

The background of the cover is a dark, textured globe. Overlaid on the globe are numerous bright, glowing lines in red, blue, yellow, and green. These lines crisscross the globe in various directions, creating a complex, web-like pattern that suggests global connectivity or data flow. The lines have a soft, ethereal glow around them.

OLIVIER BLANCHARD

MACROECONOMICS

THIRD EDITION

Macroeconomics

Third Edition

Olivier Blanchard

Massachusetts Institute of Technology



Upper Saddle River, New Jersey 07458

Preface

I had two main goals in writing this book:

- To make close contact with current macroeconomic events.

What makes macroeconomics exciting is the light it sheds on what is happening around the world, from the introduction of the Euro in Western Europe, to the current U.S. recession, to the Japanese slump, to the economic and political crisis in Argentina. These events—and many more—are described in the book, not in footnotes, but in the text or in detailed boxes. Each box shows how you can use what you have learned to get an understanding of these events. My belief is that these boxes not only convey the “life” of macroeconomics, but also reinforce the lessons from the models, making them more concrete and easier to grasp.

- To provide an integrated view of macroeconomics.

The book is built on one underlying model, a model that concentrates on the implications of equilibrium conditions in three sets of markets: the goods market, the financial markets, and the labor market. Depending on the issue at hand, the parts of the model relevant to the issue are developed in more detail while the other parts are simplified or lurk in the background. But the underlying model is always the same. This way, you will see macroeconomics as a coherent whole, not a collection of models. And you will be able to make sense not only of past macroeconomic events, but also of those that unfold in the future.

Changes

The response to the first two editions, in the United States and around the world, has shown that there is a large demand for such an approach. At the same time, feedback from instructors and from students has led to a number of important changes since the first edition.

- The main change from the first to the second edition was in the architecture of the book. I reorga-

nized the book into two parts: A core, and a set of three major extensions.

The core focused on the behavior of the economy in the short run, the medium run, and the long run.

The three extensions focused on the role of expectations, on the implications of openness, and on pathologies—times of very high inflation, or times of very high unemployment.

The response to this new organization in the second edition has been very positive, and I have kept it in this third edition, with only a few minor changes: I have eliminated one chapter on pathologies, allocating some of its content to other chapters. Two chapters are largely new: Chapter 22 examines the economic slump in Japan. Chapter 21 focuses on the implications of different exchange rate regimes.

- The main focus of revisions for this third edition has been on simplification.

The truth: Macroeconomics is hard. It is hard because it is about understanding what economists call “general equilibrium.” In thinking about what happens to the economy, you must keep in mind all at the same time, what happens in the labor market, what happens in the goods market, and what happens in financial markets. One way of writing a macroeconomics text is to hide these complexities, taking different “convenient” approaches when looking at different topics. This way makes for a textbook which may be easy to read, not a textbook you can use to understand events other than the events you read about in the text. As you may suspect, this is not the route I have taken. And so, because I did not want to take these intellectual shortcuts, I have had to work hard to make the arguments as simple as they could be.

In the second edition, I introduced margin notes running in parallel to the text. These notes serve many purposes: to emphasize an important point, to help you follow a derivation, to relate an argument to an earlier one, to summarize a series of

steps, to give a related fact, or to tell a related anecdote. My hope was that these notes would make reading the book and learning from it much easier. The reaction has been extremely positive, and you will find margin notes again in this third edition.

To simplify further, I prepared for this third edition by putting together a team of students and giving them a simple mandate: Look at each argument in the book; tell me if it feels hard or confusing; tell me how it could be presented more simply. Their work has led to a nearly complete rewrite of the book. The architecture of the book is the same. But the book is very different in the small, that is, in the way things are discussed, explained, and illustrated. The arguments are, I believe, simpler and easier to grasp.

Organization

The book is organized around two central parts: A core, and a set of three major extensions. An introduction precedes the core. The set of extensions is followed by a review of the role of policy. The book ends with an epilogue. A flowchart on the front end paper makes it easy to see how the chapters are organized, and fit the book's overall structure.

- Chapters 1 and 2 introduce the basic facts and issues of macroeconomics. Chapter 1 offers a tour of the world, from the United States, to Europe, to Japan. Some instructors will prefer to cover it later, perhaps after Chapter 2, which introduces basic concepts, articulates the notions of short run, medium run, and long run, and gives a quick tour of the book.

While Chapter 2 gives the basics of national income accounting, I have put a detailed treatment of national income accounts to Appendix 1 at the end of the book. This decreases the burden on the beginning reader, and allows for a more thorough treatment in the appendix.

- Chapters 3 to 13 constitute the **core**.

Chapters 3 to 5 focus on the **short run**. These three chapters characterize equilibrium in the goods market and in the financial markets, and they derive the basic model used to study short-run movements in output, the *IS-LM* model.

