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### **Statistical Demography and Forecasting**

JUHA M. ALHO AND BRUCE D. SPENCER

*Springer Series in Statistics*

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This book contains extensive discussions on various issues in demography with emphasis on the application of statistical models and techniques for studying these issues. It gives a fairly detailed and somewhat self-contained introduction to the relevant statistical theory and illustrates how they may be used in demographical studies. The authors state: "This book was written to bring together much of the basic statistical theory and methodology for estimating and forecasting population growth and its components of births, deaths, and migration." They have been highly successful in meeting their objective.

The book covers a variety of demographic concepts beginning with simpler topics such as cohort and case-control studies, measures of various demographic rates and life tables, and then moving on to relatively specialized topics such as demographic forecasting and associated errors, demographics of pensions and public finances, effects of errors in census on estimates and forecasts, formula-based allocation of public benefits, cost-benefit analysis of demographic data, etc. The book amply demonstrates the use of modern statistical methods in demography and highlights the fact that these methods lead to greater accuracy for measuring population rates, predicting the future and also assessing the uncertainty of the demographic estimates and forecasts.

The book is divided into twelve chapters, and the wide spectrum of topics covered is evident from some of the chapter headings, e.g., Sampling Designs and Inference, Waiting times and their Statistical Estimation, Regression models for Counts and Survival, Multistate Models and Cohort-Component Book-Keeping, Approaches to Forecasting Demographic Rates, Errors in Census Numbers, Financial Applications, Decision Analysis and Small Area Estimation. Each chapter covers a number of statistical methods in detail, and thus the reader is made familiar with a very large number of different topics in statistics such as various sampling schemes, survival analysis, gen-

eralized linear models, time series models, random walks, Markov chains, kernel smoothing, bootstrap and jackknife estimates and many others. All these could be a bit overwhelming to a reader who does not have a good statistical background. However, the topics are introduced lucidly and are accompanied by more than 150 illustrative examples and 33 figures. The empirical examples highlight interesting problems in demography and add substantially to the usefulness of the book. Each chapter ends with a number of exercises and instructive complements on special topics.

The book will be extremely useful to a statistician who wants to learn about demographic problems and study them. It is also highly recommended for demographers, actuaries, epidemiologists interested in risk assessment, economists interested in pension and health care problems, public health researchers interested in gerontology, and others who want to use statistics for studying similar problems. All the relevant statistical concepts have been defined, and their applications are explained in the book. However, a good background in statistics will be needed for a full understanding of all the material in the book. An interested reader will also benefit from the extensive list of references. Some chapters of the book could also be used as course material for graduate students in demography and statistics.

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