Using Simulation Methods for Bayesian Econometric Models: Inference, Development, and Communication

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ABSTRACT

This paper surveys the fundamental principles of subjective Bayesian inference in econometrics and the implementation of those principles using posterior simulation methods. The emphasis is on the combination of models and the development of predictive distributions. Moving beyond conditioning on a fixed number of completely specified models, the paper introduces subjective Bayesian tools for formal comparison of these models with as yet incompletely specified models. The paper then shows how posterior simulators can facilitate communication between investigators (for example, econometricians) on the one hand and remote clients (for example, decision makers) on the other, enabling clients to vary the prior distributions and functions of interest employed by investigators. A theme of the paper is the practicality of subjective Bayesian methods. To this end, the paper describes publicly available software for Bayesian inference, model development, and communication and provides illustrations using two simple econometric models.

Econometric Inference Using Simulation Techniques

Chao Zhang

Econometric Inference Using Simulation Techniques:

    <u>Econometric Inference Using Simulation Techniques</u> Herman K. van Dijk,Alain Monfort,Bryan W. Brown,1995-07-11 This book provides a comprehensive assessment of the latest simulation techniques and examines the three main areas of econometric inference where the use of simulation methods has been successful Bayesian inference classical inference and the solution and stochastic simulation of dynamic econometric models in particular general equilibrium models

    Econometric Inference Using Simulation Techniques Herman Van Dijk,1995-10-01   *Special issue on econometric inference using simulation techniques* Bryan W. Brown,1993   *Stochastic Processes: Modeling and Simulation* D N Shanbhag,Calyampudi Radhakrishna Rao,2003-02-24 This sequel to volume 19 of Handbook on Statistics on Stochastic Processes Modelling and Simulation is concerned mainly with the theme of reviewing and in some cases unifying with new ideas the different lines of research and developments in stochastic processes of applied flavour This volume consists of 23 chapters addressing various topics in stochastic processes These include among others those on manufacturing systems random graphs reliability epidemic modelling self similar processes empirical processes time series models extreme value therapy applications of Markov chains modelling with Monte Carlo techniques and stochastic processes in subjects such as engineering telecommunications biology astronomy and chemistry particular with modelling simulation techniques and numerical methods concerned with stochastic processes The scope of the project involving this volume as well as volume 19 is already clarified in the preface of volume 19 The present volume completes the aim of the project and should serve as an aid to students teachers researchers and practitioners interested in applied stochastic processes   **Monte Carlo Simulation for Econometricians** Jan F. Kiviet,2012 Monte Carlo Simulation for Econometricians presents the fundamentals of Monte Carlo simulation MCS pointing to opportunities not often utilized in current practice especially with regards to designing their general setup controlling their accuracy recognizing their shortcomings and presenting their results in a coherent way The author explores the properties of classic econometric inference techniques by simulation The first three chapters focus on the basic tools of MCS After treating the basic tools of MCS Chapter 4 examines the crucial elements of analyzing the properties of asymptotic test procedures by MCS Chapter 5 examines more general aspects of MCS such as its history possibilities to increase its efficiency and effectiveness and whether synthetic random exogenous variables should be kept fixed over all the experiments or be treated as genuinely random and thus redrawn every replication The simulation techniques that we discuss in the first five chapters are often addressed as naive or classic Monte Carlo methods However simulation can also be used not just for assessing the qualities of inference techniques but also directly for obtaining inference in practice from empirical data Various advanced inference techniques have been developed which incorporate simulation techniques An early example of this is Monte Carlo testing which corresponds to the parametric bootstrap technique Chapter 6 highlights such techniques and presents a few examples of semi parametric bootstrap

