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Book Review: Barriers to Conflict Resolution

Robert D. Cooter

Lyapunov stable, (iv) only perfect equilibrium strategies can be asymptotically stable, and (v) ESS are asymptotically stable. There are also differences between the classical and the evolutionary approaches: the latter, for example, does not provide support for the elimination of weakly dominated strategies. In fact, discrete time dynamics may not even eliminate pure strategies that are strictly dominated by mixed strategies.

Chapter 5 investigates whether the results can be generalized to multipopulation interactions. Individuals belong to N distinct populations (for example, buyers and sellers) and in each encounter one individual from each population is randomly selected to play an N -person game. With x denoting the state of all populations, each population n now evolves according to a dynamic $x_{n+1} = g_n(x)x_n$ where g_n has similar properties as in the one population case. The results are less satisfactory in this case. In particular, asymptotic stability of the state is equivalent to the state being a strict Nash equilibrium, hence, the evolutionary approach offers no justification for equilibria in which players have alternative best responses, such as, for example, equilibria in mixed strategies.

The book concludes with a concise introduction to the theory of ordinary differential equations, which ensures that the book can indeed fulfil its aim to serve as a text for second-year graduate students in economics. The book not only is a clearly written synthesis of some of the most important findings in the field, it also (albeit somewhat implicitly) points to fruitful directions for future research. A virtue of the dynamic approach is that it shifts attention from an analysis of the equilibrium state to an analysis of the underlying equilibrating mechanisms and the initial configuration. The equilibrium that is finally selected (if any) and the speed of convergence may well depend crucially on these latter aspects, so that a study of these is invited. As the author notes, the "formal modeling of social evolution of behaviors in a population of strategically interacting agents" is as yet a "not much researched arena."

The book gives some examples of imitation dynamics that happen to fit the formalism developed by biologists. It remains to be seen

whether this formalism helps to describe and analyze the human learning processes that take place in economic environments, such as in the experimental laboratory.

ERIC VAN DAMME

Tilburg University

D Microeconomics

Barriers to conflict resolution. Edited by KENNETH J. ARROW, ROBERT MNOOKIN, LEE ROSS, AMOS TVERSKY, AND ROBERT WILSON. New York and London: Norton, 1995. Pp. x, 358. \$35.00. ISBN 0-393-03737-1.

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By understanding games better, people who play them can increase their probability of winning, and people who make the rules can decrease the probability of conflict among players. So game theory is about two things at once: victory and compromise, strategy and conflict resolution. The latter is the special concern of the Stanford Center on Conflict and Negotiation (SCCN). This book collects 15 papers from a SCCN conference on conflict resolution and divides them into four groups. "Social and Psychological Perspectives" contains papers by Lee Ross, Daniel Kahneman and Amos Tversky, Robyn Dawes and John Orbell, Max Bazerman and Margaret Neale. "Strategic and Analytical Perspectives" contains papers by Robert Wilson, Ariel Rubinstein, Howard Raiffa, and James Sebenius. "Institutional Perspectives" contains papers by Ronald Gilson and Robert Mnookin, Edward Parson and Richard Zeckhauser, Jon Elster, and Kenneth Arrow. The final section, "Contextual Explorations," contains papers by John Dunlop, Lawrence Susskind, and Wolfgang Panofsky.

These contributors, some of whom are intellectual icons in their fields, signal a volume of high quality. The reader will not be disappointed. Although each paper deserves reflection, I cannot comment on all of them. Even the lucid introduction avoids this daunting task. Instead, I will discuss the book's level, tone, and accomplishments.

The contributions are written, with one or two exceptions, for the intelligent consumer of social science. In each paper, the authors

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introduce technical concepts in ordinary language, provide a gloss on their history and use, and then apply these concepts to policies for resolving conflicts. Even for familiar ideas, reading a terse restatement in ordinary language has its rewards. Because the authors are drawn from a multiplicity of disciplines (economics, statistics, political science, psychology, law), however, every reader will encounter much that is new. In reading the book, I repeatedly experienced the pleasant struggle of testing my understanding of concepts from other disciplines by trying to anticipate the author's application of them to concrete problems.

If you are an economist puzzled by the future of game theory, this volume provides tantalizing suggestions. In principle, game theory should develop, like other sciences, by empirical confirmation of hypotheses drawn from abstract theories. A model that yields multiple equilibria, however, is not so easy to confirm or disconfirm. So game theory often develops by more lax methods. Many advances in game theory have come by scrutinizing decisions and institutions to find out what game theory has left out. For example, the study of corporations and contracts dramatically increased the empirical content of models of the principal-agent relationship. If you want to discover what game theory leaves out, you can't do better than to read this volume.

Here are a couple of examples. As a graduate student, I learned that economics concerns behavior. Two very different essays in this volume approach games from the viewpoint of argument, not behavior. Ariel Rubinstein proposes to reinterpret the Nash bargaining equilibrium as a condition in which argument stops. His idea goes like this: In bargaining, argument continues so long as someone can make a credible objection to a proposed settlement. An objection runs the risk of disagreement. An objection is not credible if the person who makes it prefers the proposed settlement rather than running the risk of disagreement. When challenged, a person whose objection is not credible must withdraw it.

Because his model is mathematical, Rubinstein's paper has power but not texture.

