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Publications

Geoffrey Heal, Valuing the Future: Economic Theory and Sustainability, Columbia University Press, 1999, ISBN 0–231–11306–4

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This book is required reading for students of the economic theory of sustainability at all levels. It provides a very clear and logically consistent discussion of sustainability, presented in a style accessible to those new to the subject, exploring the economic and moral factors behind the problem of sustainability. The book goes on to explain thoroughly the technical implications of sustainability and natural resource use. It also contributes significantly to the development of the subject. One of the major focuses of the book is the role of the concept of optimality, and its relationship to sustainability. Heal extends the standard analysis of sustainability in the context of optimal dynamic programmes of consumption and natural resource use, by analysing thoroughly the implications of using concepts of optimality other than Discounted Utilitarianism, which is standard in economics.

The first chapter discusses the economic reasons behind sustainability, and the rationale for using an economic framework to analyse the problem. Sustainability can, Heal argues, be thought of as a problem of internalizing external costs, but with the particular problem that some of these costs are felt over the very long run. The four main moral frameworks used to identify optimal growth and resource use paths are introduced here. These include the standard discounted utilitarian framework, the Rawlsian criterion, under which the optimal path maximizes the well being of the least well-off generation, and the Green Golden Rule, under which the long-run utility level is maximized. The forth framework, analysed at length in later chapters, is the Chichilnisky criterion, which maximizes a weighted average of the discounted flow of utility and the long-run utility level.

Chapter 2 discusses the Hotelling rule for the optimal use of non-renewable (or exhaustible) resources under discounted utilitarianism.

Sustainability cannot meaningfully be discussed in this context, but the chapter uses this simple context to provide an intuitive introduction to the optimal control framework of dynamic optimization, which is used throughout the remainder of the book. Chapter 3 shows that the optimal path under discounted utilitarianism changes, in that the depletion rate is lower, and some of the stock may be conserved in perpetuity, if the resource stock contributes directly to utility.

Chapter 4 extends the analysis by allowing the resource to be renewable. The Utilitarian optimum is identified and compared to the Green Golden Rule solution. It is explained that for renewable resources, the latter is not necessarily equivalent to the Rawlsian optimum, as it was shown to be for non-renewable resources. This chapter discusses also the concept of ecological sustainability, illustrating that solutions in which the optimal resource stock is greater than the maximum sustainability yield stock are ecologically stable. Solutions under the Green Golden Rule criterion are shown to be ecologically stable.

Chapter 5 provides a very useful discussion of the concept of optimality, and its influence on the sustainability of natural resource use. It looks in more detail at optimality criteria that have been suggested as alternatives to discounted utility, in particular those that give more consideration to the long-run implications of following a particular path. It points out that in fact discounted utilitarianism is not a good description of actual preferences, since empirical evidence has shown that the rate at which people discount future utility declines with the distance into the future. A variety of alternatives are discussed, including Chichilnisky's criterion. Under relatively weak assumptions, this approach can be shown to provide a unique ranking of possible paths. The main message of this chapter is that it is difficult to judge optimality criteria without an understanding of their consequences. That is, the moral judgements that lead to the choice of optimality criteria must be reconsidered in the light of the consequences of choices made using the chosen criteria. The following chapters analyse this 'iterative process'.

Chapters 6 and 7 revisit the models of optimal resource use introduced earlier. Chapter 6 shows that using the Chichilnisky criterion to optimize non-renewable resource use results in a solution that lies between those obtained under discounted utilitarianism and the Green Golden Rule. The result is closer to the Green Golden Rule the more weight is placed on the long-term utility level. Chapter 7 discusses the (slightly more complicated) implications of the Chichilnisky criterion for renewable resource use, as well as the problem of time inconsistency. Chapter 8 considers the problem of investment in a backstop technology that can substitute for natural resource use, an example of such a technology being alternative energy. The problem is how much to invest in developing the alternative, and its structure can be used to analyse other situations in which current investment can increase well being in the long term, such as global warming and the disposal of nuclear waste. The analysis is therefore particularly important for environmental economics. It shows, using the four main objective functions, that the more weight is given to the future, the more investment will be undertaken.

Chapters 9 and 10 explore the problem of optimal capital accumulation where natural resources are used in production. The resulting optimal paths are not qualitatively different, but they are more complex and depend among other things on whether or not the natural resource is essential in production. Chapters 11 and 12 discuss the implications of natural resource use for measures of national income. They each analyse one of two major definitions of national income. The first is the consumption level that, if held constant over time, would yield a path with the same net present value as the present value-maximizing path. This type of income is increasingly being labelled in the literature 'Hicksian Income', and this term is used here. The second is the value of equilibrium consumption at equilibrium prices, known as national welfare. Chapter 13 analyses the problem of project evaluation, using the national welfare accounting framework. The challenge for an optimizing society is to decide which projects to implement, using as a criterion the amount that they add to national welfare. This discussion shows how alternative criteria, which place different weights on the future, allocate resources differently, highlighting the use of shadow prices in indicating whether or not a re-allocation of resources would have a positive effect on national welfare.

