

Development

Economics

Debraj Ray

Advance Praise for

Development Economics

“An elegant, insightful, and extremely effective textbook on development economics. It combines astute theoretical reasoning with a firm grip on empirical circumstances, including institutional possibilities and limitations. There is real originality here without sacrificing usefulness and accessibility.”

—Amartya Sen, *Harvard University*

“The best textbooks spring from a coherent intellectual vision and a deeply felt passion. Debraj Ray’s *Development Economics* is such a book.”

—Paul Romer, *Stanford University*

“Debraj Ray has written a splendid book that brings a unified intellectual framework to the myriad disparate topics that constitute development economics. Here is a lucid exposition of modern economic theory in its application to development problems that will be an essential text for advanced undergraduate courses, as well as a basic prerequisite for graduate studies.”

—Angus Deaton, *Princeton University*

“Debraj Ray has written an innovative and accessible book on development that is sure to become widely used. By integrating the latest trends in economic theory—information asymmetry, contracts, risk bearing—he has provided the best evidence that development economics is a part of economics and not an orphan subject. His style is clear and his ability to explain the most technical topics in reader-friendly style is most uncanny.”

—Lord Desai, *London School of Economics*

“I used this book to teach development economics to upper-level undergraduates and, for the first time in my years of teaching this kind of class, I felt that I was using a textbook that could convey to the students why they should be excited about what has happened in this field in the last twenty-five years.”

—Abhijit V. Banerjee, *Massachusetts Institute of Technology*



Development Economics

Debraj Ray

PRINCETON UNIVERSITY PRESS
PRINCETON, NEW JERSEY

Copyright © 1998 by Princeton University Press
Published by Princeton University Press, 41 William Street, Princeton, New Jersey 08540
In the United Kingdom: Princeton University Press, Chichester, West Sussex

All rights reserved

Library of Congress Cataloging-in-Publication Data

Ray, Debraj.

Development economics / Debraj Ray.

p. cm.

Includes bibliographical references and index.

ISBN 0-691-01706-9 (cl : alk. paper)

1. Development economics. I. Title.

HD75.R39 1998

338.9--dc21 97-33459

This book has been composed in Palatino

Princeton University Press books are printed on acid-free paper and meet the guidelines for permanence and durability of the Committee on Production Guidelines for Book Longevity of the Council on Library Resources

<http://pup.princeton.edu>

Printed in the United States of America

10 9 8 7 6 5 4 3 2 1

Development Economics

For my parents, Radha and Kalyan

Preface

This book provides an introduction to *development economics*, a subject that studies the economic transformation of developing countries. My objective is to make a large literature accessible, in a unified way, to a student or interested individual who has some training in basic economic theory. It is only fair to say that I am not fully satisfied with the final product: in attempting to provide a well-structured treatment of the subject, I have had to sacrifice comprehensiveness. Nevertheless, I do believe that the book goes quite far in attaining the original objective, within the limitations created by an enormous and unwieldy literature and the constraints imposed by my own knowledge and understanding.

The primary target for this book is the senior undergraduate or masters level student with training in introductory or intermediate economic theory. I also recommend this book as background or supplementary reading for a doctoral course in development economics, along with the original articles on the subject.

Mathematical requirements are kept to a minimum, although some degree of mathematical maturity will assist understanding of the material. In particular, I have eschewed the use of calculus altogether and have attempted to present theoretical material through verbal argument, diagrams, and occasionally elementary algebra. Because the book makes some use of game-theoretic and statistical concepts, I have included two introductory appendixes on these subjects. With these appendixes in place, the book is self-contained except for occasional demands on the reader's knowledge of introductory economic theory.

I begin with an overview of developing countries (Chapter 2). I discuss major trends in per capita income, inequality, poverty, and population, and take a first look at the important structural characteristics of development. Chapters 3–5 take up the study of economic growth from several aspects.

