

Cambridge University Press

978-1-107-01169-4 — Dynamic Modeling and Applications for Global Economic Analysis

Edited by Elena Ianchovichina, Terrie L. Walmsley

Frontmatter

[More Information](#)

DYNAMIC MODELING AND APPLICATIONS FOR GLOBAL ECONOMIC ANALYSIS

A sequel to *Global Trade Analysis: Modeling and Applications* (Cambridge University Press, 1997, edited by Thomas W. Hertel), this book presents the technical aspects of the Global Trade Analysis Program's global dynamic framework (GDyn) and its applications within important global policy issues. The book covers a diverse set of topics including trade reform, growth, investment, technology, demographic change, and the environment. Environmental issues are particularly well suited for analysis with GDyn, and this book covers its uses with climate change, resource use, and technological progress in agriculture. Other applications presented in the book focus on integration issues such as rules governing foreign investment, e-commerce regulations, trade in services, harmonization of technical standards, sanitary and phytosanitary regulations, streamlining of customs procedures, and demographic change and migration.

Elena I. Ianchovichina is Lead Economist for the Middle East and North Africa region of The World Bank. Since joining The World Bank in 2000, she has served in its Research Department, East Asia and Pacific Region, and managed the Economic Policy and Debt Department's program on inclusive growth. Her work has focused on country-specific analyses of economic growth, emerging Asia, and fiscal and trade reform. Dr. Ianchovichina has published more than twenty articles in a variety of journals, including the *Canadian Journal of Economics*, *Contemporary Economic Policy*, *Review of International Economics*, *World Bank Economic Review*, and *Ecological Economics*. She received Purdue University's 2008 Apex award for outstanding contributions to quantitative trade analysis.

Terrie L. Walmsley is an Associate Professor at Purdue University and a Principal Fellow and Associate Professor at the University of Melbourne, Australia. Dr. Walmsley is also the Director of the Center for Global Trade Analysis, the Purdue home of the Global Trade Analysis Project, a global network of 8,500 researchers from 150 countries (www.gtap.org). Dr. Walmsley leads the construction of the GTAP Data Base, a global database used worldwide to examine the impact of international trade and environmental policies. Her research has focused on international trade in goods and services and the movement of capital and labor across national boundaries; it has been used extensively by The World Bank.

Cambridge University Press

978-1-107-01169-4 — Dynamic Modeling and Applications for Global Economic Analysis

Edited by Elena Ianchovichina , Terrie L. Walmsley

Frontmatter

[More Information](#)

Dynamic Modeling and Applications for Global Economic Analysis

Edited by

ELENA I. IANCHOVICHINA

The World Bank

TERRIE L. WALMSLEY

Purdue University and University of Melbourne, Australia



CAMBRIDGE
UNIVERSITY PRESS

Cambridge University Press

978-1-107-01169-4 — Dynamic Modeling and Applications for Global Economic Analysis

Edited by Elena Ianchovichina , Terrie L. Walmsley

Frontmatter

More Information

CAMBRIDGE
UNIVERSITY PRESS

University Printing House, Cambridge CB2 8BS, United Kingdom

One Liberty Plaza, 20th Floor, New York, NY 10006, USA

477 Williamstown Road, Port Melbourne, VIC 3207, Australia

314-321, 3rd Floor, Plot 3, Splendor Forum, Jasola District Centre, New Delhi - 110025, India

103 Penang Road, #05-06/07, Visioncrest Commercial, Singapore 238467

Cambridge University Press is part of the University of Cambridge.

It furthers the University's mission by disseminating knowledge in the pursuit of education, learning and research at the highest international levels of excellence.

www.cambridge.org

Information on this title: www.cambridge.org/9781107011694

© Cambridge University Press 2012

This publication is in copyright. Subject to statutory exception and to the provisions of relevant collective licensing agreements, no reproduction of any part may take place without the written permission of Cambridge University Press.

First published 2012

A catalogue record for this publication is available from the British Library

Library of Congress Cataloging in Publication data

Dynamic modeling and applications for global economic analysis /
[edited by] Elena Ianchovichina, Terrie Walmsley.

p. cm.

Includes bibliographical references and index.

ISBN 978-1-107-01169-4 (hardback) – ISBN 978-1-107-00243-2 (paperback)

1. International trade – Mathematical models. 2. International economic relations – Mathematical models. 3. International trade.

4. International economic relations. I. Ianchovichina, Elena.

II. Walmsley, Terrie Louise. III. Title.

HF1379.D957 2011

337.01'5195-dc23 2011025080

ISBN 978-1-107-01169-4 Hardback

ISBN 978-1-107-00243-2 Paperback

Cambridge University Press has no responsibility for the persistence or accuracy of URLs for external or third-party internet websites referred to in this publication, and does not guarantee that any content on such websites is, or will remain, accurate or appropriate.

