

Flood Risk and Property Values

Sebastian KROPP, Germany

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SUMMARY

The issue of climate change and its consequences is all over the media and has moved up the political agenda. Since the 1980's the number of extreme weather events has tripled worldwide. For example for Germany statistical predictions say that flood events that have occurred on average every 50 years in the past will take place every 25 years in the future. Flood damages on real estate can multiply and economical losses should not be underrated.

The paper is based on a comprehensive survey of about 500 certificated property and valuation experts throughout Germany. The main objective of the survey was to examine whether and to what extent residential property values can be influenced by flood risk. The experts were asked to evaluate two different situations. First was the general location of a residential property in a formally designated flooding area and second the influence of a concrete flooding event. Results of the survey indicate the relevance of the topic.

65 percent of the questioned experts claim to consider flood risk within the valuation process. Flood risk in combination with a concrete flooding event is even considered through a high majority of 93 percent. A consideration within the valuation process primarily takes place through a discount on the unaffected property value. For the location in a designated flooding area a discount between 6 to 10 percent and for a flooding event more than 15 percent seem to be appropriate according to the survey results. In addition a higher property yield can reflect the flood risk compared to unaffected real estate.

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1. INTRODUCTION

Wide regions of Germany were affected by floods in the summer of 2013 that caused around 12 billion of total economic costs and damages. In the same year a total of about 880 natural disasters caused insurance losses of around 90 billion euro worldwide (Munich RE, 2014). Besides windstorms flood events are the most common natural disasters worldwide. In addition to the consequences of climate change extended settlement of areas near by water led to an increase of risk. Number and intensity of extreme weather events will increase in the future. In a statistical way flood events that have occurred in the past every 50 years will take place in the future already after 25 years (GDV, 2014). Flood events in recent years make it obvious that mankind is helpless exposed to forces of nature very often. Besides to damages on infrastructure or impacts on the local economy the local real estate market has been affected. Flood risk exposes all properties that are located within a designated flooding area or that have experienced a flood event in recent years. Coastal flood events and circumstances due to rising groundwater are not subject of this article. The question is if flood risk affects property values. The valuation expert has to assess the situation and if yes consider it in an appropriate way. The article highlights specifics of flood-endangered properties and gives recommendations for dealing with it in practice. The article is based on a publication in the German valuation journal "immobilien & bewerten" (2014).

2. LEGAL FRAMEWORK IN GERMANY

The Federal Water Act and the respective water laws of the several states are crucial for water management policies as well as flood protection and flood prevention matters in Germany. Flood is defined by law as a time limited flooding of areas that are normally not covered with water. Affected areas are generally designated as floodplains with special protection rules, as a general ban on construction or expansion of structures to avoid future events or at least to minimize their consequences. The formal designation as a floodplain area in terms of a legal fact or a specific flood event as a specific characteristic of the property need to be considered in the valuation process according to the relevant German valuation norms; e.g. the definition of the market value in the German Building Code. Also environmental influences as flood risk are part of the locational characteristics.

3. PREVIOUS STUDIES

Despite of the increase of flood events in the recent past the connection between flood risk and property values plays only a marginal role in the German evaluation literature. Comprehensive and scientific research on a wide range of data does not exist. Publications, including discount values, are based primarily on personal experiences and smaller and locally limited

surveys of their authors. The need of broader and more sophisticated research is pointed out. In general the use of comparable prices, that means prices that are already influenced by flood risk, is recommended. In Germany comparable prices are based on the “Kaufpreissammlung” (sales prices out of an official transactions register) as well as “Bodenrichtwerte” (reference land values) and comparable rents. Due to the legal situation in Germany (no more undeveloped land should exist in designated flood areas) the required number of comparable prices for analysis is in general not available. In addition, due to the exclusive location of watersided properties the number of transactions is very low.