Chapters 6–8 shift the focus to an analysis of *unevenness* in development: the possibility that the benefits of growth may not accrue equally to all. In turn, these inequalities may influence aggregate trends. This interaction is studied from many angles. Chapter 9 extends this discussion to population growth, where the relationship between demography and economics is explored in some detail.

Chapter 10 studies unevenness from the viewpoint of structural transformation: the fact that development typically involves the ongoing transfer of resources from one sector (typically agriculture) to another (typically industry and services). This chapter motivates a careful study of the agricultural sector, where a significant fraction of the citizens of developing countries, particularly the poor, live and work.

Chapters 11–15 study informal markets in detail, with particular emphasis on the rural sector. We analyze the land, labor, credit and insurance markets.

Chapter 16 introduces the study of trade and development. Chapter 17 motivates and studies the instruments of trade policy from the point of view of a single country. Finally, Chapter 18 studies multilateral and regional policies in trade.

For programs that offer a single semester course in economic development, two options are available: (1) if international economic issues can be relegated to a separate course, cover all the material up to the end of Chapter 15 (this will require some skimming of chapters, such as Chapters 4–6 and 11–15); (2) if it is desirable to cover international issues in the same course, omit much or most of the material in Chapters 11–15. A year-long course should be able to adequately cover the book, but some supplementary material may be required for international economics, as well as financial issues in development, such as inflation and monetary policy.

This book could not have been written without my students and the many classes I have taught in development economics over the years: I thank students at Boston University, at the Indian Statistical Institute, at the People's University of China in Beijing, at Stanford, and at Harvard. I would also like to thank the many people who have read and commented on earlier drafts of this book and have used them in courses they have taught, among them Jean-Marie Baland, Abhijit Banerjee, V. Bhaskar, Gautam Bose, Ira Gang, James Foster, Patrick Francois, Gabriel Fuentes, Bishnupriya Gupta, Ashok Kotwal, Dilip Mookherjee, Jonathan Morduch, James Robinson, Ann Velenchik, Bruce Wydick, and Frederic Zimmermann.

Several people have made contributions to this text. Chief among them is Parikshit Ghosh, my intrepid and thoroughly uncontrollable research assistant, whose contributions to this book are too numerous to mention. I would also like to thank Eli Berman, Gary Fields, Hsueh-Ling Huynh, Chiente Hsu, Luis-Felipe López-Calva, Anandi Mani, Ghazala Mansuri, Jonathan Morduch, and Hiranya Mukhopadhyay for input at various stages.

Much of this book was written while I was Director of the Institute for Economic Development at Boston University. I thank Margaret Chapman, Administrative Assistant to the Institute, for covering for my many administrative lapses during this period. I thank the Instituto de Análisis Económico (CSIC) in Barcelona, where this book was completed, and the Ministerio de

Educación, Government of Spain for financial support during my stay. I am very grateful to Peter Dougherty, my publisher at Princeton University Press, for his help and encouragement.

I would like to record my deep appreciation to a (smaller) set of people who have shaped the way I think about economics: Kenneth Arrow, Doug Bernheim, Bhaskar Dutta, Joan Esteban, Mukul Majumdar, Tapan Mitra, Dilip Mookherjee, Kunal Sengupta, Amartya Sen, and Rajiv Vohra.

I thank Monica Das Gupta for innumerable discussions, and words of advice and encouragement.

Finally, I owe gratitude to Angela Bhaya Soares who always wanted me to write a magnum opus but will have to be content with what she gets, to Bissera Antikarova and Farahanaaz Dastur for seeing me safely through bad times, to Nilita Vachani for creating unforeseen but happy delays, and to Jackie Bhaya for getting me started on it all.

