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Book Reviews

A Pearl of Great, But Not Onerous, Price

Handbook of Econometrics, Volume III. Zvi Griliches and Michael D. Intriligator (eds.) Amsterdam. Elsevier Science Publishers, 1986, 632 pp \$195 00 (for three-volume set)

Reviewed by Ralph M. Monaco

With the third volume of the *Handbook of Econometrics*, the series is complete. The three volumes follow the plan of most conventional econometric texts, with the earlier essays laying the groundwork of matrix algebra and statistical theory and the subsequent essays proceeding through hypothesis testing, dynamic specification, and other standard topics. The third volume corresponds to the "special topics" section of most standard texts, with 11 essays on diverse advanced topics. The essays are not aimed at the casual reader, and someone without a strong background in econometric theory will find them difficult. They are designed for "professional use by economists, econometricians, and statisticians and for use in advanced graduate econometrics courses." This statement does not imply that the essays are badly written. The opposite is true. The difficulty reflects instead the increasing specialization and complexity of the field.

Volume III is divided into two parts: "Special Topics in Econometrics" and "Selected Applications and the Uses of Econometrics." Several essays address the same, or similar, issues from slightly different viewpoints.

Four of the essays describe methods for motivating and estimating models with discrete or truncated dependent variables. Dhrymes provides an excellent overview of the problems of ordinary least squares in the context of limited dependent variables. He outlines logit and probit estimation and discusses consistent estimation when the dependent variable is truncated. He considers the problem of sample selectivity, a problem that emerges when a model is specified so that whether a particular variable is observed or not (as opposed to what value it takes) depends on another variable, which may or may not be observed. One example of such a structure is the modeling of employment choices. Whether or not a worker accepts a wage

depends on whether that wage is above his "reservation" wage, which itself is not observable.

Heckman and Singer extend the analysis of discrete choices to include models in which the dependent variable observations are obtained in discrete time periods, like quarters or months, whereas the underlying decisionmaking process occurs in continuous time. Heckman's essay on "Labor Econometrics" really should be titled "An Index Function Approach to Labor Econometrics." It shows that recent new approaches in labor econometrics are special cases of an index function model—a model in which discrete or censored random variables are really outcomes of underlying continuous random variables subject to a particular sampling scheme. The essay is a full-blown introduction to the index function framework and ties in nicely with the third section of Dhrymes' essay and Heckman and Singer's essay. Finally, Maddala shows that disequilibrium and self-selection models are special cases of switching models, that is, models in which the observations on the dependent variables are generated by a number of different structural regimes. Maddala extensively discusses the economic meaning behind the disequilibrium specification.

Together, this quartet of essays provides an in-depth view of the current state of econometric analysis on discrete or censored dependent variables from complementary perspectives. Be warned though that the essays are quite technical and will probably need to be read with an advanced statistics text at the ready.

The contributions by Lau, Deaton, and Jorgenson are related because they all deal with econometric techniques in the context of the most mathematically well-developed bodies of economic theory: consumer and producer theory. Besides being good summaries of econometric developments in these fields, the three essays provide refresher courses in consumer and producer theory as well. Taylor provides a similar service for rational expectations macroeconomic models. Although his essay runs nearly 60 pages, fully two-thirds is devoted to solution concepts and techniques of rational expectations models, rather than to econometrics. Thus it provides a good source for those who need a concise review or an introductory overview of the rational expectations approach. Anyone interested in econometric methods in these areas would do well to use the essays as a starting point.

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Lau's contribution on functional forms is especially interesting. He attempts to develop a schema for choosing the precise algebraic form an econometric model should take. Most of the examples of how to use this schema, however, are drawn from production and consumer theory, where parametric restrictions implied by theory are well known. In these cases, checking for theoretical consistency and functional-form flexibility are well defined. The schema is harder to use where theory is not so well developed mathematically. The important point, however, is that choosing a specific functional form involves tradeoffs among competing criteria, which implies that some sort of weighting mechanism, or utility function, must be used to discriminate among competing functional forms.

Although Lau does not explicitly put forth the idea, the notion of tradeoffs in selecting econometric specification suggests the possibility that debates about econometric technique may actually be debates about the underlying weights given to the competing criteria. One researcher may, for example, attach greater importance to computational ease and linearity in parameters than another, who may value theoretical consistency or functional form flexibility more highly. Should these analysts reach different conclusions with their respective models, it is unlikely that the difference will be resolved by appeal to econometric technique. Instead, the reasons behind each analyst's respective criteria weights should be examined. This area is nebulous at best, however. Calling attention to the notion that how econometric modeling is done depends on the underlying utility function of the modeler is an important, if unemphasized, facet of Lau's contribution.

The remaining essays in volume III are the most accessible to the general reader and, in a sense, deal with more philosophical problems. Griliches addresses data problems. Are data accurately measured? Are data measuring what modelers think they are measuring? How should a modeler cope with imperfect data? Griliches describes the econometric response to three common data problems: measurement error, missing observations, and missing variables. He makes a plea for using our data sets to explore "what is actually going on without trying to force our puny models on them." Such an attitude presents a stark contrast with other essays in the volume which emphasize the theoretical restrictions implied by "puny models."

Fair reviews methods for evaluating and comparing econometric model forecasts and suggests a method of his own. The method attempts to account for four main areas of forecast uncertainty, including model misspecification. Using this method on equations suggested by the theoretical restrictions of producer or

consumer theory would be an interesting exercise. Should the resulting equations prove to be substantially misspecified, one would have to wonder, like Griliches, whether we are asking questions that are too precise for the available data.

Klein provides an excellent discussion of the use of econometric modeling in guiding economic policymaking. He makes, however, the questionable assertion that "small [macroeconomic] models are inherently unable to deal with the demands of economic policy formation." Model size is not the relevant issue. Model specification is. A badly specified large model is probably as bad for policymaking as a badly specified small model and is certainly worse for policymaking than a well-specified small model. Only under the dubious assumption that disaggregated models are always better specified than more compact models can Klein's statement be justified. Despite this problem, his essay really should be read by applied economists who want their results to be useful to policymakers.

Volume III represents an important contribution to the econometrics literature. The essays, though largely intended for an audience already possessing a high degree of econometric sophistication, are lucidly written, and the references following each article provide an excellent bibliography. For those whose specializations do not include econometrics, volume III is best used in conjunction with at least one other, more conventional econometrics textbook. In this case, the textbook could be used as background for a particular problem, with this handbook providing a bridge to the more recent literature. Used in this way, volume III has much to offer almost any economist faced with an applied problem in one of the covered areas.

The papers include (1) "Economic Data Issues" by Zvi Griliches, (2) "Functional Forms in Econometric Model Building" by Lawrence T. Lau, (3) "Limited Dependent Variables" by Phoebus J. Dhrymes, (4) "Disequilibrium, Self-Selection, and Switching Models" by G. S. Maddala, (5) "Econometric Analysis of Longitudinal Data" by J. J. Heckman and B. Singer, (6) "Demand Analysis" by Angus Deaton, (7) "Econometric Methods for Modeling Producer Behavior" by Dale W. Jorgenson, (8) "Labor Econometrics" by James J. Heckman and Thomas E. Macurdy, (9) "Evaluating the Predictive Accuracy of Models" by Ray C. Fair, (10) "New Econometric Approaches to Stabilization Policy in Stochastic Models of Macroeconomic Fluctuations" by John B. Taylor, (11) "Economic Policy Formation, Theory and Implementation (Applied Econometrics in the Public Sector)" by Lawrence R. Klein.