

Reflection

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Public presentation – P5
Wednesday, 18-01-2023

Wider academic field

The topic of sustainable value drivers fits perfectly within the research domain Real Estate Economics. The thematic field of Real Estate Economics and Finance addresses the relationship between market and building characteristics and real estate value in the space, asset and construction market. The topic of sustainable value drivers considers environmental certification as an indicator for building performance and assesses the monetary value of this building characteristic. The rental premium in the space market has its implications on the asset market and consequently the construction market. Construction of green buildings will only take place if the marginal benefits exceed the marginal costs. Research on the marginal benefits might give more insights in the role of sustainability measures, in particular environmental certification, in commercial real estate pricing. Comprehensive results on the economic benefits influence decision-making processes on managerial levels in the commercial real estate sector, as covered in the track Management in the Built Environment.

The literature on green building economics is rapidly growing and there is now much evidence to support the hypothesis that environmental certification positively influence market value. The effects in the U.S. market has been extensively studied, however, less attention has been paid to European markets, and especially the Dutch real estate market. As real estate markets are highly heterogeneous, results cannot be easily transferred across borders. Therefore, the objective of this study was to analyse the effects of environmental certification specifically in the Dutch office market. The results are highly relevant and contribute to the current body of literature on real estate economics, and green building economics in particular. By providing empirical evidence on green premiums, the academic field can contribute science-based real estate profession. The study contributes to the real estate profession by providing more insights in the marginal effect of underlying property characteristics.

Quantitative research in the field of Management in the Built Environment is highly valuable. Alumni act a 'linking-pin' within the construction and real estate sector, having expertise on design- and management level. As discussed in the preface, quantitative research skills are a valuable addition to our skill to develop design-based solutions. A linear regression is appropriate statistical method to examine the marginal effect of independent variables on a dependent variable. Knowledge and expertise in other statistical analysis provides a professional more tools to approach complex problems characteristic for the built environment.

Methodology and results

The research question consisted of several hypotheses and required multiple analyses. Multiple linear regression is used as methodology to test the existence of green premia in the Dutch office market. Linear regression analysis is proven to be a useful method to analyse correlations in a certain field of knowledge. However, the model generalizes the effect to one single linear relation. Especially in commercial real estate, whereby all properties are highly heterogeneous, the relationship between rent determinants and rent level is not equally across geographical regions. Nevertheless, linear regression analysis is a good indicator of the overall relationship and dynamic between the dependent and independent variable and plays a pivotal role in the field of green building economics. Despite more sophisticated quantitative research methods, linear regressions is still the most commonly used technique in real estate economics journals. Getting familiar with new statistical models enabled me to develop my overall data analysis skills. Still, I encourage the next generation students to consider multi-level linear models when analysing the effect of property characteristics on rental levels. Looking back to the research, this would be a valuable contribution. Due to the poor fit of the regression model on occupancy rates, I was not able to test the effect of BREEAM-NL on occupancy rates in a statistical appropriate manner. These insights would complete the findings and would result in a more comprehensive answer on the main research question.

The qualitative interviews complement the purely quantitative regression analysis. The both methods combined are able to get a comprehensive view on the dynamics within the Dutch office market. The interviews are used to validate the results from the regression analysis, and therefore I was able to better interpret the empirical results. Semi-structured interviews were a secondary research method and therefore inferior to the multiple regression analysis. The number of interviews are still rather limited, however, due to the roles of the interviewees, the interviews were still able to give a broad view on the drivers and perceptions present in the Dutch real estate market. I would advise all students who are planning to do a quantitative study to complement their study with several (expert) interviews. On the one hand, your study benefits from consolidating multiple views into one conclusion, on the other hand, you, as a researcher, can learn a lot from real estate professionals.

The academic and societal relevance of the results is clear. Practical evidence from the occupier market is needed to bring the investors into motion. The results of this study are far from exhaustive, however, it is a meaningful first step to make the (economic) benefits of green buildings explicit to the market. Only then, market actors will respond positively to the transition and change their perception.