Chapters 6 to 9 focus on the **medium run**. Chapter 6 focuses on equilibrium in the labor market and introduces the notion of the natural rate of unemployment. Chapters 7 to 9 develop a model based on aggregate demand and aggregate supply, and show

how that model can be used to understand movements in activity and movements in inflation, both in the short and in the medium run.

Chapters 10 to 13 focus on the **long run**. Chapter 10 describes the facts, showing the evolution of output across countries and over long periods of time. Chapters 11 and 12 develop a model of growth, focusing on the determinants of capital accumulation and technological progress and the role of each in growth. Chapter 13, which is optional, focuses on the effects of technological progress not only in the long run, but also in the short run and in the medium run. This topic is typically not covered in textbooks but is important. And the chapter shows how one can integrate the short run, the medium run, and the long run—an example of the payoff of an integrated approach to macroeconomics.

- Chapters 14 to 24 cover the three major **extensions**.

Chapters 14 to 17 focus on the role of **expectations** in the short run and in the medium run. Expectations play a major role in most economic decisions, and, by implication, play a major role in the determination of output.

Chapters 18 to 21 focus on the implications of the **openness** of modern economies. Chapter 21, which is largely new, focuses on the implications of different exchange rate regimes, from flexible exchange rates, to fixed exchange rates, to currency boards, to dollarization.

Chapters 22 and 23 focus on **pathologies**, times when (macroeconomic) things go very wrong. Chapter 22 looks at depressions and slumps. Much of the chapter, from the discussion of the dangers of deflation and the liquidity trap to the analysis of Japan's economic slump, is new. Chapter 23 looks at episodes of hyperinflation.

- Chapters 24 to 26 return to macroeconomic **policy**. While most of the first 23 chapters constantly discuss macroeconomic policy in one form or another, the purpose of Chapters 24 to 26 is to tie the threads together. Chapter 24 looks at the role and the limits of macroeconomic policy in general. Chapters 25 and 26 review monetary policy and fiscal policy. Much of Chapter 26 is devoted to recent developments in monetary policy, from inflation targeting to interest rate rules. Some instructors may want to use parts of these chapters earlier. For example, it is easy to move forward the discussion of the government budget constraint in Chapter 26.

- Chapter 27 serves as an **epilogue**; it puts macroeconomics in historical perspective, showing the evolution of macroeconomics in the last 60 years and discussing current directions of research.

Alternative Course Outlines

Within the book's broad organization, there is plenty of opportunity for alternative course organizations. I have made the chapters shorter than is standard in textbooks, and, in my experience, most chapters can be covered in an hour and a half. A few (Chapters 5 and 7 for example) may require two lectures to sink in.

- Short courses (15 lectures or less)

A short course can be organized around the two introductory chapters and the core. Leaving aside Chapters 9 and 13 gives a total of 11 lectures. Informal presentations of one or two of the extensions, based for example on Chapter 17 for expectations (which can be taught as a stand alone) and on Chapter 18 for the open economy, can then follow, for a total of 13 lectures.

A short course may leave out the study of growth (the long run). In this case, the course can be organized around the introductory chapters, and Chapters 3 to 8 in the core; this gives a total of 8 lectures, leaving enough time to cover, for example, Chapter 17 on expectations, Chapters 18 to 20 on the open economy, and Chapter 22 on depressions and slumps, for a total of 13 lectures.

- Longer courses (20 to 25 lectures)

A full semester course gives more than enough time to cover the core, plus at least two extensions, and the review of policy.

The extensions assume knowledge of the core, but are otherwise mostly self contained. Given the choice, the order in which they are best taught is probably the order in which they are presented in the book. Starting with the study of the role of expectations is useful, for example, in understanding the interest parity condition and the nature of exchange rate crises.

One of the choices facing instructors is likely to be whether to teach growth (the long run) or not. If growth is taught, there may not be enough time to cover all three extensions and have a thorough discussion of policy. In this case, it may be best to leave out the study of pathologies. If growth is not taught,

there should be time to cover most of the other topics in the book.

Features

I have made sure never to present a theoretical result without relating it to the real world. In addition to discussions of facts in the text itself, I have written a large number of **Focus** boxes, which discuss particular macroeconomic events or facts, from the United States or from around the world.

I have tried to recreate some of the student-teacher interactions that take place in the classroom by the use of **Margin notes** running parallel to the text. The margin notes create a dialogue with the reader, to smooth the more difficult passages, and to give a deeper understanding of the concepts and the results derived along the way.

For students who want to explore macroeconomics further, I have introduced the following two features:

- **Short appendices** to some chapters, which expand on a point made within the chapter.
- **Further readings** section at the end of each chapter, indicating where to find more information, including a number of key Internet addresses.