Contents

<i>Contributors</i>	<i>page vii</i>
<i>Acknowledgments</i>	<i>ix</i>
PART I INTRODUCTION AND OVERVIEW	
1 Introduction <i>Elena I. Ianchovichina</i>	3
PART II STRUCTURE OF THE DYNAMIC GTAP FRAMEWORK	
2 Theoretical Structure of Dynamic GTAP <i>Elena I. Ianchovichina and Robert A. McDougall</i>	13
3 Behavioral and Entropy Parameters in the Dynamic GTAP Model <i>Alla Golub and Robert A. McDougall</i>	71
4 An Overview of the Dynamic GTAP Data Base: The Data Base Construction and Aggregation Programs <i>Robert A. McDougall, Terrie L. Walmsley, Alla Golub, Elena I. Ianchovichina, and Ken Itakura</i>	120
5 A Baseline Scenario for the Dynamic GTAP Model <i>Terrie L. Walmsley, Betina V. Dimaranan, and Robert A. McDougall</i>	136
6 Welfare Analysis in the Dynamic GTAP Model <i>Terrie L. Walmsley, Robert A. McDougall, and Elena I. Ianchovichina</i>	158
7 Implementing the Dynamic GTAP Model in the RunDynam Software <i>Ken Itakura, Elena I. Ianchovichina, Csilla Lakatos, and Terrie L. Walmsley</i>	173

PART III APPLICATIONS OF DYNAMIC GTAP		
8	Assessing the Impact of China's WTO Accession on Investment <i>Terrie L. Walmsley, Thomas W. Hertel, and Elena I. Ianchovichina</i>	205
9	Dynamic Effects of the "New-Age" Free Trade Agreement between Japan and Singapore <i>Thomas W. Hertel, Terrie L. Walmsley, and Ken Itakura</i>	235
10	Resource Use and Technological Progress in Agriculture <i>Elena I. Ianchovichina, Roy Darwin, and Robin Shoemaker</i>	269
11	Global Economic Integration and Land-Use Change <i>Alla Golub and Thomas W. Hertel</i>	290
12	The Contribution of Productivity Linkages to the General Equilibrium Analysis of Free Trade Agreements <i>Ken Itakura, Thomas W. Hertel, and Jeffrey J. Reimer</i>	312
13	Global Demographic Change, Labor Force Growth, and Economic Performance <i>Rod Tyers and Qun Shi</i>	342
PART IV EVALUATION OF THE DYNAMIC GTAP FRAMEWORK		
14	Household Saving Behavior in the Dynamic GTAP Model: Evaluation and Revision <i>Alla Golub and Robert A. McDougall</i>	379
15	Implications for Global Economic Analysis <i>Elena I. Ianchovichina and Terrie L. Walmsley</i>	406
	Appendix: Negative Investment: Incorporating a Complementarity into the Dynamic GTAP Model <i>Terrie L. Walmsley and Robert A. McDougall</i>	413
	Glossary of GDyn Notation <i>Terrie L. Walmsley</i>	421
	<i>Index</i>	429

Contributors

Elena I. Ianchovichina (The World Bank, USA)

Robert A. McDougall (Purdue University, USA)

Terrie L. Walmsley (Purdue University, USA, and University of Melbourne, Australia, Australia)

Roy Darwin (U.S. Department of Agriculture, USA)

Betina V. Dimaranan (IFPRI, USA)

Alla Golub (Purdue University, USA)

Thomas W. Hertel (Purdue University, USA)

Ken Itakura (Purdue University, USA)

Csilla Lakatos (Purdue University, USA)

Jeffrey J. Reimer (University of Wisconsin, USA)

Qun Shi (Australian National University, Australia)

Robin Shoemaker (U.S. Department of Agriculture, USA)

Rod Tyers (University of Western Australia, Australia)

Acknowledgments

We would like to thank a number of individuals for their help in making this book a reality. The dynamic GTAP work builds on the intellectual accomplishments of the GTAP project, and we are indebted to the many individuals who have contributed to GTAP over the years. We also recognize that the dynamic GTAP project would not have become a reality without the unwavering support of Professor Thomas W. Hertel – the founder of the GTAP project – who encouraged and steered this work in the right direction from the very beginning.

We are grateful to several individuals for their advice and guidance in the early stages of the dynamic GTAP project. We were fortunate to have Robert A. McDougall on the dynamic GTAP team. His leadership and vast technical expertise were invaluable. Philippa Dee encouraged us to embark on this work because she foresaw the appeal of a dynamic GTAP version to analysts of a wide range of global economic policy issues. As in the case of GTAP, Alan Powell was generous with his time and support, whereas Ken Pearson and Mark Horridge helped us operationalize the dynamic model and address GEMPACK and other software issues.

Over the years a number of researchers contributed to this project in different ways. Ken Itakura worked on updating the tab file to match the GTAP v6.2 tab file, whereas Csilla Lakatos developed postsimulation processing programs. We are grateful to the instructors of and participants in the dynamic GTAP short courses held at Purdue University in 2000, 2006, 2008, and 2010. These courses provided an opportunity for fruitful exchanges on important research questions concerning the theory behind the model and many of the applications discussed in this book. We would like to recognize in particular Robert A. McDougall, Anna Strutt, Thomas W. Hertel, Alla Golub, Csilla Lakatos, Ken Itakura, Amer Ahmed, Angel Aguiar, Peter Minor, Peter Dixon, and Kevin Hanslow. Finally, we are grateful to the three anonymous reviewers for their useful insights and comments.