

Discrete Choice Model Application To The Credit Risk

Choice Models in Marketing examines recent developments in the modeling of choice for marketing and reviews a large stream of research currently being developed by both quantitative and qualitative researches in marketing. Choice in marketing differs from other domains in that the choice context is typically very complex, and researchers' desire knowledge of the variables that ultimately lead to demand in marketplace. The marketing choice context is characterized by many choice alternatives. The aim of Choice Models in Marketing is to lay out the foundations of choice models and discuss recent advances. The authors focus on aspects of choice that can be quantitatively modeled and consider models related to a process of constrained utility maximization. By reviewing the basics of choice modeling and pointing to new developments, Choice Models in Marketing provides a platform for future research

'This collection of papers, by leading researchers in the field, provides an excellent view of the current state of research and applications. Exciting new techniques are presented, and realistic solutions are offered to issues that arise in applied work. It is an admirably rich volume, offering valuable insights for all readers of choice modeling.' Kenneth Train, University of California, Berkeley and NERA Economic Consulting, Inc., San Francisco, California, US 'I'm an enthusiastic fan of the ICMC, where researchers are friendly, genuinely interested in learning from and helping one another. There is much to learn because each discipline brings a different perspective to the field and to theoretical and applied problems in decision-making and choice behavior. The ICMC embodies the philosophy that most real choice problems are complex and require a cross-disciplinary approach. The papers in this volume represent an eclectic cross-section of the topics covered by key researchers in the field. I look forward to getting our PhD students and postdocs stuck into them.' Jordan Louviere, University of Technology Sydney, Australia Choice modelling has been one of the most active fields in economics over recent years. This valuable new book contains leading contributions from academics and practitioners from across the different areas of study where choice modelling is a key analytical technique, drawn from a recent international conference. Choice models explain the behaviour of individuals by quantifying their values, responses and perceptions of attributes describing the various options (alternatives) available to them. Policy makers and planners have long since recognised the potential of using choice models for guidance purposes, with applications in fields as diverse as transport analysis, healthcare, telecommunications, public service evaluation and energy. The unique mix of theoretical and applied chapters will appeal to academics, students, researchers and practitioners in various fields, as well as anyone with a general interest in the subject.

This book is a treatise on empirical microeconomics: it describes the econometric theory of qualitative choice models and the empirical practice of modeling consumer demand for a heterogeneous commodity, housing. Accordingly, the book has two parts. The first part gives a self-contained survey of discrete choice models with emphasis on nested and related multinomial logit models. The second part concentrates on three substantive questions about housing demand and how they can be answered using discrete choice models. Why combine these two distinct parts in one book? It is the interaction between theory and application in empirical microeconomics on which we focus in this book. Hence, emphasis in the methodological part is on practicability, and emphasis in the applied part is on the usage of the proper econometric specifications. Econometrics means measuring economic phenomena. Because nature (ironically, in the case of economics, this is most often the government) rarely provides us with well-defined economic experiments, measurement of economic phenomena usually requires an elaborate statistical apparatus that is able to separate concurrent and confounding phenomena. Discrete choice models have proved to be a very convenient apparatus to study the complex issues in housing demand. We present models, techniques, and statistical problems of discrete choice in the first and methodological part of the book, written in conventional textbook style.

"The discrete choice approach provides an ideal framework for describing the demands for differentiated products and can be used for studying most product differentiation models in the literature. By introducing extra dimensions of product heterogeneity, the framework also provides richer models of firm location and product selection."--BOOK JACKET.

Balancing simplicity with technical rigour, this practical guide to the statistical techniques essential to research in marketing and related fields, describes each method as well as showing how they are applied. The book is accompanied by two real data sets to replicate examples and with exercises to solve, as well as detailed guidance on the use of appropriate software including: - 750 powerpoint slides with lecture notes and step-by-step guides to run analyses in SPSS (also includes screenshots) - 136 multiple choice questions for tests This is augmented by in-depth discussion of topics including: - Sampling - Data management and statistical packages - Hypothesis testing - Cluster analysis - Structural equation modelling

This paper develops a multiple-discrete choice model for the analysis of demand of differentiated products. Users maximize profits by choosing the number of units of each brand they purchase. Multiple-unit as well as multiple-brand purchases are allowed. These two features distinguish this model from classical discrete choice models which consider only a single choice among mutually exclusive alternatives. Model parameters are estimated using the simulated method of moments technique. Both requirements - microfoundations and estimability - are imposed in order to exploit the available micro level data on personal computer purchases. The estimated demand structure is used to assess welfare gains from computerization and technological innovation in peripherals industries. The estimated return on investment in computers is 90%. Moreover, a 10% increase in the performance to price ratio of microprocessors leads to a 4% gain in the estimated end user surplus

