

The Stern Review ‘Oxonia Papers’: A Critique

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In this note we comment on the three related documents (the ‘Oxonia papers’) that were issued at the end of January 2006 as the first fruits of the Stern Review of the economics of climate change. These comprise a discussion paper entitled ‘What is the Economics of Climate Change?’, Sir Nicholas Stern’s Oxonia Lecture with the same title, and a short Technical Annex on ‘The science of climate change’. Except where otherwise indicated, the page references that follow are to the discussion paper.

We believe that these documents constitute a false start: they do not provide a sound basis for the further work of the Review team. If the Review exercise is to serve a useful purpose, its treatment of the issues has to be more inclusive, more informed, and less dominated and constrained by questionable or mistaken presumptions.

‘The science’: a misleading picture

Taking their cue from the Technical Annex, both lecture and discussion paper have opening sections that deal with scientific aspects. What is concluded under this heading forms the point of departure for what both documents have to say about economics: as Sir Nicholas puts it in his lecture (p. 5), ‘the science... actually shapes all the economics that follows’.

From all three papers, one would gather that the main scientific issues relating to climate change are now substantially settled. Both lecture and discussion paper take as given the state of the world, and the prospects and possibilities for the future, that emerge from the work of climate scientists as summarised in the Annex. The picture of reality thus presented is accepted and reproduced unquestioningly.

This picture is sombre, even dramatic; and accordingly, far-reaching inferences are drawn for economic policy. Lecture and discussion paper take the view that the starting-point for economic analysis must be that ‘climate change is a serious and urgent issue’ (pp. 3 and 6), since ‘the overwhelming weight of scientific opinion supports the view that climate change represents a real and growing threat’ (p. 9). It is true that at one point (p. 18) the discussion paper notes that ‘it is important to recognise and incorporate any benefits from climate change’; but aside from this passing observation, and understandably in view of what is presumed here about ‘the science’, the whole emphasis is on the risks and dangers arising from anthropogenic global warming.

As to what follows from this supposedly science-based diagnosis, Sir Nicholas holds (p. 5 of his lecture text) that ‘strong action has to be taken quite soon’. The action in question chiefly comprises measures and programmes to curb greenhouse gas emissions – in a word, ‘mitigation’. True, the discussion paper makes the point (p. 19) that ‘promoting and managing adaptation is an essential policy response’; and in a recent talk that he gave in Delhi, Sir

¹ Our affiliations, and our involvement with issues relating to climate change, are summarised at the end of the note.

Nicholas has made the point that ‘this is not a contest between mitigation and adaptation’. But in lecture and discussion paper alike it is asserted that ‘we will have to go far beyond the actions currently agreed if we are to stabilise greenhouse gases at any acceptable level’ (p. 3). A corollary, since such far-reaching actions, to be effective, must be world-wide in scope, is that ‘Climate change should become a central element in the whole set of international engagements’ (p. 27). An ambitious world-wide programme to limit greenhouse gas emissions is represented as a matter of urgency.

In our view, these various interrelated judgements are too confident and unqualified. What is said here about the scientific aspects gives insufficient weight to the pervasive uncertainties which still surround projections of climate change, largely because of the extraordinary complexity of the system under study. This complexity has been emphasised by the Intergovernmental Panel on Climate Change (IPCC) itself, in its Third Assessment Report, where the point is made that:

‘In climate research and modeling, we should recognize that we are dealing with a coupled non-linear chaotic system, and therefore that the long-term prediction of future climate states is not possible. The most we can expect to achieve is the prediction of the probability distribution of the system’s future possible states by the generation of ensembles of model solutions.’²

We think that these uncertainties are underplayed in the Technical Annex, and hence in the lecture and discussion paper: it is in fact misleading to speak of ‘the science’, as though it were virtually settled.

Although the Oxonia papers take it that there is a consensus among climate scientists, they offer no survey evidence. The only recent survey of climatologists of which we are aware,³ which was conducted by the highly-regarded Institute of Coastal Research (GKSS) in Germany, concluded that ‘These results... seem to suggest that consensus is not all that strong and only 9.4% of the respondents “strongly agree” that climate change is mostly the result of anthropogenic causes.’ The survey also found that fewer than a quarter of respondents strongly agreed that the IPCC reflects the consensus of thought in the climate science community.

The treatment of scientific aspects in these documents is unbalanced; and for this reason alone, it does not provide a firm basis for the radical policy recommendations that both the lecture and the discussion paper derive from it.

