

Abridged Report

on the project

„ImmoWert“

- Integration of sustainability aspects in the valuation and risk assessment of real estate and building stock/portfolio –

A joint project of:

Universität Stuttgart

Karlsruhe Institut für Technologie KIT

LBBW Immobilien

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1. Project motivation

Buildings are working areas and living spaces in which people spend up to 90% of their day. Moreover, buildings have long lifespans and are therefore used by several generations. Equally impressive as their importance for everyday life is their economic significance: In 2007, real estate accounted for 86% (6128.21 billion Euros) of the German net fixed assets. This is regularly accompanied by high investment requirements in this part of the macroeconomic capital stock with the related necessary conditions for financing. Real estate plays a significant role in the sustainable development of economy and society. Many aspects of the ecological dimension of sustainability, such as greenhouse gas emissions or strain on resources and land, are closely linked with buildings. On the one hand, they are able to harm buildings and the people living in them considerably (e.g. as a result of anthropogenic storms such as hurricanes and torrential rain) and on the other hand, the buildings themselves, or their creation and management, are the cause for claims on resources and strain on the environment. Therefore, buildings are a focal point of sustainable development and have primarily financial effects but also economical effects; an area that has not been well researched up to now.

The main task of the project ImmoWert is, therefore, to process the wide spectrum of sustainably relevant characteristics of buildings and to examine the connected risks. The relevant topics within the catalogue are the areas of energy and greenhouse gas emission.

Experts agree that the potential for the highest saving regarding energy consumption and a relatively large contribution to energy efficiency exist in the building stock. It can be said that old buildings use approximately three or four times more energy than new buildings, according to present standards. A considerable reduction in energy consumption would be achieved by an energy-saving renovation for most old buildings – almost 30% of the consumption in 1990 by 2020 according to calculations of the Intergovernmental Panel on Climate Change (IPCC). The maximum effect would be achieved for residential buildings which are more than 30 years old. An energy-saving renovation would not require improved technology beyond the present state and even a moderate increase in energy prices would economically justify the required energy-efficient construction measures. Principally, the effects of energy

price increases and energy price fluctuations (price changing risk) would in the future provide the biggest boost to the willingness to carry out modernization measures under purely economical aspects.

One of the main questions for successfully coping with the climate change and achieving national climate goals in the real estate sector is the efficiency of energy measures. Typical for the present discussion is the high-priority of the costs for energy-saving renovations and the task to reduce them. While there is nothing against the optimization of the cost and income (rent) structure under economic aspects, nevertheless, the investment character of energy efficient measures and their effects over time should not be ignored. Therefore, renovation due to economic reasons causes a temporal and dynamic examination in which the once-off costs and running costs should be looked at separately. The distribution from the point of view of energy-effective modernization measures beyond the narrowed cost perspective, allows the derivation of economical incentives for capital allocation in the direction of these measures. So far the financial discussions in the area of energy-saving renovations propose little creativity towards the development of private financial sources. Government financial funds are quickly called upon even though there is no real financial scope due to the rescue actions towards the banks that will strain the national budget over years.

A more efficient allocation of private capital (as credit or equity capital) towards investments in sustainable real estate and especially investments in measures of energy efficiency requires that the connected economic efficiency results, measured in form of risk and return, are known. The present project report starts at this point and fills a gap between the available analysis and strategy instruments and their application to sustainable real estate.

2. Implementation of the research task

The determination of sustainably relevant megatrends with a special significance for real estate is the starting point for this research work. These can increase or decrease the value of real estate and often show correlation among each other. The most common idea of risk that dominates the fiscal attitude is the symmetric one, so that the described megatrends are able to not only decrease the value of real estate (downside risk) but also increase it (upside risk). The aim of risk management usually

is to limit the downside risk, which springs from sustainability of real estate value and to use such risks to increase value. Most risk management methods, though not valuation methods are based on this idea of asymmetry. The present document will introduce an innovative approach for the asymmetric risk consideration in the valuation.