Each chapter ends with three ways of making sure that the material in the chapter has been digested:

- A **summary** of the chapter's main points.
- A list of **key terms**.
- A series of **end-of-chapter exercises**; some easy, some harder; some requiring access to the Internet, some requiring the use of a spreadsheet program. More challenging exercises, web based or otherwise, are indicated by an asterisk.

A list of symbols on the back endpapers makes it easy to recall the meaning of the symbols used in the text.

The Teaching and Learning Package

The book comes with a number of supplements to help both students and instructors.

For Instructors

- **Instructor's Manual.** Written by Mark Moore, of the University of California-Irvine, the Instructor's

manual discusses pedagogical choices, alternative ways of presenting the material, and ways of reinforcing students' understanding. For each chapter in the book, the manual has 7 sections: (I) a motivating question; (II) why the answer matters; (III) key tools, concepts, and assumptions; (IV) summary; (V) pedagogy; (VI) extensions, and (VII) observations and additional exercises. The Instructor's Manual also includes the answers to all end-of-chapter questions and exercises. The Instructor's Manual is available for download at <http://www.prenhall.com/blanchard>.

- **Test Item File.** Written by David Findlay, of Colby College, the test bank is completely revised with an all new set of short-answer, analytical questions.
- **New TestGen-EQ Software.** The print Test Bank is designed for use with the TestGen-EQ test generating software. This computerized package allows instructors to custom design, save, and generate classroom tests. The test program permits instructors to edit, add, or delete questions from the test bank; edit existing graphics and create new graphics; analyze test results; and organize a database of tests and student results. This new software allows for greater flexibility and ease of use. It provides many options for organizing and displaying tests, along with a search and sort feature. The software can prepare twenty-five versions of a single test.
- **Transparency Masters.** A complete set of transparency masters for all figures in the text can be downloaded from <http://www.prenhall.com/blanchard>. Contact your Prentice Hall representative for a password.

For Students

- **Study Guide.** David Findlay, of Colby College, has once again done an outstanding job of writing a student-friendly study guide. Each chapter begins with a presentation of objectives and review. It is organized in the form of a tutorial, covering the important points of the chapter, with learning tips along the way. The tutorial is followed by quick self-test questions, review problems, and multiple-choice questions. Solutions are provided for all study guide problems.
- **Active Graph CD-ROM.** This interactive student tool contains a series of active graphs created specifically for this text and corresponding to the most important figures in the book. Each graph allows the student to change the value of some variable and

see the effects in the movement of the graphs. Experience indicates that using graphs in this way considerably strengthens the students' intuition and understanding of the mechanisms at work.

For Both Instructors and Students

- **Companion Web site (<http://www.prenhall.com/blanchard>).** The Companion Web site is a content-rich, multidisciplinary Web site with Internet exercises, activities, and resources related specifically to the third edition of *Macroeconomics*. It includes the following features:

The Online Study Guide, prepared by David Black of the University of Toledo, offers students another opportunity to sharpen their problem-solving skills and to assess their understanding of the text material. The Online Study Guide now contains two levels of quizzes with a total of 20 questions per chapter. The Online Study Guide grades each question submitted by the student, provides immediate feedback for correct and incorrect answers, and allows students to e-mail results to up to four email addresses.

Current Events Articles and Exercises, related to topics in each chapter, are fully supported by group activities, critical-thinking exercises, and discussion questions. These articles, from current news publications to economics-related publications, help show students the relevance of economics in today's world.

Internet Exercises—New Internet resources are added every two weeks by a team of economics professors to provide both the student and the instructor with the most current, up-to-date resources available.

Syllabus Manager—For the instructor, the Companion Web site offers resources such as the answers to Current Events and Internet exercises, and a *Faculty Lounge* area including teaching resources and faculty chat rooms.

Downloadable Supplements—From the Companion Web site, instructors can also download supplements and lecture aids. Instructors should contact their Prentice Hall sales representative to get the necessary username and password to access the faculty resources. The supplements include the following:

■ **The PowerPoint Presentation**—This lecture presentation tool, prepared by Fernando and Yvonn Quijano, offers outlines and summaries of important text material, key equations, terms, tables and graphs. Many important graphs “build” upon themselves so that students may see the step-by-step process involved in these economics activities. This tool will allow instructors to make full-color, professional-looking presentations and custom handouts to be provided to their students.

■ The Instructor’s Manual

■ Transparency Masters

Online Course Offerings

■ **WebCT.** Developed by educators, WebCT provides faculty with easy-to-use Internet tools to create online courses. Prentice Hall provides the content and enhanced features to help instructors create a complete online course. For more information, please visit our Web site, located at www.prenhall.com/webct.

