

## A SIMULATION MODEL FOR WELFARE POLICY ANALYSIS

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**Abstract.** This paper describes a new approach to large-scale simulation modeling for the analysis of public welfare policies. Whereas conventional microanalytic simulation models extrapolate the dynamic behavior of a representative sample of individuals in the corresponding target population, the new modeling technique disaggregates an exogenous demographic forecast into enough detail to evaluate the impact and cost of proposed social programs. This approach uses a multivariate extension of the Johnson translation system of probability distributions to estimate the percentage of individuals in a target population who satisfy given program eligibility criteria. The methodology is demonstrated as a prototype decision support system for analysis of the Institutional Care and Community Care programs of the Texas Department of Human Services.

### INTRODUCTION

Throughout the world, the need for more rigorous public policy analysis has been intensified in recent years by budget reductions and by the redefinition of national, regional, and local roles in public decision making. In developing and analyzing policy options, decision makers have been forced to consult resources with objectives and to identify those actions that most effectively contribute to solving a set of problems confronting the public. In recognition of this need, many government agencies have sought to increase their analytical capabilities. Some agencies, for the first time, have turned to computer simulation models to forecast the economic and social impact of policy alternatives.

This paper reports the results of an effort to develop a large-scale computer simulation model for the analysis of public welfare policies [1-3]. The project was a component of a major research effort directed at understanding and enhancing policy analysis in the Texas Department of Human Services (TDHS) [4]. It afforded the opportunity to work closely with agency staff in identifying managerial, technical, and political problems associated with the design and implementation of computer simulation techniques for public policy analysis.

As an alternative to traditional microanalytic simulation modeling [5, 6], we evolved a modeling technique based on disaggregation of a given demographic forecast into enough detail to evaluate the impact and cost of proposed social programs. In a study of the welfare services provided to the aged and disabled population of Texas, we implemented a prototype decision support system based on this alternative approach. The study required a method for estimating the percentage of individuals in each of 80 target populations (defined by 10 service regions and 8 age cohorts) who satisfy 3 specified program eligibility criteria. Consequently we have developed algorithms for testing and graduating trivariate data

sets based on an extension of the Johnson translation system of univariate probability distributions [7, 8].

This paper is organized as follows. The second section discusses the major decision variables and exogenous variables that are relevant to the analysis of public welfare policies. The third section surveys previous research on simulation models for welfare policy analysis. The fourth section describes our modeling approach, and the fifth section details the statistical methodology that was used to implement this approach. In the sixth section we summarize the basic findings of this research. In the Appendix we establish the fundamental results that underlie the statistical and numerical methods used in the simulation model.

### A FRAMEWORK FOR WELFARE POLICY ANALYSIS

Public agencies, particularly welfare agencies, must estimate the social impacts and costs of alternative methods of service delivery. The task of improving these forecasts is becoming more important as the use and distribution of public resources is scrutinized more closely. These forecasts are used in the political process that determines which social programs merit public funding. To the extent that these forecasts are accurate and believable, then public decision makers are able to make informed decisions about the allocation of resources. The accuracy and believability of these estimates significantly increases the credibility of an agency and the relative influence that an agency will have in the political decision process.

Two major sets of policy (decision) variables must be considered by the decision maker in analyzing alternative methods of service delivery. The first set concerns about eligibility, which is usually determined by an income needs test together with a functional needs test. In order to be eligible for welfare assistance, a person must be poor and sick, or poor and

# Microanalytic Simulation Models For Analysis Of Public Welfare Policies

**Robert E. Wright**



## **Microanalytic Simulation Models For Analysis Of Public Welfare Policies:**

Microanalytic Simulation Models for Analysis of Public Welfare Policies Robert Harris, 1978-01-01 Journal of Human Services Abstracts, 1977 *Dynamic Microsimulation for Public Policy Analysis* Jinjing Li, 2011 *Improving Information for Social Policy Decisions -- The Uses of Microsimulation Modeling* National Research Council, Division of Behavioral and Social Sciences and Education, Commission on Behavioral and Social Sciences and Education, Committee on National Statistics, Panel to Evaluate Microsimulation Models for Social Welfare Programs, 1991-02-01 This book reviews the uses and abuses of microsimulation models large complex models that produce estimates of the effects on program costs and who would gain and who would lose from proposed changes in government policies ranging from health care to welfare to taxes Volume 1 is designed to guide future investment in modeling and analysis capability on the part of government agencies that produce policy estimates It will inform congressional and executive decision makers about the strengths and weaknesses of models and estimates and will interest social scientists in the potential of microsimulation techniques for basic and applied research as well as policy uses The book concludes that a second revolution is needed to improve the quality of microsimulation and other policy analysis models and the estimates they produce with a special emphasis on systematic validation of models and communication of validation results to decision makers **Analysis Memorandum** United States. Energy Information Administration, 1978 *Microsimulation Techniques for Tax and Transfer Analysis* Gordon H. Lewis, Richard C. Michel, 1990 Analiza modelos de simulaci n sobre distintos tipos de ingresos y aspectos de los propios modelos **Simulating an Ageing Population** Anders Klevmarken, Björn Lindgren, 2008-02-29 Presents the international exchange of scientific information This series represents a range of geographic and subject matter interests in economics and includes books from various areas of macroeconomics and microeconomics **The CEPHID modelling project** Robert E. Wright, 1992 This project is a complex set of micro simulation models and databases which allows users from a wide variety of disciplines to construct and evaluate forecasts and simulations concerned with the causes and consequences of Canada's aging population Chapter 1 is a brief statement by three representatives of the major funding agencies of the project Chapter 2 is an overview of the CEPHID project Chapter 3 presents a series of projections of health status attributes of the elderly Chapter 4 describes the FADEP model which is a major component of the CEPHID project In Chapter 5 CEPHID is used to project the future needs for informal care amongst the elderly Chapter 6 shows how CEPHID can be used to examine a tightly defined problem Finally Chapters 7 and 8 look at methods of micro simulation as models to study a variety of substantive issues *Practical Microsimulation Modelling* Cathal O'Donoghue, 2021-09-23 The purpose of this book is to bring together for the first time a description and examples of the main methods used in microsimulation modelling used in the field of income distribution analysis It is structured to develop and use the different types of models used in the field with a focus on household targeted policy The book aims to provide a greater degree of codified knowledge

