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Letter from the Associate Editor concerning the comments from Anthoff and Tol and Ackerman and Munitz

Recently *Ecological Economics* published a paper by Ackerman and Munitz (2012) analyzing the treatment of climate damages in the FUND model developed by David Anthoff and Richard Tol. Richard Tol wrote to the journal voicing his concerns about some of the paper's statements and assertions about FUND. As the journal's Editor in Chief, Richard Howarth had previously published together with Frank Ackerman on the broader issue of the limitations of integrated assessment models such as FUND (Ackerman et al., 2009), he chose to recuse himself on this matter. I was then asked to take on the role of investigating and resolving this issue by Sandra Broerse, the publisher of *Ecological Economics* at Elsevier. As a resolution to this dispute, the journal is publishing a commentary from David Anthoff and Richard Tol and a response from Frank Ackerman and Charles Munitz as well as this letter, which lays out some details of the case as well as listing the corrections to the paper requested by Tol.

The main point of contention is around Section 4.1 of the paper, which claims that the results of the FUND model could be affected by a division by zero problem. In my investigation, I had access to correspondence between Anthoff and Tol and Frank Ackerman prior to publication of the paper. In this exchange, Anthoff and Tol had told Frank Ackerman that the apparent division by zero problem was in fact addressed by the FUND model and the results were not substantially affected by it. I also relayed Tol's concerns to Ackerman and received a reply from him. Based on the responses I received and the previous correspondence, I determined that some statements in the paper were problematic and that Ackerman and Munitz did not report in their paper the information they had received from the model developers about the division by zero issue.

Richard Tol stated that the minimum set of corrections that would address his concerns is the following:

In the abstract:

[1] In place of: "We examine the treatment of climate damages in the FUND model." substitute: "We examine the treatment of climate damages in a modified version of the FUND model."

In section 2:

[2] In place of: "The analysis described here begins with the Working Group's modified version of FUND (fn 2)." substitute: "The analysis described here begins with the Working Group's modified version of FUND, to which further changes were made (fn 2)." and add the following to footnote 2:

[3] "We made changes to the FUND model code as described in this paper. These changes were not validated by the model developers, David Anthoff and Richard Tol, and they did not vet the results. David Anthoff and Richard Tol are, therefore, not responsible for any of the model results presented below."

In section 4:

[4] In place of: "4.1. Risk of division by zero" substitute: "4.1. Apparent risk of division by zero"

[5] In place of: "A fix for the optimum temperature equation bug is planned for the next version of FUND." substitute: "Changes to the optimum temperature equation are planned for the next version of FUND."

Ackerman and Munitz were willing to accept [5] and a modified version of [3] but were not willing to accept the other changes. Given this, *Ecological Economics* could not publish a formal correction to the article. Therefore, I decided to include the full set of requested corrections in this Editor's note, along with the commentary of Anthoff and Tol, and the response from Ackerman and Munitz.

I trust that with the publication of both the commentary and response, along with this note, the journal has provided all parties the opportunity to express their concerns and opinions.

Reference

Ackerman, F., Munitz, C., 2012. Climate damages in the FUND model: a disaggregated analysis. Ecological Economics 77, 219–224.
Ackerman, F., Decanio, S.J., Howarth, R.B., Sheeran, K.A., 2009. Limitations of integrated assessment models of climate change. Climatic Change 95, 297–315.

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