

under a different rubric, ('Model Evaluation and Selection'), essentially develop the same theme.

The alternative views receive less page space in total, but are well and fairly represented. If anything, Bayesian econometrics emerges as the dominant alternative methodology (ideology?). The war between Bayesian and classical statisticians forms an interesting subplot which deserves a volume all of its own; meanwhile, interesting and useful as some of the methods described in the papers by Todd and Leamer (Chapters 10 and 11) appear to be, the Hendryite will be struck by the fact that none of them are much use when it comes to the basic question of model selection. It is noteworthy that Jean-Francois Richard, a Bayesian by training and conviction, none the less leaves that baggage behind in his collaborations with Hendry and Mizon on the model selection problem.

The episode in the development of econometrics which this volume documents is now coming to an end, or at least entering a new phase. The discovery of methods to cope statistically with trends and non-stationarity, and the idea of cointegration, have changed the rules of the game fundamentally, and the process of coming to terms with these developments is far from complete. Even so, it is noticeable that cointegration has been variously hailed as a breakthrough for the reduced-form approach (allowing us to search happily and mindlessly for cointegrating vectors, and to forget about theory), and regarded as providing fundamental new insights into structural economic relationships and renewed relevance to the Cowles Commission programme. The framework changes, but the debate continues.

A tremendous virtue of the 'I(1) revolution' is that it has shaken up old habits and old allegiances, and got the whole profession moving in a new direction, with confidence to tackle anew the problems of time-series analysis. There has always been an undercurrent of opinion, especially in North America, and especially since the failure of the macro-modelling programmes of the 1960s, that time-series modelling (apart perhaps from financial data problems) was just too difficult to tackle. The prejudice against Hendryism has had a lot to do with the view that dynamic modelling is a mug's game. In the United States researchers are blessed with access to large amounts of survey and panel data, and the best minds have gone to work on these problems where they could escape the nightmare of dependent data-sets. On the other hand, in Europe and especially the United Kingdom, perhaps because of the nature of our most abundant raw material, the commitment to time-series modelling has never weakened. Now that we have the implications of the biggest theoretical advance in several decades to unravel, it will be fascinating to watch how the methodology controversy develops. As the show begins, this volume will be an indispensable handbook for both interested spectators and participants in the arena.

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Bargaining and Markets. By MARTIN J. OSBORNE and ARIEL RUBINSTEIN. Academic Press, New York. 1990. xi+216 pp. £34.50. Paperback \$14.95.

This book is based mainly on Ariel Rubinstein's theory of strategic bargaining and on some of the subsequent developments made over the past eight years.

Chapter 1 provides an outline of the book and defines some of the basic terms. Chapter 2 presents a rigorous statement of Nash's axiomatic theory of bargaining. This axiomatic theory finds itself in this book on strategic bargaining for several reasons, one of which is its close connection with Rubinstein's strategic theory. A thorough and a critical discussion is also provided, thus enabling readers to develop a deep and proper understanding of Nash's theory, appreciating its weaknesses and its strengths. For example, it is argued that the 'Independence of Irrelevant Alternatives' axiom relates to the unmodelled bargaining process: hence the need to study models of strategic bargaining. An interesting observation is that the Nash bargaining solution, defined as it is in terms of the *product* of the utilities, lacks an appealing interpretation. An alternative definition in terms of the players' preferences is presented, thus giving rise to a reasonable interpretation of this classic axiomatic bargaining solution.

Chapter 3 presents Ariel Rubinstein's alternating-offers bargaining model. I have not seen such a rigorous and detailed elucidation of this model before. For example, the various assumptions on the players' preferences (which constitute the backbone of the model) are carefully explained and critically evaluated. A particularly novel feature is the introduction of a language to describe the strategies in a compact and unambiguous way. Basically, strategies are described as automata. A player's action at any point in the game depends on the *state* that is prevailing at that point. Moreover, *transition rules* dictate when and if there is a change in the state. This language turns out to be extremely useful in the subsequent chapters; indeed, it can be fruitfully exploited in the analysis of any extensive-form game where the equilibrium strategies possess a relatively simple structure (in that they are, to a large extent, history-independent). The main result of this chapter is, of course, the statement of the uniqueness of the subgame-perfect equilibrium of Rubinstein's bargaining model. Several other issues are addressed, including the role of outside options.

Chapter 4 addresses the important issue of the relationship between the Nash bargaining solution and the equilibria of strategic models of bargaining. This type of exercise follows the 'Nash programme', for it was John Nash who first suggested this idea of relating *axiomatic* solutions to the equilibria of *strategic* models. The chapter develops some broad principles that should be of interest to the applied theorist in forming well-founded judgments on the delicate issue of how to use the Nash bargaining solution.

Chapter 5 extends the analysis of Rubinstein's alternating-offers bargaining model to a situation in which one bargainer does not know his opponent's cost of delay. Various restrictions on out-of-equilibrium beliefs that have been proposed receive rigorous and clear explanation. The issue of delay in equilibrium is a major focus of attention. A brief but illuminating formal discussion of the relationship between the strategic approach to bargaining among incompletely informed players and the approach of the mechanism design literature is also presented.

