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Climate Economics: Economic Analysis of Climate Change and Climate Policy, edited by Richard S. J. Tol. Published by Edward Elgar, Cheltenham, UK, 2014, pp. 208 pages, ISBN: 178 254 591 3, AU\$ 149 (hard cover), AU\$ 47.36 (paperback).

This is a text on climate change and its economics. It is written in a brisk, lecture note format with much material tersely presented. It contains exercises, reading lists and utilises a supplementary website which contains lecture notes, quizzes, lecture slides and supporting databases. As someone who teaches classes on climate economics, I found this useful. Particularly useful were those early parts of this book that involve describing the science and in establishing a conceptual policy setting.

Early chapters summarise the physical science basis of climate science with an emphasis on the physical uncertainties, the difficulties of projecting climate trends and of devising future emissions scenarios. Then, abatement costs are discussed. They are seen as low provided adjustments are given enough time to be implemented. Carbon taxes work best if they are implemented broadly and double-dividend benefits are utilised.

The choice of market-based policy instruments – taxes, subsidies, tradable permits – for emission reduction is then analysed in both static and dynamic contexts. The dynamic efficiency conditions are presented tersely. It is assumed that the carbon price equals a costate variable from an optimal control task reflecting the shadow price of emissions. With respect to choosing between taxes and tradable permits under uncertainty, the standard Weitzman result is provided. Since costs depend on stocks of emissions (not on flows), using a tax instrument will outperform tradable permits. Tol rejects the realist political argument that ‘grandfathering’ permits admit greater political feasibility than subjecting emitters to taxes. He also discusses problems of making permits internationally tradable and discusses the EU scheme and the Clean Development Mechanism (CDM) mechanism. Technological innovation in the energy sector is best driven by a credible abatement policy. These are all sensible views and well argued.

Approaches to valuation of various climate impacts are provided, along with a useful discussion of willingness-to-pay and willingness-to-accept compensation for climate changes. This binds the way climate policy discussions are formulated and impacts on the way climate impacts are valued.

Chapter 6, which looks at empirical estimates of climate impacts, is more problematic. This is the start of a sequence of chapters that downplay the need for a stringent activist climate policy. The claim is that moderate climate change is most likely which will have small aggregate impacts mainly in poor countries where limited adaptation capacity creates extra costs. Hence, it is argued, economic development is the best means of addressing climate issues since it best improves this capacity. The probabilities of severe climate events

are minute, so such events can be disregarded. The unstated hypotheses here are that economic development will occur in time to prevent extreme climate change and that the probabilities of 'fat tail' extreme climate change are low. These hypotheses are rejected by many, for example, by the 4th IPCC Assessment Reports.

This type of argument is developed further in Tol's view of 'optimal' climate policy which is seen as involving a modest emissions reduction that will not end the use of carbon-based fuels anytime soon. Tol correctly points out that climate policy objectives should be posed in terms of emission stocks in the atmosphere, not in terms of emission rates. To make this clear, the world could emit at maximum rates for a hundred years and then cut emissions significantly – hitting any pre-assigned emissions target but still leaving a devastated environment. This is a straightforward stock/flow confusion that is made by the UNFCCC and many policymakers (including those in Australia). But it is a long step from endorsing this view to asserting the case for limited action to address climate change. Tol's case is based entirely on his interpretation of the Nordhaus DICE model. It is a strong, controversial argument, derived from a narrow ideas base.

Tol goes further. He seems to claim that climate change only matters if you care about the distant future, faraway lands and remote probabilities. Some nice economics is expounded as a precursor to these claims (the Ramsay rule for discounting, the role of equity weights, Weitzman's dismal theorem and so on), but I could find no empirical or theoretical justification provided for the claims. Of course, the Stern Review – which uses a low discount rate – made a strong presumptive case for addressing climate change decisively and now.

Indeed, in a subsequent chapter, Tol also shows how risk and irreversibility intensify the case for a more stringent climate policy. The presented dichotomy between advocating limited action versus more stringent policies is of major practical policy concern.

On the strategic issues involved in climate policy, Tol asserts that game theory and 'free riding' explain why cooperative agreements such as Kyoto have not yet had a large impact and why future attempts at negotiation will also be futile. The implication Tol draws is that most policies will, of necessity, be nationally based adaptation policies that do not require international agreements. This seems an overly pessimistic assessment given current initiatives worldwide (in Europe, China and the United States) to mitigate emissions.

Tol provides an Excel-based integrated assessment model that can be numerically explored by students. Although highly aggregative, this is a useful way of illustrating how the various science and economic components of modelling need to be put together to determine policy impacts.

In a final brief chapter, Tol sets out his bottom line on policy. The climate issue is seen as a minor problem that can be efficiently resolved with a limited carbon tax. Views that the problem is more serious than this are identified as

climate ‘alarmism’, fostered partly by the self-interest of politicians and bureaucrats. The potential for international action is limited by right-wing conspiracy fears and the free-riding issue. Domestic actions are expensive but politically sought even though they have relatively high cost compared to a cooperative global response. These views can be debated but what is nondebatably is that Tol’s opinions do not reflect the worthwhile discussions of climate science and climate economics that lie elsewhere in this book. There is much sound analysis in this book, even though the analysis does not seem to drive the author’s policy views.

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