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BOOK REVIEWS

The Economics of Uncertainty, by Karl H. Borch. Princeton: Princeton University Press, 1969. Pp. viii, 227. \$9.75.

This is the second contribution in the series, *Princeton Studies in Mathematical Economics*, under the general editorship of Oskar Morgenstern, Harold Kuhn, and David Gale. Karl Borch is a Norwegian Professor of Insurance and the lectures on which the book is based were previously presented at Bergen, Vienna, and Los Angeles. It is a pity that no introductory comments were provided by the editors as they could have usefully set the book in perspective. Instead it is left to the reader to glean indirect snippets from the dust jacket and the author's preface. In hoping to write a book which "will be useful to students of economics", Borch adopts an approach of harvesting material from diverse disciplines rather than sowing new ideas and theories. In fact, when recording his gratitude to the labours of erstwhile colleagues, he suggests that a more apt title for the book would have been *Other Men's Flowers*.

The main theme is to demonstrate that meaningful economic theories can be constructed by giving explicit recognition to uncertainty, rather than assuming it away as in the days of the classicists. This of course is a commendable stand, since few practical problems fall into the "perfect knowledge" category. Unfortunately, too many researchers have in the past been imbued with the desirability of erecting mathematically elegant manipulations of completely worthless certainty theories. If the book under review can succeed significantly in banishing such abstract theorising, then it will have served a very useful purpose.

Most of the book traces to von Neumann and Morgenstern's classic treatise on game theory. In an appendix of this book reference is made to, and proof given of, a formula originally propounded in 1732 by Daniel Bernoulli. Bernoulli purported to explain how rational people make decisions under uncertainty. In so doing he easily disposed of the St Petersburg Paradox, which the Law of Large Numbers implied should be played to infinity. Bernoulli's claim was that rational people not only take expected value, but also variability of outcome, into account when making decisions. Surprisingly, the theory lay dormant from this time until von Neumann-Morgenstern's restoration in 1944, except for a publication by F. P. Ramsey in the 1920's which itself did not receive recognition until after the emergence of von Neumann-Morgenstern's book. Since 1944, however, interest in uncertainty has mushroomed, so that there are now a plethora of publications offering prescriptions for decision making under uncertainty. Three chapters of Borch's book are directly concerned with the Bernoulli principle and its extensions and applications.

A further three chapters are devoted to aspects of game theory—two person zero sum games, general two person games, and elements of general game theory, respectively. Unfortunately, they merely rehash old material and no effort is made to set the theory in historical perspective, nor to acknowledge criticisms which have for several years been levelled at game theory. One feels that Borch somewhat overplays his esteem for von Neumann-Morgenstern's book.

Remaining chapters cover such facets as portfolio selection, market equilibrium under uncertainty, objectives of the firm, survival of the firm, credibility and subjective probability, and group decisions. The treatment here is well documented, though naturally does not explore any aspect in depth. A fair degree of mathematical rigor is maintained throughout.

One defect of *The Economics of Uncertainty* is that it lacks a unifying thread. Although Borch intended to show that results from diverse disciplines constitute an entity, he does not effectively integrate successive chapters, with the result that the book is somewhat disjointed. It is further aggravated by the internal structuring of chapters which have numbered, but untitled, paragraphs. This hinders comprehension of subject matter and makes it hard for the average reader to quickly gain an overall perspective of the book.

In view of the spate of recent publications in the general field of Bernoullian decision theory and uncertainty, comparisons, though odious, are more or less unavoidable. There are, in this reviewer's opinion, other recently compiled volumes which treat basically similar material more commendably than does *The Economics of Uncertainty*.

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The Principles of Development Aid, A. K. Hawkins. Penguin Modern Economics Texts Series, Penguin Books, 1970. Pp. 152. \$1.20.

Foreign Aid, J. Bhagwati and R. S. Eckans. Penguin Modern Economics Readings Series, Penguin Books, 1970. Pp. 351. \$1.70.

Foreign or development aid has emerged, in the post-war period, as a full brother to trade in its significance in international affairs. The virtues and vices of aid have been widely, and often heatedly debated, with no lack of discussion on the issues involved appearing in print. The two books under review fulfil a need for a more objective examination of the subject. Together, they present the various political and economic arguments for and against aid-giving, in historical and economic context, so that the reader is able to draw his own conclusions on many of the contentious issues involved.

It is recommended that, if both books are available, *The Principles of Development Aid* by A. K. Hawkins, should be read first. It succeeds admirably in providing a systematic analysis of the principles of aid. The main points are clearly stated, although some length and detail in discussion has been sacrificed for conciseness. With the review of the important Pearson Commission Report (The Commission on International Development) as a postscript, the book provides an excellent grounding for the serious student who wishes to go on to examine the more specialized aspects of foreign aid.

