The Stern Report: The Continuing Fallacy of Global Cost-Benefit Analysis

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Introduction

This recent UK Government sponsored Report has for some reason captured global news headlines, working out why would tell you more about the political economy of climate change than reading the content of the Report itself. OK so this study came out in favour of a more serious level of action than most (but not all see Cline, 1992) previous economic studies, but that is hardly a coup when you consider how far backwards we have gone since the late 1980s when reductions of 30-50% were already on the political agenda. So is there anything in here we should be excited about, and especially as ecological economists?

Anyone who has spent more than five minutes contemplating the future projections for human induced climate change knows the prognosis is bad and can only get worse as long as we continue to emit greenhouse gases. There are a whole series of potentially catastrophic events which any rational person would do their utmost to avoid. The poor and least able to adapt will obviously be the most likely to suffer worst. On these points the Stern Report repeats the general agreement amongst all those demanding serious action. Unfortunately in much else the report proves lacking.

"*It is the task of this Review to explore the economics of climate change in the depth that is possible given the current state of economic and scientific knowledge.*" (Stern p.38). Just don't look too deeply because you'll see a lot of the relevant literature is absent. Indeed, as a review, this is a poorly structured, rambling document which is thin on coverage (yet hard to navigate). Finding the key facts, supporting the conclusions, is far from straight forward. There is much included which is irrelevant to the main argument and much missing which would have undercut the arguments being made (see Spash, 2002).

I've been through the report for this ESEE news item. My main concentration was on the valuation aspects and I do not address proposed regulatory responses here. While I don't pretend to have read the Report thoroughly from end to end, at this stage, I've read enough of the key documents and chapters to assess the basic arguments and their foundation. For those who want to cut to the chase try going to Chapter 6, where the valuation model, which has created the headline growth projections, is described. In the following commentary I take summary quotes of key points from the report and explain why there are problems. I try to use the Report's own language as much as possible as I think for many it will speak for itself.

Economic Growth Will Grow, No Worries

"*Tackling climate change is the pro-growth strategy for the longer term, and it can be done in a way that does not cap the aspirations for growth of rich or poor countries.*" (Stern p.viii). The biggest lie of the whole pro-growth argument is the failure of growth to measure anything meaningful in terms of human well-being. We are supposed to plaudit the fact that the economy will be OK because billions will be spent on controlling and adapting to greenhouse gas emissions. "*Climate change also presents opportunities for financial markets. Capital markets, banks and other financial institutions will have a vital role in raising and allocating the trillions of dollars needed to finance investment in low-carbon technology and the companies producing the new technologies.*" p.270 "*The development of carbon trading markets also presents an important opportunity to the financial sector. Trading on global carbon markets is now worth over $10bn annually*" p.271. That the economy will be able to grow through disaster prevention should really make such

economists think more about their favoured measure of welfare, and how the market system can feed-off itself, it certainly has little to do with human well-being. As the saying goes, "nothing like a good war to boost the economy".

Damage Estimates

"*Using the results from formal economic models, the Review estimates that if we don't act, the overall costs and risks of climate change will be equivalent to losing at least 5% of global GDP each year, now and forever. If a wider range of risks and impacts is taken into account, the estimates of damage could rise to 20% of GDP or more. In contrast, the costs of action – reducing greenhouse gas emissions to avoid the worst impacts of climate change – can be limited to around 1% of global GDP each year.*" There is nothing particularly new in the Stern Report here. Some 14 years ago Cline (1992) produced a global cost benefit analysis which gave a central estimate of damages reaching 6 per cent of GDP with a 10ºC warming, and under a pessimistic scenario losses rose to 20 per cent of GDP. He also showed that, even with a 5 per cent discount rate, incorporating only a small probability of catastrophe within such economic models is all that is required to justify 'aggressive' action (Cline, 1992: p.6).