Debraj Ray
Boston University
September 1997

Contents

Preface	xv
Chapter 1: Introduction	3
Chapter 2: Economic Development: Overview	7
2.1. Introduction	7
2.2. Income and growth	10
2.2.1. Measurement issues	10
2.2.2. Historical experience	16
2.3. Income distribution in developing countries	21
2.4. The many faces of underdevelopment	25
2.4.1. Human development	25
2.4.2. An index of human development	27
2.4.3. Per capita income and human development	29
2.5. Some structural features	33
2.5.1. Demographic characteristics	34
2.5.2. Occupational and production structure	34
2.5.3. Rapid rural–urban migration	36
2.5.4. International trade	38
2.6. Summary	42
Exercises	44
Chapter 3: Economic Growth	47
3.1. Introduction	47
3.2. Modern economic growth: Basic features	48
3.3. Theories of economic growth	51
3.3.1. The Harrod–Domar model	51
3.3.2. Beyond Harrod–Domar: Other considerations	58
3.3.3. The Solow model	64
3.4. Technical progress	71
3.5. Convergence?	74
3.5.1. Introduction	74
3.5.2. Unconditional convergence	74
3.5.3. Unconditional convergence: Evidence or lack thereof	75
3.5.4. Unconditional convergence: A summary	80
3.5.5. Conditional convergence	82
3.5.6. Reexamining the data	84
3.6. Summary	88

Appendix	90
3.A.1. The Harrod–Domar equations	90 • 3.A.2. Production functions and per capita magnitudes
	91
Exercises	94

Chapter 4: The New Growth Theories 99

4.1. Introduction	99
4.2. Human capital and growth	100
4.3. Another look at conditional convergence	105
4.4. Technical progress again	107
4.4.1. Introduction	107 • 4.4.2. Technological progress and human decisions
	108 • 4.4.3. A model of deliberate technical progress
	109 • 4.4.4. Externalities, technical progress, and growth
	112 • 4.4.5. Total factor productivity
	117
4.5. Total factor productivity and the East Asian miracle	119
4.6. Summary	123
Appendix: Human capital and growth	125
Exercises	126

Chapter 5: History, Expectations, and Development 131

5.1. Introduction	131
5.2. Complementarities	132
5.2.1. Introduction: QWERTY	132 • 5.2.2. Coordination failure
	136 • 5.2.3. Linkages and policy
	138 • 5.2.4. History versus expectations
	143
5.3. Increasing returns	147
5.3.1. Introduction	147 • 5.3.2. Increasing returns and entry into markets
	148 • 5.3.3. Increasing returns and market size: Interaction
	150
5.4. Competition, multiplicity, and international trade	152
5.5. Other roles for history	155
5.5.1. Social norms	155 • 5.5.2. The status quo
	156
5.6. Summary	159
Exercises	161

Chapter 6: Economic Inequality 169

6.1. Introduction	169
6.2. What is economic inequality?	170
6.2.1. The context	170 • 6.2.2. Economic inequality: Preliminary observations
	171
6.3. Measuring economic inequality	173
6.3.1. Introduction	173 • 6.3.2. Four criteria for inequality measurement
	174 • 6.3.3. The Lorenz curve
	178 • 6.3.4. Complete measures of inequality
	184

- 6.4. Summary 192
- Exercises 193

Chapter 7: Inequality and Development: Interconnections 197

- 7.1. Introduction 197
- 7.2. Inequality, income, and growth 199
 - 7.2.1. The inverted-U hypothesis 199 • 7.2.2. Testing the inverted-U hypothesis 201 • 7.2.3. Income and inequality: Uneven and compensatory changes 209 • 7.2.4. Inequality, savings, income, and growth 211 • 7.2.5. Inequality, political redistribution, and growth 218 • 7.2.6. Inequality and growth: Evidence 220 • 7.2.7. Inequality and demand composition 223 • 7.2.8. Inequality, capital markets, and development 226 • 7.2.9. Inequality and development: Human capital 237
- 7.3. Summary 238
- Appendix: Multiple steady states with imperfect capital markets 241
- Exercises 244