techniques This chapter also demonstrates that the bootstrap is not an alternative to MCS but just another practical inference technique which uses simulation to produce econometric inference Each chapter includes exercises allowing the reader to immerse in performing and interpreting MCS studies The material has been used extensively in courses for undergraduate and graduate students The various chapters all contain illustrations which throw light on what uses can be made from MCS to discover the finite sample properties of a broad range of alternative econometric methods with a focus on the rather basic models and techniques **The Econometrics of Panel Data** László Mátyás,Patrick Sevestre,2013-12-01 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 diffi culties 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 pro bit models latent variable models duration and count data models incomplete panels and selectivity bias point processes and simulation techniques **The Econometrics of Panel Data** Lászlo Mátyás,Patrick Sevestre,2008-04-06 This restructured updated Third Edition provides a general overview of the econometrics of panel data from both theoretical and applied viewpoints Readers discover how econometric tools are used to study organizational and household behaviors as well as other macroeconomic phenomena such as economic growth The book contains sixteen entirely new chapters all other chapters have been revised to account for recent developments With contributions from well known specialists in the field this handbook is a standard reference for all those involved in the use of panel data in econometrics *Microeconometrics* Steven Durlauf,L. Blume,2016-06-07 Specially selected from The New Palgrave Dictionary of Economics 2nd edition each article within this compendium covers the fundamental themes within the discipline and is written by a leading practitioner in the field A handy reference tool **Financial Risk Management with Bayesian Estimation of GARCH Models** David Ardia,2008-05-08 This book presents in detail methodologies for the Bayesian estimation of sing regime and regime switching GARCH models These models are widespread and essential tools in n ancial econometrics and have until recently mainly been estimated using the classical Maximum Likelihood technique As this study aims to demonstrate the Bayesian approach o ers an attractive

alternative which enables small sample results robust estimation model discrimination and probabilistic statements on nonlinear functions of the model parameters The author is indebted to numerous individuals for help in the preparation of this study Primarily I owe a great debt to Prof Dr Philippe J Deschamps who inspired me to study Bayesian econometrics suggested the subject guided me under his supervision and encouraged my research I would also like to thank Prof Dr Martin Wallmeier and my colleagues of the Department of Quantitative Economics in particular Michael Beer Roberto Cerratti and Gilles Kaltenrieder for their useful comments and discussions I am very indebted to my friends Carlos Ord as Criado Julien A Straubhaar J er ome Ph A Taillard and Mathieu Vuilleumier for their support in the elds of economics mathematics and statistics Thanks also to my friend Kevin Barnes who helped with my English in this work Finally I am greatly indebted to my parents and grandparents for their support and encouragement while I was struggling with the writing of this thesis

Handbook of Computational Econometrics David A. Belsley,Erricos Kontoghiorghes,2009-08-18 Handbook of Computational Econometrics examines the state of the art of computational econometrics and provides exemplary studies dealing with computational issues arising from a wide spectrum of econometric fields including such topics as bootstrapping the evaluation of econometric software and algorithms for control optimization and estimation Each topic is fully introduced before proceeding to a more in depth examination of the relevant methodologies and valuable illustrations This book Provides self contained treatments of issues in computational econometrics with illustrations and invaluable bibliographies Brings together contributions from leading researchers Develops the techniques needed to carry out computational econometrics Features network studies non parametric estimation optimization techniques Bayesian estimation and inference testing methods time series analysis linear and nonlinear methods VAR analysis bootstrapping developments signal extraction software history and evaluation This book will appeal to econometricians financial statisticians econometric researchers and students of econometrics at both graduate and advanced undergraduate levels   Bayesian Econometrics Siddhartha Chib,William Griffiths,2008-12-18 Illustrates the scope and diversity of modern applications reviews advances and highlights many desirable aspects of inference and computations This work presents an historical overview that describes key contributions to development and makes predictions for future directions   **The Econometrics of Macroeconomic Modelling** Gunnar Bårdsen,Øyvind Eitrheim,Eilev Jansen,Ragnar Nymoen,2005-04-14 Macroeconometric models in many ways the flagships of the economist s profession in the 1960s came under increasing attack from both theoretical economist and practitioners in the late 1970s Critics referred to their lack of microeconomic theoretical foundations ad hoc models of expectations lack of identification neglect of dynamics and non stationarity and poor forecasting properties By the start of the 1990s the status of macroeconometric models had declined markedly and had fallen completely out of and with academic economics Nevertheless unlike the dinosaurs to which they often have been likened macroeconometric models have never completely disappeared from the scene This book describes how and why the discipline of macroeconometric modelling

