PREFACE

The first major study of air pollution emissions in the United States was undertaken in the St. Louis region as a cooperative effort by federal, state, and local agencies. While still in mimeograph form, this study was made available to me and provided a data base for a linear programming model of air pollution control. The basic structure of that model was developed in my doctoral dissertation.

This research continued for seven years. The original data base was augmented as new aspects of air pollution abatement were examined. Some of the results of this research have been published in articles appearing in journals and conference volumes from 1970 through 1977. Each of these publications is based on a different extension of the model, incorporating additional data. Nowhere have the results of these individual extensions been interrelated; this is one of the objectives of the present volume. Another objective is to incorporate the linear programming model of air pollution control into the context of a general equilibrium analysis, in which the results have welfare economic implications. In this broader perspective the research takes on new meaning and some of the results that had gone unnoticed are found to be important.

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A number of colleagues contributed to the development of this model. These include the editors of journals, their referees, and the discussants who have seen pieces of the model and whose comments have opened up new paths and directions. I am grateful to John Kenneth Gohagen of Washington University for his in-depth review of this manuscript. His suggestions and his influence are reflected in every chapter. I have also benefited from the help of David Ault, Donald Aucamp, David Harrison, Jr., Jerome Hollenhorst, Karlyn Klopmeier, Richard Parker, and other colleagues. The students in my graduate economics seminar and in the environmental studies program at Southern Illinois University used a preliminary version of this book as a text and provided a number of useful ideas. I am grateful to Gloria Horkits, Virginia Schneider, and Lisa Wyatt for typing successive drafts with enduring patience. Finally, I thank my wife Martha for her support

and encouragement.

This book is written for economists, air pollution control planners, and for engineers and mathematicians who are interested in the application of linear programming to social problems. For readers who are planning to implement similar models in other airsheds, this book anticipates many of the problems they are likely to encounter and illustrates the richness of results that can be obtained.