

## **Editorial Note**

# Correction to Richard S. Tol’s “The Economic Effects of Climate Change”

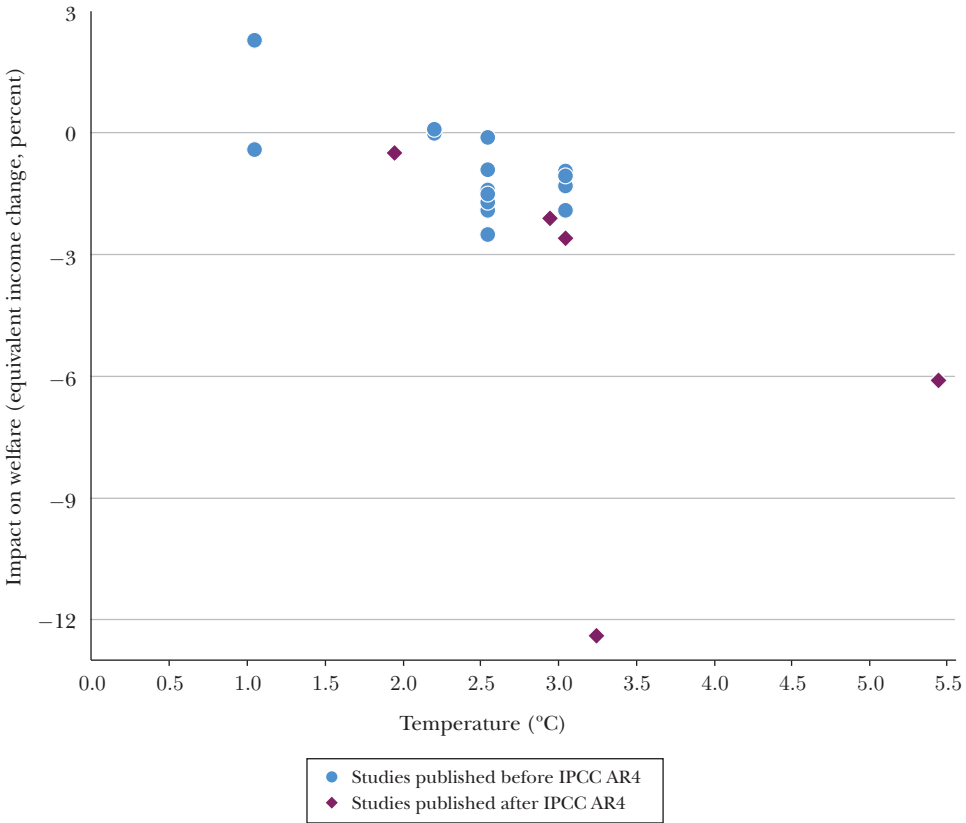
In the Spring 2009 issue, this journal published “The Economic Effects of Climate Change” by Richard S. J. Tol (vol. 23, no. 2, pp. 29–51). The paper included a figure summarizing the results of a number of studies, showing their estimates of how the economic costs of climate change varied with the predicted change in global temperatures. In early 2014, the editors received a complaint pointing out errors in the paper: specifically, several estimates had not been accurately transferred from the original studies. In the Spring 2014 issue, we published a “Correction and Update: The Economic Effects of Climate Change” (vol. 28, no. 2, pp. 221–26) by Richard Tol. However, this version also contained errors that were soon pointed out by various researchers. The editors discussed the situation with Richard Tol and with outside reviewers at some length.

