

A REVIEW OF ONLY PART OF THE LITERATURE

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Richard Tol's recent article, "The Economic Effects of Climate Change" (JEP vol. 23, no. 2) presents itself as a comprehensive survey of economic research on climate change, but in fact restricts its coverage to a subset of the economists writing on the subject. As he notes (p.30), most of the work he surveys comes from two groups, one centered at Yale and the other at University College in London; in honor of their most prominent living members, they could be called the Nordhaus and Tol groups, respectively (since David Pearce, the original leader of the London group, is deceased).

What's missing? The Stern Review, a paradigm-shifting new look at the economics of climate change which is now central to global debate on climate policy, gets barely a mention. The AEA invited Nicholas Stern to give the Ely Lecture in 2008, hardly a sign that he is a marginal figure in the profession; that thoughtful lecture, now available as an article in the AER, didn't make it into Tol's review. Work by Simon Dietz and other economists who have collaborated with Stern is badly underrepresented. Stern's challenge to standard assumptions about discount rates, and the extensive peer-reviewed literature he cites on that subject in the Review, might have been worth discussing in a truly comprehensive literature review.

Martin Weitzman's recent work on uncertainty and climate change, one of the most important new theoretical insights in the field, suggests that the detailed cost calculations discussed by Tol may be irrelevant to policy. This, too, got only a passing mention, which falls far short of taking Weitzman's message seriously.

Totally omitted is the extensive work by several other European groups, including Ottmar Edenhofer and his colleagues at the Potsdam Institute for Climate Impact Research (PIK), Claudia Kemfert at the German Institute for Economic Research (DIW), and Terry Barker at the Cambridge Centre for Climate Change Mitigation Research (4CMR). US economists writing about climate change, outside the Nordhaus-Tol school, include Stephen DeCanio at the University of California, Richard Howarth at Dartmouth, and my colleague Frank Ackerman at Tufts. They, too, are absent from Tol's bibliography.

What's included? Tol's survey identifies 14 estimates of the global economic impact of climate change (Table 1 and Figure 1); five of these are by Nordhaus, presenting similar estimates from successive vintages of the same model. Two more are by Tol, and most of the others are by their colleagues and collaborators. (One of these estimates, from Hope 2006, is described in Tol's footnotes as the estimate used in the Stern Review; however, there must be a mistake here: the

projection of significant economic gains at 2.5 degrees of warming, shown for that study, is clearly at odds with Stern's message and conclusions.) The fact that the Nordhaus-Tol school often projects economic gains from the early stages of warming is visible in Figure 1; the explanation of this odd "finding", however, is quite incomplete. Early versions of Nordhaus' DICE model projected large gains based on a thinly documented estimate of huge willingness to pay for warmer weather in cold, rich countries (Ackerman and Finlayson 2006). Tol's own estimate of huge health benefits from moderate warming is based on a series of empirical mistakes (Ackerman and Stanton 2008). Agricultural benefits from longer growing seasons and CO₂ fertilization are the strongest argument for benefits from near-term warming, but recent research is shifting toward projections of agricultural losses rather gains from warming; the projected increase in the number of extremely hot summer days is bad for virtually all crops (e.g., Schlenker et al. 2006).

Tol also discusses 232 estimates of the marginal cost of carbon emissions. In his most recent publication analyzing these estimates (Tol 2008), which included 211 of them, he also provided data on authorship, showing that more than half - 112 of the 211 - were authored or coauthored by Tol himself. Thus to an extent which is unusual for literature surveys and meta-analyses, he is re-analyzing his own work. He did not, of course, do 112 unique studies; rather, he identified separate scenarios within his studies as yielding separate estimates. In contrast, the Stern Review, which included several widely discussed scenarios, was counted as a single estimate. That article (Tol 2008) seemed focused on demonstrating that Stern was an extreme outlier relative to the rest of "the literature" - meaning, it seems, the literature written by the Nordhaus-Tol school.

In the end, the crucial question is one of boundaries and definitions. Is the economics of climate change a gated community, where it is important to police the perimeters against intruders? Or is it an open public space for free-wheeling intellectual debate, welcoming new voices with something different to say? I hope that JEP, and the economics profession, will embrace the latter view in the future.

Frank Ackerman and Ian Finlayson, "The Economics of Inaction on Climate Change: A Sensitivity Analysis," *Climate Policy*, vol. 6 no. 5, 2006, 509-526.

Frank Ackerman and Elizabeth A. Stanton, "A Comment on 'Economy-wide Estimates of the Implications of Climate Change: Human Health'," *Ecological Economics* vol. 66 no. 1, 2008, 8-13.

Wolfram Schlenker, W. Michael Hanemann, and Anthony C. Fisher, "The Impact of Global Warming on U.S. Agriculture: An Econometric Analysis of Optimal Growing Conditions," *Review of Economics and Statistics*, vo. 88 no. 1, 2006, 113-125.

Richard S.J. Tol (2008). *The Social Cost of Carbon: Trends, Outliers and Catastrophes*.

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