A number of international studies have investigated the influence of flood risk on property values (Kropp, 2012). There is a consensus of the majority that flood risk influences the value of a property in a negative way. Discounts are in average around 10 percent, but can also increase up to 20 percent. The significant findings of international studies can be summarized as follows:

- flood events lead to higher discounts than just the location of a property in a designated flood plain area
- the amount of the discount is significantly affected by the flooding parameters (e.g. duration and intensity of a flood, flood height, flood history)
- the discount depends on the location of the property (i.e. in good to very good locations the influence is lower compared to simple and medium locations)
- the discount depends on the market situation (i.e. in stronger/growing markets the influence is lower compared to shrinking market phases)
- the discount is temporally limited (it can last up to 10 years but is getting weaker with time)
- availability and cost of insurance influence the discount; there is a correlation between capitalized insurance premiums and the amount of the discount

4. SPECIAL FEATURES IN THE VALUATION PROCESS OF FLOOD RISKED PROPERTIES

As the valuation of flood endangered properties is rather the exception than the rule, in the following chapter the special features in the valuation process will be introduced and briefly explained. Also mortgaging aspects will be considered. Further information on the topic can be found in the real estate valuation literature, e.g. in Germany in Sprengnetter (2014).

For the sake of completeness it has to be noted, that waterfront location and near to water can also influence property values in a positive way. Studies have shown that land values can increase – especially in the first series to the water – up to three times of the regular price (Geppert, 2006; Pfeiffer, 2012). Reasons can be seen in the special view as well as in recreation and leisure aspects. Positive and negative location effects overlap each other, what makes analysis even more complicated.

4.1 Land Value Determination

The easiest and most uncomplicated way to address flood risk within the valuation process would be, if the risk would already been taken into account in the comparable prices, that are made available by the “Gutachterausschüsse” (valuation committees). Unfortunately this is

mostly not so. Own surveys through the author have shown, that only a quarter of all committees consider flood risk within their analyses. Thus, estimated reduction through the expert can already be used in the land value determination.

4.2 Remaining Operating Life Period

Basically, it can be assumed that flood events affect building structure in a negative way with the consequence of an increased stress. This leads to a reduced (economic) remaining operating life period of the building. This results in a higher discount in comparison to non-affected properties.

4.3 Reduction of Rent

In general it can be assumed that an existing flood risk has already priced in in attainable rents. If there are no such comparable rentals available flood risk can be considered by an appropriate discount on the rental figure. Flooding can limit the usability of the property, especially in the basement and the ground floor depending on the intensity of the flood as well as time the property has been flooded. Another fact is the necessary time for damage elimination. Limitations can range up to a complete non-habitability. Conceivable consequences could be reduced rental figures or even complete loss of rental income. Other economic failure costs might have to be considered for commercial properties.

4.4 Increased Management Costs

Management costs include expenses for maintenance and repair, operating, vacancy and collection loss and administrative work. Whether, higher maintenance costs, operating costs for insurance or necessary cleaning measures flood events in general result in additional costs. An increased rent fluctuation, for example due to regularly occurring flood events justifies an increase of the loss of rent risk. Despite the possibility of reflecting the costs to the tenants still higher management costs can be expected.

4.5 Property Yield

The property yield fulfills the function as a market adjustment factor and can also be seen as an indication of future expectations on the real estate market. Furthermore, it can be used as a correction factor for those valuation cases that differ from regular cases. Thus, flood risk can be considered by an increase of the property yield.

4.6 Special Object-Specific Property Characteristics

Flood risk can also be attributed to the (open) catalogue of special object-specific property characteristics. Special characteristics are taken into account by market-oriented discounts almost at the end in the valuation process right before the final market value determination.

4.7 (Flood-related) Mercantile Decrease

A mercantile (flood-related) decrease is a reduction of the market value, which occurs despite of a proper elimination of all damages on the property caused by the flood, due to the suspicion of remained hidden damages. Consideration of a mercantile decrease assumes that flood risk actually plays a role on the local real estate market, i.e. that certain reservations towards flood risk properties exist.

The previous descriptions (4.1 to 4.7) have shown that a consideration of flood risk in the valuation process is possible in various ways. If the valuation expert concludes that a threat exists and it affects the property value in a negative way, he has to decrease the value. The difficult question is at what (exact) point in the process and in what amount. A clear and regulation-compliant answer to this question doesn't exist. With regard to the model conformity a consideration should be made in particular in the context with the object-specific property characteristics (see 4.6). This statement is supported by the results of the valuation experts survey (see chapter 7). A double-consideration is generally not recommended, as it would reduce the market value of the property unjustified. Only in clearly justifiable cases this should be done.

