per year. So, a healthy environment is desirable (Productivity in Offices. The next chapter for green building, 2015).

Key factors that could lead to healthier environment were assessed by World Green Building Council: improved ventilation (11% gains in productivity), thermal comfort (4% reduction in performance at cooler temperatures, 6% reduction in performance at warmer temperatures), noise and acoustics (66% drop in performance when exposed to distracting noise) (Productivity in Offices. The next chapter for green building, 2015).



The factors that organization consider as being looked for in decisions on buildings are: improved employee engagement, improved productivity, ability to attract new talent, lower healthcare costs, lower absenteeism and positive effect on reputation. (SmartMarket Report. The Drive toward Healthier Buildings: SmartMarket Report Managing Editor, 2014).

### **2.3 Appraisers as actors, appraisal industry standards and standardization**

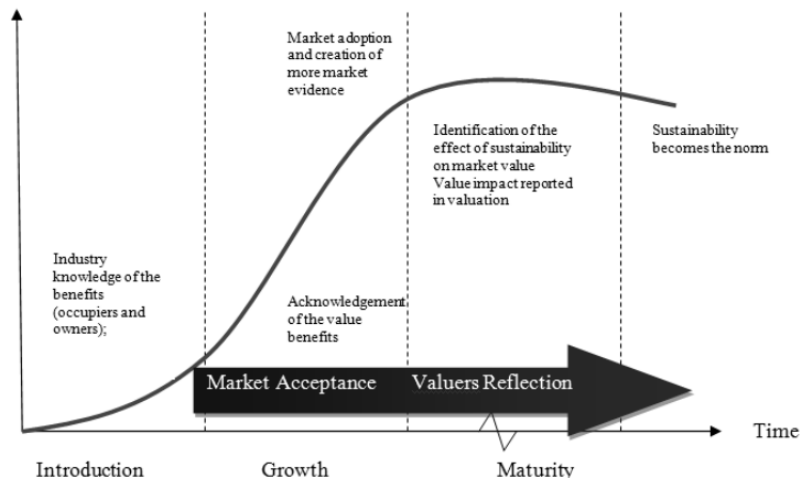
The valuation profession has been increasing its standardization through the founding of the International Assets Valuation Standards Committee in 1981, later changing its name in International Valuation Standards Council, including 74 member bodies from 54 countries (IVSC, 2015).

In real estate market, the appraisers became actors for transactions to be finalized and thus, through specific techniques can calculate the value of a property. There are three valuation approaches that an appraiser could use: the market approach, income approach and cost approach. The level of standardization considering these methods is high corresponding to a certain type of value that could be obtained. (IVSC, 2013).

## **3. Valuation issues related to green buildings**

The role of the appraiser is crucial in the adoption of sustainability in commercial property, also because, from a valuation practice perspective, the relationship between sustainability and market value is still inconclusive (Warren-Myers, 2011). The Appraisal Institute is just one of the professional bodies that started offering professional development programs in valuation of sustainable buildings.

The amount of knowledge and the steps that will lead to further including of green-building related issues in valuation standardization is represented in Figure 3.



**Figure 3. Market adoption of sustainability and the development of valuers' knowledge**

(Source: Warren-Myers, 2011: 497)

So, what is the role of the appraiser in including in the value of the building all the characteristics that we previously presented: rent premium, occupancy premium, lower vacancy rate, higher productivity or lower operational cost? Appraisers should reconcile the primary approaches to valuation, as if a recent sale of green building occurred, the sales comparison approach may take on greater significance (Appraisal Institute & Institute for Market Transformation, 2013).

Our main research question, suggested a dilemma regarding the inclusion of higher value of green building in current valuation practices. Appraisal Institute presents a way in which the premiums could be included in the methods.

**Table 1. Income capitalization of green buildings**

Gross Revenue	(higher rents)
-Vacancy	(lower vacancy vs. market)
= Effective Revenue	(revenue up)
- Operating Expenses	(lower utility bills, maintenance, reserves)
= Net Operating Income	(NOI up)
NOI/Cap Rate = Value	(lower cap rate)

(Source: Appraisal Institute & Institute for Market Transformation, 2013: 5)

As suggested in Table 1, income capitalization of green buildings could be included in order to obtain the value of green buildings. In terms of gross revenues, higher rent represents a basis for future growth. Vacancy rate could end up in the effective revenues, as lower vacancy rate create more revenues. The most common understanding of how green buildings are operating is by analyzing operating expenses. Lower operating expenses are represented by lower utility bills, maintenance, reserves but also lower cost for facility management. This will lead to higher net operating income and through a lower capitalization rate, a higher value of the building.