This book addresses two significant research areas in an interdependent fashion. It is first of all a comprehensive but concise text that covers the recently developed and widely applicable methods of qualitative choice analysis, illustrating the general theory through simulation models of automobile demand and use. It is also a detailed study of automobile

demand and use, presenting forecasts based on these powerful new techniques. The book develops the general principles that underlie qualitative choice models that are now being applied in numerous fields in addition to transportation, such as housing, labor, energy, communications, and criminology. The general form, derivation, and estimation of qualitative choice models are explained, and the major models - logit, probit, and GEV - are discussed in detail. And continuous/discrete models are introduced. In these, qualitative choice methods and standard regression techniques are combined to analyze situations that neither alone can accurately forecast. Summarizing previous research on auto demand, the book shows how qualitative choice methods can be used by applying them to specific auto-related decisions as the aggregate of individuals' choices. The simulation model that is constructed is a significant improvement over older models, and should prove more useful to agencies and organizations requiring accurate forecasting of auto demand and use for planning and policy development. The book concludes with an actual case study based on a model designed for the investigations of the California Energy Commission. Kenneth Train is Visiting Associate Professor in Economics at the University of California, Berkeley, and Director of Economic Research at Cambridge Systematics, Inc., also in Berkeley. Qualitative Choice Analysis is included in The MIT Press Transportation Studies Series, edited by Marvin L. Manheim.

Research in discrete choice modeling in recent years has been focused on more flexible expansions in order to better capture taste heterogeneity. Mixed Logit models appear as a better tool than pure multinomial models to achieve such goals. By using a Monte Carlo study, this thesis tests the ability of both Mixed Logit and Mixed-Mixed Multinomial Logit models to capture possible taste variations. As empirical application, we focused on flood/hurricane insurance purchase decision-making. Using online survey data from four northeastern states in the US, we built various discrete choice models to analyze the influence of the premiums, the deductibles and other socio-demographic variables towards an individual insurance policy choice. The thesis consists of three parts: model introductions in Chapter 1, Monte Carlo simulations in Chapter 2 and insurance purchase decision-making applications in Chapter 3.

This book describes the new generation of discrete choice methods, focusing on the many advances that are made possible by simulation. Researchers use these statistical methods to examine the choices that consumers, households, firms, and other agents make. Each of the major models is covered: logit, generalized extreme value, or GEV (including nested and cross-nested logits), probit, and mixed logit, plus a variety of specifications that build on these basics. Simulation-assisted estimation procedures are investigated and compared, including maximum simulated likelihood, method of simulated moments, and method of simulated scores. Procedures for drawing from densities are described, including variance reduction techniques such as antithetics and Halton draws. Recent advances in Bayesian procedures are explored, including the use of the Metropolis-Hastings algorithm and its variant Gibbs sampling. The second edition adds chapters on endogeneity and expectation-maximization (EM) algorithms. No other book incorporates all these fields, which have arisen in the past 25 years. The procedures are applicable in many fields, including energy, transportation, environmental studies, health, labor, and marketing.

The second edition of this popular book brings students fully up to date with the latest methods and techniques in choice analysis. Comprehensive yet accessible, it offers a unique introduction to anyone interested in understanding how to model and forecast the range of choices made by individuals and groups. In addition to a complete rewrite of several chapters, new topics covered include ordered choice, scaled MNL, generalised mixed logit, latent class models, group decision making, heuristics and attribute processing strategies, expected utility theory, and prospect theoretic applications. Many additional case studies are used to illustrate the applications of choice analysis with extensive command syntax provided for all NLOGIT applications and datasets available online. With its unique blend of theory, estimation and application, this book has broad appeal to all those interested in choice modelling methods and will be a valuable resource for students as well as researchers, professionals and consultants. In recent years, airline practitioners and academics have started to explore new ways to model airline passenger demand using discrete choice methods. This book provides an introduction to discrete choice models and uses extensive examples to illustrate how these models have been used in the airline industry. These examples span network planning, revenue management, and pricing applications. Numerous examples of fundamental logit modeling concepts are covered in the text, including probability calculations, value of time calculations, elasticity calculations, nested and non-nested likelihood ratio tests, etc. The core chapters of the book are written at a level appropriate for airline practitioners and graduate students with operations research or travel demand modeling backgrounds. Given the majority of discrete choice modeling advancements in transportation evolved from urban travel demand studies, the introduction first orients readers from different backgrounds by highlighting major distinctions between aviation and urban travel demand studies. This is followed by an in-depth treatment of two of the most common discrete choice models, namely the multinomial and nested logit models. More advanced discrete choice models are covered, including mixed logit models and generalized extreme value models that belong to the generalized nested logit class and/or the network generalized extreme value class. An emphasis is placed on highlighting open research questions associated with these models that will be of particular interest to operations research students. Practical modeling issues related to data and estimation software are also addressed, and an extensive modeling exercise focused on the interpretation and application of statistical tests used to guide the selection of a preferred model specification is included; the modeling exercise uses itinerary choice data from a major airline. The text concludes with a discussion of on-going customer modeling research in aviation. Discrete Choice Modelling and Air Travel Demand is enriched by a comprehensive set of technical appendices that will be of particular interest to advanced students of discrete choice modeling theory. The appendices also include detailed proofs of the multinomial and nested logit models and derivations of measures used to represent competition among alternatives, namely correlation, direct-elasticities, and cross-elasticities.

