

Accounting for well-being

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The Review is a long and impressive document. It is possible though that readers will not notice that the authors have treated one important aspect of the economic analysis cavalierly.

When economists analyse public policy, they take two sets of considerations into account. First, they identify the ways in which the world might work (the ways which people would choose under various circumstances, the pathways Nature chooses, and so on). Once that task is done, they are able to chart the consequences (perhaps long term consequences) of alternative policies. Second, they value those consequences so as to be able to judge the relative desirabilities of the alternative policies.

Reading the Review gives one the impression that the case has been made for strong, immediate action in the form of an annual expenditure of about 1 per cent of global GDP. Yet, the conclusion I have reached is that *the strong, immediate action on climate change advocated by the authors is an implication of their views on intergenerational equity; it is not driven so much by the new climatic facts the authors have stressed.*

I should say at once that the ethical *framework* advanced by the authors is standard in modern economics. The authors conduct a Cook's tour of contemporary ethical theories, but pretty soon get down to the modern economist's mode of ethical reasoning. This framework was proposed by Frank Ramsey in his great 1928 paper in the *Economic Journal* ('A Mathematical Theory of Saving'). As might be expected, though, the numerical figures for the ethical parameters in the framework are not given by the framework: to arrive at them requires further deliberation.

Even the meaning of the ethical parameters is not self-evident, because there are several alternative philosophical underpinnings of the Ramsey framework and each interprets the parameters in its own way (see my 'Three Conceptions of Intergenerational Justice'¹). The Review is curiously silent about differences in the views experts hold about what those figures ought to be and about the various philosophical underpinnings. It is silent too on the huge literature about those views and their justifications.

Assume, as the Review does, that a generation's well-being is the sum of the well-beings of the members of that generation. Assume too, as the Review does, that each person's well-being depends on his or her level of consumption. By the *ethical values* that reflect the idea of intergenerational equity I mean two things:

1. The tradeoffs that ought to be made between the well-beings of future generations and our own well-being, given that future generations will be here only in the future;
2. The tradeoffs that ought to be made between the well-beings of people regardless of the date at which they appear on the scene.

Technically, (1) is reflected in the *time/risk discount rate* which, following the Review, I shall call *delta*; and (2) is reflected in the *elasticity of the marginal value of the social weight that ought to be placed on individual well-beings*, which, following the Review, I shall call *eta*. Both terms are defined in the Review.

The Review, rightly in my view, asserts that the tradeoff between the present 'us' and the future 'thems' should be, roughly speaking, one-to-one. In other words, we should not discount future generations' well-beings simply because those generations will appear only in the future. The Review assumes that delta ought to be set equal to 0.1 per cent per year, which is a very low figure if we are to compare it with the values advocated by other climate economists. This is to adopt a very egalitarian attitude across the *time* dimension.

Yet the Review adopts a very *inegalitarian* attitude with regard to the distribution of well-being across the generations when futurity is not the issue. The Review's central case is based on the assumption that eta ought to be unity which, I shall show, reflects a fairly indifferent attitude toward equity over the distribution of well-being among people, *qua* people. The distinction between the two parameters is crucial. As the numerical figures that are assumed for them influence estimates of the economic costs and benefits of action, delta and eta are hugely significant parameters.

In fact, the very same ethical values that have been adopted in the Review were the basis of a pioneering 1992 study on the economics of climate change (aptly titled *The Economics of Global Warming*) by William Cline of the Institute for International Economics, Washington DC. In a symposium on Cline's book in *Finance and Development*, a quarterly publication of the World Bank and the International Monetary Fund, Cline summarised his finding in an article ("Give Greenhouse Abatement a Fair Chance") thus: "My central scenario shows that ... if risk aversion is incorporated by adding high-damage and low-damage cases and attributing greater weight to the former, benefits comfortably cover costs (with a benefit-cost ratio of about 1.3 to 1). Aggressive abatement is worthwhile even though the future is much richer, because the potential massive damages warrant the costs" (*Finance and Development*, March 1993, pp 3-5). Despite the striking similarities between the numerical figures adopted for the pair of ethical parameters (delta and eta) in the two studies, there is no mention of Cline's work in the Review.

