Stochastic Methods in Economics and Finance, by A. G. Malliaris; W. A. Brock
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posterior mean of $\beta$ given $\sigma$ when there is a prior distribution for $\beta$ with mean $\beta_0$ and covariance matrix $\Sigma^{-1}$.

Chapter 5 considers model choice and prediction. The discussion of model choice is extremely brief. Concerning prediction, the author notes the comforting fact that better estimation leads to better prediction. This chapter also contains a discussion of the estimation of the shrinkage constant of Mayer, Singh, and Wilke (1974) that is more related to choice of sample size than choice of model. Finally, Chapter 6 introduces econometric models. Mixed estimation of the type described in Chapter 3 is considered. Attention is focused in this chapter on consistency and asymptotic efficiency rather than on minimizing mean square error, although no reason is given for the change of focus. A numerical example, based on an econometric model of East Germany, is included.

This book is extremely dry reading, consisting of one lengthy matrix manipulation after another. There are only three numerical examples in the entire book, and a simulation to study the robustness of the minimax linear estimator includes fourteen pages of tabulated output. This hardly compensates for the lack of numbers elsewhere in the book. Considering that so many of the estimators suggested in this book are of the shrinkage type, it is surprising to find no reference to Stein (1956). There is almost no motivation for the many problems that are stated and then solved in rapid succession. For example, in the midst of several multilinear matrix equations (pp. 94–95), the author introduces a special case with the following justification for the effort: "This case seems to be of practical relevance." The one last impression left with this reviewer is how painful it is to make use of prior information in a non-Bayesian fashion. It’s a wonder non-Bayesian statisticians try to avoid prior information altogether.

In conclusion, one might ask, "For whom is this book intended?" The only clue is provided on the jacket: "This advanced text is aimed both at statisticians and econometricians." I suggest we all duck.

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Recent Advances in Regression Methods.


In Recent Advances in Regression Methods, Vinod and Ullah bring together recent developments in "improved estimation" for the linear regression model. "Improved estimation" refers to the use of biased, and possibly nonlinear, estimators that are known to have lower risk than the least squares estimator. The intended audience for the book includes graduate students and professionals in statistics, economics, and other fields that use the linear regression model. The authors state that the book would serve as a primary or supplementary text in graduate statistics or econometrics courses, and they have included useful algebraic and numerical exercises for this purpose. However, because of the breadth of the material, it seems that the book would be used most appropriately as a supplementary text or as a reference book. To take full advantage of this work, readers should have substantial exposure to mathematical statistics and the linear statistical model at an advanced undergraduate level or beginning graduate course in statistics and should be thoroughly familiar with the standard array of econometric models and estimators.

The book is organized into 13 chapters. In the first eight chapters the authors survey basic results relating to the linear statistical model, decision theory, traditional uses of nonsample information from both the classical sampling theory and Bayesian points of view, multicollinearity, and Stein-like and ridge rules. The single exception to the twin themes of biased estimation and multicollinearity is Chapter 4, which treats ARMA regression errors and heteroscedasticity. Chapters 9 through 12 apply methods of improved estimation to polynomial distributed lags, sets of regression equations, simultaneous equations and the multivariate analysis techniques of canonical correlation and discriminant analysis. Finally, Chapter 13 investigates the properties of improved estimators in the absence of normalization and introduces robust regression techniques.

Vinod and Ullah survey and summarize the large body of literature on biased estimation. Their treatment is more extensive than surveys at approximately the same level by Judge et al. (1980, 1982) and Bibby and Toutenburg (1977), and it is less theoretical than the works by Judge and Bock (1978) and Greenberg and Webster (1983). They categorize a variety of specific estimators as special cases of general classes of estimation rules, which is an efficient framework for relating and comparing various estimators.

The book is a curious mixture of statistical theory and ad hoc rules of thumb. The ambiguity of the authors’ approach reflects the state of the literature on biased estimation and multicollinearity. One explanation for this ambiguity is the apparent conflict between biased estimators that are minimax and those that can offer significant risk gains in the presence of multicollinearity.