Moreover, and itself contributing to the lack of balance, what is said in all three papers about the scientific aspects contains mistakes and inaccuracies.

In relation to both these weaknesses, we would draw attention to the well-documented critique which has been submitted by the Lavoisier Group in Australia, entitled ‘scientific issues in the Stern Review papers’. In its opening paragraph, the Lavoisier submission notes that in their treatment of climate science the Oxonia papers contain ‘serious gaps and errors’; and it goes on to say that ‘“The science” of climate change prediction is still in its infancy, and the account of it given in these documents is questionable, misleading and biased’.

² *Climate Change 2001: The Scientific Basis*, Report of Working Group I of the IPCC, Cambridge University Press 2001, p. 774.

³ <http://w3g.gkss.de/G/mitarbeiter/bray/BrayGKSSsite/BrayGKSS/WedPDFs/Science2.pdf>

Evidence for these statements is presented in the text that follows. The document concludes with the observation that ‘Climate change is poorly understood, and industrial emissions of greenhouse gases may be a small, even negligible, factor’.

In taking as its point of departure an unbalanced and technically defective account of ‘the science’, the Stern Review has made a premature and injudicious choice. Further, it is not only in relation to scientific aspects that the Technical Annex is an unreliable guide. It has flaws of another kind, which pass unnoticed in lecture and discussion paper alike.

Twin lapses

Contrary to the impression conveyed in the Oxonia papers, the Annex is not confined to climate science: the treatment extends to economic and statistical aspects. In relation to these, the Annex presents as valid and authoritative twin sets of results both of which have been subjected to damaging professional criticism.

Both sets are presented in the same diagram, which is taken over from the Third Assessment Report of the IPCC and displayed on p.3 of the Technical Annex. The diagram shows, first, a reconstruction of Northern Hemisphere mean temperature ‘anomalies’ over the period from AD 1000 to the end of the twentieth century: this is the much-publicised and highly influential ‘hockey-stick’. Alongside the ‘hockey-stick’ diagram, and extending the time-period of the graph, are placed the IPCC projections of possible temperature increases over the present century. These projections take as a point of departure the projections of greenhouse gas emissions that emerged from the Special Report on Emissions Scenarios (SRES) which was prepared for the IPCC as part of the Third Assessment Report and published in 2000. The emissions projections in turn are derived from SRES projections of world output (GDP), the energy-intensity of GDP, and the carbon-intensity of energy use: in large part, therefore, they are based on economic analysis, arguments, and evidence.

Combining these two elements, the diagram conveys the impression of a dramatic departure in global average temperatures from a stable thousand-year norm, starting in the late twentieth century and gathering pace in the twenty-first.

Both elements are flawed. First, it has been shown that the ‘hockey-stick’ temperature reconstruction combines mistreatment of evidence with basic errors in statistical procedures.⁴ The depth of the critique, and the prominent role the hockey stick has played in policy documents, led the US House of Representatives Science Committee, in February 2006, to ask the US National Academy of Sciences to set up a special panel to investigate it. Second, the SRES has been shown to have serious weaknesses in its handling of economic issues, while there is good reason to query the specific projections of emissions that emerge from it.⁵ The House of Lords Select Committee on Economic Affairs, which brought out in July last

⁴ The main critique of the hockey-stick reconstruction has been developed over the past three years by Stephen McIntyre and Ross McKittrick: see, for instance, “Hockey Sticks, Principal Components and Spurious Significance” *Geophysical Research Letters* Vol. 32, No. 3, 12 February 2005.. A full recent account is given by McKittrick in Chapter 2 of *Shattered Consensus: The True State of Global Warming*, edited by Patrick J. Michaels (Rowman and Littlefield, 2005).

⁵ Two of us, Ian Castles and David Henderson, have been among the critics both of the SRES and, more generally, of the IPCC’s treatment of economic aspects. A recent review of the whole range of issues is contained in David Henderson, ‘SRES, IPCC and the Treatment of Economic Issues: What Has Emerged?’, published in *Energy and Environment*, Vol 16 Nos 3 and 4, 2005.

⁶ From a press statement issued in December 2003, and since posted on the IPCC website.

year a major report on ‘The Economics of Climate Change’, concluded (p. 35) that ‘serious questions have been raised about the IPCC emissions scenarios, and ... a reappraisal of the scenarios exercise is urgently needed’.