I then turned to the work of William Nordhaus, who has been studying the economics of climate change for over three decades. By contrast, the most remarkable conclusion of his studies – conducted on his Dynamic Integrated Model of Climate and the Economy (DICE) – has been that, despite the serious threats to the global economy posed by climate change, little should be done to reduce carbon emissions in the near future. He argues instead that controls on carbon should be put into effect in an increasing but gradual manner, starting several decades from now. This conclusion has withstood the many modifications Nordhaus and others have made to the climate science embodied in DICE.

Their idea is not that climate change should not be taken seriously, but that it would be more equitable (and efficient) to invest in physical and human capital now, so as to build up the productive base of economies, and divert funds to meet the problems of climate change at a later year. These conclusions are reached on the basis of an explicit assumption that global GDP per capita will continue to grow over the next 100 years even under business as usual, an assumption the Review appears to make as well.

Where then is the real difference between the economics in DICE and those in the Review? No doubt DICE differs from PAGE (the acronym for the Review's climate model) in its climatic specifications. But I looked for the underlying ethics. Nordhaus

and others have used a considerably higher figure for delta. In contrast to the Review's figure of 0.1 per cent per year, Nordhaus in recent years has used a starting value of 3 per cent a year for delta, declining to about 1 per cent a year in 300 years' time. Interestingly, Nordhaus also takes eta to be unity. He reports that the first-period social price of carbon (which is a measure of the social damage a marginal unit of carbon emitted today inflicts on humanity) is about \$13 per ton, whereas the figure reached in the Review's central case is about \$310 per ton.

If the Review's figure for delta is put to work on DICE, the first-period social price of carbon becomes about \$150 per ton. This is about half the figure offered by the Review, but it is enough to suggest that the driver behind the Review's findings is the very low values of the two ethical parameters, delta and eta. Indeed, modifying DICE slightly, so as to take a more alarming view for the worst case scenario under business as usual, raises the figure for the social price of carbon to \$400 per ton, in excess of the figure recommended in the Review. (I am grateful to William Nordhaus for these figures and for the many discussions we have had over the years on the economics of climate change.)

Are the numbers taken in the Review to reflect the two ethical parameters compelling? I have little problem with the figure of 0.1 per cent a year that the authors have chosen for the rate of pure time/risk discount (delta). However, the figure for eta – the ethical parameter reflecting equity in the distribution of human well-being – is deeply unsatisfactory. To assume that eta equals 1 is to say that the distribution of well-being among people does not matter much; that we should spend huge amounts for later generations even if, adjusting for risk, they were expected to be much better off than us.

As an example, suppose we set delta equal to 0.1 per cent per year and eta equal to 1 in a deterministic economy where the social rate of return on investment is, say, 4 per cent a year. *It is an easy calculation to show that the current generation in that model economy ought to save a full 97.5 per cent of its GDP for the future!* Yet the aggregate savings ratio in the UK is currently about 15 per cent of GDP. Should we accept the Review's implied recommendations for this country's overall savings? Of course not. A 97.5 per cent saving rate is so patently absurd that we must reject it out of hand. To accept it would be to claim that the current generation in the model economy ought literally to impoverish itself for the sake of future generations.

The moral of exercises such as this is that we should be very circumspect about accepting numerical values for parameters of which we have little *a priori* feel. What we should have expected from the Review is a study of the extent to which its recommendations are sensitive to the choice of eta. A higher figure for eta would imply greater sensitivity to risk and inequality in consumption, meaning that it could in principle imply greater or less urgency in the need for collective action on global warming. Whether it is greater or less would depend on whether the downside risks associated with the warming process overwhelm growth in expected consumption under business as usual.

To put it more sharply, a higher value of eta could imply that the world should spend more than 1 per cent of GDP on curbing emissions, or it could imply that the expenditure should be less. Only a series of sensitivity analyses would tell. Curiously, the Review does not report any such sensitivity analysis.

Ethics, like facts, raises questions for which there are no easy answers. I certainly have none to offer. But the authors of the Review could have spent a lot more space discussing the various implications of its choice of the two ethical parameters. For that is where the Review's particular intellectual action lies.

1. Lillehammer H and Mellor D H, eds (2005) *Ramsey's Legacy*. Oxford: Clarendon Press.

A full version of Professor Dasgupta's comments appears in the *National Institute Economic Review*, No 199. www.niesr.ac.uk