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# Estimating Dynamic Economic Models With Non Parametric

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Estimation of Dynamic Discrete Choice Models in Continuous Time

Estimation of Capital and Technology with a Dynamic Economic Model

Estimating Dynamic Discrete Choice Models with Hyperbolic Discounting, with an Application to Mammography Decisions

Economic Modeling and Inference

Dynamic Econometrics For Empirical Macroeconomic Modelling

Economic Modeling and Inference

Optimal Control Methods for Linear Discrete-Time Economic Systems

A Synthesis

Statistical Inference in Dynamic Economic Models

Handbook of Theory and Applications

Qualitative Analysis and Econometric Estimation of Continuous Time Dynamic Models

Estimation of Dynamic Programming Models with Censored Dependent Variables

Correcting the Biases in Dynamic Models with Fixed Effects

Efficient Estimation of Dynamic Panel Data Models Under Alternative Sets of

Assumptions

Estimation and Testing of Dynamic Models with Generalized Hyperbolic Innovations  
Essays on the Solution, Estimation, and Analysis of Dynamic Nonlinear Economic Models

Economic Dynamics in Discrete Time

DYNAMIC ECONOMIC MODELS WITH AN UNOBSERVED VARIABLE: AN APPLICATION TO THE GROSS PRIVATE SAVING RATE.

A Note on the Identification of Dynamic Economic Models with Generalized Shock Processes

Information and Efficiency in Economic Decision

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A Handbook of the Theory with Applications  
Estimation of dynamic economic models when variables are subject to measurement errors  
Econometric Models with Panel Data Across States  
Discrete Methods for the Estimation of Nonlinear Economic Models  
Identification and Estimation of Linear Dynamic Economic Models with Temporally Autocorrelated Disturbances  
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**ORLANDO SUTTON**

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*Estimation of Dynamic  
Discrete Choice Models in*

*Continuous Time* Elsevier  
This book is concerned  
with recent developments  
in time series and panel

data techniques for the analysis of macroeconomic and financial data. It provides a rigorous, nevertheless user-friendly, account of the time series techniques dealing with univariate and multivariate time series models, as well as panel data models. It is distinct from other time series texts in the sense that it also covers panel data models and attempts at a more coherent integration of time series, multivariate analysis, and panel data models. It builds on the author's

extensive research in the areas of time series and panel data analysis and covers a wide variety of topics in one volume. Different parts of the book can be used as teaching material for a variety of courses in econometrics. It can also be used as reference manual. It begins with an overview of basic econometric and statistical techniques, and provides an account of stochastic processes, univariate and multivariate time series, tests for unit roots, cointegration, impulse

response analysis, autoregressive conditional heteroskedasticity models, simultaneous equation models, vector autoregressions, causality, forecasting, multivariate volatility models, panel data models, aggregation and global vector autoregressive models (GVAR). The techniques are illustrated using Microfit 5 (Pesaran and Pesaran, 2009, OUP) with applications to real output, inflation, interest rates, exchange rates, and stock prices.

**Estimation of Capital and Technology with a Dynamic Economic Model** MIT Press

Time series of production capital and total factor productivity (or "technology," as we call the latter here) are fundamental to understanding the processes of output and productivity growth. Unfortunately, capital and technology are unobserved except at the most disaggregated levels of production units and capital components and must be estimated prior

to being used in empirical analysis. Standard methods for estimating capital and technology were developed decades ago (Jorgenson, 1963; Solow, 1957) and are based on analytical and computational methods of that era. We develop and apply a new method for estimating production capital and technology, based on advances in economics, dynamic optimization, statistics, and computing over the intervening years. Estimating Dynamic Discrete Choice Models

with Hyperbolic Discounting, with an Application to Mammography Decisions  
London : Department of Economics, University of Western Ontario  
We compare the performance of maximum likelihood (ML) and simulated method of moments (SMM) estimation for dynamic discrete choice models. We construct and estimate a simplified dynamic structural model of education that captures some basic features of educational choices in the

