

General equilibrium model for development policy

KEMAL DERVIŞ
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SHERMAN ROBINSON

The bottom half of the cover features a dark brown background with several thick, wavy, horizontal lines in a lighter orange-brown color, creating a rhythmic, undulating pattern.

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*The World Bank
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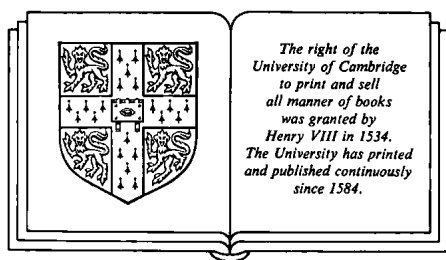
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WITH A FOREWORD BY HOLLIS CHENERY



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Foreword

The analysis of development policy has evolved through the interactions between development theories and their application to varied countries and problems. This process has been facilitated by the rapid accumulation of information on developing economies and the better identification of constraints on the development process and the policy instruments available to governments. In the course of this evolution there has been a shift in emphasis away from planning techniques to models that can simulate the functioning of mixed economies in which policies are implemented largely through market mechanisms.

The heart of the development problem is the relation among resource allocation decisions in different sectors of the economy. Early formulations of this problem were based on simple extensions of the Leontief input-output system. These led to the accumulation of data on the relations among economic sectors, which has in turn made possible the formulation of more complex analytical systems. In this way, general equilibrium models that were being tested only in experimental forms ten years ago have evolved into tools that can be used in a variety of practical applications.

The work of Derviş, de Melo, and Robinson represents a substantial advance in this direction, both in the systematic formulation of computable general equilibrium models and in their application to the policy problems of individual countries. The authors' theoretical approach has been refined in a series of applications to problems ranging from the response to rising energy prices to long-term structural change and income distribution. As a result of extensive testing of alternative methods, they are able to show the advantages and limitations of more complex general equilibrium formulations in comparison to simpler forms of interindustry analysis.

The present work is one of a series of studies supported by the World Bank research program that are designed to contribute to the methodology and use of policy analysis.

HOLLIS CHENERY
Vice-president, Development Policy
The World Bank

Preface

Recent years have seen a great deal of effort focused on building applied general equilibrium models to support the formulation and conduct of economic policy in developing countries. This work is in the tradition of the earlier input-output and linear programming “planning models” pioneered in the 1950s and 1960s by Leontief, Chenery, and others. The more recent work focuses explicitly on the mixed-market nature of most developing economies. Instead of describing the problem from the point of view of a planner able to determine economic quantities as part of a centrally determined optimal plan, the emphasis has shifted to modeling the market mechanism, including special institutional features and distortions, as it operates in actual, always partially decentralized, economies.

Our basic objective in this book is to present the theoretical structures underlying these applied models and hence to clarify their relationship to economic theory, particularly general equilibrium, growth, and trade theory. We thus attempt to establish a more structured framework for the applied model builder, analyzing the various stages of multisector model building from static input-output models with fixed prices to dynamic computable general equilibrium models with endogenous price determination and an elaborate treatment of trade and income distribution. Paralleling the theoretical discussion, we present a series of empirical applications that illustrate how applied general equilibrium models can be used in policy analysis. Our particular applications are concerned with questions of growth and structural change, the choice of foreign exchange regime, and the impact of different development strategies on the distribution of income.

Our collaboration over the years has greatly benefited from the facilities and support of a number of institutions. In the early phases, the Research Program in Development Studies at Princeton University provided a congenial atmosphere and generous support. The presentation of the material has also benefited from student reactions to courses taught at Georgetown, Johns Hopkins, Princeton, and Middle East Technical Universities. Some of our work was financially supported by the Agency for International Development. However, the bulk of the

study was completed at the World Bank, which provided much of the stimulus for our work. In particular, two research projects at the Bank have provided the material for most of the empirical applications: (1) "A Comparative Study of the Sources of Industrial Growth and Structural Change" (World Bank reference RPO 671-32) and (2) "The Sources of Growth and Productivity Change: A Comparative Analysis" (RPO 671-79).

Hollis Chenery and Larry Westphal have, over the past few years, provided inspiration, criticism, and sustained encouragement. Their support was always available when it was most needed. In addition, we owe a general intellectual debt to Hollis Chenery. Indeed, much of what we have done can be seen as an attempt to pull together and build on the various strands of his work on multisector models over the past twenty years.

Throughout the drafting we have profited from the comments and criticisms of a number of colleagues. In particular, we would like to thank Irma Adelman, Bela Balassa, Michael Bruno, Merih Celasun, Shanta Devarajan, Peter Dixon, Vinod Dubey, Alan Gelb, Victor Ginsburgh, Wafik Grais, Timur Kuran, Thomas McCool, Martha de Melo, Joan Nelson, Graham Pyatt, Lance Taylor, Laura Tyson, Jean Waelbroeck, and Adrian Wood. We owe a special debt of gratitude to Anne Krueger, who read the entire draft of the book. Her queries and suggestions, both on substance and exposition, have greatly improved the product. Murat Köprülü, Maria Kutcher, Jeffrey Lewis, and Narayana Poduval have supported our work through their exceptionally skillful and dedicated research assistance. For their help and patience in typing the various drafts of the manuscript, we thank Nenita Bencio, Isabelle Kim, Robert Kisch, and Kim Tran. From Cambridge University Press we have had both encouragement and substantive support. Finally, we owe an enormous debt of gratitude to our wives, Neslihan, Martha, and Barbara, who have tolerated the inordinate demands on our time over the past few years. This book could not have been written without the support of all those teachers, colleagues, friends, and family mentioned above. The responsibility for the views expressed herein, including any errors, remains, of course, solely ours.

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Introduction

1.1 Introduction

Currently developed countries required a century to industrialize. This transformation, which Kuznets (1966) calls “modern economic growth,” involves large and systematic shifts in the structure of production, demand, employment, investment, and trade. Today, some fast-growing developing countries are achieving a similar transformation in a quarter of a century. Both the speed and systematic nature of this transformation implies that sectors cannot be considered in isolation from one another. Bottlenecks arise, and it is necessary to view the economy at a sufficiently disaggregated level to reflect important differences in production and trade structures. Furthermore, this complex transformation process depends jointly on both domestic policies and external events, including changes in international prices and access to markets in developed countries. Structural adjustment to external events is an important feature of development policy.

In understanding and managing structural change, multisector models have provided an especially useful framework. Such models incorporate production at a level of aggregation that permits the analysis of structural change and also captures the essential interdependent nature of production, demand, and trade within a general equilibrium system. Whereas the earlier input-output models could capture only very simple general equilibrium relationships, more recent models are able to incorporate market mechanisms and policy instruments that work through price incentives. In virtually all modern countries, development takes place within the structure of a mixed-market economy, so it is important for models to capture the relevant market mechanisms.

This book concerns the application of multisector, general equilibrium models. The more theoretical chapters aim to provide the reader with an understanding of the nature of these models and their links to economic theory. The chapters devoted to cross-country applications show how multisector models can capture the diversity in economic conditions across countries and how this diversity can affect a country's development strategy. The chapters devoted to applications within par-