



# The Economics of Growth

PHILIPPE AGHION  
PETER HOWITT

---

# THE ECONOMICS OF GROWTH

Philippe Aghion and Peter Howitt

with the collaboration of Leonardo Bursztyn

The MIT Press  
Cambridge, Massachusetts  
London, England

© 2009 Massachusetts Institute of Technology

All rights reserved. No part of this book may be reproduced in any form by any electronic or mechanical means (including photocopying, recording, or information storage and retrieval) without permission in writing from the publisher.

For information about special quantity discounts, please email [special\\_sales@mitpress.mit.edu](mailto:special_sales@mitpress.mit.edu)

This book was set in Times Roman by SNP Best-set Typesetter Ltd., Hong Kong.  
Printed and bound in the United States of America.

Library of Congress Cataloging-in-Publication Data

Aghion, Philippe.

The economics of growth / Philippe Aghion and Peter W. Howitt.

p. cm.

Includes bibliographical references and index.

ISBN 978-0-262-01263-8 (hardcover : alk. paper)

1. Economic development. I. Howitt, Peter. II. Title.

HD82.A5452 2009

338.9—dc22

2008029818

10 9 8 7 6 5 4 3 2 1

---

## Preface

---

### Why This Book?

To learn about economic growth you need formal theory, for organizing the facts, clarifying causal relationships, and drawing out hidden implications. In growth economics, as in other areas of economics, an argument that is not disciplined by a clear theoretical framework is rarely enlightening.

Our experience with graduates and undergraduates at Brown and Harvard has taught us, however, that the theory needed to understand the substantive issues of economic growth is much simpler than what is found in most modern textbooks. You do not need to master all the subtleties of dynamic programming and stochastic processes in order to learn what is essential about such issues as cross-country convergence, the effects of financial development on growth, and the consequences of globalization. The required tools can be acquired quickly by anyone equipped with elementary calculus and probability theory.

These considerations are what motivated us to write *The Economics of Growth*. We believe that what is going on at the frontiers of research on economic growth can also be made accessible to undergraduates, as well as to policy makers who have not been to graduate school for many years, even though gaining this access requires learning some basic tools and models. Although there are many other excellent books on growth economics,<sup>1</sup> those that focus on theory are either too removed from policy and empirical applications or too involved with formal technicalities to be useful or interesting to the uninitiated reader wanting to learn about the substantive issues, while other books that focus on substantive issues are not as concerned with formal models as is necessary. None of them present the main facts and puzzles, propose simple tools and models to explain these facts, acquaint the reader with frontier material on growth—both theoretical and empirical— or initiate the reader into thinking about growth policy. What follows is our attempt to fill this gap.

To bring the reader up to date on the frontiers of the subject, we have had to write a comprehensive book. In the first part we introduce all the major growth paradigms (neoclassical, AK, product-variety, and Schumpeterian), and then in subsequent chapters we show how these paradigms can be used to analyze various aspects of the growth process and to think about the design of growth policy. The

1. For example, Weil (2008), C. Jones (1998), Barro and Sala-i-Martin (1995a), Helpman (2004), and Acemoglu (2008a, forthcoming). Modesty does not prevent us from also including Aghion and Howitt (1998a).



book is also comprehensive in its account of the most recent contributions and debates on growth: in particular, we acquaint the reader with the literature on directed technical change and its applications to wage inequality; we provide simple presentations of recent models of industrialization and the transition to modern economic growth; we show simple models of trade, competition, and growth with firm heterogeneity; we analyze the relationships between growth and finance, between growth, volatility and risk, between growth and the environment, and between growth and education; we reflect on the recent debates on institutions versus human capital as determinants of growth; and we introduce the reader to the nascent literature on growth and culture.

Although comprehensive, the book does not provide an unbiased survey of all points of view. On the contrary, it is opinionated in at least two respects. First, in order to keep the book from getting too big, we had to be selective in the material covered on each topic. At the end of each chapter, however, we include literature notes that provide the reader with extensive references on the subject and, in particular, direct her to the corresponding chapter(s) in the *Handbook of Economic Growth* (Aghion and Durlauf 2005), the most recent compendium of research on economic growth. Second, even though we repeatedly use the AK or product-variety models in the text or in problem sets, we do not hide our preference for the Schumpeterian model, which we use more systematically than the others when analyzing the growth process and when discussing the design of growth policy.