United States in the 1980s and early 1990s. We use estimates from our model to simulate a synthetic dataset and assess the ability of ML and SMM to recover the model parameters on this sample. We investigate the performance of alternative tuning parameters for SMM. [Economic Modeling and Inference](#) Oxford University Press, USA "Christensen and Kiefer's excellent book shows how careful dynamic theory and econometrics go hand in hand, opening up new

vistas in the areas of search theory, finance, and macroeconomics."-- Tom Sargent, New York University and the Hoover Institution "There is no other book that mixes dynamic economic theory, statistical inference, and real quantitative applications like this one. Christensen and Kiefer will challenge the top tier of students and take them to the research frontier."-- Robert Lucas, University of Chicago "Dynamic programming is an organizing framework that has enabled economists

to integrate economic theory with empirical analysis. Few textbooks reflect the integrated nature of contemporary research, but Christensen and Kiefer reveal the power of the dynamic programming approach in a wide variety of applications from job search to portfolio choice. Their new book will be invaluable to students who wish to participate in this exciting enterprise."-- John Y. Campbell, Harvard University "The authors do a splendid job of showing how to use

stochastic dynamic optimization techniques to generate the implied distributions of observables needed for estimation. There are many interesting and useful examples included in the book, ranging from applications of the theory of job search to those of asset pricing theory. This book should be a reference for anyone interested in using dynamic economic models to make inferences about the world we observe."--Dale Mortensen, Aarhus

University, Denmark, and Northwestern University "An extremely ambitious and thought-provoking book, one that combines state-of-the-art economic theory with sophisticated econometric techniques. The dynamic programming framework brings together important results and recent developments in a unique, unified way. The book is sure to inspire many PhD students and empirically oriented researchers for years to come."--Tim Bollerslev, Duke University "I have been

looking for a book like this for quite a while. Economic Modeling and Inference is written for those who want to do applied work and actually apply this to real-life data or run simulations. This much-needed book fills a void. It is certainly a significant contribution to the field."--Yaw Nyarko, New York University "Economic Modeling and Inference blends economic theory and statistical inference in a seamless fashion. Every dynamic decision model is discussed with an eye for

it to be fit with economic data. Every econometric inference tool is developed for the purpose of testing economic decision models. This book is long overdue. It will influence and benefit young economists for generations to come."--  
 Mark Y. An, Fannie Mae Dynamic Econometrics For Empirical Macroeconomic Modelling  
 Routledge  
 Analysis of Economic Time Series: A Synthesis  
 integrates several topics in economic time-series analysis, including the

formulation and estimation of distributed-lag models of dynamic economic behavior; the application of spectral analysis in the study of the behavior of economic time series; and unobserved-components models for economic time series and the closely related problem of seasonal adjustment. Comprised of 14 chapters, this volume begins with a historical background on the use of unobserved components in the analysis of economic time series, followed by an

Introduction to the theory of stationary time series. Subsequent chapters focus on the spectral representation and its estimation; formulation of distributed-lag models; elements of the theory of prediction and extraction; and formulation of unobserved-components models and canonical forms. Seasonal adjustment techniques and multivariate mixed moving-average autoregressive time-series models are also considered. Finally, a time-series model of the



U.S. cattle industry is presented. This monograph will be of value to mathematicians, economists, and those interested in economic theory, econometrics, and mathematical economics. Economic Modeling and Inference Springer Science & Business Media As our title reveals, we focus on optimal control methods and applications relevant to linear dynamic economic systems in discrete-time variables. We deal only with discrete cases simply because economic data are

available in discrete forms, hence realistic economic policies should be established in discrete-time structures. Though many books have been written on optimal control in engineering, we see few on discrete-type optimal control. Moreover, since economic models take slightly different forms than do engineering ones, we need a comprehensive, self-contained treatment of linear optimal control applicable to discrete-time economic systems. The present work is

intended to fill this need from the standpoint of contemporary macroeconomic stabilization. The work is organized as follows. In Chapter 1 we demonstrate instrument instability in an economic stabilization problem and thereby establish the motivation for our departure into the optimal control world. Chapter 2 provides fundamental concepts and propositions for controlling linear deterministic discrete-time systems, together with some economic

applications and numerical methods. Our optimal control rules are in the form of feedback from known state variables of the preceding period. When state variables are not observable or are accessible only with observation errors, we must obtain appropriate proxies for these variables, which are called "observers" in deterministic cases or "filters" in stochastic circumstances. In Chapters 3 and 4, respectively, Luenberger

observers and Kalman filters are discussed, developed, and applied in various directions. Noticing that a separation principle lies between observer (or filter) and controller (cf. *Optimal Control Methods for Linear Discrete-Time Economic Systems* Springer Science & Business Media) The book's comprehensive coverage on the application of econometric methods to empirical analysis of economic issues is impressive. It uncovers

the missing link between textbooks on economic theory and econometrics and highlights the powerful connection between economic theory and empirical analysis perfectly through examples on rigorous experimental design. The use of data sets for estimation derived with the Monte Carlo method helps facilitate the understanding of the role of hypothesis testing applied to economic models. *A Synthesis* World Scientific