by providing a practical guide to developing and using microsimulation models At present the training of researchers and analysts that use and develop microsimulation modelling is done on a relatively ad hoc basis through occasional training programmes and lecture series built around lecture notes Practical Microsimulation Modelling enables a more formalised and organised approach Each chapter addresses a separate modelling approach in a similar consistent way describing in a practical way the key methodological skills for each approach

Public Policy Allan Kornberg,1989 **Improving Information for Social Policy Decisions -- The Uses of Microsimulation Modeling** Division of Behavioral and Social Sciences and Education,Commission on Behavioral and Social Sciences and Education,Panel to Evaluate Microsimulation Models for Social Welfare Programs,National Research Council,1991-02-01 This volume second in the series provides essential background material for policy analysts researchers statisticians and others interested in the application of microsimulation techniques to develop estimates of the costs and population impacts of proposed changes in government policies ranging from welfare to retirement income to health care to taxes The material spans data inputs to models design and computer implementation of models validation of model outputs and model documentation

*GIS for Sustainable Development* Michele Campagna,2005-08-29 GIS for Sustainable Development examines how GIS applications can improve collaboration in decision making among those involved in promoting sustainable development This volume reviews leading GIScience providing an overview of research topics and applications that enable GIS newcomers and professionals to apply GIScience methods to sustain

*The SAGE Handbook of Spatial Analysis* A Stewart Fotheringham,Peter A Rogerson,2008-12-22 The widespread use of Geographical Information Systems GIS has significantly increased the demand for knowledge about spatial analytical techniques across a range of disciplines As growing numbers of researchers realise they are dealing with spatial data the demand for specialised statistical and mathematical methods designed to deal with spatial data is undergoing a rapid increase Responding to this demand The Handbook of Spatial Analysis is a comprehensive and authoritative discussion of issues and techniques in the field of Spatial Data Analysis Its principal focus is on why the analysis of spatial data needs separate treatment the main areas of spatial analysis the key debates within spatial analysis examples of the application of various spatial analytical techniques problems in spatial analysis areas for future research Aimed at an international audience of academics The Handbook of Spatial Analysis will also prove essential to graduate level students and researchers in government agencies and the private sector

*Distributional Impacts* Robert H. Haveman,Kevin Hollenbeck,2013-09-25 Microeconomic Simulation Models for Public Policy Analysis Volume 1 Distributional Impacts is a collection of papers presented at a conference of the same title held in Washington D C in March 1978 This collection discusses extended micro data models for first round distributional analysis models that incorporate behavioral responses to the policies being stimulated models of macroeconomics and models that have sectorial or regional impacts One paper explains that increasing support for the negative income tax scheme can result in bigger increase in the budgetary cost

of the program itself Another paper evaluates the Kasten Greenberg Betson program as useful for policymakers to determine the distributional consequences of any proposed changes in policy in welfare reforms With the oil embargo and energy crisis in the U S one author presents a model to measure the impacts these events have on energy consumers especially on the lower income group Such model employs a comprehensive human resources data system that measures the distributional impacts of energy policies This book is beneficial for policy makers and regulators involved in economic and public services This book can also help sociologists and academicians in the field of political science and developmental studies

*Handbook of Microsimulation Modelling* Cathal O'Donoghue, 2014-11-06 Microsimulation Modelling involves the application of simulation methods to micro data for the purposes of evaluating the effectiveness and improving the design of public policy The field has been applied to many different policies within both government and academia This handbook describes and discusses the main issues within the field

**Compendium of HHS Evaluations and Relevant Other Studies** HHS Policy Information Center (U.S.), 1990 [Applied Poverty Research](#) Richard Goldstein, Stephen M. Sachs, 1984 No descriptive material is available for this title

**Social Science Microsimulation** Klaus G. Troitzsch, 1996-09-17 This book gives an overview of the state of the art in five different approaches to social science simulation on the individual level The volume contains microanalytical simulation models designed for policy implementation and evaluation multilevel simulation methods designed for detecting emergent phenomena dynamical game theory applications the use of cellular automata to explain the emergence of structure in social systems and multi agent models using the experience from distributed artificial intelligence applied to special phenomena The book collects the results of an international conference which brought together social scientists and computer scientists both engaged in a wide range of simulation approaches for the first time

*Data, Linkages, and Models* Kenneth Hanson, 1989 *Information Systems in the Political World* K. V. Andersen, 1995 This text investigates the nature of impacts of information systems on the political world in the First World countries The overall aim is to provide a framework on how to analyze implications of information technology IT on the political world and vice versa This is illustrated by a study of economic modelling at the central and local levels of government

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