■ **Blackboard.** Easy to use, Blackboard’s single template and tools make it easy to create, manage, and use online course materials. Instructors can create online courses using the Blackboard tools, which include design, communication, testing, and course management tools. For more information, please visit our Web site located at www.prenhall.com/blackboard.

■ **CourseCompass.** This customizable, interactive online course management tool powered by Blackboard provides the most intuitive teaching and learning environment available. Instructors can communicate with students, distribute course material, and access student progress online. For further information, please visit our Web site located at www.prenhall.com/coursecompass.

Subscription Options

■ **The Wall Street Journal Print and Interactive Editions Subscription.** Prentice Hall has formed a strategic alliance with *The Wall Street Journal*, the most respected and trusted daily source for information on business and economics. For schools that adopt a special package containing the book and subscription supplement, professors will receive a complimentary one year personal subscription and students will receive a 10-week sub-

scription to *The Wall Street Journal* print edition and *The Wall Street Journal* interactive edition. As well, professors will receive a weekly subject-specific Wall Street Journal educators’ lesson plans.

■ **The Financial Times Subscription.** We are pleased to announce a special partnership with *The Financial Times*. For schools that adopt a special package containing the book and subscription supplement, instructors will receive a complimentary one-year personal subscription and students will receive a 15-week print subscription. Please contact your Prentice Hall representative for details and ordering information.

■ **Economist.com Subscription.** Through a special arrangement with Economist.com, upon adoption of a book and subscription supplement package, professors will receive a six-month subscription and students will get a 12-week subscription to the online version. Please contact your Prentice Hall representative for further details and ordering information.

Acknowledgments and Thanks

This book owes much to many.

I thank Adam Ashcraft, Peter Berger, Peter Benczur, Efe Cakarel, Harry Gakidis, David Hwang, Kevin Nazemi, Stacy Tevlin, Gaurav Tewari, Corissa Thompson, John Simon, and Jeromin Zettelmeyer for their research assistance. I thank the generations of students in 14.02 at MIT who have freely shared their reactions to the book over the years.

I have benefited from comments from many colleagues and friends. Among them are John Abell, Roland Benabou, Samuel Bentolila and Juan Jimeno (who have adapted the book in a Spanish edition), François Blanchard, Roger Brinner, Ricardo Caballero, Martina Copelman, Ludwig Chincarini, Daniel Cohen (who has adapted the book for a French edition), Larry Christiano, Bud Collier, Andres Conesa, Peter Diamond, Martin Eichenbaum, Gary Fethke, David Findlay, Francesco Giavazzi (who has adapted the book for an Italian edition), Yannis Ioannides, David Johnson, P.N. Junankar, Paul Krugman, Peter Montiel, Bill Nordhaus, Angelo Melino (who has adapted the book for a Canadian edition), Tom Michl, Athanasios Orphanides, Daniel Pirez Enri (who has adapted the book for a Latin American edition), Jim Poterba, Ronald Schettkat, Watanabe Shinichi (who has adapted the book for a Japanese edition), Changyong Rhee, Julio Rotemberg, Robert Solow, Andre Watteyne,

and Michael Woodford. I have also benefited from often stimulating suggestions from my daughters, Serena, Giulia, and Marie; I did not however follow all of them.

I have benefited from comments from many readers, reviewers, and class testers. Among them:

- John Abell, Randolph-Macon Woman's College
- Carol Adams, Cabrillo College
- Terence Alexander, Iowa State University
- Robert Archibald, College of William & Mary
- Stephen Baker, Capital University
- Charles Bean, London School of Economics and Political Science
- Dr. David C. Black, University of Toledo
- Scott Bloom, North Dakota State University
- Pim Borren, University of Canterbury, New Zealand
- Henry Chappell, University of South Carolina
- Maria Crummett, University of Tampa
- Brad DeLong, UC Berkeley
- Wouter Denhaan, UC San Diego
- E. Trenery Dolbear, Brandeis University
- John Edgren, Eastern Michigan University
- J. Peter Federer, Clark University
- Rendigs Fels, Vanderbilt University
- Yee-Tien Fu, National Cheng-Chi University, Taiwan
- Marc Fox, Brooklyn College
- Randy Grant, Linfield College
- Reza Hamzaee, Missouri Western State College
- Thomas Havrilesky, Duke University
- John Holland, Monmouth College
- Ralph Husby, University of Illinois, Urbana-Champaign
- Fred Joutz, George Washington University
- Miles Kimball, University of Michigan
- Paul King, Denison University
- Ng Beoy Kui, Nanyang Technical University, Singapore

