The Structure of Disaster Resilience

Response to Referee Report # 2

By John H. Y. Edwards

I would like to thank Referee 2 (apparently a fellow economist!) for his/her thoughtful comments and in particular for appreciating this piece as an attempt to communicate with our colleagues in the sciences. Below are my responses to Referee report 2 and a description of the modifications to the paper that I intend to make. They are identified by report paragraph number.

Paragraph 2. On the "top-down" approach and getting the resources from nowhere.

This is of course a very valid point, but something of a below-the-belt blow. After all, Public Finance (the sub-field of economics that is devoted to the analysis of public sector behavior) traditionally splits the analysis in two: taxation and expenditure. I do note (footnote 4) that links to higher levels do not always increase resilience. Points of negative influence on resilience or net effects can be accommodated just as easily as positive ones in the model. Yet, I feel that allowing for this additional flexibility will distract from the main point of the section, which is to emphasize that resilience is multi-layered, that each layer has its own resilience, and that we can operate on the system as a whole as well as on its constituent parts. The paper does not attempt to construct a fully self-contained general equilibrium model, yet I believe it does provide some guidance for how that might be done.

Paragraph 3. In the Cobb-Douglas specification, aren't all "elasticities" equal to one?

No, the expansion paths are linear, but the elasticities of output w.r.t. inputs are given by the coefficient values. For instance, if we have a Cobb Douglas production function of the form $y = f(K, L) = K^\alpha L^\beta$, then

$$\frac{\partial y}{\partial K} = \alpha \frac{y}{K} \ . \qquad\qquad (1)$$

The elasticity with respect to "K" is then

$$\frac{K}{y} \frac{\partial y}{\partial K} = \alpha.$$

Paragraph 4. Cobb-Douglas is a very special functional form with very special properties. Can it be better justified?

I will add a note to page 5771 of the paper explaining that Cobb-Douglas is one of the simplest functional forms used to describe production relations and that it is restrictive. However I am quite confident that I could develop the model in a much more general form by specifying production functions as continuous, twice differentiable, quasi-concave and strictly increasing in their inputs. I am confident that all of the results will follow. I purposely tried to minimize the technical clutter because the purpose of the paper is to communicate economic intuition across disciplinary boundaries.

Paragraph 5. **On preference aggregation language and absence of references to Foster et al. (1984)**. Basically, this comes down to preference aggregation or, in different language, the specification 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.

I've added mentions of Foster et al. (1984) as well as Atkinson (1987), Sen (1976) and Sen (1979). And the following text:

> *The literature on poverty is one of the areas of study where the aggregation problem has been most carefully studied (for instance Sen 1976 and 1979). The many ways to deal with the aggregation problem range from acknowledging it explicitly, as in Foster et al. (1984), to cleverly circumventing it, as in Atkinson (1987). In disaster analysis shortfalls need not be measured in reference to some exogenously determined benchmark like the poverty line. Indeed, in the present application post-disaster shortfalls are measured in relation to pre-event levels of welfare.*

New References

Atkinson, A. 1987. "On the Measurement of Poverty", Econometrica 55 (4): 749-764.
Sen, A. 1976. "Poverty: An Ordinal Approach to Measurement," Econometica, **44**:219-231.
Sen, A.1979. "Issues in the Measurement of Poverty," Scandinavian Journal of Economics, **81**:285-307.