

Referee Report:
“Risk Premia and the Social Cost of Carbon – A Review”

This paper provides an interesting and in my opinion quite valuable literature review on the role of risk and uncertainty in the economics of climate change. The emphasis is placed squarely on the so-called social cost of carbon, which represent the present-value marginal benefit of reducing carbon emissions. The paper is admirable for its thoroughness, its expositional clarity, and the quality of the writing. I believe that it is suitable for publication in its present form – a recommendation that I very rarely make in reviewing an initial version of a new paper. That said, I do have several comments that might be useful if the paper is revised prior to publication.

First, the focus on the social cost of carbon is interesting and appropriate. The paper’s arguments and literature review, however, apply in equal measure to evaluating the benefits generated by non-marginal changes in greenhouse gas emissions. This is a point that might be emphasized at various points in the text.

Second, I like the fact that the paper explains in a straightforward way how some very basic ideas from the theory of decision-making under risk can be applied to the economics of climate change. This is necessary because some of the leading climate economists – notably Nordhaus and Tol – have pushed models that (methodologically) are premised on the assumption of intertemporal optimization under perfect foresight. It’s true that Nordhaus and Tol have used their models to conduct Monte Carlo simulations concerning uncertainties in the parameters. But the preference parameters invoked by Nordhaus and Tol assume levels of risk aversion that are plainly inconsistent with people’s observed economic decisions. That highlights the rather urgent need to bring climate economics and integrated assessment models back into touch with the basic economics of decision-making under uncertainty. That in a nutshell explains the value of the present contribution.

Third, I like the fact that the paper emphasizes basic expected utility theory while also touching on the emerging literature on ambiguity aversion. I wonder if it would be possible to expand the paper somewhat to attach more weight to this latter topic. I could be persuaded that a proper exposition would render the paper much more technical, while at this stage there is not that much work published on ambiguity aversion and climate change. So I will leave this issue in the hands of the authors and the editor.

Finally, my take is that a fair interpretation of the recent literature suggests that the risk premium is likely to be numerically quite large, both because the level of risk aversion is much higher than previously thought, and because uncertainties about climate sensitivity and the damage function are much, much larger than assumed by models such as FUND, DICE, and even PAGE. The authors may or may not agree with me on this, and I understand in part while their conclusions are a bit equivocal, mainly (and rightly) pointing to the need for more research. Still, the paper provides a nice exposition and literature review without generating much in the way of interesting and striking conclusions. It’s as though the authors don’t want to risk putting their cards on the table and telling the reader what lessons they (tentatively) perceive. In other words it would be nice if the abstract and conclusions section were at least somewhat more conclusive.