

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

### **Anonymous Referee #2**

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0. This referee has not had previous experience with the open-source model of NHESS, nor with the journal itself. I hope that these comments are useful to the author and to the broader community. I write as an economist, presuming that the journal attempts to reach a multi-disciplinary readership with shared interests in hazards and "geoscience".

1. In this spirit, the paper is a welcome contribution because it reaches out to a broad audience about important public policy questions, highlighting the very important point that disaster policies must be based, in part, on an understanding of the natural hazards that they are intended to remediate or to prevent, but also on an understanding of the economic and institutional systems through which policies must inevitably be formulated and implemented. The paper especially highlights the roles of different actors

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in the policy process – ranging from individual households and firms, to markets (like insurance markets), to different levels of government (local, state/provincial, national). This is not a well-established field of inquiry in economics, and it deserves much more attention than it has received. The paper does a good job of presented a conceptual framework. It also presents a good discussion of such literature as is available to date. Readers unfamiliar with the economics literature (sparse as it is) will get a good introduction here, and can go on to read other papers based on the bibliography.

2. Section 2.3: The "top down" or hierarchical idea has its uses, but remember that the resources that may flow down from above all have a cost. The "top" doesn't get resources from nowhere, but rather from the "bottom", typically via taxation or via the commandeering of resources through regulatory policies. This is addressed briefly in n. 4 but should probably be acknowledged more centrally, as there is sometimes a tendency in policy debates to think that the higher level authorities always have abundant resources relative to those at lower levels. This is surely not so, if, for instance, we compare indebtedness of Federal, state, and local governments in the US: Federal debt is vastly greater, relative to the economy, than state/local combined.

3. Section 2.4: In the Cobb-Douglas specification, aren't all "elasticities" equal to one? Do you mean "shares" rather than elasticities?

4. Indeed, Cobb-Douglas is a very special functional form with very special properties. Can it be better justified? What about some alternative specification (CES, of course, but also functions with some separability, say)? In the absence of any empirical foundation, it seems important to entertain a wider class of alternatives. I understand that the purpose of using this specific function is merely illustrative, but readers not familiar with Cobb-Douglas (Inada conditions etc.) may be misled by it, failing to see how quite different results might arise under different specifications.

5. Similar remarks might apply to the overall/average recovery measures. Basically, this comes down to preference aggregation or, in different language, the specification

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of a social welfare function. Why not just use (or at least reference) the terms that are standard in welfare economics? (I see a reference to Foster et al. in the references, but this publication (and perhaps others?) is not mentioned in the paper.

6. In learning about NHESS, I notice the publication of a special issue in Vol. 14 on "Flood resilient communities". Interestingly, the prefatory article by Thieken et al. starts, like the present paper, by trying to define "resilience". The paper under review should reference relevant contributions in this special issue in order to engage better with the NHESS community.

7. Finally, the fact that everyone seems to struggle in defining "resilience" suggests that it may not be a useful term. Economists have well-developed concepts for policy evaluation, notably in intertemporal contexts with uncertainty. These are spelled out in the literature of welfare economics and have been operationalized in various ways in benefit-cost analysis – admittedly not without some controversy. Why do we really need new terminology? Or, in somewhat different terms, why not use this opportunity to inform non-economists about standard benefit-cost concepts as they might be applied in this context, and about their limitations, as the author might see them, either in theory or in practice? (Needless to say, there are good reasons to be skeptical of benefit/cost as practiced, say, by the Corps of Engineers, but is this a reason to jettison benefit/cost analysis or to improve it?)

Typos:

p. 5763, l. 10: Kuhn

p. 5768, l. 22: "interdependet organization"

This typo and the previously mentioned citation issue (Foster et al.) clearly indicate the need for a careful spell check and edit.

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