Preface

This book consolidates and summarizes the results of an econometric study of the characteristics of world energy demand. Since the resources available for this study were limited, the scope of the study also had to be limited. Attention was focused on particular sectors of energy use (primarily the residential and industrial sectors, although some work was also done on the transportation sector), models were designed primarily to elicit information about the long-run structure of demand, with only limited attention given to the dynamic adjustment of demand in response to changing prices or income, and most of the empirical estimation and hypothesis testing was done for a limited set of industrialized countries (although some models were also estimated using data for a broader set of both industrialized and less developed countries).

Despite these and other limitations, these results should contribute to our understanding of the structure of energy demand. In addition, they may help to resolve such issues as the extent to which energy demand in the long run is responsive to price changes, the possibilities for interfuel substitution, the substitutability of energy with other factors of industrial production, the impact of energy price changes on macroeconomic output, and the ways in which energy demand differs in the industrialized versus the less developed countries. These issues have been the subject of considerable debate in recent years and are important to the design of both energy and economic policy.

This study itself was conducted as part of a larger project at MIT to develop analytical models of the world oil market. Several of the sectoral demand models constructed here have become part of a large simulation model of the oil market; that larger model describes world oil demand, competitive oil supplies, and the production capacities of the OPEC cartel countries.

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This study relied extensively on the research assistance of a number of MIT graduate students and Energy Laboratory staff members. The estimation of our demand models required the assembling, organizing, and documenting of a large and comprehensive database. The data-gathering effort was begun by Ken Flamm and Dan Duboff, then graduate students in the Economics Department and Sloan School, respectively. The final organization and documentation of the database was carried out by Jacqueline Carson, a staff member of the Energy Laboratory. Kevin Lloyd and Eric Rosenfeld, Sloan School graduate students, and Jeff Ward, an Economics Department graduate student, devoted a considerable amount of time to setting up and carrying out the estimations of the translog and other models of residential and industrial demands. Ross Heide estimated the models of energy demand in the developing countries, and, as part of his Sloan School Master's thesis, constructed the models of energy demand in the transportation sector. Finally, Wayne Christian and Vinod Dar carried out much of the testing and validation of the models, and developed the computer framework for their integration into the simulation model of the world oil market. The help of all of these individuals is greatly appreciated.

The computational work for this study was performed on MIT's IBM 370 computer, using TROLL, a system for the estimation and simulation of econometric models. TROLL is maintained by the Center for Computational Research in Economics and Management Science in the Sloan School of Management, and members of the staff of that Center provided invaluable assistance in the use of the system.

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