

An Introduction to Markov Modelling for Economic Evaluation

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Summary

Markov models are often employed to represent stochastic processes, that is, random processes that evolve over time. In a healthcare context, Markov models are particularly suited to modelling chronic disease. In this article, we describe the use of Markov models for economic evaluation of healthcare interventions. The intuitive way in which Markov models can handle both costs and outcomes make them a powerful tool for economic evaluation modelling. The time component of Markov models can offer advantages of standard decision tree models, particularly with respect to discounting. This paper gives a comprehensive description of Markov modelling for economic evaluation, including a discussion of the assumptions on which the type of model is based, most notably the memory-less quality of Markov models often termed the "Markovian assumption". A hypothetical example of a drug intervention to slow the progression of a chronic disease is employed to demonstrate the modelling technique and the possible methods of analysing Markov models are explored. Analysts should be aware of the limitations of Markov models, particularly the Markovian assumption, although the adept modeller will often find ways around this problem.

The use of decision-analytical modelling to estimate the cost effectiveness of healthcare interventions is becoming widespread.^[1,2] Models have a range of uses including the synthesis of data from various sources and extrapolation from primary data sources. Hence, a sound knowledge of modelling can be an important and powerful tool for economic evaluation.

A particular type of model that is now used frequently in economic evaluation is the Markov model. Markov models have a long history of use in health service decision-making, including clinical and epidemiological applications.^[3,4] Health economists are also beginning to use Markov models widely in economic-evaluation studies.^[5-8] The fundamental difference between economic and

other applications of Markov modelling in medical decision-making is that economists are interested in both the resource and health outcome consequences of healthcare interventions. The way in which Markov models simply and intuitively handle both costs and outcomes simultaneously is one of their strengths.

The aim of this article is to provide an introduction to the use of Markov models for performing economic evaluation. An excellent and comprehensive introduction to Markov modelling has been provided by Sonnenberg and Beck,^[9] which we strongly recommend to interested readers. We hope that our article will add additional insight to the use of Markov modelling in economic evaluation. The paper is divided into 3 main sections. The

Economic Modelling An Introduction

Lawrence Robert Klein



Economic Modelling An Introduction:

Economic Modelling Donald A. R. George, 1987 **Spatial Economic Modelling** Stefano Colombo, 2025-06-24 This textbook provides an accessible introduction to spatial competition models in economics. It shows students how to understand and apply spatial models to analysis of market design, structure, competition, and pricing. The book aims to provide a step-by-step guide to learning and implementing spatial modelling. It provides a concise history of the spatial approach and a self-contained primer chapter on the key game theory tools required to undertake spatial analysis. It then provides a comprehensive explanation of the key traditions and models, including the Hotelling model and related Salop circle model, and demonstrates their various applications to consumer-firm and market interactions. Topics covered in the book include product differentiation, the physical location of firms, spatial price discrimination, oligopolistic competition, non-uniform distributions of consumers, political competition, and the basic Downs model, and the application of spatial models to marketing and management. This book will be a valuable resource for undergraduate students in microeconomics and applied economics, particularly on industrial organization courses.

“An” Introduction to Financial and Economic Modelling for Utility Regulators, 2003 **Introduction to Estimating Economic Models** Atsushi Maki, 2010-12-14 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. Topics covered in the book are consumer behavior, producer behavior, market equilibrium, macroeconomic models, qualitative response models, panel data analysis, and time series analysis. Key econometric models are introduced, specified, estimated, and evaluated. The treatment on methods of estimation in econometrics and the discipline of hypothesis testing makes it a must-have for graduate students of economics and econometrics and aids their understanding on how to estimate economic models and evaluate the results in terms of policy implications.

A Practical Introduction to Econometric Methods Patrick K. Watson, Sonja S. Teelucksingh, 2002 The text is aimed at final-year undergraduate students or those at the graduate level doing econometrics for the first time. It is an introductory course in the theory and practice of classical and modern econometric methods. A proper study of the material will allow the reader to understand the scope and limitations of classical and modern econometric techniques. Read, write, and properly interpret articles and reports of an applied econometric nature. Build upon the elements of econometric theory and practice introduced in the book. Although some basic knowledge of matrix algebra and elementary statistical theory will be assumed, much of it is covered in the body of the text. All the main theoretical concepts are illustrated with the use of econometric software, mainly EViews.

A Continuous Time Econometric Model of the United Kingdom with Stochastic Trends Albert Rex Bergstrom, Khalid Ben

Nowman,2007-04-16 This monograph presents a continuous time macroeconometric model of the United Kingdom incorporating stochastic trends It describes the model in detail to permit a rigorous mathematical analysis of its steady state and stability properties thus providing a valuable check on the capacity of the model to generate plausible long run behaviour

Economic Models of Material-Product Chains for Environmental Policy Analysis P.P. Kandelaars,2013-11-21 A theoretical and empirical contribution to the quest for sustainability and environmental quality The book examines the physical and economic aspects of flows of materials and products as well as the policies and strategies designed to reduce the related resource depletion and environmental pollution The material product chain concept forms a general framework defined as a system of linked flows of materials and products that support the provision of a certain service Various economic models of material product chains are studied both theoretical and applied such as static optimisation dynamic simulation and general equilibrium models Applications to metals rain gutters and window frames are described Audience Readers in universities research organizations and policy institutes interested in the environment economics and government policy

