Ward,RE

From: Ward,RE
Sent: 18 October 2013 13:23
To: 'Richard Tol'
Cc: 'c.hope@jbs.cam.ac.uk'
Subject: RE: Query about your 2009 JEP paper

Hi Richard,

Many thanks for your rapid response. I am afraid you may need to spend a little more time considering the points I raised.

On the Nordhaus 1994 paper, you need to look again at Figure 3 – it presents the results in terms of the percentage of the 19 experts who thought that there would be a high-consequence event resulting in a loss of at least 25 per cent in global output – you may have mistakenly misread it to state that the percentages were in terms of the estimated loss in gross world output, as in Figure 2.

Thanks for confirming that the cited warming for the Nordhaus 2006 was a mistake. That paper raises another potential question about your 2009 paper. Nordhaus 2006 includes on page 3517 a discussion of other estimates of global impacts. It states: "Nordhaus and Boyer estimated impacts of a 2.5C warming to be -0.2% and -0.4% of global output for output and population weights, respectively". This is a reference to Nordhaus and Boyer (2000), 'Warming the World: Economic Models of Global Warming'. You also include Nordhaus and Boyer (2000) in your 2009 and 2012 papers, but you indicate that they estimated the impact to be -1.5% of GDP for warming of 2.5 centigrade degrees. I have not checked the original text, so Nordhaus may have mis-cited his own work, but perhaps you might check whether you have correctly interpreted the results of Nordhaus and Boyer (2000)?

Finally, on the question of Hope (2006), I am still puzzled by your interpretation. Hope (2006) provides figures for the economic and non-economic impacts in the EU of warming of 2.5 centigrade degrees above the tolerable level in each impact sector in the EU (ie the impact of warming by about 4.5 centigrade degrees). Hope (2006) also provides weights for other regions of the world. In every region except Eastern Europe and the former Soviet Union, the mean impacts are negative. Hence I am puzzled both that you list Hope 2006 as providing estimates of warming by 2..5 centigrade degrees instead of 4.5 centigrade degrees and that you found an overall positive impact. Perhaps Chris might be able to provide a more detailed comment on this puzzle?

Best wishes,

Bob

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From: Richard Tol [mailto:R.Tol@sussex.ac.uk]
Sent: 18 October 2013 12:54
To: Ward,RE
Subject: RE: Query about your 2009 JEP paper

Hi Bob,

>For instance, the Nordhaus 1994b paper, which is listed as 'Expert opinion on climate change' and published in American Scientist, found that the loss from a 3 celsius degree rise in global average temperature by 2090 would result in a loss of between 0 and 21 per cent of gross world product, with a mean value of 1.9 per cent and a mode of 3.6 per cent, as shown in Figure 2 in the paper. However, your 2009 paper indicates that the paper found a loss of between 0 and 30 per cent, with a mean of 4.8 per cent. In fact, these figures correspond exactly to the results in figure 3 of the Nordhaus 1994b paper, which provides the estimates of the likelihood of a high-consequence event from global warming. I wonder whether you have accidentally mixed up the two, and used the wrong numbers?

Figure 2 has the impact without a high-impact scenario; Figure 3 with. The text makes clear that the high-impact is contingent on climate change. Fig 3 is therefore the appropriate choice.

Your 2009 paper also includes the Nordhaus 2006 paper which is listed as 'Geography and macroeconomics: new data and new findings' and published in the Proceedings of the National Academy of Sciences. The paper presents an estimate of impacts from two scenarios, one which considers warming only and one which includes mid-continental drying as well. On page 3516 of the paper, Nordhaus states that the scenarios are drawn from the IPCC TAR and "have been rescaled to correspond to a 3C global average equilibrium increase". However, in your 2009 paper, you list the Nordhaus 2006 paper as relating to a warming of 2.5 centigrade degrees. I wonder if this is an error?

Indeed. It's 3C.

In both these cases, you have used the same numbers in your 2012 paper 'On the uncertainty about the total economic impact of climate change', which was published in Environmental and Resource Economics. I note that this paper corrects the typographic error in Table 1 of your 2009 paper which accidentally states that the Plambeck and Hope (2006) estimates a positive impact of 2.5 per cent from a warming of 2.5 centigrade degrees.

However, I am puzzled by the figure you cite in your 2009 paper for the Hope 2006 paper on 'The marginal impact of CO2 from PAGE2002: an integrated assessment model incorporating the IPCC's five reasons for concern', which was published in The Integrated assessment Journal. Table 1 of your 2009 paper and Table 1 of your 2012 paper both indicate that Hope (2006) estimates that warming of 2.5 centigrade degrees would result in an impact of between -0.2 and 2.7 per cent, with a mean value of 0.9 per cent. I cannot work out how you have arrived at such a result from the Hope (2006) paper and I wonder if it might be another mistake. I have copied in Chris Hope who I think will be interested in your response about this point.

Hope gives impacts per region. Multiple by income per region, add, and divided by total income.

Richard