---

### For Whom?

The book is aimed at three main audiences. The first is graduate students. The book can be taught in its entirety in a one-semester graduate growth course. It can also be used as part of a growth and development sequence, in which case one can start with the first four chapters, then move on to the chapters on finance (and wealth inequality), convergence, directed technical change (and appropriate technologies), stages of growth, institutions, democracy, and education, and the concluding chapter (on culture and development). The book can also be used for topics courses—for example, in trade or in industrial organization (with the general-purpose technologies, competition, and trade chapters) or in labor economics (with the chapters on directed technical change and general-purpose technologies that analyze the issue of wage inequality, and of course the chapter on education). In each case, the book provides the graduate student with easy

access to frontier material, and hopefully it should spur many new research ideas.

The second target group is intermediate or advanced undergraduate students. In particular, the first four chapters of the book have been conceived so as to make the basic growth paradigms fully accessible to students who have no more background than elementary notions of calculus (derivatives, maximization) and a very basic knowledge of economic principles. One can then complete the undergraduate course or sequence by using some of the other chapters of the book—for example, the chapters on stages of growth, finance, convergence, institutions, education, and volatility. The more advanced material, which can be skipped at the undergraduate level, is put in starred sections and problems. (Problems with two stars are the most difficult.)

The third audience is that of professional economists in government or in international financial institutions who are involved in advising governments on growth and development policies. With parsimonious use of models and equations, the book provides them with the basic paradigms (part I), and also with the tools (chapters 11–18), to think about the design of growth policy.

More generally, this book can be used by any reader with a basic mathematical background who is interested in learning about the mechanics of growth and development.

---

## Outline of the Book

The book comprises three parts. Part I presents the main growth paradigms: the neoclassical model (chapter 1), the AK model (chapter 2), Romer’s product-variety model (chapter 3), and the Schumpeterian model (chapter 4). Chapter 5 concludes part I by introducing physical capital into a growth model with endogenous innovation, in order to provide a theoretical framework for interpreting the results of growth accounting.

Part II builds on the main paradigms to shed light on the dynamic process of growth and development. Chapter 6 analyzes the relationship between financial constraints, innovation, and growth, and then the relationship between financial constraints, wealth inequality, and growth. Chapter 7 analyzes the phenomenon of “club convergence,” in other words, why some countries manage to converge to growth rates of the most advanced countries whereas other countries continue to fall further behind. Chapter 8 introduces the notion of directed technical change and uses it to analyze wage inequality or to explain persistent productivity

differences across countries. Chapter 9 introduces the notion of general-purpose technology and explains why new technological revolutions can produce both temporary slowdowns and accelerating wage inequality. Chapter 10 analyzes how an economy can evolve from a stagnant Malthusian agricultural economy into a persistently growing industrial economy, or from an economy that accumulates capital to an innovating economy, or from a manufacturing to a service economy. Chapter 11 discusses the role of institutions in the growth process, and introduces the notion of appropriate growth institutions to understand why different institutions or policies can be growth enhancing in countries at different levels of development.

Part III focuses on growth policies. Chapter 12 analyzes the growth effects of liberalizing product market competition and entry. Chapter 13 analyzes the growth effects of education policy. Chapter 14 focuses on the relationship between risk, financial development, and growth. Chapter 15 discusses the effects of trade liberalization. Chapter 16 analyzes how growth can be sustained in an economy with environmental or resource constraints. And Chapter 17 investigates the relationship between democracy and growth.

Chapter 18 concludes the book by summarizing the main conclusions from previous chapters and then by linking growth to culture and to modern development economics.

Finally, the appendix acquaints the reader with basic notions of econometrics, so that without any prior knowledge this chapter should allow her to read and understand all the empirical sections and tables in the book.