Optimized operating conditions for complex systems can be attained by using advanced combinations of numerical and statistical methodologies. One of the most efficient and straightforward solutions relies on the application of statistical methods with an emphasis on the design of experiments (DoEs). Throughout the book, the design and analysis of experiments are conducted involving several approaches, namely, Taguchi, response surface methods, statistical correlations, or even fractional factorial and model-based evolutionary operation designs. This book not only presents a theoretical overview about the different approaches but also contains material that covers the use of the experimental analysis applied to several chemical processes. Some chapters

highlight the use of software products to assist experimenters in both the design and analysis stages. It helps graduate students, teachers, researchers, and other professionals who are interested in chemical process optimization and also provides a good basis of theoretical knowledge and valuable insights into the technical details of these tools as well as explains common pitfalls to avoid. The world's leading pharmaceutical companies and local governments are trying to achieve their eradication.

This book provides practical, research-based advice on how to conduct high-quality stated choice studies. It covers every aspect of the topic, from planning and writing the survey, to analyzing results, to evaluating quality. There is no other book on the market today that so thoroughly addresses the methodology of stated choice. Chapters are written by top-notch academics and practitioners in an accessible style, offering practical, tough advice.

This tutorial presents a hands-on introduction to a new discrete choice modeling approach based on the behavioral notion of regret-minimization. This so-called Random Regret Minimization-approach (RRM) forms a counterpart of the Random Utility Maximization-approach (RUM) to discrete choice modeling, which has for decades dominated the field of choice modeling and adjacent fields such as transportation, marketing and environmental economics. Being as parsimonious as conventional RUM-models and compatible with popular software packages, the RRM-approach provides an alternative and appealing account of choice behavior. Rather than providing highly technical discussions as usually encountered in scholarly journals, this tutorial aims to allow readers to explore the RRM-approach and its potential and limitations hands-on and based on a detailed discussion of examples. This tutorial is written for students, scholars and practitioners who have a basic background in choice modeling in general and RUM-modeling in particular. It has been taken care of that all concepts and results should be clear to readers that do not have an advanced knowledge of econometrics.

Originally published in 1981. Discrete-choice modelling is an area of econometrics where significant advances have been made at the research level. This book presents an overview of these advances, explaining the theory underlying the model, and explores its various applications. It shows how operational choice models can be used, and how they are particularly useful for a better understanding of consumer demand theory. It discusses particular problems connected with the model and its use, and reports on the authors' own empirical research. This is a comprehensive survey of research developments in discrete choice modelling and its applications.

Unobserved heterogeneity is comprehensively acknowledged as an important feature to be considered in discrete choice modeling. Over the last decade, there were abundant studies showing the great outperformance of capturing unobserved heterogeneity of Mixed-Mixed Logit(MM-MNL) models. However, most empirical researches still use mixed logit(MIXL) models or latent class(LC) models which introduced strong assumptions on distributions of marginal utility. In this dissertation, a Mixed-Mixed Logit model(MM-MNL) that assumes a non-parametric mixing distribution for marginal utility is discussed. Consequently, three empirical studies solving different transportation problems are introduced.