The generalization of the results can be argued due to the limitations discussed in the conclusions. However, I truly believe that the results are a good indication and a first step towards the quantification of green premiums in the Dutch office market. The explanatory power of the model proves the generalization potential to the wider population. The results are based on historical data and are a snapshot of the current situation. The rental premium is highly dependent on the sample used and therefore the suggested premiums in this study are not fully representative for future valuations. When applying the results into practice, the premiums should be rather interpret with a certain bandwidth. Nevertheless, this study provides clear empirical evidence to feed the public debate and stimulate investors and developers to seriously consider green building construction over conventional and traditional building processes. As the introduction showed, the climate is changing and the built environment has a pivotal role to play in the transition towards a sustainable future. The industry should take the responsibility and seize this opportunity with both hands.

Process

I started the graduation process very smoothly as I already had a few conversations with colleagues about a graduation topic. Additionally, articles on Vastgoedmarkt.nl gave me more insights in relevant topics in the construction and real estate sector. This preparation made that I already had a quite tangible topic in the first week. After P1, I did not alter my scope much as I was convinced in the literature gap and research plan. The period towards P2 was characterized by considerable amount of reading. There was a substantial amount of literature available on green premiums and building certificates, proving the actuality and relevance of this topic. The combination with 17 ECT's electives, RM II and the extensive literature review took up a lot of my time. However, the time spent provided a solid base to start the second phase of the graduation thesis.

After a well-deserved break I continued with studying in August. I had planned the summer to plan and conduct most of the interviews. This partly succeeded, but due to vacation periods some had to be planned in September or October. Due to the extensive literature review before the summer, it was quite clear which variables needed to be included in the analysis. Thanks to my graduation internship, I had access to an exhaustive dataset of lease transactions from 2004 onwards, including data on important building and locational characteristics. Therefore, I can conclude that the data collection phase went quite smoothly.

The data structuring phase was more chaotic and characterized by a real trial-by-error process. There were definitely days with major breakthroughs, but they were also followed by days where I had no work to be saved. As quantitative research was not covered extensively in the bachelor, it was searching for an efficient way of working. At this point, I was busy with the data collection, trying to complement the dataset with more hedonic characteristics, data cleaning and -structuring, but also with conducting and processing the interviews. Additionally, my curiosity couldn't resist to run preliminary regression models to identify possible rental premiums. The lack of focus resulted in an inefficient way of working. However, later in the process I learned to focus and finish on specific parts before starting the other. Accepting the results and considering that phase done was also part of this process. A week before P3 I decided to clean up the dataset from scratch so I knew exactly what was in the dataset and how it was computed. This gave me the confidence to draw proper conclusions from the results. I think that setting up and executing such a (research) plan is one of the implicit skills a student learns during a graduation process.

The period between P3 and P4 was only 7 weeks and within this period all analyses needed to be run, including the interpretation and reporting. Ellen and Farley wanted to make time to review my draft report and I chose to have a preliminary version of my report reviewed relatively early in the process. This gave me quite some time to process feedback before I had to submit the final version. This turned out to be a good choice. Based on the feedback, I had to change the regression models for hypotheses 2 and 3 and this triggered a real domino-effect through my thesis in the last week. In the end I was able to process all feedback which made my conclusion much more meaningful.

In the period between P4 and P5, I focused on transferring the results into practice to make the study, both on academic and societal level, more relevant. In consultation with the mentor group, we decided to restructure the thesis towards a journal article. Journals act as linking-pin between the academic and professional world and are well read by important actors in the built environment. To stimulate investors and occupiers towards a sustainable built environment, it is important to make the results of these kind of studies explicit to the market.

Looking back on the graduation process, and the work I was able to do, I am very happy with the end result. Probably every student can confirm a graduation thesis is a never ending process, however, there is only a certain amount of time available. After one year individually working on my thesis, I value teamwork even more. *There are only a limited number of things one person can do, but there are endless things a team can do.* Therefore I am also very happy with the support and guidance I received from all my mentors, Farley, Ellen, Hilde, and Wybrand.