First of all a main part is devoted to the arrangement of risk management systems and processes for risk control in the real estate area in the project. This is done by widening the case of mixed portfolios with real estate. Following that the connection between systems and methods, which are generally known in risk management and partly adapted in the real estate business, is produced and the integration possibilities of sustainability aspects is justified. Based on this a concept has been newly developed, which is built on the system inosys and supplements it with sustainability criteria. In a subsequent validation in an existing portfolio of residential real estate of the project partner LBBW Immobilien the effects on the portfolio risk structure are empirically carved out. A first conclusion of the knowledge gained is drawn for the international accounting of real estate agencies and the necessity of sustainability aspects in the valuation models is justified.

This necessity is supported by the description of the status quo of valuation in the real estate sector in Germany by briefly introducing the valuation methods and explaining their specifics regarding market value, property interest as well as time to maturity. It is shown that the integration of sustainability into this “foregone world” of valuation is possible in the way it is accomplished with energy in the project later on. A new approach from the area of derivatives is used, the real option approach, with which the discounted cash flow methods for real estate valuation are complemented. The real option method is introduced, which has proven its analytical performance in the area of real estate valuation as well as the valuation of regulations in the energy sector. The key message of the resulting deliberations and models is the idea, originally from the option markets, that strategic flexibility – being prepared for future energy price increases or fluctuations – interprets the energy-effective investments as an insurance premium, not primarily as a cost driver. It is shown how the conventional Discounted Cash Flow (DCF)-value of real estate is added to by the value of the insurance coverage and used against future price fluctuations. These ideas of risk and valuation are rounded off by transferring central aspects into international accounting.

3. Summary of the results

The focal point of the project was the research of effects of sustainability of buildings on their risk structure and the object-related risk management. Furthermore the portfolio aspect was given increased attention, since it is typically of importance for real estate agencies with multiple and mixed real estate stocks. A concentration of work takes place around residential real estate.

The work on the risk aspect was followed by the valuation question and adequate modeling to analytically deduce a causal model for the example of energy-saving renovation. Again the focus was on residential real estate. In correlation with the knowledge previously gained about risk effects of sustainability for residential real estate the value changing risk of sustainable real estate was modeled with a stochastic process of the gas price development. It was shown that energy-saving renovation measures have a temporal effect and risks, here in the form of gas price volatilities, determine the value of sustainably positioned real estate.

The remarks about risk analysis, portfolio management and valuation methods give clues about the consequences for the capital market based accounting of real estate agencies, if their stock consists totally or partially of sustainable buildings. The research project has opened the door for further discourses, for instance in the IAS-committee, based on these results.

The knowledge gained from this research project poses new territory and offers a discussion foundation as well as first recommendations for action regarding real estate and residential property business. This is the intention of the research project, since the work was done in a well argued way as well as being innovative and technically inspiring. For the integration of sustainability aspects into the risk analysis and the portfolio management methodical basics were developed and practical applicable solutions were carved out and tested together with the partner LBBW Immobilien.

The authors are of the opinion that the inherent way of thinking in the discourse, regarding the concept of sustainable development, is especially emphasized and can unfold a vast amount of innovative strength.

For the ensuing research the following areas will be sketchily referred to:

- The listed risk factors and their interactions are conceptually prepared that they can be verified with actual numbers. The inquiry, preparation and integration of such data are extremely complex, due to high individuality of buildings. Due to this an intermediate step should take place to compress the relevant non-financial key performance indicators of sustainable buildings.
- Based on this it is an obvious step to urge the utilization of risk valuation concepts for the real estate industry by further empirical substantiations, as has already taken place with the data of the LBBW Immobilien.
- The valuation model, based on a real option has basic functionality and can be expanded and supplemented with other sustainability factors. A starting point was shown through the integration possibilities of emission certificates. The empirical validation of a theoretically deduced fair value with observable market values of sustainable real estate would be the obvious next step.
- Furthermore, the real option model is extremely suitable for industrial areas, due to critical overburdening of investment costs for energy saving building measures which are reflected in the rental value of the property. An adaptation of the model should be preferred, also to carry out empirical verifications.

Last but not least the research team believes that the project work is very suitable to initiate a constructive debate in the responsible committees of evaluators and accounting specialists. It should especially lead to a stronger recognition of sustainability as a value driver as well as using sustainability evaluation as an instrument for supporting risk management.