Panel data econometrics has evolved rapidly over the past three decades. The field is of both theoretical and practical importance, and methods to deal with micro- and macroeconomic panel data are in high demand from practitioners. Applications in finance, development, trade, marketing, health, labor, and consumer economics attest to the usefulness of these methods in applied economics. This book is a comprehensive source on panel data. It contains 20 chapters edited by Professor Badi Baltagi--one of the leading econometricians in the area of panel data econometrics--and authored by renowned experts in the field. The chapters are divided into two sections. Part I examines new developments in theory. It includes panel cointegration, dynamic panel data models, incidental parameters and dynamic panel modeling, and panel data models for discrete choice. The chapters in Part II target applications of panel data, including health, labor, marketing, trade, productivity and macro applications in panels.

It is increasingly common for analysts to seek out the opinions of individuals and organizations using attitudinal scales such as degree of satisfaction or importance attached to an issue. Examples include levels of obesity, seriousness of a health condition, attitudes towards service levels, opinions on products, voting intentions, and the degree of clarity of contracts. Ordered choice models provide a relevant methodology for capturing the sources of influence that explain the choice made amongst a set of ordered alternatives. The methods have evolved to a level of sophistication that can allow for heterogeneity in the threshold parameters, in the explanatory variables (through random parameters), and in the decomposition of the residual variance. This book brings together contributions in ordered choice modeling from a number of disciplines, synthesizing developments over the last fifty years, and suggests useful extensions to account for the wide range of sources of influence on choice.

The volume presents innovations in data analysis and classification and gives an overview of the state of the art in these scientific fields and applications. Areas that receive considerable attention in the book are discrimination and clustering, data analysis and statistics, as well as applications in marketing, finance, and medicine. The reader will find material on recent technical and methodological developments and a large number of applications demonstrating the usefulness of the newly developed techniques.

This open access book offers up-to-date advice and practical guidance on how to undertake a discrete choice experiment as a tool for environmental valuation. It discusses crucial issues in designing, implementing and analysing choice experiments. Compiled by leading experts in the field, the book promotes discrete choice analysis in environmental valuation through a more solid scientific basis for research practice. Instead of providing strict guidelines, the book helps readers avoid common mistakes often found in applied work. It is based on the collective reflections of the scientific network of researchers using discrete choice modelling in the field of environmental valuation (www.envecho.com).

Multinomial Probit

Since data grows faster than ever, the role of statistics becomes more and more crucial nowadays, and there is no doubt that statistics will be even more critical in the future. The application of statistics is extensive, and in our daily lives there is almost no human activity where the use of statistics is not needed. In this limited volume, we try to cover as many as different and multidisciplinary fields in statistics as possible and aim to present recent developments and applications of statistical analysis.

Therefore, this book is organized into three sections: "The Role of Statistics on Quantification," "Applications of Statistics on Economics and Development," and "Applications of Statistics on Various Topics."

The Handbook of Choice Modelling, composed of contributions from senior figures in the field, summarizes the essential analytical techniques and discusses the key current research issues. The book opens with Nobel Laureate Daniel McFadden calling for Discrete Choice Analysis presents these results in such a way that they are fully accessible to the range of students and professionals who are involved in modelling demand and consumer behavior in general or specifically in transportation - whether from the point of view of the design of transit systems, urban and transport economics, public policy, operations research, or systems management and planning. The methods of discrete choice analysis and their applications in the modelling of transportation systems constitute a comparatively new field that has largely evolved over the past 15 years. Since its inception, however, the field has developed rapidly, and this is the first text and reference work to cover the material systematically, bringing together the scattered and often inaccessible results for graduate students and professionals. Discrete Choice Analysis presents these results in such a way that they are fully accessible to the range of students and professionals who are involved in modelling demand and consumer behavior in general or specifically in transportation - whether from the point of view of the design of transit systems, urban and transport economics, public policy, operations research, or systems management and planning. The introductory chapter presents the background of discrete choice analysis and context of transportation demand forecasting. Subsequent chapters cover, among other topics, the theories of individual choice behavior, binary and multinomial choice models, aggregate forecasting techniques, estimation methods, tests used in the process of model development, sampling theory, the nested-logit model, and systems of models. Discrete Choice Analysis is ninth in the MIT Press Series in Transportation Studies, edited by Marvin Manheim.

This work takes a fresh and contemporary look at the growing interest in the development and application of discrete choice experiments (DCEs) within the field of health economics. The book comprises chapters by highly regarded academics with experience of applying DCEs in the area of health. Thus the book is relevant to post-graduate students and applied researchers with an interest in the use of DCEs for valuing health and health care and has international appeal.

