Nat. Hazards Earth Syst. Sci. Discuss., 2, C128–C132, 2014
www.nat-hazards-earth-syst-sci-discuss.net/2/C128/2014/

Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Financing increasing flood risk: evidence from millions of buildings" *by* B. Jongman et al.

Anonymous Referee #2

Received and published: 6 March 2014

B. Jongman, E.E. Koks, T.G. Husby, P.J. Ward: Financing increasing flood risk: evidence from millions of buildings

In the paper an amazing and outstanding data set of Dutch properties on the object scale is analyzed with regard to flood exposure and changes from 1960 to 2012. The aim is to provide a better understanding of rising trends of flood damage and implications for risk financing. The paper is well-structured and well written. Due to the uniqueness of the data set, the paper should be considered for publication. However, since the monetary valuation of the building stock and the implications of the analysis for risk financing play a key role in the paper, the issue and the methodologies of the assessment of building/property values deserve more attention. Property values can be assessed by their (re)construction costs (in prices of a specified reference year),

their market value (which are driven by local demands, not only costs) or their depreciated value (i.e. the construction and maintenance costs minus the loss in value due to utilization). A discussion about these different concepts and their implication for the results and conclusions is completely missing and should be added in the revised version. This is especially important, since different insurance systems use different concepts in their compensation payments. In the US, for example, compensation of flood damage is based on depreciated values (to my knowledge), in Switzerland and Germany it is based on replacement/repair costs. The question is whether the results of the analysis and their implications for risk financing would differ if different valuation concepts were used. The relevant literature should be added in the introduction and the implications should be discussed in the discussion and conclusions sections. Furthermore, the relevant literature on disaggregation of property values as well as other studies that analyzed asset development in- and outside of the floodplains should be better considered and discussed.

Some minor aspects are: The title should make clear that the data are solely from the Netherlands. I suggest: "Financing increasing flood risk: evidence from the Netherlands".

p. 139, lines 11-14: The referenced paper by Kreibich et al. (2005) does not provide risk estimates at the local scale, nor are hazard and exposure models combined in that paper. You could refer to the studies of Apel et al. (2009) and Wünsch et al. (2009) that were published by the same research team. The full references are provided at the end of this text.

p. 139, line 23-27: Here, you could refer to work that aimed to overcome the spatial mismatch between hazard and exposure data by disaggregation methods, e.g. Chen et al. (2004), Thieken et al. (2006), Wünsch et al. (2009) or Seifert et al. (2010). See Eicher & Brewer (2001) for an overview of disaggregation techniques.

Further remark to the introduction: There is at least one study that shows that settle-

ment development in flood-prone areas is NOT stronger than outside the floodplains (Cammerer & Thieken, 2013). You might find more.

p. 140, line 18: Please outline the Dutch safety standards in more detail. To my knowledge there are clear regulations (1250-year flood at Lobith for inland rivers (at least for the Rhine) and 10000-year events along the coast).

p.141, line 11-13: In Germany and Austria, governmental compensation payments are also financed by tax revenues. Reconsider your statement.

p. 142, Section 2.3: There is relevant literature on the comparison of different flood insurance systems, which should be considered in this section, e.g. von Ungern-Sternberg (2004) or Schwarze et al. (2011).

p. 143, section 2.4, line 12-15: To overcome these limitations, unit values could be adapted/scaled in accordance with the regional GDP or another economic parameter.

p. 144, line 9-11: The definition of the zone "outer dike" is not totally clear. I was wondering whether properties in this zone were also affected in 1953, 1993 or 1995.

p. 144, line 17: The proper status (i.e. a date/year of compilation) should be provided for the flood depth map.

p.144, line 22-26: These sentences were not clear to me. How valid is the assumption on constant hazard zones? Were there no changes in protection levels of embankments etc.?

p. 145, line 6: "these" instaed of "this"

p. 145, line 9: I suggest using "building use" instead of "building function".

p. 145, line 9: How is the "surface area" defined or calculated?

Section 3.2.2: see my comments above on the monetary valuation of buildings. Obviously, market values are used in this data base. I am wondering whether this approach

is reasonable for discussions on risk financing, since compensation payments are either based on construction/repair costs or on depreciated values. Demand on the market and its effect on selling prices of buildings is something different.

p. 146, line 15-17: It is not clear how different building types (single homes, multi-family houses etc.) are distinguished during the data processing.

p.147, line 13: Does "the average value per square meter" refer to the floor space (usable area) or the base area (= surface area?)?

p.147, line 26 to p. 148, line 2: This test protocol should be mentioned earlier.

p.148, line 20-25: Are there any explanations for this trend?

p.149, line 11-16: You could simply calculate the number of buildings per km^2 to get an idea of the building density.

p.150, line 11-12: Here, the question arises whether the analysis should be better performed per province, not on the national level. Maybe rural areas are overrepresented in the non-flood prone areas. At least, you should discuss this issue or consider the introduction of a kind of normalization with regard to the proportion of rural/urban areas.

p. 153, line 15-29: In these paragraphs the concepts of market valuation and replacement values/costs are definitely mixed up. Please clarify.

General remark on sections 4 and 5: Discuss also the limitations of your results as well as their transferability to other countries/systems. In addition, the government is also responsible for flood protection, not only for compensation payments. The relation between the level of protection and risk financing should deserve more attention.

I am looking forward to a revised version of the paper.

References: APEL, H., G.T. ARONICA, H. KREIBICH, A.H. THIEKEN (2009): Flood risk assessments – How detailed do we need to be? – Natural Hazards 49(1): 79-98.

CAMMERER, H., A.H. THIEKEN (2013): Historical development and future outlook of the flood damage potential of residential areas in the Alpine Lech Valley between 1971 and 2030. – Regional Environmental Change 13: 999-1012.

CHEN, K., McANENEY, J., BLONG, R., LEIGH, R., HUNTER, L., MAGILL, C. (2004): Defining area at risk and its effect in catastrophe loss estimation: a dasymetric mapping approach. - Appl. Geography 24: 97–117.

EICHER, C. L., BREWER C. A (2001): Dasymetric Mapping and Areal Interpolation: Implementation and Evaluation. - Cartography and Geographic Information Science 28(2): 125–138.

SCHWARZE, R., M. SCHWINDT, H. WECK-HANNEMANN, P. RASCHKY, F. ZAHN, G.G.WAGNER (2011): Natural Hazard Insurance in Europe: Tailored Responses to Climate Change are Needed. – Environmental Policy and Governance 21: 18-30.

SEIFERT, I., A.H. THIEKEN, M. MERZ, D. BORST, U. WERNER (2010): Estimation of industrial and commercial assets values for hazard risk assessment. – Natural Hazards 52(2): 453-479.

von UNGERN-STERNBERG, T. (2004). Efficient Monopolies - The Limits of Competition in the European Property Insurance Market. Oxford: Oxford University Press.

WÜNSCH, A., U. HERRMANN, H. KREIBICH, A.H. THIEKEN (2009): The Role of Disaggregation of Asset Values in Flood Loss Estimation: A Comparison of Different Modeling Approaches at the Mulde River, Germany. – Environmental Management 44(3): 524-541 (DOI 10.1007/s00267-009-9335-3).

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 2, 137, 2014.