- Leonard Lardaro, University of Rhode Island
- Hsien-Feng Lee, National Taiwan University
- Frank Lichtenberg, Columbia University
- Mark Lieberman, Princeton University
- Mathias Lutz, University of Sussex
- Bernard Malamud, University of Nevada, Las Vegas
- Rose Milbourne, University of New South Wales
- W. Douglas Morgan, University of California, Santa Barbara
- Jack Osman, San Francisco State University
- Allen Parkman, University of New Mexico
- Gavin Peebles, National University of Singapore
- Jack Richards, Portland State University
- Kehar Sangha, Old Dominion University
- Peter Sephton, University of New Brunswick
- Ruth Shen, San Francisco State University
- Kwanho Shin, University of Kansas
- Carol Scotese, Virginia Commonwealth University
- David Sollars, Auburn University
- Abdul Turay, Radford University
- Frederick Tyler, Fordham University
- Doug Waldo, University of Florida
- Susheng Wang, Hong Kong University
- Mark Wheeler, Western Michigan University
- Mark Wohar, University of Nebraska, Omaha
- Michael Woodford, Princeton University
- Ip Wing Yu, University of Hong Kong
- Chi-Wa Yuen, Hong Kong University of Science and Technology
- Ky H. Yuhn, Florida Atlantic University.

They have helped me beyond the call of duty, and each has made a difference to the book.

I have many people to thank at Prentice Hall, from Stephen Dietrich for convincing me to write this book in the first place, to Rod Banister, the executive editor for Economics, to P.J. Boardman, the editor-in-chief, to Gladys Soto, the managing editor, to Marie McHale, the

assistant editor, to Lisa Amato, the editorial assistant, to Victoria Anderson, the media project manager, to Kathleen McLellan, the marketing manager, to Chris Bath, the marketing assistant, and to Michael Reynolds, the production editor.

I want to single out both Steve Rigolosi, the outstanding editor for the first edition, and Michael Elia, the equally outstanding editor to the second and third editions. Steve forced me to clarify. Michael has forced me to simplify. Together, they have made all the differ-

ence to the process and to the book. I thank both of them deeply.

At MIT, I continue to thank John Arditì for his absolute reliability.

At home, I continue to thank Noelle for preserving my sanity.

Olivier Blanchard
Cambridge, MIT
February 2002

Brief Contents

Introduction 1

- Chapter 1 **A Tour of the World 3**
Chapter 2 **A Tour of the Book 21**

The Core 43

The Short Run 43

- Chapter 3 **The Goods Market 45**
Chapter 4 **Financial Markets 65**
Chapter 5 **Goods and Financial Markets:
The IS-LM Model 87**

The Medium Run 111

- Chapter 6 **The Labor Market 113**
Chapter 7 **Putting All Markets Together:
The AS-AD Model 135**
Chapter 8 **The Natural Rate of
Unemployment and the Phillips
Curve 161**
Chapter 9 **Inflation, Activity, and Nominal
Money Growth 181**

The Long Run 201

- Chapter 10 **The Facts of Growth 203**
Chapter 11 **Saving, Capital Accumulation,
and Output 219**
Chapter 12 **Technological Progress and
Growth 243**
Chapter 13 **Technological Progress, Wages,
and Unemployment 267**

Extensions 287

Expectations 287

- Chapter 14 **Expectations: The Basic Tools 289**
Chapter 15 **Financial Markets and
Expectations 311**
Chapter 16 **Expectations, Consumption,
and Investment 335**

- Chapter 17 **Expectations, Output,
and Policy 355**

The Open Economy 371

- Chapter 18 **Openness in Goods and Financial
Markets 373**
Chapter 19 **The Goods Market in an Open
Economy 395**
Chapter 20 **Output, the Interest Rate, and the
Exchange Rate 417**
Chapter 21 **Exchange Rate Regimes 437**

Pathologies 461

- Chapter 22 **Depressions and Slumps 463**
Chapter 23 **High Inflation 489**

Back to Policy 507

- Chapter 24 **Should Policy Makers Be
Restrained? 509**
Chapter 25 **Monetary Policy:
A Summing Up 529**
Chapter 26 **Fiscal Policy: A Summing Up 549**

Epilogue 571

- Chapter 27 **Epilogue: The Story of
Macroeconomics 571**

- Appendix 1 **An Introduction to National Income
and Product Accounts A-1**
Appendix 2 **A Math Refresher A-6**
Appendix 3 **An Introduction to
Econometrics A-12**

- Glossary **G-1**
Index **I-1**

Contents

Preface xvii

Introduction 1

Chapter 1

A Tour of the World 3

1-1 The United States 4

The Current Slowdown 5 • Has the United States Entered a New Economy? 7

1-2 The European Union 8

How Can European Unemployment Be Reduced? 11 • What Will the Euro Do for Europe? 12

