

The Impact of Climate Change on the United States Economy

Robert Mendelsohn and James Neumann (Eds); Cambridge University Press, 1999, 330 pp., hardcover, ISBN 0-521-62198-4

The 1997 Kyoto Protocol to the 1992 Framework Convention on Climate Change set greenhouse gas emission reduction targets for the ‘Annex 1’ countries—basically the developed economies and the economies in transition. While the targets appear superficially modest, when allowance is made for the expected growth in greenhouse gas emissions in a ‘business as usual’ world, they appear far tougher. Most developed economies, for example, would have to reduce emissions by 20–30% of the baseline of what emissions would otherwise be around 2010. Since the main greenhouse gas is carbon dioxide, and since carbon is pervasive to modern economies, reductions of this order of magnitude will be difficult to achieve. Even if they are achieved, one of the ironies of the Kyoto process is that they will do very little to rates of global warming. Only if the developing countries accept targets in the next round of emission reduction negotiations can there be any significant difference to rates of warming. Given the apparent scale of the targets, and the doubts about just how effective they will be in combating global warming, it is only right that economists should focus on the costs and benefits of greenhouse gas reduction.

Mendelsohn and Neumann have assembled a dozen essays on the damage that global warming will do to the United States economy. The narrow geographical focus is perhaps a little unfortunate since most damage studies suggest that global warming will have a bigger impact, relative to GNP, in the developing world. The political sensitivity of this unequal distribution of damages is well known. Developing countries regard global warming as something that has been imposed on them by profligate energy consumption in the West. The detailed focus on damages to the US economy thus looks a little misdirected. On the other hand, it is the US consumer who will decide if anything significant is done about global warming. As the major contributor to CO₂ emissions, if the USA does not act, nothing will happen. But for the US to act the American consumer has to be persuaded, along with other actors, to change energy-intensive life styles. The political difficulty of doing this is well established and is reflected in the enthusiasm of the US Administration for tradable carbon permits which would permit the US to buy carbon credits and pay for emission reduction in other countries rather than at home. Since the US is critical to the whole process, perhaps Americans will be persuaded to act if it can be shown that the economic damage they will suffer because of warming will be large. The message of the essays in this volume, however, is that past studies have exaggerated damages

to the USA. If this is correct, one senses that the USA will have even less incentive to ‘sign up’ to the full provisions of Kyoto.

The individual essays focus on different sectors of the US economy: agriculture, timber, water resources, coastal areas (to account for sea level rise), fisheries, energy and recreation. The bottom line conclusion is that, whereas previous studies estimated a net loss to the USA of 0.3% to 1.2% of GNP, the new estimates suggest a net gain of some 0.2% of GNP. Thus, not only is the effect very modest, global warming is a benefit rather than a loss to the USA. Whereas previous studies suggested all the measured sectors were net losers, this study suggests that only water, energy and fisheries lose, with coastal areas being very marginal losers.

Given that these conclusions are in marked contrast to previous studies, what accounts for the change? One of the major deficiencies of previous studies was their neglect of adaptive behaviour. Farmers are not likely to stand idly by if they see productivity fall and all kinds of adaptive behaviour can restore climate-induced losses. Moreover, if climate does affect agriculture it will affect prices and this will induce change. Thus Kathleen Segeron and Bruce Dixon suggest that adaptation in corn and wheat farms could reduce the negative impacts of climate change by as much as 50 per cent. A second feature of the new estimates is the refining of ‘climate-response functions’, functions that estimate the response of the relevant ecosystems to different climate change scenarios. Some of the refinement involves the use of new scientific information, e.g. on the fertilisation effects of carbon dioxide. Third, the response of markets that depend on those ecosystems, such as timber and water, are modelled so that the resulting estimates of damage or benefits are far more sophisticated than in previous models. Fourth, climate response functions for residential and commercial energy use are estimated in the form of regression equations linking demand to temperature change.

