

Reply to Ward/Stern

Dear Mr Ward,

Thank you for your letter of 14th December on behalf of Lord Stern.

You object to my description in Parliament of the Stern Report as "discredited". In my pamphlet "*What is Wrong with the Stern Report?*" I list the principal criticisms which invalidate his findings as "comparing apples and pears, conflating predictions centuries ahead with the present, inconsistent discounting of costs and benefits and cherry picking alarmist projections" together with "sacrificing today's poor for tomorrow's rich". You largely ignore all of these except one which you confirm was correct. I take this as tacit admission that the Stern Review is indeed discredited even in the eyes of its professional defenders. Instead of responding to those key charges you try to divert attention from them - like a barrister who knows his client is guilty - by raising a number of feeble issues. Even if some or all of your counter criticisms were correct (which is not the case), it would not restore your client's reputation.

Why the Stern Review is discredited. Let me spell out some of the key criticisms which have discredited the Stern Review (see Summary and Chapter 2 of my pamphlet) before responding to your diversionary points.

1. **Comparing apples and pears.** Or rather, comparing a part of an apple with the whole of a pear. Stern compares the cost of reducing emissions not with the corresponding reduction in damage as a result of lower emissions but with the total damage caused by all greenhouse gas emissions – both those he plans to prevent and those which will still be permitted plus all those that have accumulated since the industrial revolution!

I am not surprised you do not mention this. You could not deny it. Nor could you argue that the difference between the damage prevented by setting a ceiling on emissions and the damage resulting from all emissions past, present and future is minimal. To do so would mean admitting that the likely damage resulting from Stern's maximum tolerable level of emissions is very small. So a higher level of admissions would be tolerable.

2. **Conflating centuries ahead with "now".** Stern suggests losses from global warming will be at least 5% of GDP "**each year now and forever**" giving the clear impression that the benefits of mitigation will exceed the costs (1% of GDP) from "**now**".

But, as I point out "Even on Stern's questionable calculations, **it will be the next century before the cumulative benefits of (entirely) preventing global warming would exceed Stern's low estimate of the costs of (partially) limiting it**".

I am grateful to you for confirming this is the case in your letter where you say that the Stern Review carried out "*1000 runs of the model, yielding a mean loss in global per capita GDP of 0.2% in 2060, rising to 0.9% in 2100 and 5.3% in 2200*".

There is an enormous difference between a strategy whose benefits exceed the costs “each year now and forever” and one whose (predicted but uncertain) benefits only exceed costs after more than a century!

3. **Inconsistent discounting of costs and benefits.** Although Stern discounts benefits of curbing emissions at an ultra-low rate, he does not discount the true cost of doing so – the returns foregone on alternative investments – at the same low rate. As a result, his estimate of the cost of avoiding climate change is understated relative to his estimate of the benefits by a factor of between 2 1/2 and 5 times.

Your failure to address this crucial point is very telling.

4. **Sacrificing today's poor for tomorrow's rich.** Stern's strategy involves this comparatively poor generation making sacrifices to make generations centuries hence, who (even if we do nothing to mitigate global warming) will be many times better off than us, richer still.

On Stern's own worse case assumptions, if we do nothing to mitigate carbon emissions incomes of people in developing countries – net of losses due to global warming - are expected to rise 7 fold by 2100 and 20 fold by 2200. That growth will be fuelled by harnessing energy largely from hydrocarbons.

Poor countries are currently more vulnerable to global warming – because they are poor. The cure for poverty is growth, which requires energy.

Requiring poor countries to replace fossil fuels by renewables costing upwards of twice as much will hinder their growth, leaving them both poorer and more vulnerable to global warming.

Stern admits the bio-fuel target will require 10% of the world's arable land, driving up food prices by more than the yield loss he expects if temperatures rise 4°C.

Again you do not address this criticism – but in your paragraph 14 you tacitly admit it is true.

Parliamentary Question 29th November 2012. You also take issue with the substance of my Parliamentary Question. You appear to have misunderstood the point I was trying to make and I regret if I was not able to make myself clear in an intervention limited by convention to fewer than 100 words.