1-3 Japan 13

What Happened to Japan in the 1990s? 14 • How Can Japan Recover? 15

1-4 Looking Ahead 16

Appendix: Where to Find the Numbers? 19

Chapter 2

A Tour of the Book 21

2-1 Aggregate Output 22

GDP: Production, and Income 22 • Nominal and Real GDP 24

2-2 The Other Major Macroeconomic Variables 26

The Unemployment Rate 26 • The Inflation Rate 29

2-3 A Road Map 34

A Tour of the Book 35

Appendix: The Construction of Real GDP, and Chain-Type Indexes 40

The Core 43

The Short Run 43

Chapter 3

The Goods Market 45

3-1 The Composition of GDP 46

3-2 The Demand for Goods 48

Consumption (C) 48 • Investment (I) 50 • Government Spending (G) 50

3-3 The Determination of Equilibrium Output 51

Chapter 4

- Using Algebra 52 • Using a Graph 53
• Using Words 55 • How Long Does It Take for Output to Adjust? 56
- 3-4 Investment Equals Saving: An Alternative Way of Thinking About Goods–Market Equilibrium 58
- 3-5 Is the Government Omnipotent? A Warning 60

Financial Markets 65

4-1 The Demand for Money 66

Deriving the Demand for Money 68

4-2 The Determination of the Interest Rate. I 69

Money Demand, Money Supply, and the Equilibrium Interest Rate 69 • Monetary Policy and Open-Market Operations 73

4-3 The Determination of the Interest Rate. II 75

What Banks Do 75 • The Supply and the Demand for Central Bank Money 78

4-4 Two Alternative Ways to Think About the Equilibrium 81

The Federal Funds Market and the Federal Funds Rate 81 • The Supply of Money, the Demand for Money, and the Money Multiplier 82

Chapter 5

Goods and Financial Markets: The IS-LM Model 87

5-1 The Goods Market and the IS Relation 88

Investment, Sales, and the Interest Rate 88 • The Determination of Output 89 • Deriving the IS Curve 90 • Shifts of the IS Curve 92

5-2 Financial Markets and the LM Relation 93

Real Money, Real Income, and the Interest Rate 93 • Deriving the LM Curve 93 • Shifts of the LM Curve 95

5-3 Putting the IS and the LM Relations Together 96

- Fiscal Policy, Output, and the Interest Rate 97 • Monetary Policy, Output, and the Interest Rate 99
- 5-4 Using a Policy Mix 101
- 5-5 How Does the *IS-LM* Model Fit the Facts? 102

The Medium Run 111

Chapter 6

The Labor Market 113

- 6-1 A Tour of the Labor Market 114
 - The Large Flows of Workers 115
- 6-2 Movements in Unemployment 116
- 6-3 Wage Determination 120
 - Bargaining 120 • Efficiency Wages 121 • Wages, Prices, and Unemployment 121
- 6-4 Price Determination 124
- 6-5 The Natural Rate of Unemployment 125
 - The Wage-Setting Relation 125 • The Price-Setting Relation 126 • Equilibrium Real Wages and Unemployment 126 • From Unemployment to Employment 128 • From Employment to Output 128
- 6-6 Where We Go from Here 129
- Appendix: Wage- and Price-Setting Relations Versus Labor Supply and Labor Demand 132

Chapter 7

Putting All Markets Together: The AS-AD Model 135

- 7-1 Aggregate Supply 136
- 7-2 Aggregate Demand 139
- 7-3 Equilibrium in the Short Run and in the Medium Run 141
 - Equilibrium in the Short Run 142 • From the Short Run to the Medium Run 143
- 7-4 The Effects of a Monetary Expansion 144
 - The Dynamics of Adjustment 145 • Going Behind the Scenes 145 • The Neutrality of Money 147
- 7-5 A Decrease in the Budget Deficit 149
 - Deficit Reduction, Output, and the Interest Rate 150 • Budget Deficits, Output, and Investment 151
- 7-6 Changes in the Price of Oil 152
 - Effects on the Natural Rate of Unemployment 153 • The Dynamics of Adjustment 154

7-7 Conclusions 156

The Short Run Versus the Medium Run 156 • Shocks and Propagation Mechanisms 157 • Where We Go from Here: Output, Unemployment, and Inflation 157

Chapter 8

The Natural Rate of Unemployment and the Phillips Curve 161

- 8-1 Inflation, Expected Inflation, and Unemployment 162
- 8-2 The Phillips Curve 163
 - The Early Incarnation 164 • Mutations 164 • Back to the Natural Rate of Unemployment 168
- 8-3 A Summary and Many Warnings 169
 - Variations in the Natural Rate of Unemployment Across Countries 170 • Variations in the Natural Rate of Unemployment over Time 172 • High Inflation and the Phillips Curve Relation 175 • Deflation and the Phillips Curve Relation 176