All these developments are significant improvements on previous efforts to estimate damage. But how far the changes affect policy towards climate change is open to question. First, like previous estimates, the damage estimates relate to a doubling of atmospheric carbon dioxide concentrations—so called ‘2×CO₂’. Global warming will not stop at 2×CO₂, so that damages could easily increase after 2×CO₂ has been reached. How far into the future policy-makers should look is, of course, a disputed issue. Perhaps projecting beyond, say, the next 50 or 60 years is pointless because of the errors involved. Perhaps technological change by then will be so rapid that the human race will be able to adapt to almost any major environmental change. But perhaps gulf streams will have been reversed and tundra unfrozen, making damages greater and accelerating the pace of warming. The editors’ concluding chapter does

have a trace of complacency about it: none of these issues is discussed. They do acknowledge throughout that they have not estimated most non-market impacts: 'health, aesthetics and non-market environmental changes are not evaluated' (p.2). Yet it should not be surprising to discover that adaptive mechanisms will be strongest in market sectors where there are price and quantity changes to act as incentives. By definition, such incentives are absent in the non-market sectors. There is a risk that, just as the figure of 1 percent of GNP damages became so widely quoted in the IPCC discussions, so the new 0.2 percent figure will be quoted from this book, without sufficient recognition that whole areas of damage have not been accounted for. Third, from a policy perspective the focus should not be on damages but on the benefits of policy measures to reduce greenhouse gas emissions. Avoided damages are not the same thing as the benefits of action. Reducing carbon dioxide, for example, reduces many other pollutants as well, including small particulate matter which is heavily implicated in estimates of air pollution damage to human health. Again, this issue of 'secondary benefits' is not discussed in this volume. Of course, one cannot justify acting on carbon dioxide so as to secure secondary benefits if it is more efficient to act on the secondary pollutants directly. But it is widely acknowledged that reducing so pervasive a pollutant as carbon brings with it these secondary benefits. Finally, the models used to estimate the relevant functions are generally 'well-behaved'. There are no real threshold effects, no discontinuities and hence no accounting for extreme events. Yet ecologists repeatedly warn that ecosystems do not behave 'smoothly' in response to stress and shock of the kind that climate change may bring. To some extent, the essays in this volume attempt to take account of thresholds by using dynamic models which estimate the rate of response to climate change. But the underlying response functions still appear to be well-behaved. Perhaps this is how things are, but it is difficult to feel reassured that the authors have given the issue adequate attention.

There is no question that these essays are marked improvements on previous estimates of climate change damage, and fine scholarship has been brought to bear on the individual sector studies. The result is best seen as an input to a hoped-for wider and more embracing analysis of effects on different regions of the world and with a focus on non-market sectors where we might least expect human adaptation, rather than a study that tells us that global warming does not matter too much. As the editors rightly say, the achievement of this volume lies mainly in showing us that methodologies exist that will enable better studies of impact to be undertaken.

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Minerals Yearbook of Poland

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Poland is one of Europe's premier mining countries but until recently information in English about its mining industry has been difficult to obtain. This has changed recently with the publication of an annual minerals yearbook in English prepared by the Department of Mineral and Energy Policy of the Polish Academy of Sciences. The volume is comprehensive covering 113 mineral commodities produced or consumed in Poland. Data coverage extends from 1993 to 1997.

The information presented is largely taken from data provided by the Central Statistical Office but has been supplemented for some commodities with producer and user supplied information. The volume opens with approximately 20 pages giving an overview of the industry and tables summarizing the mineral commodity balance for key minerals. Tabulated data is presented on reserves, production, imports, exports, apparent derived demand, and exports and imports as a percentage of demand. The remainder of the volume treats selected commodities in greater depth with each individual commodity section broken down into uniform subsections (overview, sources, production, trade, consumption, by-products, companies involved in production).

The volume is very strong on data but weak on interpretation of that data. There is no attempt to analytically describe past, current and possible future trends. Discussion of mineral policies, laws, privatization schemes, unions and so forth are wholly absent.

In summary, the publication of this annual yearbook will be a valuable addition to the mineral economics literature making available data previously not accessible to most readers. Unfortunately, its almost total emphasis on data makes it of less interest than might otherwise be the case. The Polish mineral industry is in the midst of a fundamental transition from central planning to a more market-oriented system, and annual reporting on this process, by knowledgeable insiders, would be of equal or greater interest than the data to many potential readers.

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