

throughout the book. This notation is defined on pages 4 and 5. The reader would be well advised to keep a place marker between those pages. Katzner provides examples at the end of each chapter. I did not work through them, but a mature student who did, found them quite useful. The mathematical appendix at the end of the book is fairly clear and brings together a good deal of relevant material. As it is presented, there is little that the reader can do other than go over it as a separate unit. It would be helpful to the reader if more cross references between the appendix and the text were provided so that one could be warned in the text to review needed portions of the appendix before beginning sections of the book. The current alternative of 42 pages of tightly written unrelieved mathematics is not attractive.

Katzner ends the body of the book with a brief listing of difficulties remaining in demand theory. In this context he mentions indivisibility, transactions costs, consumer credit, etc. He closes with the observation, "Considerable time and energy will undoubtedly be spent on questions such as these in the future" (p. 178). The publication of Katzner's book makes it more likely that such work will be attempted. It also makes it more likely that the attempts will be successful. This book is worthy of the effort that it requires.

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Microeconomic foundations of employment and inflation theory. Edited by EDMUND S. PHELPS, et al. New York: W. W. Norton, 1970. Pp. viii, 434. \$9.50.

In the eighteen months that have passed since this book was published, it has become something of a classic. Almost every recent paper on the Phillips curve or inflation refers to the book, most often in a way that suggests that it succeeds in doing what its title promises, providing a rigorous theory of inflation and unemployment. I discern three basic questions that the various papers in the volume try to answer: 1) Why is there unemployment at all? 2) Why is the rate of change of wages inversely related to the amount of unemploy-

ment? 3) By how much does this relation shift if inflation is fully expected?

The conscientious reader of the volume will probably feel that he knows the answer to the first question too well by the time he finishes. Three of the papers—those of Armen Alchian, Donald Gordon and Allan Hynes, and Donald Nichols—are devoted to expositions of the basic view that unites almost all of the authors: In the efficient operation of a market for heterogeneous goods, where it is costly to evaluate any single good, there will be unemployed goods at any point in time. The rational seller does not accept the first offer he receives unless it is exceptionally attractive, nor does the rational buyer purchase the first good he locates. Both can profit by waiting. In the labor market, the rational unemployed worker will remain unemployed long enough to be confident that he has located the best possible job. Unemployment is voluntary in this theory. This view has attracted the hostility of macroeconomists of more conventional persuasions [1, Eckstein, 1969 and 2, Rees, 1970].

It strikes me that a debate over whether or not unemployment is voluntary is practically meaningless. The authors of this volume observe that the unemployed make the best of a bad situation, whereas the more conventional view is that unemployment is simply a bad situation. I suspect that the real issue is how tolerant of unemployment the federal government should be. The older macroeconomists fear that the young theorists of this volume, brought up in the bullish sixties, will not have their hearts in the battle to convince the federal government to stimulate demand enough to provide every worker with a job.

The papers by Holt, Phelps and Mortensen address the second of my three questions. Again, there is substantial agreement on the answer: When unemployment is high and vacancies are low, unemployed workers receive few offers, so the rational strategy is to accept a relatively poor offer, since the cost of waiting until the next offer is high. Holt also emphasizes that the cost of waiting may rise during a spell of unemployment as a person draws down his liquid assets, so when the average duration of unemployment is high, the unemployed will accept poorer offers. On the

other hand, when unemployment is low and vacancies are high, employers receive inquiries infrequently relative to the number of positions to be filled. Then their rational strategy is to make a good offer to the occasional worker who expresses interest. Again, the cost for the employer of additional waiting may rise with the duration of vacancies, adding further to the inflationary effect of a tight labor market. It strikes me that the elaboration and formalization of this story is the principal contribution of the volume. It does succeed in making sense out of the confused notion of disequilibrium that has had a central role in macroeconomic theory since Keynes. As Phelps and Sidney Winter remark (p. 337): "A landing on the non-Walrasian continent has been made. Whatever further exploration may reveal, it has been a mind-expanding trip: We need never go back to $p = \alpha (D - S)$ and $q = \min (D, S)$."

The third question has generated the most controversy recently in the theory of inflation. Phelps, Robert Lucas and Leonard Rapping, and most of the other authors except Charles Holt believe that the benefits of inflation suggested by the Phillips curve are really the benefits of unexpected inflation. Unemployment cannot be held at a low level by tolerating a fixed rate of inflation because employers will add an allowance for expected inflation to the inflationary wage offers that they find it profitable to make when unemployment is low. Thus low unemployment requires an accelerating rate of inflation. The logical force of this argument is considerable, although its empirical validity is in doubt. But it is not, by itself, an argument against a policy of reaching a point high on the Phillips curve, with low unemployment and rapid inflation. It only suggests that such a policy has costs as well as benefits. Again, the hostility of conventional macroeconomists to the view that inflation cannot reduce unemployment in the long run probably relates to their fear that economists will become more tolerant of unemployment in their recommendations for federal policy.

In addition to the papers already mentioned, the volume contains a new exposition of the theory of sectoral disequilibrium (as a complement to, not a substitute for, the basic theory of

the book) by Christopher Archibald, an early contribution to the recent upsurge of interest in the mathematical theory of monopolistic competition by Phelps and Winter, a paper by John Gould on the theory of advertising, and a paper by Paul Taubman and Maurice Wilkinson on the role of unexpected changes of prices in the theory of investment.

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2. REES, A. "Equilibrium in Labor Markets," *J. Polit. Econ.*, March-April 1970, 78(2), pp. 306-10.

Theory of cost and production functions. By RONALD W. SHEPHARD. Princeton Studies in Mathematical Economics. Princeton: Princeton University Press, 1970. Pp. xi, 308. \$15.00.

This book is a more complete and systematic treatment of cost and production theory than that in the author's earlier study, *Cost and production functions*, (Princeton, 1953). In addition, there is new substantive material (beyond the generalizations) on the treatment of joint product firms.

There are eleven chapters in the book; the first summarizes its contents. The second defines the production function more generally than was done in the earlier book (it is only upper semi-continuous rather than continuous). Homotheticity of production functions is also generalized in the same way. The notion of essential (combination of) inputs is introduced and (as is well-known) shown to be responsible for the existence of diminishing returns. If all combinations are nonessential (if they are complete substitutes for one another), then unbounded output can be obtained even if the inputs of any of those combinations are all bounded; in this case diminishing returns do not exist. There is an application of the diminishing returns theory to the Cobb-Douglas and CES (Constant Elasticity of Substitution) production forms.

In general, this chapter, which is basic to the entire book, attempts to define rigorously the