Foreign Aid is a collection of papers by distinguished economists, several of whom have been closely identified with the economics of aid and development over the last decade or more. It serves as a useful complement to Hawkins' book, going into great depth on the topics he introduces. The main worth of these readings lies in demonstrating firstly how our knowledge of economics in this specialized field has expanded; secondly, to what a great extent there are conflicting and sometimes equally valid views on the prickly issues involved. It is conveniently divided into six parts, with two or more, often highly critical papers in each. Each section is based on a distinct topic with the overall theme well maintained through short introductions. Both books have extensive further reading lists.

Although not a new phenomenon, foreign aid has only come to the fore in the last quarter of a century. Since World War II, along with the consolidation of the Eastern and Western blocs, we have seen the emergence of the Third World. This group of countries, expanding as more colonies attain independence, have one thing more or less in common, namely, the underdeveloped state of their economies. In recognition of the desirability (based on various motives) for development in these countries, the advanced nations elected initially to help in this sector by implementing foreign aid programmes. Recently the position has changed somewhat, in that needy governments are as likely to approach prospective donors as vice versa.

As a popular cause in the Western World, led by the U.S.A., foreign aid distribution reached its peak in the late fifties and early sixties, a period in which donor countries had recovered from the war and many were making substantial economic progress. In the middle and late sixties the increase in aid slowed down, until in 1968-9 there was an actual downturn in total dollar value of aid for the first time since the war. This was parallel to the increase in economic difficulties experienced by several western nations, and the widespread dissent over the inadequacy of governmental efforts, especially in the U.S.A., to resolve such problems as civil rights and indigenous poverty, the war in Vietnam, and more recently conservation and the pollution of the environment. These pressing problems have helped to divert both attention and funds from foreign aid programmes.

Although several international organizations, for example the World Bank and the European Development Fund, have been set up to facilitate the distribution of aid, the individual donor nations have always determined the volume and direction of the majority of aid transfers.

After reading these books one begins to doubt the integrity of both donor and recipient countries in the past, whether they have ever been altruistically motivated, as we have sometimes been led to believe and how much of the substantial volume of aid flows, has, and is being wasted because of the lack of effort and information at the planning stage. On the brighter side, with the development of more economic expertise (especially in the use of econometric models as detailed in the papers submitted by Rosenstein-Rodan and Chenery and Bruno

in *Foreign Aid*) and international co-operation, experience with foreign aid programmes is being shared more freely. This, one hopes, will lead to a more efficient use of resources. In this respect it is a pity that the experience of communist countries in this field is not available for comparison.

It is evident that participating nations are now in a position to use foreign aid more effectively than has been the case in the past. On the evidence presented in the books under review, it is difficult to subscribe to the argument of today's Cassandras, that the less developed countries of the present are the never-to-be developed of the future. On the other hand, it would be supremely optimistic to expect the developing nations ever to attain a level of affluence relative to that of advanced western countries, and it is difficult to believe that this would necessarily be desirable.

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Systems Analysis in Agricultural Management, edited by J. B. Dent and J. R. Anderson. Sydney: John Wiley, 1971. Pp. xviii, 394. \$10.95 (cloth), \$7.96 (Wiley International Edition).

This book is a timely and notable addition to agricultural literature. Timely, because the systems simulation approach to agricultural research is just recently gaining recognition, popularity and success. Notable, because the nineteen contributors are leaders in the field of agricultural systems research and their contributions add significantly to current knowledge about the systems approach.

The book marks the first occasion where a variety of empirical systems simulation studies, specifically agricultural, have been gathered and presented between the covers of one volume. Much of the research was conducted at the University of New England. Additional chapters were commissioned from CSIRO, United Kingdom, Netherlands, and United States researchers.

The appeal of the book is severalfold. Principles of system simulation are detailed in a rigorous, yet readily comprehended fashion and agricultural researchers who have not had previous contact with the systems approach should have little difficulty in understanding the concepts. The ten applications cover diverse fields in biological and bio-economic research and should suggest a multitude of future research investigations. More importantly, the book should stimulate considerable interest in systems simulation among biological researchers. This will be commendable from two points of view. First, the value of applied biological research will be enhanced when simulation techniques are employed in conjunction with real system experimentation, simply because simulation permits a more complete coverage of possible experimental treatments and greater replication of climatic variability. Time and cost considerations necessarily preclude such a complete

investigation of a real system. Hence results from biological research should be available sooner than otherwise would be the case and will be more relevant for practical implementation. Second, improved communication between biologists and economists can be expected, with the consequence that interdisciplinary research will gather momentum, instead of being the pipedream which it has largely proved to date.