Chapter 8: Poverty and Undernutrition 249

- 8.1. Introduction 249
- 8.2. Poverty: First principles 250
 - 8.2.1. Conceptual issues 250 • 8.2.2. Poverty measures 253
- 8.3. Poverty: Empirical observations 256
 - 8.3.1. Demographic features 257 • 8.3.2. Rural and urban poverty 259 • 8.3.3. Assets 259 • 8.3.4. Nutrition 261
- 8.4. The functional impact of poverty 267
 - 8.4.1. Poverty, credit, and insurance 268 • 8.4.2. Poverty, nutrition, and labor markets 272 • 8.4.3. Poverty and the household 279
- 8.5. Summary 288
- Appendix: More on poverty measures 290
- Exercises 292

Chapter 9: Population Growth and Economic Development 295

- 9.1. Introduction 295
- 9.2. Population: Some basic concepts 297
 - 9.2.1. Birth and death rates 297 • 9.2.2. Age distributions 300
- 9.3. From economic development to population growth 302
 - 9.3.1. The demographic transition 302 • 9.3.2. Historical trends in developed and developing countries 303 • 9.3.3. The adjustment of birth rates 307 • 9.3.4. Is fertility too high? 318

9.4. From population growth to economic development	326
9.4.1. Some negative effects	326
9.4.2. Some positive effects	332
9.5. Summary	338
Exercises	340
Chapter 10: Rural and Urban	345
10.1. Overview	345
10.1.1. The structural viewpoint	345
10.1.2. Formal and informal urban sectors	346
10.1.3. Agriculture	348
10.1.4. The ICRISAT villages	349
10.2. Rural–urban interaction	353
10.2.1. Two fundamental resource flows	353
10.2.2. The Lewis model	353
10.3. Rural–urban migration	372
10.3.1. Introduction	372
10.3.2. The basic model	373
10.3.3. Floors on formal wages and the Harris–Todaro equilibrium	374
10.3.4. Government policy	379
10.3.5. Comments and extensions	386
10.4. Summary	395
Exercises	398
Chapter 11: Markets in Agriculture: An Introduction	403
11.1. Introduction	403
11.2. Some examples	404
11.3. Land, labor, capital, and credit	409
11.3.1. Land and labor	409
11.3.2. Capital and credit	412
Chapter 12: Land	415
12.1. Introduction	415
12.2. Ownership and tenancy	416
12.3. Land rental contracts	420
12.3.1. Contractual forms	420
12.3.2. Contracts and incentives	423
12.3.3. Risk, tenancy, and sharecropping	431
12.3.4. Forms of tenancy: Other considerations	436
12.3.5. Land contracts, eviction, and use rights	441
12.4. Land ownership	445
12.4.1. A brief history of land inequality	445
12.4.2. Land size and productivity: Concepts	446
12.4.3. Land size and productivity: Empirical evidence	453
12.4.4. Land sales	456
12.4.5. Land reform	457
12.5. Summary	462

Appendix 1: Principal–agent theory and applications	463
12.A.1. Risk, moral hazard, and the agency problem	463 •
12.A.2. Tenancy contracts revisited	466
Appendix 2: Screening and sharecropping	474
Exercises	478

Chapter 13: Labor 483

13.1. Introduction	483
13.2. Labor categories	484
13.3. A familiar model	486
13.4. Poverty, nutrition, and labor markets	489
13.4.1. The basic model	489 •
13.4.2. Nutrition, time, and casual labor markets	499 •
13.4.3. A model of nutritional status	500
13.5. Permanent labor markets	504
13.5.1. Types of permanent labor	504 •
13.5.2. Why study permanent labor?	505 •
13.5.3. Permanent labor: Nonmonitored tasks	507 •
13.5.4. Permanent labor: Casual tasks	515
13.6. Summary	522
Exercises	524