Vinod and Ullah take the position that a ‘‘skilled’’ use of estimators that may not be minimax can sometimes help lead the researcher closer to the truth about the model, especially when the data are multicollinear” (p. 49). Consequently, a major emphasis of the book is on how biased estimation formulas, which depend on unknown parameters, can be made operational. Less emphasis is placed on the statistical consequences of the choices.

While Vinod and Ullah present clearly and concisely a wide range of estimation alternatives, the problem of choosing an estimator for a specific application has not been made easier. Despite their belief in the ‘‘skilled’’ use of nonminimax estimators, there is no assurance that the performance of a nonminimax estimator will be superior to, or as good as, that of the conventional least squares estimator.

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Prior to about 1958, the field of finance was largely descriptive (as opposed to analytical) in nature. Since then, starting with Markowitz and Tobin’s work on portfolio analysis and selection, and Modigliani and Miller’s work on capital structure and valuation, the field has become progressively more mathematical and statistical. Indeed, it is hard to imagine a recent Ph.D. graduate in finance from a leading university who has not had substantial training in econometric techniques, statistics, and even an introduction to stochastic calculus. We suspect that a poll of recent Ph.D. graduates in finance would produce more persons able to quote Ito’s lemma and define stochastic differential equations than would an equivalent poll of recent Ph.D.’s in mathematics and statistics. Accordingly, it is surprising that before the publication of this book, yet another book on this topic was published. Hence, this book will hold an important position in the stochastic training of finance Ph.D.’s for several years to come.

There are two principal audiences for this unique book: probabilists and statisticians who seek an understanding of the economic and financial applications of stochastic processes, and students of finance and economics who seek a sufficient understanding of stochastic processes to enable them to use these techniques in financial and economic modeling. The book begins with a two-chapter survey of results from prob-
ability and stochastic processes that most persons trained in advanced probability will skim through easily, but that will be very difficult going for most graduate students in economics and finance. The remainder of the text consists of two chapters, one devoted to each of the applications to economics and finance.

In this day of good fortune, Prof. Brock credits the undertaking of the book to Prof. Malliaris. We concur with him in that Prof. Malliaris undertook the "extraordinarily difficult task of assembling the relevant literature on stochastic methods used in recent articles in economics and finance." Indeed, that is the book's chief strength. It brings together current applications in these areas with the relevant mathematics. In our judgment, the authors have succeeded in creating a "user's guide" that will be of considerable value to the two groups of potential readers mentioned above.

As with all first attempts to define and cover a field of study, the choice of topics to be included and excluded did not completely coincide with our preferences. For example, the Martingale Upcrossing Theorem is stated without proof, but it is never used and could easily have been deleted. A noticeable absence of applications to actuarial science and insurance (where such applications are readily apparent) would have also been appreciated.

Each of the reviewers has used this book in teaching an introductory course on financial applications of stochastic calculus to graduate students in various business disciplines, including accounting, finance, and insurance. Our students typically had a mathematics background that included a year of calculus and a year of probability and statistics. Still, it was necessary to provide substantial introductory material. Our conclusion is that it would be a mistake to rely on this text alone for students meeting advanced probability for the first time. It would be appropriate as a second text or as the text for a course for students who have had an introductory junior level course in stochastic methods.

For those already familiar with stochastic methods, it is a beautiful introduction to the uses of stochastic calculus in finance and economics. This is a well-written text that should be purchased by all professional libraries, by quantitative academic finance and economic researchers, and by applied probabilists seeking real-world applications.

An Integrated System of World Models.

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This study consists of a set of global models in a multisector and multiregion framework, including a world economic model at the core, surrounded by models of population and labor force, energy, and agriculture. The regions are linked with each other by means of trade and international financial flows, and the sectors are linked by means of an input-output system. The very broad purpose of the volume is "to discover how the various components of the model at the regional and global levels are determined, what their future trends are likely to be and how the alternative development strategies can be used to shift the various economic components from the undesirable or less desirable to the more desirable . . . ." The study is supposed to serve as a practical tool for quantitatively oriented analysts in international organizations, national governments, universities, and other research bodies.

The study limits itself at the outset by assuming away prices; neither relative prices nor the price level play any role whatsoever in the world economic model. However, considering the crucial role of prices in an economy, particularly during the last 10 years, it is self-evident that such an approach renounces the analysis of central economic issues on national and international levels.