A unified, comprehensive, and up-to-date introduction to the analytical and numerical tools for solving dynamic economic problems. This book offers a unified, comprehensive, and up-to-date treatment of analytical and numerical tools for solving dynamic economic problems. The focus is on introducing recursive methods—an important part of every economist's set of tools—and readers will learn to apply recursive methods to a variety of dynamic economic

problems. The book is notable for its combination of theoretical foundations and numerical methods. Each topic is first described in theoretical terms, with explicit definitions and rigorous proofs; numerical methods and computer codes to implement these methods follow. Drawing on the latest research, the book covers such cutting-edge topics as asset price bubbles, recursive utility, robust control, policy analysis in dynamic New Keynesian models with the zero lower bound on

interest rates, and Bayesian estimation of dynamic stochastic general equilibrium (DSGE) models. The book first introduces the theory of dynamical systems and numerical methods for solving dynamical systems, and then discusses the theory and applications of dynamic optimization. The book goes on to treat equilibrium analysis, covering a variety of core macroeconomic models, and such additional topics as recursive utility (increasingly used in

finance and macroeconomics), dynamic games, and recursive contracts. The book introduces Dynare, a widely used software platform for handling a range of economic models; readers will learn to use Dynare for numerically solving DSGE models and performing Bayesian estimation of DSGE models. Mathematical appendixes present all the necessary mathematical concepts and results. Matlab codes used to solve examples are indexed and

downloadable from the book's website. A solutions manual for students is available for sale from the MIT Press; a downloadable instructor's manual is available to qualified instructors. *Statistical Inference in Dynamic Economic Models* MIT Press Use of information is basic to economic theory in two ways. As a basis for optimization, it is central to all normative hypotheses used in economics, but in decision-making situations it has stochastic and evolution

ary aspects that are more dynamic and hence more fundamental. This book provides an illustrative survey of the use of information in economics and other decision sciences. Since this area is one of the most active fields of research in modern times, it is not possible to be definitive on all aspects of the issues involved. However questions that appear to be most important in this author's view are emphasized in many cases, without drawing any definite conclusions.

It is hoped that these questions would provoke new interest for those beginning researchers in the field who are currently most active. Various classifications of information structures and their relevance for optimal decision-making in a stochastic environment are analyzed in some detail. Specifically the following areas are illustrated in its analytic aspects: 1. Stochastic optimization in linear economic models, 2. Stochastic models in dynamic economics with

problems of time-inc-sistency, causality and estimation, 3. Optimal output-inventory decisions in stochastic markets, 4. Minimax policies in portfolio theory, 5. Methods of stochastic control and differential games, and 6. Adaptive information structures in decision models in economics and the theory of economic policy. Handbook of Theory and Applications CreateSpace Economic Modeling and Inference takes econometrics to a new

level by demonstrating how to combine modern economic theory with the latest statistical inference methods to get the most out of economic data. This graduate-level textbook draws applications from both microeconomics and macroeconomics, paying special attention to financial and labor economics, with an emphasis throughout on what observations can tell us about stochastic dynamic models of rational optimizing behavior and equilibrium. Bent Jesper Christensen

and Nicholas Kiefer show how parameters often thought estimable in applications are not identified even in simple dynamic programming models, and they investigate the roles of extensions, including measurement error, imperfect control, and random utility shocks for inference. When all implications of optimization and equilibrium are imposed in the empirical procedures, the resulting estimation problems are often nonstandard, with

the estimators exhibiting nonregular asymptotic behavior such as short-ranked covariance, superconsistency, and non-Gaussianity. Christensen and Kiefer explore these properties in detail, covering areas including job search models of the labor market, asset pricing, option pricing, marketing, and retirement planning. Ideal for researchers and practitioners as well as students, *Economic Modeling and Inference* uses real-world data to illustrate how to derive