5. BASIC APPROACHES FOR QUANTIFICATION OF THE DISCOUNT

As in general comparison and standard values not available (see chapter 3) there is a particular difficulty in the accurate quantification of the impairment of the property value. Different methods, which are introduced in following chapters, can support the quantitative determination.

5.1 Capitalization of Additional Investment Costs

In general flood protection measures on the building can reduce or even eliminate the threat caused by flooding. However, these measures for a (theoretically) flood-resistant building result in additional costs compared to non-affected properties. Extra investments primarily result from installing structural flood defenses, as the utilization of water-resistant materials a constructions (e.g. a water-resistant basement; a system preventing backwater from sewerage; or the installation of special demountable door and window guards).

5.2 Capitalization of Additional Management Costs

As has been pointed out already in chapter 4.4 a flood event can lead to increased management costs. If it is possible to quantify these additional management costs, it could be used for a determination of the impairment of the affected property.

5.3 Consideration of Actual Damage Repair Costs

If the valuation follows (immediately) a flooding event actual damage repair costs give an indication of the property impairment. Since future flood events might vary in intensity and duration, and also no one knows when the next flooding will be, accrued expenses should only be used as an orientation for the discount.

5.4 Capitalization of Rental Income Loss

In chapter 4.3 the consequences of a flood event with its limitations of usability have already been discussed. Is it possible to quantify expected rental income losses it could be used, similar to the described methods above, for a determination or an orientation of the impairments.

5.5 Capitalization of Additional Insurance Costs

A fact that many people do not know in Germany is that damages through natural disasters as

floods are not automatically covered by a general building insurance. An additional “Elementarschadenversicherung” (elementary insurance against natural forces) is required. According to the German insurance association (GDV, 2014) 99 percent of all residential buildings are insurable against natural disasters in Germany. For the remaining 1 percent customized solutions are available. Already today the German insurers can inform themselves about flood risk for more than 20 million households by using geo-information systems. An additional insurance against natural forces of course creates additional costs. International studies have shown that capitalized insurance premiums correlate with the discount on the market value due to flood risk (Skantz and Strickland, 1987; Speyer and Ragas, 1991).

6. FLOOD RISK FROM THE MORTGAGING POINT OF VIEW

Many valuation experts also work in the field of mortgage valuation. The sustainability of the property with a long forward-looking consistency of the value plays an important role here (Crimmann and Rüchardt, 2008). German mortgaging regulations generate a certain compulsory insurance for the entire credit period in the amount of the building value. Flood risk can endanger stability of the property value as well as future salability with the effect that loan conditions can change in a negative way or even that a mortgaging is completely impossible. In order to meet the increased need for security of lenders in general a more critical look at the valuation parameters is made. In the case of flood risk this strategy should be maintained. This means that discounts at the mortgage value should be slightly higher compared to a regular valuation of the market value.

7. RESULTS OF A VALUATION EXPERTS SURVEY

It has been already pointed out that so far no comprehensive studies about the influence of flood risk on the property value have been carried out in Germany. For this reason an online survey of about 1.500 valuation experts was conducted. The rate of return was around 32 percent. Free estimation/valuation is made on specific market knowledge and experiences and is relatively common in the valuation practice. How do valuation experts deal with flood risk in practice, do they consider flood risk, do they discount, at what point in the valuation process and to what extent, were the main core issues of the survey. A distinction was made between the general location in designated flood plain area and a specific flood event. Although the survey results are statistically not significant they allow initial conclusions about the topic.

The survey has shown that the majority of the respondents consider flood risk within the valuation process. 65 percent would consider the location in a designated flood plain area. A specific flood event is even considered by 93 percent of the respondents. The main reason for a non-consideration is that it is assumed that flood risk has already been priced in in the used comparable value (e.g. reference land values). However, this rarely the case as already has been pointed out. Surprisingly the compensation of the negative effect of flood risk by a positive influence due to the nearby water location hardly plays a role.

A consideration within the special object-specific property characteristics is the most stated answer to the type of consideration within the valuation process followed by an increase of

the property yield and a flood-related mercantile decrease. Location in a designated floodplain area justifies lump-sum discounts between 6 to 10 percent, flood events over 15 percent. These figures are confirmed by a comparison with the data concerning the property yield increase. A variation of the property yield of 0.5 percent corresponds with a variation in the (final) market value of about 10 percent.

