

***Interactive comment on* “Evaluation of Economic Impacts from Flood Damages Using Hybrid Input-Output Analysis” by Cholapat Jongdeepaisal et al.**

Anonymous Referee #2

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In this paper, the economic impacts of flooding are simulated with the so-called hybrid IO method. The description of the methodology in Section 2 is incomplete and in contraction with the description of the actual assumptions made in Section 3 and 4. Moreover, the application of method suffers from several unrealistic assumptions. Hence, a total rewrite is necessary. In detail: (1) Equation 2 is incomplete. What is needed is the specification of the full IO table with the two virtual industries (garbage cleaning and reconstruction), which is only partially done in Table 2. In Section 4 and Table 2 it is explained rightly that garbage cleaning inter alia needs manpower, which is taken from the manpower row of existing industries. Amongst others, this is absent in (2). (2) The cut-off method for resources described on p.3 is too rude. Equation 3

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implies that structure of the use of resources from the rest of the economy by the new industry C_u is equal to the structure of the aggregate use of those resources in the rest of the economy M_i , where i is a summation vector with ones. This a highly unrealistic assumption because the new virtual industries take care of garbage cleaning and reconstruction, which both have cost structures that will be quite different from the cost structure of the rest of the Kochi economy that is dominated by services. In fact, Section 3, describing the details of the procedure for garbage cleaning and reconstruction activities, is contradictory to (3), but more realistic. (3) The cut-off method for products also described on p.3 is imprecise and not convincing. Equation 4 that should describe the structure of C_d is lacking. The most plausible solution would be to assume that the new industries do not deliver intermediate products (i.e. C_d is zero), but only deliver final products to f_P , which goes at the cost of the final demand for products from the rest of the economy f_M . (4) As a consequence of the inconsistency of equation 5 (see Major details) Table 3 delivers nonsense. (5) can only be used to establish the overall total of z_{12} (i.e. a small case as it is not a matrix, but a column). Instead of Table 3, the structure of the inputs to the manpower sector should resemble the structure of the household consumption part of the final demand column (see Oosterhaven, Rethinking IO Analysis, Springer 2019, ch. 4). The procedure that describes from which sectors the manpower of garbage cleaning is taken should be specified independently. It is not related with the structure of household consumption demand.

Major details: P.1-2 & p.12-14. This article does not mention the direct loss of output of industries that have to partially or entirely close down due to the simulated flood nor does it mention the indirect impacts of these close down in the rest of the economy nor does it mention the cost in the rest of the economy of raising the money for the cleaning and reconstruction activities. The article, consequently, presents a far too optimistic view of the effects of the simulated flood for Kochi. If the authors believe their own results, they should advocate to have regular floods in Kochi. P.7, l.12. The matrix dimensions of equation 4 and 5 are inconsistent. In (4), first row, unity columns should be added behind the Z-matrices. In (4), second row, unity rows should be added in front

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of the Z-matrices. Consequently, (5) is inconsistent at the matrix level. It is only correct for the overall matrix totals. – P.3, I.7 & elsewhere. Write input coefficients instead of technical coefficients, because you are dealing with an open economy in which: input coefficients = trade origin ratios * technical coefficients (see Oosterhaven, 2019, ch. 2). – P.8, I.17. As a consequence of the above misuse of the term technical, it is incorrectly stated that input coefficients change only gradually due to technological advancement. In fact, they also change much faster due to spatial substitution. Not taking this into account leads to overestimation of the indirect damages of garbage cleaning in Section 4.3. The authors might want to have a look at Oosterhaven and Többen (Spatial Econ An, 2017) for a solution to this problem.

Minor details: – P.2, I.14. These costs are only part of the total impact. So, better call them total direct impact. – P.3, I.5. Write Miller and Blair, 2009. – Figure 2. The pre-process related to garbage cleaning, not to reconstruction. – The text around Figure 2 fails to discuss how it differs from the quite comparable approaches of Hallegate and others (see also Koks et al, in Okuyama & Rose, Springer, 2019).

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