**Table 2. Comparing methods in green building valuation with benefits for owner occupied buildings**

	<b>Cost approach</b>	<b>Income approach</b>	<b>Market approach</b>
<b>OWNER occupied</b>			
<b>Lower Operating expenses</b>	X – no mean of reflection	Lower energy bills, maintenance	Increasing number of green building will lead to reflecting lower operating expenses
<b>Higher productivity</b>	Higher productivity can't be included in the cost approach	Lower operating cost through higher efficiency (energy cost reduction), higher revenues	X (t) – could be reflected in time
<b>Lower healthcare cost</b>	X – no mean of reflection	Higher revenues	X (t) – could be reflected in time
<b>Higher reputation</b>	Increased value of brand	V - Reflected in future income	Increasing number of green building will lead to reflecting lower operating expenses
<b>Better workforce</b>	X – no mean of reflection	V - Reflected in future income	X (t) – could be reflected in time

**Table 3. Comparing methods in green building valuation with benefits for tenant occupied buildings**

<b>TENANT occupied</b>			
<b>Rent premium</b>	X – no mean of reflection	Higher rents, increased revenues	X (t) – could be reflected in time with higher number of green buildings
<b>Vacancy rate</b>	X – no mean of reflection	V - Reflected in future income through higher effective revenues	X (t) – could be reflected in time
<b>Higher productivity, healthier environment</b>	X – no mean of reflection	Higher rents because low level of vacancy	X (t) – could be reflected in time
<b>Operating expenses</b>	X – no mean of reflection	Lower operating expenses with utilities	X (t) – could be reflected in time as similar building will provided information about operating expenses.
<b>Higher reputation</b>	Increased value of brand	Higher rents, lower vacancy rate	X (t) – could be reflected in time
<b>Better workforce</b>	X – no mean of reflection	Lower vacancy rate, lower operating expenses	X (t) – could be reflected in time with higher number of green buildings

As shown previously, potential benefits of green building are different from owner-occupied buildings and tenant-occupied buildings, with higher incentives for tenant-occupied buildings to have a green label certification. This argument is valid as higher rent premium and lower vacancy rate have the highest influences in the literature.

Comparing methods of valuation with potential benefits (with evidence from different studies), could increase the awareness of appraisers related to green building. By also using hedonic methods to assess the green premium, the further development of green building valuation will be understood. As there is an increased number of new green buildings being built, there will be further data related to higher value of green buildings. One question still will remain. As the

rapid spreading of green label certifications in new buildings, old buildings (uncertified) will receive further feedback from the market as need to engage in a process of retrofitting and green building certification plan, as the decision for tenants to rent office spaces in green buildings will be further influenced by recent studies.

## **4. Conclusions**

The current valuation practices have limited view of the full characteristics of a green building, more precisely on the following points. The cost approach is not covering the premium characteristics of a green building. Appraisers don't have cost catalogs in order to measure "green building" value. This could be further assessed as more constructions are certified as being green.

The income approach reflects the rent premium or lower vacancy rate in future income. Moreover, there isn't a relevant and sufficient base for market premium for rents and resale/reverse value or yield rate. One solution to these issues could be further analysis on small data related to the performance of organizations that rent green building. By correlating the financial performance with the spatial analytic, the appraiser could use the results for the valuation process.

The market approach could reflect in the future these characteristic, when the number of green building transactions will increase. Moreover, as green buildings are also developed in areas where location premium is relevant, excluding the location effect and retaining the "green" effect could be made through more data in the sample. Appraisers should include in their valuations the results of studies suggesting benefits of green buildings, as basis for their adjustments.

Due to constraints regarding the broad area of analysis which doesn't cover only economic effects, we consider that research limitations should be considered in order to develop new analysis into this topic. This could be continued through empirical analysis when the actual data could be significant to test some of the initial assumptions mentioned in our study.

Moreover, future research questions should answer the actual quantifiable effect of the benefits for tenants and owners of green buildings. Although, the market adoption in order to develop alternatives to the current valuation practices will need more time, there is definite understanding that specific methods are needed to set the norm for this type of buildings.

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