the best results using a combination of theory and cutting-edge econometric techniques. Covers identification and estimation of dynamic programming models. Treats sources of error-- measurement error, random utility, and imperfect control. Features financial applications including asset pricing, option pricing, and optimal hedging. Describes labor applications including job search, equilibrium search, and retirement. Illustrates the wide

applicability of the approach using micro, macro, and marketing examples

Qualitative Analysis and Econometric Estimation of Continuous Time Dynamic Models Least Squares and Its Alternatives in the Estimation of Dynamic Economic Models Estimation of dynamic economic models when variables are subject to measurement errors Economic Dynamics in Discrete Time For Masters and PhD students in Economics In

this textbook, the duality between the equilibrium concept used in dynamic economic theory and the stationarity of economic variables is explained and used in the presentation of single equations models and system of equations such as VARs, recursive models and simultaneous equations models. The book also contains chapters on: exogeneity, in the context of estimation, policy analysis and forecasting; automatic (computer based) variable selection, and how it can aid in the

specification of an empirical macroeconomic model; and finally, on a common framework for model-based economic forecasting. Supplementary materials and notes are available on the publisher's website. Estimation of Dynamic Programming Models with Censored Dependent Variables Springer Science & Business Media average of the indicator series are shown to be good approximations to estimates based on the entire sample. Correcting the Biases in

Dynamic Models with  
Fixed Effects World  
Scientific

Economic Models for  
Industrial Organization  
focuses on the  
specification and  
estimation of econometric  
models for research in  
industrial organization. In  
recent decades, empirical  
work in industrial  
organization has moved  
towards dynamic and  
equilibrium models,  
involving econometric  
methods which have  
features distinct from  
those used in other areas  
of applied economics.

These lecture notes,  
aimed for a first or  
second-year PhD course,  
motivate and explain  
these econometric  
methods, starting from  
simple models and  
building to models with  
the complexity observed  
in typical research papers.  
The covered topics  
include discrete-choice  
demand analysis, models  
of dynamic behavior and  
dynamic games, multiple  
equilibria in entry games  
and partial identification,  
and auction models.  
*Efficient Estimation of  
Dynamic Panel Data*

*Models Under Alternative  
Sets of Assumptions*  
Academic Press

The aim of this volume is  
to provide a general  
overview of the  
econometrics of panel  
data, both from a  
theoretical and from an  
applied viewpoint. Since  
the pioneering papers by  
Edwin Kuh (1959), Yair  
Mundlak (1961), Irving  
Hoch (1962), and Pietro  
Balestra and Marc Nerlove  
(1966), the pooling of  
cross sections and time  
series data has become  
an increasingly popular  
way of quantifying



economic relationships. Each series provides information lacking in the other, so a combination of both leads to more accurate and reliable results than would be achievable by one type of series alone. Over the last 30 years much work has been done: investigation of the properties of the applied estimators and test statistics, analysis of dynamic models and the effects of eventual measurement errors, etc. These are just some of the problems addressed by this work. In addition,

some specific difficulties associated with the use of panel data, such as attrition, heterogeneity, selectivity bias, pseudo panels etc., have also been explored. The first objective of this book, which takes up Parts I and II, is to give as complete and up-to-date a presentation of these theoretical developments as possible. Part I is concerned with classical linear models and their extensions; Part II deals with nonlinear models and related issues: logit and probit models, latent

variable models, duration and count data models, incomplete panels and selectivity bias, point processes, and simulation techniques.

### **Estimation and Testing of Dynamic Models with Generalized**

### **Hyperbolic Innovations**

Princeton University Press

This paper provides a method for estimating large-scale dynamic discrete choice models within a continuous time framework. An advantage of our model is that state changes occur sequentially, rather than

simultaneously, avoiding a substantial curse of dimensionality that arises in multi-agent settings. Eliminating this computational bottleneck is the key to providing a seamless link between estimating the model and performing post-estimation counterfactuals. While recently developed two-step estimation techniques have made it possible to estimate large-scale problems, solving for equilibria remains computationally challenging. By modeling

decisions in continuous time, we are able to take advantage of the recent advances in estimation while preserving a tight link between estimation and policy experiments. We address the most commonly encountered situation in empirical work in which only discrete-time data are available and the actual sequence of events that occur between two points in time is unobserved. We apply our techniques to examine the effects of Walmart's entry into the retail grocery industry,

showing that even the threat of entry by Walmart has a substantial effect on market structure.