The opposite is true of Jon Elster's paper on strategic use of arguments. Elster analyzes arguments used by constitutional assemblies in 18th century America and France. French speeches made relatively more appeal to passion, and American speeches made relatively more appeal to interest. Elster explains this difference by the fact that the Federal Convention in Philadelphia held closed meetings, whereas the *Assemblée Constituante* in Paris met in public. Elster observes that passion is a form of precommitment. By reducing strategic behavior, precommitments can promote agreement, but inconsistent precommitments guarantee disagreement.

Elster distinguishes threats ("If you do that, I'll do this") from warnings ("If you do that, this will inevitably happen"). Threats are choices, whereas warnings are predictions. Converting a threat into a warning changes a bargain into a debate. Elster explains the conditions under which speakers will convert threats into warnings, thus shifting from bargaining to debating. I am intoxicated by the possibility that Rubinstein's power might eventually encompass Elster's texture.

As another example, Robert Wilson explains simply and rigorously the lemons model: sellers prefer to withdraw cars of above-average quality from the market rather than accept the price that uninformed buyers are willing to pay. Similarly, in legal disputes, plaintiffs with above-average cases might litigate rather than accept the settlement offered by an uninformed defendant. Wilson asks what prevents adverse selection from cascading in legal disputes and closing the market for out-of-court settlements.

In contrast, Gilson and Mnookin draw upon a different model of games and markets to explain litigation. They argue that the parties to a legal dispute gain individually, and lose jointly, from aggressive lawyering. Consequently, both parties can gain by precommitment to cooperation. To precommit, both parties must choose a lawyer or law firm with a reputation for cooperation. Reputation in the market for lawyers provides a vehicle for precommitment. In the Gilson-Mnookin model, the possibility of cooperation between potential litigants depends upon the profitability of investment in reputational capital.

*Decker*²

by lawyers.

In Wilson's paper, adverse selection causes litigation. In the Gilson and Mnookin paper, aggressive lawyering causes litigation, and reputational capital ameliorates it. What happens if Wilson's account of the litigation game is combined with Gilson and Mnookin's account of the market for lawyers? Will the choices of a lawyer reveal the quality of the case and produce a pooling equilibrium? The juxtaposition of papers in this volume poses many more intriguing questions. I have not even discussed the contributions on social and cognitive psychology, which demonstrate how much game theory has yet to absorb from those disciplines. (Reading Kahneman and Tversky yet again, I still enjoyed their lucidity and the precision with which their experiments address this book's topic.) In addition to theories from different social sciences, the volume also contains many case studies on such topics as environmental pollution, labor relations, and arms control.

I have been discussing the use of this volume for game theory. What about its explicit goal—a better understanding of conflict resolution? Its publication will not pacify the Middle East or eliminate teamsters' strikes, but these contributors demonstrate that top scholars from several social sciences can converge to illuminate a vexing social problem.

ROBERT COOTER

University of California

Cooperative microeconomics: A game-theoretic introduction. By HERVE MOULIN. Princeton: Princeton University Press, 1995. Pp. ix, 454. \$49.50. ISBN 0-691-03481-8. JEL 96-0473

In the beginning, when game theory was mentioned outside of the fraternity, it was assumed to be two person zero sum game theory. Then the work of Nash and its relationship to the work of Cournot and Bertrand gradually worked its way into oligopoly theory and then into everyday industrial organization. The final blessing of this process came with the awarding of the Bank of Sweden's prize to several distinguished scholars whose work has been primarily (but not exclusively) on noncooperative game theory. In spite of being overshadowed by the popular attention being paid to noncooperative theory, Hervé

Moulin's fine new book shows that cooperative theory is still alive and well.

This book of seven chapters presents an excellent introduction and overview of many of the cooperative game theoretic applications to microeconomics. The introduction aimed at the senior undergraduate or first year graduate student level touches on both economic and political theory. The second and third chapters launch into applications of the core in economies with one or more goods, including the house market, the marriage market, and other games. Two small but much repeated misconceptions concerning the core are unfortunately repeated in these chapters. The concept of the core as solution to an n -person game did not exist when Edgeworth was writing. Hence to write about Edgeworth's conjecture concerning the convergence of the core has some problems. To the best of my knowledge the core was first suggested in Gillies' thesis as the set of imputations common to all Von Neumann Morgenstern stable sets. In the early 1950s Shapley and Shubik discussed Gillies' work and out of these discussions and other work Shapley proposed the undominated imputation set as a solution concept and suggested the name core and I observed that Edgeworth's treatment of many person bargaining could be interpreted as a special instance of the core applied to an economic market. The concept of replication utilized by Debreu and Scarf, as I observed in explaining the problem to Scarf, had been utilized first by Cournot and by Edgeworth.

Chapters 4 and 5 provide an excellent coverage of fair division from many different approaches starting with the "no envy" test illustrated by the time honored divide and choose procedures. These chapters contain many worked through examples and worthwhile exercises. An omission from these chapters is a discussion of the nucleolus which in its minimization of the maximum complaint can be regarded as a form of a fair division procedure.

Chapter 6 is devoted to production externality games and Chapter 7 to pure cooperative game theory. This reviewer feels that either the position of the last chapter should have been changed or earlier references

*Debreu*²