Discourse on Social Planning under Uncertainty

Economists have long studied policy choice by social planners aiming to maximize population welfare. Whether performing theoretical studies or applied analyses, researchers have generally assumed that the planner knows enough about the choice environment to be able to determine an optimal action. However, the consequences of decisions are often highly uncertain. *Discourse on Social Planning under Uncertainty* addresses the failure of research to come to grips with this uncertainty. Combining research across three fields – welfare economics, decision theory, and econometrics – this impressive study offers a comprehensive treatment that fleshes out a "worldview" and juxtaposes it with other viewpoints. Building on multiple case studies ranging from medical treatment to climate policy, the book explains analytical methods and how to apply them, providing a foundation on which future interdisciplinary work can build.

Charles F. Manski is Board of Trustees Professor in the Department of Economics and Institute for Policy Research at Northwestern University. He is a member of the National Academy of Sciences and Fellow of the American Academy of Arts and Sciences, the Econometric Society, the American Statistical Association, and the British Academy. His research spans econometrics, judgment and decision, and analysis of public policy.

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CHARLES F. MANSKI
Northwestern University

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Preface

This work has emerged from an intellectual journey that has spanned over fifty years. In retrospect, I see that the long duration was inevitable. I could not have written the book earlier because it combines research and thinking in three fields – welfare economics, decision theory, and econometric analysis of partial identification – that developed separately from one another and in different time periods.

Welfare economic study of social planning began in the late 1700s, was formalized in the mid 1900s, and then progressed for several decades as a central concern of economics, but the subject has more recently become peripheral to the profession. Decision theoretic study of choice under uncertainty has advanced steadily since the mid 1900s, initially focusing on expected-utility maximization, and more recently on approaches to decision making under ambiguity (aka deep uncertainty). Econometric study of partial identification had isolated precursors in the 1930s and 1940s, but it developed into a coherent subject of analysis only from the 1990s onwards.

Different researchers have worked in these fields, so it is not surprising that they developed separately. Of particular importance is that welfare economics has primarily studied deterministic environments, whereas decision theory and econometrics are fundamentally concerned with uncertainty. I began to recognize the cross-field synergies around 2000. Since then, I have sought to build connections and to make the results useful to specific domains of planning. My integration of three disparate fields is unusual, so it may benefit readers if I sketch how my research has evolved.

I was introduced to welfare economics by Jerome Rothenberg, my undergraduate advisor at the Massachusetts Institute of Technology

(MIT) in the late 1960s. I learned directly from him and from his book *The Measurement of Social Welfare* (Rothenberg, 1961). When I began my PhD at MIT in fall 1970, I anticipated that I would do research on public economics. In my second year, I enrolled in the yearlong course sequence, one semester taught by Peter Diamond and the other by E. Cary Brown. The two semesters could not have been more different. Diamond was in the midst of his joint research on optimal income taxation with James Mirrlees, who was visiting MIT at the time. The two gave the lectures, focusing on their work in progress. The presentation was highly technical, to the extent that my difficulty with the math impeded my appreciation of basic concepts. In sharp contrast, Brown exemplified an earlier tradition in public economics whose concerns were closer to real-world public policy but whose methodologies were too heuristic for me to be able to distinguish firm conclusions from conjecture.

Finding myself uncomfortable with both polar approaches, I abandoned public economics as a focus for my research. Instead, I was attracted to econometrics. I learned the classical body of work on identification of simultaneous equations systems from Franklin Fisher. I was intrigued with the central inferential problem, but I was not enamored by the linear algebra brought to bear to study it. I was excited to learn the then brand new subject of discrete choice analysis from Daniel McFadden, who visited for a period and gave lectures. I subsequently wrote my PhD dissertation on the theory and application of discrete choice analysis.

As an econometrician, my research has emphasized analysis of identification much more than statistical inference. From the late 1980s onward, I have almost exclusively studied settings with partial identification. With scattered exceptions, previous econometric research had studied settings with point identification, which combine strong data and assumptions. In these settings, the only source of uncertainty faced in empirical research is the statistical imprecision of inference from finite data samples, which disappears as sample size grows. Research on partial identification studies settings which combine weaker data and assumptions, ones in which uncertainty persists even as sample size grows. Such settings are the norm when realistically available data are combined with credible assumptions. The analysis seeks to determine what one can learn when statistical imprecision disappears. Although one cannot learn the exact value of a population feature of interest, one may be able to learn that the feature lies in an informative set of possible values. The aim is to characterize this set.

Identification has been a central issue in empirical research on treatment response, which seeks to draw conclusions from observational data and from randomized experiments. A core objective of research on treatment response has been to inform decision making by a social planner who chooses treatments for a population of interest. I first connected econometric study of identification to welfare economic study of planning under uncertainty in my article, "Identification Problems and Decisions Under Ambiguity: Empirical Analysis of Treatment Response and Normative Analysis of Treatment Choice" (Manski, 2000). I sketched the basic problem: Combining available data with credible assumptions commonly does not reveal whether one treatment outperforms another in terms of the social welfare it yields. I recognized that, when this occurs, a planner faces a problem of decision making under ambiguity. The statistical imprecision of inference using finite samples adds further uncertainty to social planning. To cope with the latter problem, I brought to bear statistical decision theory in Manski (2004b).

From these beginnings, I have developed a program of research concerned with planning under uncertainty, embodied in numerous articles published in diverse academic journals. Some of this work has been abstract, using modern economics, econometrics, and decision theory to study general conceptual and technical issues. Some has analyzed specific planning problems, including decisions faced in policing, climate policy, and especially medical treatment of patients. I have exposited aspects of my work in two nontechnical books. *Public Policy in an Uncertain World* (Manski, 2013c) aims to make basic themes accessible to policy analysts, journalists, and the educated public. *Patient Care under Uncertainty* (Manski, 2019b) applies the themes to medical decision making, aiming to communicate with clinical researchers, public health analysts, and clinicians engaged in patient care.

Why then this new book? The two earlier books gave elementary discussions of planning under uncertainty. Here I offer a comprehensive treatment, a treatise. I expect the primary readers to be scholars and students who study public and welfare economics, mechanism design and decision theory, econometrics and statistics, operations research and systems analysis, moral philosophy and ethics. These fields of inquiry connect to planning under uncertainty in various ways. Yet they have interacted little with one another, no doubt a consequence of the prevailing siloing of academic disciplines. Research published piecemeal in concise journal articles mainly communicates within fields, not across them. A book provides the opportunity to flesh out a worldview and

juxtapose it with other viewpoints. It gives the space to explain analytical methods and show how to apply them. A book provides a foundation on which future work can build.

While writing the book, I benefited from the opportunity to lecture on some of the material in a masterclass at University College London and in my presentation of the Marshall Lectures at the University of Cambridge, both in November 2023. I subsequently used a draft of the book as the primary source material for a PhD field course at Northwestern University in winter 2024. Throughout the entire process of developing the book, I have benefited from stimulating discussions of social planning, both general principles and specific aspects, with my good friend Joram Mayshar.