**Essays on the Solution, Estimation, and Analysis of Dynamic Nonlinear Economic Models**

Springer Science & Business Media  
We propose a novel method to estimate dynamic equilibrium models with stochastic volatility. First, we characterize the properties of the solution to this class of models. Second, we take

advantage of the results about the structure of the solution to build a sequential Monte Carlo algorithm to evaluate the likelihood function of the model. The approach, which exploits the profusion of shocks in stochastic volatility models, is versatile and computationally tractable even in large-scale models, such as those often employed by policy-making institutions. As an application, we use our algorithm and Bayesian methods to estimate a business cycle model of

the U.S. economy with both stochastic volatility and parameter drifting in monetary policy. Our application shows the importance of stochastic volatility in accounting for the dynamics of the data. [Economic Dynamics in Discrete Time](#)  
CreateSpace  
We describe a two-step algorithm for estimating dynamic games under the assumption that behavior is consistent with Markov Perfect Equilibrium. In the first step, the policy functions and the law of motion for the state

variables are estimated. In the second step, the remaining structural parameters are estimated using the optimality conditions for equilibrium. The second step estimator is a simple simulated minimum distance estimator. The algorithm applies to a broad class of models, including I.O. models with both discrete and continuous controls such as the Ericson and Pakes (1995) model. We test the algorithm on a class of dynamic discrete choice models with normally distributed

errors, and a class of dynamic oligopoly models similar to that of Pakes and McGuire (1994). *DYNAMIC ECONOMIC MODELS WITH AN UNOBSERVED VARIABLE: AN APPLICATION TO THE GROSS PRIVATE SAVING RATE*. Princeton University Press

DSGE models with generalized shock processes have been a major area of research in recent years. In this paper, I show that the structural parameters governing DSGE models are not identified when

the driving process behind the model follows an unrestricted VAR. This finding implies that parameter estimates derived from recent attempts to estimate DSGE models with generalized driving processes should be treated with caution, and that there exists a tradeoff between identification and the risk of model misspecification.

**A Note on the Identification of Dynamic Economic Models with Generalized Shock**

**Processes** North Holland

The aim of this volume is to provide a general overview of the econometrics of panel data, both from a theoretical and from an applied viewpoint. Since the pioneering papers by Kuh (1959), Mundlak (1961), Hoch (1962), and Balestra and Nerlove (1966), the pooling of cross section and time series data has become an increasingly popular way of quantifying economic relationships. Each series provides information lacking in the

other, so a combination of both leads to more accurate and reliable results than would be achievable by one type of series alone. Over the last 30 years much work has been done: investigation of the properties of the applied estimators and test statistics, analysis of dynamic models and the effects of eventual measurement errors, etc. These are just some of the problems addressed by this work. In addition, some specific difficulties associated with the use of panel data, such as

attrition, heterogeneity, selectivity bias, pseudo panels etc., have also been explored. The first objective of this book, which takes up Parts I and II, is to give as complete and up-to-date a presentation of these theoretical developments as possible. Part I is concerned with classical linear models and their extensions; Part II deals with nonlinear models and related issues: logit and probit models, latent variable models, incomplete panels and selectivity bias, and point

processes.

### **Information and Efficiency in Economic Decision**

Economists increasingly use nonlinear methods to confront their theories with data. The switch from linear to nonlinear methods is driven, in part, by increased computing power, but also by a desire to understand economic phenomena that cannot easily be captured by linear models. My research is informed by questions at the intersection of macroeconomics and

finance that cannot be addressed with standard methods. Existing methods for estimating nonlinear dynamic models are either too computationally complex to be of practical use, or rely on local approximations which fail

to adequately capture the nonlinear features of interest. My research develops a new methodology for accurately estimating nonlinear dynamic models which is computationally simple and easy to apply.

In my dissertation, I apply this methodology to study a model of interest rate dynamics near the zero lower bound, an asset pricing model of rare disasters, and a model of learning about cash flows in the presence of structural change.

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