Chapter 14: Credit 529

14.1. Introduction	529
14.1.1. The limits to credit and insurance	529 •
14.1.2. Sources of demand for credit	531
14.2. Rural credit markets	532
14.2.1. Who provides rural credit?	532 •
14.2.2. Some characteristics of rural credit markets	540
14.3. Theories of informal credit markets	543
14.3.1. Lender's monopoly	543 •
14.3.2. The lender's risk hypothesis	544 •
14.3.3. Default and fixed-capital loans	545 •
14.3.4. Default and collateral	546 •
14.3.5. Default and credit rationing	548 •
14.3.6. Informational asymmetries and credit rationing	553 •
14.3.7. Default and enforcement	555
14.4. Interlinked transactions	561
14.4.1. Hidden interest	563 •
14.4.2. Interlinkages and information	564 •
14.4.3. Interlinkages and enforcement	564 •
14.4.4. Interlinkages and creation of efficient surplus	565
14.5. Alternative credit policies	572
14.5.1. Vertical formal–informal links	573 •
14.5.2. Microfinance	578
14.6. Summary	584
Exercises	586

Chapter 15: Insurance	591
15.1. Basic concepts	591
15.2. The perfect insurance model	596
15.2.1. Theory	596 • 15.2.2. Testing the theory
15.2.2. Testing the theory	597
15.3. Limits to insurance: Information	600
15.3.1. Limited information about the final outcome	601 •
15.3.2. Limited information about what led to the outcome	602
15.4. Limits to insurance: Enforcement	605
15.4.1. Enforcement-based limits to perfect insurance	606 •
15.4.2. Enforcement and imperfect insurance	608
15.5. Summary	615
Exercises	617
Chapter 16: International Trade	621
16.1. World trading patterns	621
16.2. Comparative advantage	627
16.3. Sources of comparative advantage	630
16.3.1. Technology	630 • 16.3.2. Factor endowments
16.3.2. Factor endowments	631 •
16.3.3. Preferences	636 • 16.3.4. Economies of scale
16.3.4. Economies of scale	638
16.4. Summary	643
Exercises	644
Chapter 17: Trade Policy	647
17.1. Gains from trade?	647
17.1.1. Overall gains and distributive effects	647 • 17.1.2. Overall losses from trade?
17.1.2. Overall losses from trade?	650
17.2. Trade policy: Import substitution	656
17.2.1. Basic concepts	657 • 17.2.2. More detail
17.2.2. More detail	660
17.3. Export promotion	676
17.3.1. Basic concepts	677 • 17.3.2. Effect on the exchange rate
17.3.2. Effect on the exchange rate	678 •
17.3.3. The instruments of export promotion: More detail	679
17.4. The move away from import substitution	684
17.4.1. Introduction	684 • 17.4.2. The eighties crisis
17.4.2. The eighties crisis	685 •
17.4.3. Structural adjustment	690
17.5. Summary	699
Appendix: The International Monetary Fund and the World Bank	701
Exercises	705

Chapter 18: Multilateral Approaches to Trade Policy	711
18.1. Introduction	711
18.2. Restricted trade	714
18.2.1. Second-best arguments for protection	714
18.2.2. Protectionist tendencies	715
18.2.3. Explaining protectionist tendencies	717
18.3. Issues in trade liberalization	725
18.3.1. Introduction	725
18.3.2. Regional agreements: Basic theory	727
18.3.3. Regional agreements among dissimilar countries	730
18.3.4. Regional agreements among similar countries	735
18.3.5. Multilateralism and regionalism	746
18.4. Summary	753
Exercises	755
Appendix 1: Elementary Game Theory	757
A1.1. Introduction	757
A1.2. Basic concepts	757
A1.3. Nash equilibrium	759
A1.4. Games over time	767
Appendix 2: Elementary Statistical Methods	777
A2.1. Introduction	777
A2.2. Summary statistics	778
A2.3. Regression	783
References	805
Author Index	829
Subject Index	835

Development Economics