The experts were also asked whether higher insurance premiums can affect the property value. A slight majority of 57 percent don't think that premiums would affect the value. When asked how long it could take until the price of a flood affected property would recover on the market showed that a time period of between 3 to 10 years seems to be reasonable. Also marketing of flood affected properties can extend up to 6 months. These answers also correspond with results of international studies.

8. BEST PRACTICE ADVISES

The valuation expert has to deal with flood risk within the valuation process. Is there a risk further investigations have to carry out. That means primarily obtaining specific information such as information on the topography or the distance to the next waters. Information by the authorities about current flood protection measures, e.g. technical flood protection constructions as dikes and dams, can also be helpful. Flood risk maps, flood history of the property but also simulations of different flooding scenarios such as dam failure support flood risk assessment. Obtained information has to be analyzed to estimate the specific flood risk potential of the property. The valuation report should give the reader an impression up to what water level risk is negligible and when not. Graphical presentations like flood risk maps illustrate the potential risk.

If the expert concludes that flood risk affects the property value in a negative way a discount has to be made. Basic approaches for quantification of the discount were discussed in chapter 5 in detail. It should be differentiated between location in a designated floodplain area and a specific flood event. Double consideration should be avoided.

9. CONCLUSION

Floods and storms already belong to the most prevalent natural disasters worldwide. Considering climate change and the associated increase of extreme weather events it can be assumed that the topic of "flood risk and property values" will become even more important in the future. Valuation of flood endangered property requires consideration of several special valuation features. The article makes clear that a consideration can be done through different approaches. Results of the expert's survey confirm this statement. Most important is that flood risk will be considered object-specific and is mentioned in the valuation report. Necessary discounts are to be determined with expert opinions. Still more comprehensive statistical analyses are needed to get more information about the effects of flood risk on the property value.

REFERENCES

Crimmann, W. und Rüchardt, D. (2008) Der Beleihungswert; Band 33; vdp – Schriftenreihe des Verbandes deutscher Pfandbriefbanken.

Geppert, H. (2006): Ermittlung von Wertfaktoren für Wassergrundstücke in Brandenburg, In: WFA – WertermittlungsForum Aktuell, Vol. 1, pp. 22-25.

GDV (2014): German Insurance Association (www.gdv.de).

Kropp, S. (2012): The Influence of Flooding on the Value of Real Estate, In: Journal of Building, Survey, Appraisal & Valuation, Vol. 1, No. 4, pp. 318-324.

MunichRe (2014): Reinsurance Company (www.munichre.com).

Pfeiffer, M. (2012): Wertfaktoren für Ufergrundstücke - Der Einfluss der gewässernahen Lage auf den Immobilienwert, Masterarbeit an der Professur für Städtebau und Bodenordnung an der Universität Bonn

Skantz, T.R. und Strickland, T.H. (1987): House price and a flood event: An empirical investigation of market efficiency, In: Journal of Real Estate Research, Vol. 2, Nr. 2, S. 75-83.

Sprengnetter (2014): Immobilienbewertung - Lehrbuch und Kommentar. Sprengnetter Immobilienbewertung. Sinzig 2014.

Speyrer, J.F. und Ragas, W.R. (1991): Housing prices and flood risk: an examination using spline regression, In: Journal of Real Estate Finance and Economics, Vol. 4, Nr. 4, S. 395-407.

BIOGRAPHICAL NOTES

Verm.-Ass. Dipl.-Ing. Sebastian Kropp graduated in Geodesy at the Dresden University of Technology (Germany) in 2006 with a focus in land and real estate management. After two years in the state of Baden-Württemberg where he achieved the title of assessor he worked for almost two years in a bank dealing mostly with real estate valuation. Since July 2010 he has been working as a research assistant and PhD student at the Department for Urban Planning and Real Estate Management at University of Bonn. His main research interest focuses on real estate management and valuation.

CONTACT

Verm.-Ass. Dipl.-Ing. Sebastian Kropp
Department for Urban Planning and Real Estate Management
Institute of Geodesy and Geoinformation
Rheinische Friedrich-Wilhelms-University Bonn
Nußallee 1
53115 Bonn
Germany
Tel. +49 228 73-3707
Fax +49 228 73-3708
Email: kropp@uni-bonn.de
Web site: <http://www.igg.uni-bonn.de/psb/>