My point was that the rise in fossil fuel prices since the Stern Review was published in 2006 far exceeds the increased cost of hydrocarbons which he recommends be brought about by imposing a carbon price. A rise in the cost of hydrocarbons, whether brought about by a rise in the market price or by imposing a carbon tax, will have the same effect on encouraging a switch to renewable or other non-carbon fuels and fuel efficiency.

Stern tentatively suggests (Box 13.3 page 304) “*along a trajectory towards 550ppm CO₂e, the social cost of carbon would be around \$30/tCO₂ ... These numbers indicate roughly where the range for the policy-induced price of emissions should be if the ethical judgements and assumptions about impacts and uncertainty underlying the exercise in Chapter 6 are accepted*”. He spells out (Box 11.2 page 257) that, in terms of impact on

the economy, “a \$30/tCO₂ carbon resource cost is likely to have a similar impact as an \$11/bl real oil price increase (at 2003 prices)”. In fact the price of crude oil has risen by several times that amount since 2006. Stern makes clear that the primary policy device to decarbonise the economy sufficiently to meet his target is the imposition of a carbon price “and/or using regulation to create an implicit price for carbon” (page 470).

Your diversionary criticisms. To respond to your diversionary points I have numbered the paragraphs in your letter.

Para 8. You object to me describing as simply untrue the Review’s conclusion that unmitigated global warming will be equivalent to losing at least 5% of global GDP “each year now and forever”. However, in that very para you confirm that is untrue to describe these losses as occurring “each year” let alone “now” since they are not expected to reach 5% until 2200.

Paras 9-12 mirror what I faithfully describe in my pamphlet so I am not sure what points you are making.

If you are trying to highlight the fact that Stern’s discount rate varies in line with the rate of growth of consumption - I do spell that out in my study e.g. on page 51 “In scenarios in which climate change is sufficiently severe to diminish the growth of consumption below 1.3% pa, the rate of discount is also correspondingly reduced” and again on p59 “it uses a lower discount rate the less well off the outcome leaves us”.

Para 13. You say my pamphlet “makes the entirely false statement that the Review “adopts an ultra-low rate without explicitly disclosing it”.

Far from being “entirely false” this is entirely true. It is simply a matter of fact that the discount rate used is ultra low and it is not explicitly disclosed in the Review. If you can show me where in the Review the discount rate used for the base case is explicitly stated I will happily correct my pamphlet. The nearest thing to an explicit figure I can find in the Review is a very misleading statement (Box13.3 page 304) that other authors “use a discount rate of 3%, which is a little higher than our approach would usually imply.” To describe 3% as “a little higher” than the Review’s basic rate of 1.4% is, given that it makes a fivefold difference over a century, a little economical with the truth.

I acknowledge in my study (page 48) that “Stern is ... entitled to use his own discount rate – but only if he faces up to the implications of having a different rate of discount from the rate of return available in the market. This he fails to do, which has serious implications for the valuation of investments to reflect the opportunity cost of investing elsewhere and also the optimum level of saving and investment.”

Para 14. You say it is clear that I “favour higher discount rates” which, you say, would mean even huge losses centuries hence would be treated as of negligible importance if everyone is nonetheless much richer. The main aim of my study is not to say what I favour but to make clear to policy makers the hidden assumptions on which the Stern Review and existing policies are based. I doubt very much whether most policy makers, still less their electors, would be willing to make significant sacrifices now to make future very rich generations richer still. The fact that this is the objective of policy is not spelt out in the Stern Review. I am grateful to you for setting it out so clearly in this paragraph.

You will be aware that Stern himself has subsequently argued for a higher rate of discount for future rises in consumption which would have the effect of dramatically reducing the present value of future losses to rich generations¹.

Para 14. You object to my description of the Review's use of the balanced growth equivalent as a "novel and misleading practice". It is novel because, even though Lord Stern invented the concept years ago, it has not caught on and is new to most economists. It is misleading – especially for lay readers - to say "the overall costs and risks of climate change will be equivalent to losing at least 5% of global GDP **each year, now and forever** (my emphasis)" when, as your para 8 confirms, costs only reach 5% in 200 years time.