Discrete Choice Analysis Theory and Application to Travel Demand MIT Press

This book, "Education Systems Around the World", is a collection of reviewed and relevant research chapters that offer a comprehensive overview of recent developments in the field of social sciences and humanities. The book comprises single chapters authored by various researchers and edited by an expert active in the field of social studies and humanities. All chapters are unique but are united under a common research study topic. This publication aims to provide a thorough overview of the latest research efforts by international authors on social studies and humanities, and open new possible research paths for further novel developments.

The study of differentiated-products markets is a central part of empirical industrial organization. Questions regarding market power, mergers, innovation, and valuation of new brands are addressed using cutting-edge econometric methods and relying on economic theory. Unfortunately, difficulty of use and computational costs have limited the scope of application of recent developments in one of the main methods for estimating demand for differentiated products: random coefficients discrete choice models. As our understanding of these models of demand has increased, both the difficulty and costs have been greatly reduced. This paper carefully discusses the latest innovations in these methods with the hope of (1) increasing the understanding, and therefore the trust, among researchers who never used these methods, and (2) reducing the difficulty of use, and therefore aiding in realizing the full potential of these methods.

Chapter 15 extends the networks section of the book by addressing supply chains, distribution networks and logistics. While the emphasis is on freight transportation, the principles for network design extend to other applications, such as public transportation. Chapters 16 through 18 fall in a new section on transportation economics. Chapter 16 addresses revenue management, a relatively recent topic in transportation, which has had substantial impact on the airline industry in particular. Chapter 17 presents spatial interaction models, which provide a mechanism for analyzing patterns of development.

Every one relies on some kind of transportation system nearly every day. Going to work, shopping, dropping children at school and many other cultural or social activities imply leaving home, and using some form of transportation, which we expect to be efficient and reliable. Of course, efficiency and reliability do not occur by chance, but require careful and often relatively complex planning by transportation system managers, both in the public and private sectors. It has long been recognized that mathematics, and, more specifically, operations research is an important tool of this planning process. However, the range of skills required to cover both fields, even partially, is very large, and the opportunities to gather people with this very diverse expertise are too few. The organization of the NATO Advanced Studies Institute on "Operations Research and Decision Aid Methodologies in Traffic and Transportation Management" in March 1997 in Balatonfüred, Hungary, was therefore more than welcome and the group of people that gathered for a very studious two weeks on the shores of the beautiful lake Balaton did really enjoy the truly multidisciplinary and high scientific level of the meeting. The purpose of the present volume is to report, in a chronological order, the various questions that were considered by the lecturers and the students at the institute. After a general introduction to the topic, the first week focused on issues related to traffic modeling, mostly in an urban context.

Simulation methods are revolutionizing the practice of applied economic analysis. In this book, leading researchers from around the world discuss interpretation issues, similarities and differences across alternative models, and propose practical solutions for the choice of the model and programming. Case studies show the practical use and the results brought forth by the different methods.

Multidisciplinary graduate and practitioner guide offering the theory and application of stated choice methods.

Discrete choice models and their strength to predict individual choices mostly depend on the quality of datasets that have been used for model generation. However, even the most comprehensive and detailed datasets are not able to observe all factors pertinent to someone's choice. This issue in the choice modelling literature has been addressed as unobserved heterogeneity, which means that individuals across populations are not affected identically by alternative attributes. Furthermore, such variation in preferences across populations and their sources are not always recognized by researchers. There are different methods to capture unobserved heterogeneity proposed in the discrete choice literature among which the random parameters approach, also referred to as mixed logit models, the latent class approach and the agent effect approach are the most well know methods. The main contribution of this study is to extend the formulation of LC-MMNL model to capture the agent effect by including a random term in the utility function of the model. Three types of models, Mixed Multinomial Logit (MMNL), Latent Class Mixed Multinomial Logit (LC-MMNL) and Agent Effect Latent Class Mixed Multinomial Logit (AGLC-MMNL) have been generated and the results compared. Considering agent effect simultaneously with other sources of unobserved heterogeneity in a latent class context demonstrates improvement in terms of model fit as well as cross section validation. It enables us to generate a latent class model with a larger number of classes explaining more heterogeneity across the population of a neighborhood location choice study.

The AGLC-MMNL model is able to detect four distinct classes of individuals in Montreal, exhibiting different behaviours while facing neighborhood location choices in the context of a Discrete Choice Experiment. The classes of the model are able to explain different behaviours of individuals based on their income level, whether they are transit or car oriented, and the importance of privacy to them.

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