This is a remarkable and stimulating book. It highlights the deficiencies of the standard theory of optimal economic development, formulates and alternative, and uses it to show how a set of rules for evaluating potential resource-use options can be derived. The clear conclusions of this analysis include the fact that in some circumstances it may be appropriate to use a discount rate that declines over time, and that the shadow price attached to a natural resource depends on the relative weight placed on future well being. The book provides an intuitive but technically comprehensive overview of the economics of sustainable development, as well as a logically compelling argument as to the appropriate direction for research into the theory and practice of sustainable development.

Joseph A. Herriges and Catherine L. Kling (eds.), Valuing Recreation and the Environment, Edward Elgar, 1999, ISBN 1–85898–646

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The travel cost method is one of the oldest tools for environmental valuation. This is an extremely useful new text for those currently working

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with the revealed preference techniques which developed out of the travel cost method, and for those who wish a state-of-the-art introduction to the area. Many innovations have occurred in this branch of the revealed preference method, including the random utility model, count models, contingent behaviour/panel models, and joint revealed-stated preference approaches. These approaches broadly fall into two groups, namely those based on continuous representations of demand systems, and those based on a discrete choice angle. However, there has been no book which has presented this new toolkit and the theory behind it: up until now we have had to rely on chapters in more general edited volumes, such as Bockstael (1991) and Bockstael (1995). Practice outside the US has lagged behind that inside North America, and it is illuminating to note that none of the authors of this book are from European institutions. The list of authors is, however, impressive: most of the big names in the field are here, including Nancy Bockstael, Trudi-Ann Cameron, Michael Hanemann, Dan Hellerstein, Ed Morey, Ken McConnell, Doug Shaw, Scott Shonkwiler, and Ivar Strand.

As Joe Herriges and Cathy Kling note in their short introduction, the environmental valuation literature has been dominated in recent years by contingent valuation, both in terms of journal articles and books. However, they detect an increasing interest in revealed preference (RP) approaches, which may be partly due to the sophistication of current methods, in turn due partly to increasing computing power. The availability of 'canned' routines for model estimation (e.g. in Limdep) may also help explain this rising interest. The reader of this volume will emerge with a good appreciation of the great breadth and depth of RP models (although to actually implement many of them one has to be able to programme in, say, Gauss). But there is a danger that the basic weaknesses of these approaches get lost in a daze of technical sophistication. These weaknesses include the well-known weak complementarity conditions, which means that non-use values cannot be measured; as well as old problems from travel cost days, such as the value of leisure time and multi-purpose trips. As Kling and Herriges note, there are also many environmental valuation problems to which these RP models cannot be applied: environmental impacts need to leave a recognizable trail in terms of changes in human behaviour.

The book is divided into two parts, namely theory and practice. In the first three chapters we are presented with the theory background to the methods. Chapter 1 is a very interesting introduction to this theory by Bockstael and McConnell. In the next two chapters, two oft-cited discussion papers appear, by Michael Hanemann (on welfare measurement in random utility models) and Ed Morey (on nested logit models of site choice and participation). It is very useful to have these two important papers appear side-by-side. Part two of the book is then taken up with empirical applications, each designed to illustrate different nuances within the RP approach. These include papers by: Train on mixed logit models, which gets around the infamous IIA assumption of conventional logit approaches; Chen, Lupi and Hoehn on multinomial probit models (relatively rare in this field); Herriges, Kling and Phaneuf on linked models of site choice and trip frequency; McConnell, Weninger and Strand on joint

RP–SP work; and Cameron, Shaw and Ragland on survey problems. The last two chapters are taken up with work on count models, so-called because of the integer values of visit data. In chapter 9, Scott Shonkwiler proposes an interesting alternative to RUM models, in a multi-site count data approach. Finally, Dan Hellerstein concludes the book with a look at the behavioural foundations of count models.

This book presents a very comprehensive survey of what is new in recreational demand modelling using RP data. To get full value, readers will need a good knowledge of demand theory and econometrics. The book will mainly appeal to professional economists working in the area, or wanting to get into it, along with Ph.D. students. However, it is probably not suitable for students at the undergraduate or even masters level, being too difficult (although brighter students will be able to pick up on the main messages here). I personally will find the book very useful as a reference source. It is a worthy addition to the best crop of recent books on environmental valuation.