These fundamental criticisms of both the ‘hockey-stick’ presentation and the SRES are not new: in both cases, the professional debate has been going on over a period of three years or so. But neither the lecture nor the discussion paper shows awareness of these debates. Instead, they implicitly treat both the temperature reconstruction and the emissions projections, as shown in the IPCC diagram in the Annex, as established and unquestioned features of ‘the science’. This is not a legitimate procedure, and it calls into question the balance and quality of the scientific advice behind the Oxonia documents.

Missing dimensions

The debate over the hockey-stick has brought to the surface major issues of procedure and the conduct of scientific inquiry. These issues concern not just specific pieces of published work, but also the way in which the IPCC conducts business and weighs and judges scientific contributions.

A leading aspect is that of scrutiny and due disclosure. In responding to criticisms of the SRES, the Chairman of the IPCC, Dr R. K. Pachauri, has said of the Panel that:

‘It mobilises the best experts from all over the world, who work diligently in bringing out the various reports of this body on a regular basis. The Third Assessment Report (TAR) of the IPCC was released in 2001 through the collective efforts of around 2000 experts from a diverse range of countries and disciplines. All of IPCC’s reports go through a careful two stage review process by governments and experts and acceptance by the member governments composing the Panel.’⁶

However, this built-in process of peer review, which the IPCC treats as a guarantee of quality, does not adequately serve that purpose, for two reasons:

- First, ensuring peer review is no safeguard against dubious assumptions, arguments and conclusions if the peers are drawn from the same restricted professional milieu. The ‘hockey-stick’ diagram and the SRES are cases in point.
- Second, the peer review process *as such* is insufficiently rigorous. Its main purpose is to elicit expert advice on whether a paper is worth publishing in a particular journal. Because it does not normally go beyond this, peer review does not typically guarantee that data and methods are open to scrutiny or that results are reproducible. In the case of the ‘hockey-stick’ papers, authors have failed to make due disclosure of data and sources, and neither the publishing journals nor the IPCC has required them to do so. Consequently, fundamental errors and evidence of deficient statistical properties were concealed until very recently.

The Oxonia papers show no awareness of these basic procedural faults, which are pertinent to their assumption that ‘the science’ is established.

Another respect in which the IPCC process falls short is in its treatment of economic issues. Governments have left these issues to environment departments and agencies, and those whom they choose to appoint, to handle as they think best. Not surprisingly, writings that

feature in the Third Assessment Report and the SRES contain what many economists and economic statisticians would regard as basic errors, showing a lack of awareness of relevant published sources; and the same is true of more recent IPCC-related writings, as also of material published by its parent agency, the UN Environment Programme. In relation to economics, the IPCC milieu is neither fully competent nor professionally representative. No hint of this chronic weakness is to be found in the Oxonia papers.

An issue which is likewise not touched on, in either the lecture or the discussion paper, is whether governments should continue to treat the IPCC as their sole permanent and virtually unchallenged source of information, evidence, analysis, interpretation and advice on the whole range of issues relating to climate change. Even if the IPCC process were less open to question professionally, there are grounds for concern about placing such heavy reliance, in matters of extraordinary complexity where huge uncertainties prevail, on a single source of analysis and advice and a single process of inquiry. Viewed in this light, the very notion of setting consensus as an aim appears as questionable if not ill-judged.

Implicitly, the lecture and discussion document treat the IPCC's role and conduct as above question. In so doing, they limit the scope and the potential usefulness of the whole Review, since such an exercise should consider, as a central question, how far, and in what ways, the treatment of climate change issues by the Panel and its member governments could be improved.

In taking this restrictive stance, the Oxonia papers disregard, among other pertinent writings, the report from the House of Lords Select Committee on Economic Affairs. This is an extraordinary omission.

When the Stern Review was launched, the official press announcement said that the team 'will conduct a comprehensive review of the evidence'. Reading the Oxonia papers leaves the impression that such a treatment will not be attempted, still less achieved.

Conclusion

On the evidence of these three documents, the Stern Review appears as a misdirected exercise. By taking as given hypotheses that remain uncertain, assertions that are debatable or mistaken, and processes of inquiry that are at fault, the Review has put itself on a path that can lead to no useful outcome. Unless Sir Nicholas and his team think again, and redefine their task, their final report will serve only to illustrate, and to reinforce, the present mishandling by governments of issues relating to climate change.

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(Lord Lawson and Lord Skidelsky were signatories of the 2005 report from the Select Committee on Economic Affairs of the House of Lords on 'The Economics of Climate Change'. All the rest of us have submitted evidence to the Select Committee, to the Stern Review in its opening stages, or to both.)