Part 2 (Chapters 6–10) studies several different models of decentralized markets. In these models the traders of the market are randomly matched in pairs, and then negotiate bilaterally over the terms of trade. A novel feature of these models is that the markets described operate over time. Two different assumptions are made on the number of traders present in the market at any point in time: a steady-state assumption and a one-time entry assumption. The models presented also differ from each other on the assumptions made regarding three other key items: the information that a trader holds at each point in time; the bargaining procedure used by the agents when they are matched; and the matching technology. A main objective of these models is to understand how markets work and, in particular, to investigate the conditions under which the competitive equilibrium would be an appropriate solution concept.

In Chapter 6 it is assumed that the outcome of negotiation between any matched pair of agents is described by the axiomatic Nash bargaining solution. Subsequent chapters remove this assumption by taking on board some form of strategic bargaining.

Chapter 7 is based on Rubinstein and Wolinsky's first paper on the subject which analyses a steady-state market model. One key insight obtained is that the competitive equilibrium may be an appropriate solution concept if the demand-supply data relate to the *flow* of agents into the market, but not if that data relates to the *stock* of agents present in the market.

Chapter 8 analyses a one-time entry market model. An important informational assumption is that the agents have very little information. A key result obtained is that the unique market equilibrium price is competitive. On the other hand, it is shown in Chapter 10 that, if instead agents possess perfect information, then the one-time entry market model has multiple non-competitive equilibria. It is thus argued that the competitive equilibrium concept may be appropriate when agents in the market possess *very limited* information. This kind of 'anonymity' assumption appears to be consistent with the traditional understanding of the concept of perfect competition. However, this result is shown to be sensitive to the assumption made that the agents do not discount future utilities. It is demonstrated that, by introducing a discount factor δ , the result is, in the limit as $\delta \rightarrow 1$, that the unique market equilibrium price is competitive. The authors provide some interesting informal explanations for these results, which depend

partly on their interpretation of the non-competitive equilibria; the issues they raise will no doubt stimulate further (formal) investigation.

Chapter 9 deals with a difficult but interesting issue, namely the role of trading procedures in the determination of the outcome of decentralized markets. Much exciting research is likely to be done on the effects and the role of trading procedures in decentralized markets. This chapter is an excellent place for the interested student to start.

In conclusion, this is a brilliant book on economic theory, dealing, in a rigorous and clear manner, with some of the most interesting models produced over the last eight years. Moreover, each result contained in the book is supported by a detailed proof and a lucid discussion. Indeed, readers will develop a genuine and deep understanding of the basic and subtle issues. This book is for the serious scholar, not for those who are looking for a superficial treatment of this subject.

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A Market Theory of Money. By JOHN HICKS. Clarendon Press, Oxford. 1989. viii + 142 pp. £17.50.

John Hicks was one of this century's great economists. He continued writing and thinking economics to the very end. This book was started, he tells us, after his wife's death, and 'written in seclusion'. He acknowledges a debt to Leijonhufud, Courakis and Zamagni, but his eyes are mainly on the great economists of his youth: Robertson, Keynes and Hawtrey. Indeed, very few who would now be cited by a monetary theorist are referred to. The style is unmistakably Hicksian, that is, magisterial with plentiful supply of new terminology. (Just one example: the borrowing interest rate becomes the 'in-rate' and the lending rate the 'out-rate'.) But it is also Marshallian, with its resolute appeal to common sense and experience, its determination to say everything in English and its casual empiricism. As when reading Marshall, it is easy to miss deep insights interspersed with elementary and discursive passages. The book, he says, was written 'for teachers of economics', but I suspect that it also served to teach himself.

Part I deals with the 'Working of Markets'. This analysis is required if the rôle of money is to be understood. Some of the very best pieces are to be found in this part. Much of what Hicks has to say is well known and yet is persistently ignored. Most goods that are traded are not instantly perishable, and so at any one time the stock of them will have an influence on market price. Once that is agreed, the expectations of future prices will also affect current prices. The equality of flow demand and supply—unless they include desired accumulation and decumulation—cannot determine prices. Stocks may be held by middlemen, and their speculative behaviour (as Kaldor brilliantly analysed many years ago) would play a large rôle in a theory of prices and output. In modern industry—which Hicks takes as not perfectly competitive—prices are set by manufacturers, who advertise their products at certain prices. Such advertisements have something of the nature of a contract with the consumer and so are not continuously revised in the light of circumstances. Commodity markets are the counterpart of 'perfect competition', and 'they bring out forcefully that most prices are determined not by mechanical matching of flow propensities, but by the way they are interpreted, thus by the state of mind of those who trade' (p. 17). Hurrah!

This part also contains a chapter on the labour market which has many sensible things to say. Further, it attempts, by appealing to institutional and historical features, to explain why so much that is written in America on this topic appears so odd to Europeans.

Part II is entitled 'Money and Finance'. It is a mixture of economic history, history of thought and history of analysis. Here well-known stories about bills of exchange and the development of banks and their rôle rub shoulders with penetrating remarks on liquidity, transaction costs and intermediation. However, the connection with Part I (which Hicks describes as a necessary preliminary) is not at all clear. The importance of sequential trading for monetary theory is left undiscussed. There are also a number of old hares which one believed to have been shot a long time ago. Thus, in discussing Marshallian versus Keynesian interest theory, Hicks does not cut easily through the