The seventeen chapters are grouped into three parts, with the editors supplying additional notes in the form of an introduction and an epilogue. Part one outlines various techniques and methods of simulation while parts two and three report applications to crop and livestock, and bio-economic systems respectively. These latter groupings are not completely exclusive and some overlapping occurs. Also, the final chapter by Duckham on Human Food Chains cannot really be classed as a bio-economic system in the same sense as its predecessors. Nevertheless it provides an interesting contrast with previous models.

Alan Wright provides a good account of the nature of the systems approach, and modelling, validation and experimentation of simulation models; indeed, this is perhaps the best chapter of the book. No great detail is attempted but the treatment is clear and concise, as might be expected in view of Wright's considerable experience with systems research.

It is followed by John Phillips' discussion of statistical methods in systems simulation. From a practical simulator's point of view, the most important section of this chapter concerns the preparation of historical data for simulation models. Phillips demonstrates that historical sequences themselves are inappropriate because they merely comprise a discrete, usually unsmooth, sample from a much larger population. The sample should be smoothed into a continuous distribution and then random processes used to generate specific sequences of the stochastic process.

Chapters 4 and 5 are concerned with computer languages and interactive computing respectively. In dealing with computer languages, Charlton couches his treatment largely in non-technical terms so that researchers not yet conversant with computing techniques can become familiar with the basic concepts. The chapter does not provide a *modus operandi* for constructing a specific simulation programme, but appropriate references are indicated for those interested. Armstrong deals with interactive computing, a newer development in systems research, where the analyst is actually "on-line" with the computer and can control the running of the programme. This chapter will be mainly of use to experienced researchers and simulators associated with complex biological and/or economic projects. A further requirement will be access to considerable funds to install the interactive mode. These costs are likely to inhibit the widespread application of interactive computing, even though the technique has strong advantages in a variety of situations.

The analysis and interpretation of simulation output is the subject of John Dillon's lively chapter. After having yet another sideswipe at the inappropriateness of much biological research and the concern of

biologists with “the magic of asterisks” rather than managerial relevance, Dillon develops Bernoulli’s principle of utility maximization. He contends that, despite some current difficulties with utility analysis, the approach is the only appropriate way to analyse simulated output from stochastic systems.

Parts two and three comprise ten empirical applications of simulation models. Flinn develops a crop-soil-moisture model; Dumsday conserves soil; Goodall, and Jones and Brockington analyse extensive and intensive grazing systems respectively. Morley and Graham deal with various aspects of fodder conservation for drought. In part three, where concern is with bio-economic rather than purely biological systems, the applications are more diverse. Anderson reports an investigation of spatially diversified sheep holdings in the pastoral zone. A model of an intensive pig enterprise, where pig performance and capital investment are assessed, is developed by Dent. Van Kampen discusses an interesting practical application where systems simulation has been employed to determine farm machinery selection on a large scale Netherlands cropping farm. The penultimate chapter again is an application to a real situation: an individual farm growth problem in Indiana. Eisgruber and Lee ably demonstrate the advantages of systems simulation; however, they do not discuss whether the cost of undertaking the simulation project would be within the capabilities of the individual producer. Finally, Duckham addresses himself to the overall supply of food to the human population. All these chapters are of a consistently high standard, with the possible exception of Goodall’s, which is excessively verbose and throws little light on the complexities of extensive grazing systems. Empirical applications embrace FORTRAN, ALGOL, and DYNAMO programming languages. In addition Charlton discusses other specialist simulation languages, such as SIMSCRIPT.

One disconcerting aspect, to this reviewer, concerns the use of “systems analysis”. The term is quite satisfactory in the broadest meaning of the word “analysis”. But in systems research (as Wright notes—pp. 19–20), “analysis” is associated with disassembly of an existing system, while “synthesis” involves a build up of smaller components into a larger grouping.

The general use of “systems analysis” can thus be misleading if, as in most systems studies, both analysis and synthesis are implied. This is appreciated by Wright—who prefers “systems research”—but not by other authors, nor indeed by the editors, as the title of the book testifies. “Systems simulation” is an alternative which may have greater relevance. It would permit analysis and synthesis to be used in their narrower, more precise, meanings. In addition, it would overcome confusion with another use of “simulation”, viz. a tool in the iterative solution of deterministic problems, such as Monte Carlo techniques. Finally, it would not be burdened with the cloak of academia which some practitioners associate with “research”. At that stage, quibblers who suggest that “systems simulation” can still embrace any model of a real system, are ultra-pedantic.

A slight shortcoming is lack of consistency in the use of units: authors apparently received no direction from the editors whether to use metric:

or British units. In view of the imminent conversion to a metric system, this set of units is preferred.