Despite claiming they are in the spirit of Nordhaus, the Stern Report is closer to Cline who Nordhaus has strongly attacked in the past (the debate is documented in Spash, 2002). Economic analysis has indeed typically been in the vein of Nordhaus (perhaps the most highly cited author in this Report), i.e. conservative, unscientific, highly subjective and value loaded figures. Such work has only seemed to serve the purpose of aiding successive US administrations in arguing for inaction. For a run down on some of the problems with such economic studies try Funtowicz and Ravetz (1994) or Spash (2002).

However, the basic issue is not the detail but the whole approach. The Stern Report, like Cline's, tries to balance a range of environmental concern, ethical issues and strong uncertainty within a standard neo-classical economic tradition. The result is clearly seen in the internal contradictions when trying to address the breadth of the subject area while summarising the whole issue within the narrow confines of X% growth gain at Y% growth cost. Let's consider what is required in order to get to such numbers: (i) the problem needs to be bounded both physically and institutionally; (ii) a set of cause and effect relationships must be constructed in order to link action to control pollutants with reduced damages; (iii) physical impacts must be characterised, described and measured; (iv) impacts must be associated with monetary values; (v) these "values" must be aggregated across space and time. We might want to add recommended project appraisal requirements, which are normally ignored, such as weighting (e.g. by income) and sensitivity analysis. This process is difficult to undertake properly and with integrity for a small scale local project. Every stage outlined above is so highly contentious for a global CBA that the whole approach is, quite rightly, open to derision. That is even before any validity concerns are raised about the failure to respect micro-economic welfare theory upon which CBA is justified (e.g. partial equilibrium analysis, ceteris paribus, marginal analysis, conditions for constant utility of money), let alone the meaning of monetary values, lack of pluralism, incommensurability, and so on.

At one point the Stern Report seems to reject aggregation of "*mounting risk of serious harm to economies*" (p.285) stating that, unlike previous bottom-up studies, they see no necessity "*to add these up formally into a single monetary aggregate to come to a judgement that human induced climate change could ultimately be extremely costly*" (p.285). However, they go on to employ a model which involves "*considerable simplification*" to achieve "*quantitative implications*" in a utilitarian framework where costs and benefits are measured as percentages of economic growth. Some of the previous studies of the 1990s using similar

modelling approaches conducted by the likes of Nordhaus, Tol and Manne are criticised. "*Above all, they carry out cost-benefit analysis appropriate for the appraisal of small projects, but we have argued in Chapter 2 that this method is not suitable for the appraisal of global climate change policy, because of the very large uncertainties faced. As a result, these studies underestimate the risks associated with large amounts of warming. Neither does any of these studies place much weight on benefits and costs accruing to future generations, as a consequence of their ethical choices about how to discount future consumption.*" (p.298). However, the fundamental methodology of the Stern Report is the same, and this is even noted with the approach of Nordhaus and Boyer being cited as "perhaps the closest in spirit" (p.304). Indeed the model used is stated to share "*many of the limitations of other formal models*" (p.153). "*Specifically, it yields a probability distribution of future income under climate change, where climate-driven damage and the cost of adapting to climate change are subtracted from a baseline GDP growth projection.*" (p.153).

Aggregation, Risk and Uncertainty

"*Our treatment of uncertainty follows a similar approach to that for evaluation or aggregation over space and time. Where we embody uncertainty formally in our models, we add utilities over possible states of the world that might result from climate change, weighting by the probability of those states. This yields what is known as 'expected' utility.*" (p.33). The Stern Report aggregates using the sum of utilities of consumption based upon the existence of a social welfare function. Discounting is conducted on the basis of growth reducing the utility of consumption over time and "*a low rate of pure time preference*" (p.292); the exact rate was hard to find and would seem to vary with simulation runs but from what I could tell was in the 1.5% to 3% range?

The idea of uncertainty being different from risk is raised (pp33-34). However, despite references (p.27) to further exploration of the concept in Chapters 13 and 14, on further reading there was nothing substantive anywhere on the subject. The treatment of strong uncertainty as opposed to risk (weak uncertainty) is particularly poor with a superficial reference to Keynes and to Knight. This is despite repeatedly telling us that there is considerable uncertainty over cause-effect relationships, that these will be outside empirical observation (p.293 ft nt7), that their model relies upon "*non-existent data*" (p.153), and that ethics and social values are crucial to the decision.