The model is built up as a recursive system even though there exist interactions that are treated in autonomous loops or by local iteration. The world economic model takes up almost half of the study. A Cobb-Douglas production function (equation 15, p. 37), presented as being linearly homogeneous, is central. At the same time, the function can, according to the author, exhibit decreasing or increasing returns to scale. This is a simply self-contradictory: A linearly homogeneous production function exhibits, by definition, constant returns to scale. Another problem with the author's function is that over time the share of one factor will fall and (particularly since this is a long-run model) eventually will become negative. In the same fashion, there is no restriction on the other factor's share, which will increase infinitely. Of the production functions discussed, it is unfortunate that the author chose this particular function to be represented in the equation system.

Besides production functions, Part I of the book contains the introduction to the economic disciplines on capital, depreciation, and investment. The chapter on depreciation, a subject which often has been given too little attention, is commendable. The investment function (equation 38, p. 65), however, is specified in a very doubtful way. According to the formulation the author has chosen, investments as a share of GDP will either always increase or always decrease. Particularly for a long-run model, such as the present one, this way of modeling may lead to very strange results and can hardly be considered realistic. To make sense, the coefficient for the annual change in the investments share should be zero.

Concerning sectoral growth, a function is suggested in which all sectors grow at the same rate. These dynamics are assumed to be the same for all sectors. This is also unrealistic, and there is no empirical support for such assumptions.

Consumption, treated together with savings in Chapter 12, is determined for the individual product groups by a loglinear function. However, the demand function is assumed to be the same for all products, which is a completely unacceptable assumption. Furthermore, the demand function must be reconciled with a variable called "availability for consumption." The author explains that this overdetermination of the system has been done to provide a double check that is necessary because of uncertainty in the input-output matrix.

Part II of the book models population and labor force. The chapters deal with approaches to population projection, fertility, mortality, and labor force. This part is well structured and better written than the preceding one. Still, unclear statements and formulas exist. Equation (13) on fertility, for instance, is said to approach unity. This is not so. The equation will not make sense unless restrictions are imposed on it.

Part III presents the world energy model. Concerning the demand analysis, the author starts in the traditional way by maximizing a utility function and continues by discussing the price and income effects. This is done, however, with reference to a linear function that does not qualify as a demand function since it is not homogeneous and of degree zero. If one should use, for some strange reason, an equation that is linear in the variables, the price variables should be divided by one of the prices (or an index of all) so that the homogeneity restriction is satisfied. Very unfortunately, the discussion of the income and substitution effects is carried out with reference to this misbehaving function. The author also claims that in actual estimation the income and substitution effects have not often been noticed and put to use. This is to say that economists disregard the Slutsky condition, which is a remarkable statement since a function that is not zero homogeneous is suggested in the study.

Chapter 3 of Part III is on international trade in energy products, Chapter 4 discusses interenergy flows, and Chapter 5 deals with energy models.

The study ends with an agricultural model, Part IV. Chapter 2 deals with demand analysis, Chapter 3 with international trade, Chapters 4 and 5 with production, and Chapter 6 with prices and product balances.

By and large, when reading through this book, one gets more and more conscious to see the behavior of this model, that is, to see the simulation results. However, there are no simulations presented and the reasons for this are never stated. The absence of simulations seems even more confusing in light of the Herculean purpose of the study, which is obviously not fulfilled as long as the model is not implemented. It is clear, however, that with the present formulation the model will not yield reasonable results. To fulfill the purpose, well-behaved functions need to enter the model; the functions represented in the suggested model system need to have a firmer economic theoretical foundation.

In general, the procedure followed in this book, and particularly in the world economic model, is first to describe the often complicated relationships among the variables and then to give an algebraic interpretation of the relationships. To the extent that these relationships are merely discussed, the account is in the main accurate. However, when it comes to the modeling, the dynamic changes in the world economic model are represented in a highly simplified manner mostly by the assumption of a linear trend in a coefficient or in an elasticity. The problem with such an approach, particularly since prices never enter the world economic model, is that the model will not capture the fundamental adjustments inherent in the market economy. Therefore, unrealistic conclusions may occur. This option is not relevant to the population, energy, or agricultural models as it is to the world economic model.