



Introduction to the Theory of Games

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I used to think econometrics was the wave of the future; now I am not so sure. It is just possible that the fault lies not in ourselves but in our stars. In any case, where is current research effort best directed? Probably at this stage improvement of the quality of the data, and the development of richer and more realistic economic hypotheses will have higher yields than the further refinement of already top-heavy statistical methods. Even so, high precision is hardly to be expected in this business. But graduate students should be taught what econometric analysis can do; and this is the book they will learn from.

ROBERT M. SOLOW

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Introduction to the Theory of Games. By J. C. C. MCKINSEY. A Rand Corporation Research Study. (New York: McGraw-Hill. 1952. Pp. x, 371. \$6.50.)

This is the first text on the theory of games to appear since the publication of von Neumann and Morgenstern, *Theory of Games and Economic Behavior*. Proofs of the fundamental theorems have been simplified considerably since the latter book appeared, and, in addition, many new results have been obtained. McKinsey has incorporated these developments in his book, and has included a much higher proportion of new results than is usual for textbooks. Whenever there was a choice among methods of proof, McKinsey has chosen the more elementary methods. He seems to have done this without sacrifice of content.

For those with limited mathematical equipment who are interested in acquiring a detailed knowledge of the theory of games, this is an excellent presentation. It demands of the reader a knowledge of calculus (including the notions of convergence, continuity, derivative, integral, minima and maxima), some smattering of matrix algebra and a willingness to follow the arguments closely. The book is written with unusual care and precision, resulting in a clarity of expression for which the reader, particularly the mathematically weak one, will be grateful.

The first six chapters present the theory of zero-sum two-person games where each player has a finite number of strategies. These games are studied in both normal and extensive forms. Chapters 7 through 10 consider zero-sum two-person games where each player has infinitely many strategies. Some mathematics essential for this theory is presented here. These chapters could be omitted without loss by anyone not particularly interested in this special class of games, since all the basic ideas are developed in the chapters dealing with games involving a finite number of strategies.

The chapters on n -person games will be of particular interest to economists. McKinsey presents the von Neumann-Morgenstern theory of n -person games in a very clear way and is careful to point out its shortcomings. He also presents the Nash theory (essentially a generalization to n -person games of the notion of equilibrium originally defined by Cournot for the duopoly

problem), and discusses approaches along other lines. Those interested in following the courses of contemporary mathematical economics will find this material invaluable.

McKinsey makes some attempt (two chapters) to present the formal connections between the theory of games and linear programming, and the theory of games and statistical decision theory. These chapters will be more useful to readers already familiar with the fields.

The clarity of thought, the precision of exposition, and the completeness of coverage of this book make it an excellent introduction to the theory of games.

STANLEY REITER

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Business Fluctuations; Prices

Economic Change: Selected Essays in Business Cycles, National Income, and Economic Growth. By SIMON KUZNETS. (New York: W. W. Norton. 1953. Pp. viii, 333. \$4.50.)

This is a collection of essays by the distinguished nominee for president of the American Economic Association in 1954. Nine of the eleven essays in this volume have been published previously (two in Spanish), but many are inaccessible to the average reader. They range in scope from almost purely theoretical to eminently empirical (although more technical and more methodological candidates for inclusion were rejected). The coverage indicated by the subtitle represents, "albeit roughly," the sequence of the author's interests.

The volume begins with two essays, dated 1930, attacking the equilibrium concept dominating the English-American tradition in economic theory in the first quarter of the present century. These throw a great deal of light upon the author's development as an economist, largely explaining his subsequent restless concern with dynamic phenomena and with inductive investigation. This provided their greatest interest to the present reviewer, for, read today, they seemed a little commonplace and awkward: much of their constructive content is today more effectively and adequately expressed in other ways. This very fact is, of course, a tribute to those, including Kuznets, who pioneered in the revolution in economics of the two decades which followed.

The third essay, also in some respects obsolete, stands the test of time much better. It is the well-known exposition and criticism of the acceleration principle: "The Relation Between Capital Goods and Finished Products in the Business Cycle" (1934). Although "interaction with the multiplier" is hinted at in a footnote, the essay otherwise considers the acceleration principle standing by itself. Nevertheless, it still deserves study and reflection. Apart from the care and completeness with which the several versions of the acceleration principle are expounded, the essay's criticisms of the principle, and its statistical tests, are very relevant for those seeking to place the accelerator at the