Appendix: From the Aggregate Supply Relation to a Relation Between Inflation, Expected Inflation, and Unemployment 179

Chapter 9

Inflation, Activity, and Nominal Money Growth 181

- 9-1 Output, Unemployment, and Inflation 182
 - Okun's Law: From Output Growth to Unemployment 182 • The Phillips Curve: From Unemployment to Inflation 184 • The Aggregate Demand Relation: From Nominal Money Growth and Inflation to Output Growth 185
- 9-2 The Medium Run 186
- 9-3 Disinflation 188
 - A First Pass 188 • How Much Unemployment? And for How Long? 189 • Working Out the Path of Nominal Money Growth 190
- 9-4 Expectations, Credibility, and Nominal Contracts 193
 - Expectations and Credibility: The Lucas Critique 193 • Nominal Rigidities and Contracts 194
- 9-5 The U.S. Disinflation, 1979–1985 196

The Long Run 201

Chapter 10

The Facts of Growth 203

10-1 Growth in Rich Countries Since 1950 204

10-2 A Broader Look Across Time and Space 208

Looking Across Two Millennia 208 •
Looking Across Countries 209

10-3 Thinking About Growth: A Primer 212

The Aggregate Production Function 212
• Returns to Scale and Returns to Factors 213 • Output and Capital per Worker 214 • The Sources of Growth 215

Chapter 11

Saving, Capital Accumulation, and Output 219

11-1 Interactions Between Output and Capital 220

The Effects of Capital on Output 220 •
The Effects of Output on Capital Accumulation 221

11-2 Implications of Alternative Saving Rates 223

Dynamics of Capital and Output 223 •
Steady-State Capital and Output 225 •
The Saving Rate and Output 225 • The Saving Rate and Consumption 228

11-3 Getting a Sense of Magnitudes 230

The Effects of the Saving Rate on Steady-State Output 233 • The Dynamic Effects of an Increase in the Saving Rate 234 • The U.S. Saving Rate and the Golden Rule 235

11-4 Physical Versus Human Capital 236

Extending the Production Function 236 •
Human Capital, Physical Capital, and Output 237 • Endogenous Growth 238

Appendix: The Cobb-Douglas Production Function and the Steady State 240

Chapter 12

Technological Progress and Growth 243

12-1 Technological Progress and the Rate of Growth 244

Technological Progress and the Production Function 244 • Interactions Between Output and Capital 246 • Dynamics of Capital and Output 248 • The Effects of the Saving Rate 249

12-2 The Determinants of Technological Progress 251

The Fertility of the Research Process 251
• The Appropriability of Research Results 252

12-3 The Facts of Growth Revisited 254

Capital Accumulation Versus Technological Progress 254 • Why Did Technological Progress Slow Down in the mid-1970s? 256

12-4 Epilogue: The Secrets of Growth 258

Appendix: Constructing a Measure of Technological Progress 265

Chapter 13

Technological Progress, Wages, and Unemployment 267

13-1 Productivity, Output, and Unemployment in the Short Run 268

Technological Progress, Aggregate Supply, and Aggregate Demand 269 • The Empirical Evidence 271

13-2 Productivity and the Natural Rate of Unemployment 272

Price Setting and Wage Setting Revisited 272 • The Natural Rate of Unemployment 273 • The Empirical Evidence 274

13-3 Technological Progress and Distribution Effects 278

The Increase in Wage Inequality 278 • The Causes of Increased Wage Inequality 280

Extensions 287

Expectations 287

Chapter 14

Expectations: The Basic Tools 289

14-1 Nominal Versus Real Interest Rates 290

Nominal and Real Interest Rates in the United States Since 1978 292

14-2 Expected Present Discounted Values 293

Computing Expected Present Discounted Values 294 • Using Present Values: Examples 295 • Nominal Versus Real Interest Rates, and Present Values 297

14-3 Nominal and Real Interest Rates, and the IS-LM Model 298

14-4 Money Growth, Inflation, and Nominal and Real Interest Rates 299

Revisiting the *IS-LM* Model 300 •
 Nominal and Real Interest Rates in the
 Short Run 300 • Nominal and Real
 Interest Rates in the Medium Run 301 •
 From the Short Run to the Medium
 Run 303 • Evidence on the Fisher
 Hypothesis 304

**Appendix: Deriving the
 Expected Present Discounted
 Value Using Real or Nominal Interest
 Rates 308**

Chapter 15

Financial Markets and Expectations 311

15-1 Bond Prices and Bond Yields 312

Bond Prices as Present Values 313 •
 Arbitrage and Bond Prices 314 • From
 Bond Prices to Bond Yields 316 •
 Interpreting the Yield Curve 317 • The
 Yield Curve and Economic Activity 317

