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Foders, Federico

Book Review

[Book Review of] Handbook of natural resource and energy economics, Allen V. Kneese ... (eds.), Amsterdam, North-Holland, 1985

Weltwirtschaftliches Archiv

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Suggested citation: Foders, Federico (1987) : [Book Review of] Handbook of natural resource and energy economics, Allen V. Kneese ... (eds.), Amsterdam, North-Holland, 1985, Weltwirtschaftliches Archiv, ISSN 0043-2636, Vol. 123, Iss. 4, pp. 770-772, <http://hdl.handle.net/10419/2144>

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Kneese, Allen V., James L. Sweeney (Eds.), *Handbook of Natural Resource and Energy Economics*. Vol. I and II. *Handbooks in Economics* 6. Amsterdam, New York, Oxford 1985. North-Holland, Elsevier Science Publishers. XXIII, 1–462 pp. (Vol. I); XX, 465–755 pp. (Vol. II).

A few years ago North-Holland launched a series of handbooks in economics edited by Kenneth J. Arrow and Michael D. Intriligator. Each handbook is planned to provide “self-contained surveys of the current state of a branch of economics . . . prepared by leading specialists”. The series is set out to cover almost every important branch of modern economics. The sixth handbook, consisting of three volumes, two of which were published in 1985 (Volume III is due to be published in 1987), deals with natural resources and energy, a field of economic inquiry which has only recently been theoretically formalised. Readers who might have expected more pure (as opposed to applied) branches of economics to be served first in such a comprehensive series of handbooks should be reminded that the six handbooks published hitherto deal with branches in which the quantitative approach has been extensively used. In view of the well-known professional preferences of the editors of the series this “leitmotiv” is no surprise.

The *Handbook of Natural Resource and Energy Economics*, edited by Allen V. Kneese (Resources for the Future, Inc.) and James L. Sweeney (Stanford University), offers surveys of the economics of renewable (Volumes I and II) and nonrenewable (Volume III) resources. Most of the generally well-written chapters on renewable resources address environmental issues; the basic theoretical framework is given by James E. Wilen and Horst Siebert. Wilen’s introduction sets the stage for an economic analysis of natural resources from the viewpoint of traditional capital theory without giving in to the vices associated with many growth theory adaptations of capital theory. This approach allows for an easy access to the intertemporal dimensions of resource economics, especially to bioeconomics and its problems of overlapping and nonoverlapping generations. With these tools at hand the reader is well equipped for the hidden challenges not only of fisheries, forest and wild animal management mentioned in the essay, but also of most issues in natural resource economics.

Horst Siebert focuses on the spatial aspects of the environment, stressing the relationship between pollution and the international and interregional location pattern of economic activity. As a complement to this analysis, Anthony C. Fisher and John V. Crutilla explore the possibility of allocating lands to nature preservation instead of to other, for instance, pollution intensive activities. They argue quite plausibly that decisions involving alternative uses of land should consider a positive “option value” representing the gains from avoiding the (uncertain) environmental impact of activities with high damage potential. A. Myrick Freeman takes a similar view albeit from a welfare theory perspective, aiming at a measurement of the actual benefits derived from environmental programs. Observed demand and cost functions, production functions, hedonic wage and price functions can be estimated in order to quantitatively assess commonly applied control instruments. A different approach to the same issue is chosen by David James who discusses environmental quality management models that take into account the physical law of materials balance. This family of models, initially developed at Resources for the Future, is used mainly for policy design. Rather than evaluating measures for the control of residuals discharges, the viable management actions emerging from such policy simulations are directed toward environmental

quality improvements, as a result of changes in industrial output and/or input mix on the one hand and changes in the environment's assimilation capacity on the other. Input-output tables, in a modified version incorporating discharges of residuals from production and consumption, are employed by Finn R. Forsund to identify pollution intensive industries and to estimate the impact of environmental controls on disaggregated factor demand.

The remaining two chapters in Volume I touch upon the more traditional topics of environmental policy. G.B. Christansen and T.H. Tietenberg ask what the impact of environmental policy on the economy might be. Taking U.S. air and water pollution controls as an example they conclude that although the initial incidence falls on industry, the ultimate incidence depends on the ability of firms to adjust internally and/or to pass the cost burden on to consumers. The more interesting part of this essay reviews studies on the effects of regulations on productivity growth, technological progress, inflation and unemployment. Convincing evidence is quoted relating the poor performance of the U.S. economy in the period 1966–1982 to the relatively small but adverse macroeconomic effects of pollution controls. For a plausible explanation for such an outcome, the reader is referred to the chapter by Peter Bohm and Clifford S. Russel on comparative policy analysis. After reporting some of the practical difficulties associated with monitoring and enforcing alternative policies (regulations, taxes) they mention the central problem in natural resources policy: missing markets and missing property rights. If well-defined pollution permits, i.e. exclusive, universal and transferable rights to pollute, were auctioned among interested parties the government agency usually in charge of environmental protection could be left to determine the total ambient quality capacity to be allocated. Another possibility not mentioned by these authors would be to transfer the management of environmental quality to private firms with an incentive not only to market such pollution rights profitably, but also to maintain or even increase the environment's absorption capacity.