Ethics and Harm of the Innocent

"*it is not possible to provide a coherent and serious account of the economics of climate change without close attention to the ethics underlying economic policy raised by the challenges of climate change*" (p38). Unfortunately the ethical discussion is extremely weak relying upon one or two colleagues, who are noted in footnotes as having helped summarise things. The references are at best superficial and often refer back to these colleagues or classic texts. The uninitiated might think no one had been discussing anything for the last half century to do with environmental values and ethics let alone intergenerational equity and the enhanced greenhouse effect. Despite this the Stern Report feels able to dismiss "*the right to be protected from environmental damage inflicted by the consumption and production patterns of others*" on the basis that the proposition is unlikely to gain approval (p.42). Instead the proposal is that "*...future generations should have a right to a standard of living no lower than the current one*" (p42). There is then no concept here, as in law, of the infliction of harm on the innocent being something which incurs a liability. Simultaneously the transfer of basic wealth maintenance is conflated with the need for such compensation. As I have pointed out elsewhere any transfers to maintain welfare cannot be merged with compensation for harm of the innocent (Spash, 1994; Spash, 2002).

Catastrophic Events

"*Catastrophic impacts are modelled in a manner similar to the approach used by Nordhaus and Boyer. When global mean temperature rises to high levels (an average of 5°C above pre-industrial levels), the chance of large losses in regional GDP in the range of 5 - 20% begins to appear. This chance increases by an average of 10% per ºC rise in global mean temperature beyond 5°C.*" (p.153). This is a characteristic mainstream economists' treatment of an unquantifiable irreversible event as a low probability positive risk (weak uncertainty) rather than a case of strong uncertainty i.e., partial ignorance or indeterminacy. The main treatment of uncertainty is the probability density function and multiple model runs to give ranges under a type of sensitivity analysis. The way in which uncertain future events are characterised also suffers the problems of Norhaus' approach. There is discussion of difficult to calibrate catastrophic scenarios but rather than being treated as unknown surprises, such 'catastrophes' are then treated as known threshold events, at which large losses of GNP occur. That is, the states are assumed to be known, can be avoided and while large are bounded. There appears to be considerable optimism concerning the ability to assess the risk of future events and the belief is expressed that many of the uncertainties are ones which might be resolved by further study.

Conclusions

There are a few key concerns which should be driving policy on the enhanced Greenhouse Effect: strong uncertainty, inequity, harm of the innocent and the scale and irreversibility of the potential physical damage to both human and natural systems. On picking-up the Stern Report you might initially be lulled into a false sense of security or hope by the mentions of addressing uncertainty, ethics, and inequity. The fact is that the lengthy report neglects the critical literature on these subjects, and those relating to valuation, and, while making endless qualifying comments, ends up fitting everything into an expected utility model. After a bit of reading you really feel the authors must have seriously split personalities. What might be regarded as perfectly sensible statements on a range of topics related to the enhanced Greenhouse Effect are in the end just window dressing to the main core of the report which is a standard economic approach to weighing-up costs and benefits on the basis of over simplification, adopting an extremely narrow ethical positions and denying much of what they state is important to consider.

That this study supports action is of little comfort to those arguing for a more honest approach to environmental policy and reform of the economic systems which have led to the current problems. As with other global cost-benefit valuation studies the result is a distraction from the true problems and their causes. The ends do not justify the means. For ecological economists the Stern Report is another step backwards on the path to a more sensible and rational basis for decision making processes.

References Cited

Cline, W. R. (1992) *The Economics of Global Warming*. Harlow, Essex: Longman.

Funtowicz, S. O. and J. R. Ravetz (1994) The worth of a songbird: Ecological economics as a post-normal science. *Ecological Economics* **10**(3): 197-207.

Spash, C. L. (1994) Double CO_2 and beyond: Benefits, costs and compensation. *Ecological Economics* **10**(1): 27-36.

Spash, C. L. (2002) *Greenhouse Economics: Value and Ethics*. London: Routledge.