continues to play a role for economic policymaking by adapting to changing demands in response for instance to new policy regimes like inflation targeting Model builders have adopted new insights from economic theory and taken advantage of the methodological and conceptual advances within time series econometrics over the last twenty years The modelling of wages and prices takes a central part in the book as the authors interpret and evaluate the last forty years of international research experience in the light of the Norwegian main course model of inflation in a small open economy The preferred model is a dynamic model of incomplete competition which is evaluated against alternatives as diverse as the Phillips curve Nickell Layard wage curves the New Keynesian Phillips curve and monetary inflation models on data from the Euro area the UK and Norway The wage price core model is built into a small econometric model for Norway to analyse the transmission mechanism and to evaluate monetary policy rules The final chapter explores the main sources of forecast failure likely to occur in a practical modelling situation using the large scale nodel RIMINI and the inflation models of earlier chapters as case studies *Bayesian Econometric Methods* Joshua Chan,Gary Koop,Dale J. Poirier,Justin L. Tobias,2019-08-15 Illustrates Bayesian theory and application through a series of exercises in question and answer format *The New Palgrave Dictionary of Economics* ,2016-05-18 The award winning The New Palgrave Dictionary of Economics 2nd edition is now available as a dynamic online resource Consisting of over 1 900 articles written by leading figures in the field including Nobel prize winners this is the definitive scholarly reference work for a new generation of economists Regularly updated This product is a subscription based product A Companion to Theoretical Econometrics Badi H. Baltagi,2008-04-15 A Companion to Theoretical Econometrics provides a comprehensive reference to the basics of econometrics This companion focuses on the foundations of the field and at the same time integrates popular topics often encountered by practitioners The chapters are written by international experts and provide up to date research in areas not usually covered by standard econometric texts Focuses on the foundations of econometrics Integrates real world topics encountered by professionals and practitioners Draws on up to date research in areas not covered by standard econometrics texts Organized to provide clear accessible information and point to further readings **Simulation-based Inference in Econometrics** Roberto Mariano,Til Schuermann,Melvyn J. Weeks,2000-07-20 This substantial volume has two principal objectives First it provides an overview of the statistical foundations of Simulation based inference This includes the summary and synthesis of the many concepts and results extant in the theoretical literature the different classes of problems and estimators the asymptotic properties of these estimators as well as descriptions of the different simulators in use Second the volume provides empirical and operational examples of SBI methods Often what is missing even in existing applied papers are operational issues Which simulator works best for which problem and why This volume will explicitly address the important numerical and computational issues in SBI which are not covered comprehensively in the existing literature Examples of such issues are comparisons with existing tractable methods number of replications needed for robust results choice of instruments

simulation noise and bias as well as efficiency loss in practice **Marine Mammal Survey and Assessment Methods** J.L Laake,D.G. Robertson,Steven C. Amstrup,1999-06-01 This volume comprises the proceedings of a symposium on marine mammal survey assessment methods which took place in Seattle Washington USA **Handbook of Econometrics** J.J. Heckman,Edward Leamer,2001-11-22 The Handbook is a definitive reference source and teaching aid for econometricians It examines models estimation theory data analysis and field applications in econometrics Comprehensive surveys written by experts discuss recent developments at a level suitable for professional use by economists econometricians statisticians and in advanced graduate econometrics courses For more information on the Handbooks in Economics series please see our home page on http www elsevier nl locate hes **Modelling and Evaluating Treatment Effects in Econometrics** Dann Millimet,Jeffrey Smith,Edward Vytlacil,2008-02-21 The estimation of the effects of treatments endogenous variables representing everything from individual participation in a training program to national participation in a World Bank loan program has occupied much of the theoretical and applied econometric research literatures This volume presents a collection of papers on this topic *Statistics, Econometrics and Forecasting* Arnold Zellner,2004-02-19 Based on two lectures presented as part of The Stone Lectures in Economics series Arnold Zellner describes the structural econometric time series analysis SEMTSA approach to statistical and econometric modeling Developed by Zellner and Franz Palm the SEMTSA approach produces an understanding of the relationship of univariate and multivariate time series forecasting models and dynamic time series structural econometric models As scientists and decision makers in industry and government world wide adopt the Bayesian approach to scientific inference decision making and forecasting Zellner offers an in depth analysis and appreciation of this important paradigm shift Finally Zellner discusses the alternative approaches to model building and looks at how the use and development of the SEMTSA approach has led to the production of a Marshallian Macroeconomic Model that will prove valuable to many Written by one of the foremost practitioners of econometrics this book will have wide academic and professional appeal

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