Market forces are not very much trusted by the authors of the handbook, at least as far as environmental issues are concerned; they prefer to take the Pigouvian stance. This partly explains a common feature of their theoretical and policy approach: environmental quality is viewed exclusively as a public good and an omniscient and impartial government is expected to design and implement the corresponding policies supposed to reflect the preferences of all members of society. While it can hardly be denied that the utilisation of renewable natural resources may, in many instances, lead to negative externalities calling for government action, two younger areas of applied economics, the "economics of politics" and the "economic analysis of law" warn us not to be too confident about governments applying the instruments of good to do good. It was Kenneth J. Arrow, one of the editors of the handbook series, who did not succeed in constructing a social welfare function, due to the logical impossibility of aggregating individual preferences, and who, in so doing contributed to a much better understanding of the dynamics of modern governmental bureaucracy. For this work Arrow was awarded the Nobel Prize in Economics. This may be noted as an ironical aspect of the handbook under review.

Readers interested in other specialised areas of natural resources theory and policy are recommended to turn to the selection presented in Volume II of this handbook, where they will find competent surveys of the economics of water resources, public forest and other land resources, fisheries and outdoor recreation. The last two essays

offer an introduction to resource management in China and the Soviet Union. It belongs to the original features of this handbook that Volume I follows a strict order determined by the nature of the issues dealt with, whereas Volume II appears to lack an overall conceptual framework. This reminds the reviewer of a novel by the late writer Julio Cortázar, the chapters of which could be read in virtually any order without losing the common thread. However, what seems to be true for Volume II should not be generalised: as regards Volume I of this handbook the reader is urged to disobey Cortázar's rule of individual anarchy.

Federico Foders

Kommission der Europäischen Gemeinschaften, Forschungs- und Technologiepolitik der Europäischen Gemeinschaften: Entwicklungen bis 1984. Brüssel, Luxemburg 1985. Amt für Amtliche Veröffentlichungen der Europäischen Gemeinschaften. XII, 251 S.

Wer sich einen Überblick über die Forschungs- und Technologiepolitik der Europäischen Gemeinschaft verschaffen will, hat es bisweilen nicht leicht. Inhalt und finanzielle Ausstattung der einzelnen Programme sind in den verschiedensten Veröffentlichungen des Ministerrats und der Kommission dokumentiert, deren Aufspüren selbst versierten Bibliothekaren gelegentlich Schwierigkeiten bereitet.

Für die empirische Wirtschaftsforschung war es daher eine willkommene Hilfe, als die EG-Kommission eine zusammenfassende Informationsschrift über ihre technologiepolitischen Aktivitäten vorlegte. In ihr werden die grundsätzlichen Ziele der EG-Forschungspolitik dargelegt und sämtliche bis zum Jahr 1984 durchgeführten oder in Angriff genommenen Programme vorgestellt.

Das wachsende Interesse an diesem Thema ist berechtigt, denn die Forschungspolitik der Europäischen Gemeinschaft gewinnt an Gewicht. Für das Rahmenprogramm Forschung und Entwicklung sind im EG-Haushalt für 1987-1991 immerhin 5,6 Mrd. ECU bereitgestellt, also mehr als 1 Mrd. ECU pro Jahr. Dieser Haushaltsansatz bleibt zwar deutlich hinter den Vorstellungen der EG-Kommission zurück, die ursprünglich für 1987-1991 einen Betrag von 7,7 Mrd. ECU veranschlagt hatte. Doch gegenüber früheren Jahren ergibt sich immer noch eine beträchtliche Steigerung: Im Jahre 1973 wendete die EG erst 70 Mio. ECU für die Förderung von Forschung und Entwicklung auf; und das Rahmenprogramm für 1984-1987 war mit 3,7 Mrd. ECU ausgestattet, das entspricht rund 900 Mio. ECU pro Jahr.

Gemessen an den Ressourcen, die die nationalen Regierungen für die Forschungsförderung verwenden, nimmt sich auch das neue Rahmenprogramm allerdings immer noch bescheiden aus. In den Mitgliedsländern der EG werden derzeit rund 30 Mrd. ECU pro Jahr an staatlichen Forschungsgeldern ausgegeben. Doch die Dynamik der EG-Ausgaben ist beträchtlich höher als die der nationalen Ausgaben, so daß für die Zukunft mit einem verstärkten Einfluß der Europäischen Gemeinschaft auf die in Europa betriebene Forschungspolitik gerechnet werden muß.

Die EG-Kommission selbst sieht ihre Aktivitäten nicht zuletzt als Ergänzung des EUREKA-Programms, dessen Finanzierung bekanntlich den einzelnen Teilnehmerländern überlassen ist. In der Gründungsphase (Frühjahr 1985) war die Kommission