What impact is *Systems Analysis in Agricultural Management* likely to have on the agricultural profession? Among economists, it is likely to increase the general awareness and level of discussion of the systems approach. As Eisgruber and Lee explain, behavioural theories of the firm have come more into vogue with the rejection of traditional concepts such as profit maximizing behaviour of decision makers and perfect knowledge, and their replacement by some form of satisficing behaviour and the explicit recognition of risk. Hence Dillon's infatuation with utility theory is readily understood. Systems simulation is a logical way to handle such behavioural problems. Traditional methodologies, especially mathematical programming algorithms, are often cumbersome, imperfectly specified and too abstracted from economic reality. Thus one would agree with the editors that systems simulation is here to stay and is not just a current fashionable tool to facilitate publication.

The economic applications reported pertain to the individual firm and how it can live with some aspects of its stochastic environment, produce profitability and indeed grow in size. The book presents no applications to marketing or policy situations. These facets of agriculture are also suited to systems simulation. Problems of low returns in agriculture, restricted commodity trade and the need for structural re-adjustment, all arising from surplus production, are in fact more pressing areas of research than production research at the individual farm level. It is likely that systems simulation will play an important role in the study of these problems in the ensuing years.

Among biologists, as has already been indicated, there is considerable scope for system simulation to complement real system experimentation. This will assist the production of research results which are relevant to practitioners besides editors of revered scientific journals. Finally, the improved communication between biologists and economists via a common research technique must ultimately enhance the relevance of research findings by both disciplines. This could be the book's greatest contribution.

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The Control of the Money Supply, A. D. Bain. Penguin Books, 1970. Pp. 175. \$1.55.

This book is one in the series of *Penguin Modern Economic Texts* which are designed to provide a cheap source of reference for students of economic theory. In keeping with this objective Professor Bain's book represents good value to those studying the theory of monetary control.

The main task of this book is to examine one of the more controversial issues in monetary economics—the relationship between the supply of money and the level of national income, and the economic forces contributing to this relationship.

The book describes existing monetary theory and indicates the vagaries surrounding its practical operation.

Chapters 1 and 2 provide a short description of a theoretical monetary structure and the traditional theory of the workings of monetary policy in the determination of the level of trading bank deposits. Bain concludes that existing theory used to explain the level of bank deposits has not met with much success in models describing the U.K. situation although it has been partly successful in forming the basis of models which have been used in other countries.

Chapter 3 provides a concise analysis of the various theories of the demand for money, from the rigid quantity theory, through the "Cambridge" and Keynesian approaches (including interesting modifications of the latter), to the modern asset theory model—which stands up best to empirical testing.

The rest of the book examines the role played by the money supply in determining the level of economic activity and the problems typically experienced by monetary policy in directing this activity along the required lines. It is interesting to note that the central banks in the U.K. and U.S.A. have enjoyed some measure of success in controlling the lending policies of non-banking financial institutions such as hire purchase companies—a continual problem confronting Australian monetary policy.

The book concludes by suggesting that it is difficult to quantify the alleged direct influence of the supply of money on the level of economic activity. This is basically due to the problems involved in satisfactorily isolating the separate effects of the many variables giving rise to this complex relationship.

The book exhibits a practical layout and readers will appreciate the individual subject headings on each page for ease of reference. Similarly the graphical and tabular analyses are quite sound.

As a text intending to provide the reader with an outline of questions confronting monetary economists, it can be recommended—although Australian readers should take care in drawing conclusions from the text for application to this situation.

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Climate, Irrigation and Agriculture, C. J. Wiesner. Sydney: Angus and Robertson, 1970. Pp. x, 246. \$5.95.

This book is a useful addition to the rather sparse Australian literature on irrigation and plant-soil-water relationships. It is unlikely however to appeal to a very wide audience. One wonders why the author, having gone to the effort of writing such a detailed account, did not more adequately document the sources of his data and produce a more

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rigorous exposition of the subjects covered. The book is inadequately conceived from this point of view. It is rather heavily weighted with detail to serve as a practical manual, yet insufficiently rigorous to appeal to those studying the subject in any great depth. The book is set out more in the style of a technical college text.

The book should prove useful, however, to the irrigation farmer who is prepared to devote sufficient time to the study of the book. The book will also prove useful to those who are uninitiated to irrigation and who wish to gain a fairly comprehensive introduction to the subject.

The final chapter is devoted to the economics of irrigation on the farm, and although its importance is stressed, this subject is treated so cursorily as to be of little practical use except from an illustrative point of view. The brevity of this chapter and the use of inaccurate definitions, for example *gross margin* and *benefit-cost ratio*, make this one of the least satisfactory chapters of the book.

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