An Introduction to Econometrics Lawrence Robert Klein,2021-09-09 This work has been selected by scholars as being culturally important and is part of the knowledge base of civilization as we know it This work is in the public domain in the United States of America and possibly other nations Within the United States you may freely copy and distribute this work as no entity individual or corporate has a copyright on the body of the work Scholars believe and we concur that this work is important enough to be preserved reproduced and made generally available to the public To ensure a quality reading experience this work has been proofread and republished using a format that seamlessly blends the original graphical elements with text in an easy to read typeface We appreciate your support of the preservation process and thank you for being an important part of keeping this knowledge alive and relevant

Introduction and Overview of Approach to Economic Modelling ,2008 *Dynamic Linear Economic Models* James Kenkel,2018-04-09 Originally published in 1974 This book provides a rigorous and detailed introductory treatment of the theory of difference equations and their applications in the construction and analysis of dynamic economic models It explains the theory of linear difference equations and various types of dynamic economic models are then analysed Including plenty of examples of application throughout the text it will be of use to those working in macroeconomics and econometrics [An Introduction to Financial and Economic Modeling for Utility Regulators](#) Antonio Estache,2003

Bayesian Inference in Dynamic Econometric Models Luc Bauwens,Michel Lubrano,Jean-François Richard,2000-01-06 This book contains an up to date coverage of the last twenty years advances in Bayesian inference in econometrics with an emphasis on dynamic models It shows how to treat Bayesian inference in non linear models by integrating the useful developments of numerical integration techniques based on simulations such as Markov Chain Monte Carlo methods and the long available analytical results of Bayesian inference for linear regression models It thus covers a broad range of rather recent models for economic time series such as non linear models

autoregressive conditional heteroskedastic regressions and cointegrated vector autoregressive models It contains also an extensive chapter on unit root inference from the Bayesian viewpoint Several examples illustrate the methods

Introduction to Dynamic Economic Models Brian S. Ferguson,Guay C. Lim,G. C. Lim,1998 Unnecessary complexity has been avoided yet the models have been presented in the same general form as they appear in the professional literature

Modelling Spatial and Spatial-Temporal Data Robert P. Haining,Guangquan Li,2020-01-27 Modelling Spatial and Spatial Temporal Data A Bayesian Approach is aimed at statisticians and quantitative social economic and public health students and researchers who work with spatial and spatial temporal data It assumes a grounding in statistical theory up to the standard linear regression model The book compares both hierarchical and spatial econometric modelling providing both a reference and a teaching text with exercises in each chapter The book provides a fully Bayesian self contained treatment of the underlying statistical theory with chapters dedicated to substantive applications The book includes WinBUGS code and R code and all datasets are available online Part I covers fundamental issues arising when modelling spatial and spatial temporal data Part II focuses on modelling cross sectional spatial data and begins by describing exploratory methods that help guide the modelling process There are then two theoretical chapters on Bayesian models and a chapter of applications Two chapters follow on spatial econometric modelling one describing different models the other substantive applications Part III discusses modelling spatial temporal data first introducing models for time series data Exploratory methods for detecting different types of space time interaction are presented followed by two chapters on the theory of space time separable without space time interaction and inseparable with space time interaction models An applications chapter includes the evaluation of a policy intervention analysing the temporal dynamics of crime hotspots chronic disease surveillance and testing for evidence of spatial spillovers in the spread of an infectious disease A final chapter suggests some future directions and challenges

The Politics of Economic Modelling Per Kongshøj Madsen,1991

An Introductory Guide to EC Competition Law and Practice Valentine Korah,1994

An Introduction to Economic Dynamics Srinivas Raghavendra,Petri T. Piiroinen,2023-03-31 An Introduction to Economic Dynamics provides a framework for students to appreciate and understand the basic intuition behind economic models and to experiment with those models using simulation techniques in MATLAB This book goes beyond the often limited scope of other texts on economic models which have largely focused on elucidating static equilibrium models Comparative static analysis inhibits students from asking how the equilibrium position is achieved from an initial out of equilibrium position and limits their understanding of the dynamics that underlie such analysis In this textbook readers are introduced to ten well established macroeconomic models including Keynesian multiplier models Samuelson s multiplier and Solow s growth model and guided through the dynamical systems behind each model Every chapter begins with an overview of the economic problem which the model is designed to help solve followed by an explanation of the mathematics of the model Solutions are provided using simulation and visualisation techniques in

MATLAB which are interwoven organically with the analysis and are introduced in a step by step fashion to guide the reader along the way Appendices provide an introduction to MATLAB along with all the necessary codes The book is ideally suited for courses in economic dynamics macroeconomic modelling and computational economics as well as for students of finance mathematics and engineering who are interested in economic models

Introduction to the Study of Indian Economics
Vaman Govind Kale,1922

Macroeconometric Modelling and Policy Analysis ,2004

INTRODUCTION TO ECONOMIC MODELING DIANA LOUBAKI,2012-08-11 The aim of this book is the development of a universal economic theory We mean a theory based on economic problems relate to growth and development We highlight appropriate analytical tools able to unify economic study of both poor and rich countries The analysis shows first it can be established a link between growth and development economics through a well being collective criteria which guarantee a positive evolution of the economic systems over time Therefore it becomes possible to control economic paths towards their long run locus Second the analysis begins on poverty and under development dilemmas in order to highlight the mechanics which link growth and development The purpose of the analysis is the rise of standard economic development theory Hirschman 1958 Rostow 1960 Lewis 1954 which fall in the mid 1970s Krugman 1994 through its introduction in the growth literature which began with Smith 1776

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