This correction offers a final revision and update to the figure in question. This figure is republished from the most recent report of the International Panel on Climate Change (IPCC), in Chapter 10 of the volume *Climate Change 2014: Impacts, Adaptation, and Vulnerability*. Richard Tol is one of the two “Coordinating Lead Authors” of this chapter, along with Douglas J. Arent, but the chapter also draws on efforts by a group of other lead authors, contributing authors, and review editors. Figure 1 reproduces Figure 10-1 from p. 690 of the IPCC report. The IPCC discussion of this figure offers some useful cautions about interpretation:

Estimates agree on the size of the impact (small relative to economic growth), and 17 of the 20 impact estimates shown in Figure 10-1 are negative. Losses accelerate with greater warming, and estimates diverge. The new estimates have slightly widened the uncertainty about the economic impacts of climate. Welfare impacts have been estimated with different methods, ranging from expert elicitation to econometric studies and simulation models. Different studies include different aspects of the impacts of climate change, but no

*Figure 1*  
**The Economic Costs of Changes in Global Temperatures**

**Figure 10-1** | Estimates of the total impact of climate change plotted against the assumed climate change (proxied by the increase in the global mean surface air temperature); studies published since IPCC AR4 are highlighted as diamonds; see Table SM10-1.



*Notes:* IPCC AR4 refers to the Fourth Assessment report of the IPCC, which was published in 2007. This figure is from AR5, the Fifth Assessment report of the IPCC, published in 2014.

estimate is complete; most experts speculate that excluded impacts are on balance negative. Estimates across the studies reflect different assumptions about inter-sectoral, inter-regional, and inter-temporal interactions, about adaptation, and about the monetary values of impacts. Aggregate estimates of costs mask significant differences in impacts across sectors, regions, countries, and populations. Relative to their income, economic impacts are higher for poorer people.

The original figure in the 2009 JEP article estimated a best-fit line passing through the points on this kind of figure, along with confidence intervals for that

estimate. Given the differences across the studies as mentioned in the IPCC report, several outside reviewers involved in our editorial process expressed a concern that such estimates were not meaningful. As shown, the figure in the IPCC report does not seek to estimate a best-fit line or confidence intervals, but only offers a summary of the results from existing studies. Tol offers further discussion of the curve-fitting issues with this kind of data in “Bootstraps for Meta-Analysis with an Application to the Impact of Climate Change,” forthcoming in *Computational Economics* (doi: 10.1007/s10614-014-9448-5).

For a list of studies that were included, what methods were used in these studies, what economic sectors were covered, and the like, we would point interested readers to the “Supplementary Material” table for Chapter 10. The full report, Chapter 10, and the Supplementary Material are all available at <http://www.ipcc.ch/report/ar5/wg2/>. Controversy over these estimates seems likely to continue. We recommend that readers interested in these questions use the figure and data from the IPCC report as their starting point.



**This article has been cited by:**

1. Steve Keen, Steve Keen, Timothy M. Lenton, Antoine Godin, Devrim Yilmaz, Matheus Grasselli, Timothy J. Garrett. 2021. Las estimaciones erróneas de los daños del cambio climático. *Revista de Economía Institucional* **24**:46, 249-298. [[Crossref](#)]
2. M. V. Kazakova. 2020. Quantifying the Potential Macroeconomic Consequences of Global Climate Change: What the Literature Says. *Administrative Consulting* :10, 45-60. [[Crossref](#)]
3. Katheline Schubert. 2020. William D. Nordhaus : Intégrer le changement climatique dans l'analyse macroéconomique de long terme. *Revue d'économie politique* **Vol. 129**:6, 887-908. [[Crossref](#)]
4. William Nordhaus. 2018. Projections and Uncertainties about Climate Change in an Era of Minimal Climate Policies. *American Economic Journal: Economic Policy* **10**:3, 333-360. [[Abstract](#)] [[View PDF article](#)] [[PDF with links](#)]
5. William D. Nordhaus. 2017. Revisiting the social cost of carbon. *Proceedings of the National Academy of Sciences* **114**:7, 1518-1523. [[Crossref](#)]
6. William D. Nordhaus, Andrew Moffatt. 2017. A Survey of Global Impacts of Climate Change: Replication, Survey Methods, and a Statistical Analysis. *SSRN Electronic Journal* **369**. . [[Crossref](#)]
7. William D. Nordhaus. 2016. Projections and Uncertainties About Climate Change in an Era of Minimal Climate Policies. *SSRN Electronic Journal* **37**. . [[Crossref](#)]