Stern only explains the "balanced growth equivalent" concept 160 pages further on. Nowhere does his Review spell out that the benefit of mitigation will not exceed the costs for over a century.

Para 16. You emphasise that the Review's estimated loss of 5% of GDP "is likely to be on the low side". In my Chapter 2 - Key Criticisms – I base my criticism on the worst case shown in the Review – a 35% loss of GDP in 2200.

Para 17. You seem to imply that I ought to have taken into account 'socially contingent' impacts of climate change such as migration and conflict – even though these are not incorporated in the Review's own estimates. To put it mildly that is a bit rich. If such consequences are sufficiently important to include, the Review should have done so. However, even the Review authors presumably thought it somewhat unlikely that people from poor countries will engage in mass migration when their incomes – even net of climate change impacts – are on your worst case scenario projected to be a multiple of their current level. If migration or conflict is supposed to be driven by rising sea levels I would remind you that the IPCC say that melting of the ice caps will take "millennia".

Para 18 et seq. You describe as "simply absurd" my criticism of Stern for relying on non-peer reviewed and alarmist literature. It is simply true. For example, the Review's key conclusion (page 10) that "*Costs of extreme weather alone could reach 0.5 - 1% of world GDP by the middle of the century, and will keep rising as the world continues to warm*" is based on Muir Wood et al² and Munich Re 2006, neither of which is peer reviewed. The Review is heavily criticised in a recent World Bank study:

"The additional impact of climate change ... is equivalent to 0.01 percent of GWP [in 2100]. These values are completely consistent with estimates in the literature per extreme event. However, they are completely inconsistent with values stated by Stern (2006) who suggests that extreme event damages could be 0.5 to 1.0 percent of GWP by 2050. Oral statements by Lord Stern even suggest values as high as 5 percent of GWP by 2200. The Stern analysis has been criticized because it confuses changes caused by what is in harms' way (baseline changes) with what is caused by climate change (Pielke 2007b). But

¹ "with the benefit of hindsight, my inclination would be ... a higher eta ... there is a case for raising eta, although it remains true that many would see the implications of eta = 2 for intragenerational distribution as very egalitarian." Stern *The Economics of Climate Change*, Ely Lecture. This would nearly double the Review's discount rate from 1.4% to 2.7%.

² Muir-Wood, R., Miller, S., Boissonade, A., 2006. *The search for trends in a global catalogue of normalized weather-related catastrophe losses. Workshop on climate change and disaster losses: Understanding and attributing trends and projections*. Final Workshop Report.

even this mistake cannot justify the estimates by Lord Stern. The hypothesized damages quoted by Lord Stern are completely inconsistent with empirical evidence.”³

Para 19. The figures you quote broadly confirm the point I made – that the expected rise in sea level is in line with the average experienced since the last ice age. I am not clear what your point is?

Para 20. You object to my reference to Stern’s treatment of water stress. I wrote “Stern emphasises the numbers who will experience increased water stress – though a close reading reveals that a greater number will enjoy reduced water stress as a result of climate change. Moreover, his analysis is largely based on the work of Professor Arnell, whose study does “not include adaptation” (nor, indeed, economic growth and technological change) and therefore greatly exaggerates the negative effects of climate change”.

I note that you change the goal posts from numbers of people to global land area. However, Figure 3.3 in the Review itself shows that the central estimate under all population scenarios is that more people will enjoy reduced water stress than increased water stress.

Paras 21 and 22. I am sure my study is not the last word on the subject and I remain open to any specific criticisms or corrections of fact. However, you have singularly failed to identify any substantive errors in my report whereas you have been unable to defend the Review from the key charges I made against it. So I suggest it is Stern and his team who should be carrying out the “fundamental revision” you call for. Until they do so the Stern Review will remain discredited.

Yours sincerely

Peter Lilley

³ Robert Mendelsohn & Gokay Saher *The Global Impact of Climate Change on Extreme Events* World Bank Policy Research Working Paper 5566 Feb 2011.