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Interactive comment on “The structure of disaster resilience: a framework for simulations and policy recommendations” by J. H. Y. Edwards

Anonymous Referee #1

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The author presents a formal economic definition of resilience focusing on the application to natural disasters. Starting with Holling’s and Gunderson’s ideas of resilience, the article develops a formal definition of resilience which may be used as mathematical framework in DRR. Finally, it is demonstrated by taking the financial sector as an example how the model can be used to organize and shape resilience, and to increase the political awareness of disasters. Generally, the assessment of disaster resilience and their applicability to a wider set of case studies beyond economy is of considerable interest for the readers of Natural Hazards and Earth System Sciences. Thus, the paper should be considered for publication. However, even if the manuscript is well-written and the structure is good, there are some issues that should be considered before a publication in the targeted journal. First of all, I kindly would like to stress that

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the concept of resilience is not a “new” one in DRR. Resilience research in DRR so far has focused mainly on theoretical frameworks expressing the concept and behavior of social-ecological systems, and in particular, processes such as feedbacks between social and ecological systems, adaptive capacity and transformability (e.g., Folke 2006; Folke et al. 2005). Resilience captures the ability of people and ecosystems together to adapt to changing risks and opportunities (Adger and Brown 2009), which means tolerance to disturbances. The formal definition of resilience (Page 5766, Section 2.2) seems to only be applicable for the relatively narrow (and original) definition of resilience (full recovery to the pre-shock state, compare Section 2.1). As in particular social dimensions of resilience theory remain generally undefined so far, it would be interesting to see the applicability of the presented concept on the questions of coping capacity and adaptive capacity (see e.g., Berkes et al. (2003), Galopín (2006)), both of which contain the temporal component. In general, it would be good to include also some of the ideas presented by both Holling and Gunderson since I think that there is still a linkage between the two ideas, see e.g., Holling and Gunderson (2002). Moreover, the concept of resilience formalised in this paper seems to neglect the importance of place as it just allows for analyzing the recovery speed to an ex-ante shock level. Given the context- and place-specific dynamics of resilience within diverse groups of people, there are also issues about how the concepts of resilience and vulnerability are applied and understood within different disciplinary traditions. As the author concludes, apart from the application to the financial sector, more work is needed to capture the mechanisms behind the resilience function, such as systemic resilience and resilience capacity. One possibility may be to extend Figure 2 and to show relationships to other concepts of resilience and vulnerability, such as e.g. those recently published as a result of the EU FP7 projects MOVE (Birkmann et al. 2013) and ENSURE (Menoni et al. 2012): Here, resilience is defined as not only recovery to the pre-disaster state, but also the possibility to anticipate and to cope with the threat. Nevertheless, this piece of work is a nice attempt to formalize the buzz term resilience in a mathematical way by decoupling different layers of influence. It may be desirable that such a concept will be

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applied in more domains and more case studies so that the strengths and weaknesses become more evident.

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