15-2 The Stock Market and Movements in Stock Prices 320

Stock Prices as Present Values 321 • The
 Stock Market and Economic Activity 322

15-3 Bubbles, Fads, and Stock Prices 326

**Appendix: Arbitrage and Stock
 Prices 332**

Chapter 16

Expectations, Consumption, and Investment 335

16-1 Consumption 336

The Very Foresighted Consumer 336 •
 An Example 337 • Toward a More
 Realistic Description 338 • Putting
 Things Together: Current Income,
 Expectations, and Consumption 339

16-2 Investment 342

Investment and Expectations of Profit
 342 • A Convenient Special Case
 345 • Current Versus Expected Profit
 346 • Profit and Sales 348

16-3 The Volatility of Consumption and Investment 349

**Appendix: Derivation of the Expected
 Present Value of Profits Under Static
 Expectations 353**

Chapter 17

Expectations, Output, and Policy 355

17-1 Expectations and Decisions: Taking Stock 356

Expectations, Consumption, and
 Investment Decisions 356 • Expectations

and the *IS* Relation 356 • The *LM*
 Relation Revisited 359

17-2 Monetary Policy, Expectations, and Output 360

17-3 Deficit Reduction, Expectations, and Output 364

The Role of Expectations About the Future
 364 • Back to the Current Period 365

The Open Economy 371

Chapter 18

Openness in Goods and Financial Markets 373

18-1 Openness in Goods Markets 374

Exports and Imports 374 • The Choice
 Between Domestic Goods and Foreign
 Goods 376 • Nominal Exchange Rates
 376 • From Nominal to Real Exchange
 Rates 379 • From Bilateral to Multilateral
 Exchange Rates 382

18-2 Openness in Financial Markets 383

The Balance of Payments 384 • The
 Choice Between Domestic and Foreign
 Assets 387 • Interest Rates and
 Exchange Rates 388

18-3 Conclusions and a Look Ahead 390

Chapter 19

The Goods Market in an Open Economy 395

19-1 The *IS* Relation in the Open Economy 396

The Demand for Domestic Goods 396 •
 The Determinants of the Demand for
 Domestic Goods 396

19-2 Equilibrium Output and the Trade Balance 399

19-3 Increases in Demand, Domestic or Foreign 400

Increases in Domestic Demand 400 •
 Increases in Foreign Demand 402 •
 Games That Countries Play 403

19-4 Depreciation, the Trade Balance, and Output 405

Depreciation and the Trade Balance: The
 Marshall-Herner Condition 406 • The
 Effects of a Depreciation 406 •
 Combining Exchange-Rate and Fiscal
 Policies 407

19-5 Looking at Dynamics: The *J*-Curve 408

19-6 Saving, Investment, and the Trade Balance 412

Appendix 1: Multipliers—Belgium
Versus the United States 415
Appendix 2: Derivation of the Marshall-
Lerner Condition 416

Chapter 20

Output, the Interest Rate, and the Exchange Rate 417

20-1 Equilibrium in the Goods
Market 418

20-2 Equilibrium in Financial
Markets 419

Money Versus Bonds 419 • Domestic
Bonds Versus Foreign Bonds 419

20-3 Putting Goods and Financial
Markets Together 422

20-4 The Effects of Policy in an Open
Economy 423

The Effects of Fiscal Policy in an Open
Economy 423 • The Effects of Monetary
Policy in an Open Economy 425

20-5 Fixed Exchange Rates 426

Pegs, Crawling Pegs, Bands, the EMS,
and the Euro 427 • Pegging the
Exchange Rate, and Monetary Control
428 • Fiscal Policy Under Fixed
Exchange Rates 429

Appendix: Fixed Exchange
Rates, Interest Rates, and
Capital Mobility 433

Chapter 21

Exchange Rate Regimes 437

21-1 Fixed Exchange Rates and the
Adjustment of the Real Exchange
Rate in the Medium Run 438

Aggregate Demand Under Fixed
Exchange Rates 439 • Equilibrium in
the Short Run and in the Medium Run
440 • The Case for and Against a
Devaluation 442

21-2 Exchange Rate Crises Under Fixed
Exchange Rates 444

The 1992 EMS Crisis 446

21-3 Exchange Rate Movements under
Flexible Exchange Rates 448

21-4 Choosing Between Exchange Rate
Regimes 451

Common Currency Areas 451 •
Hard Pegs, Currency Bonds, and
Dollarization 455

Appendix: The Real Exchange Rate, and
Domestic and Foreign Real Interest
Rates 458

Pathologies 461

Chapter 22

Depressions and Slumps 463

22-1 Disinflation, Deflation, and the
Liquidity Trap 464

The Nominal Interest Rate, the Real Interest
Rate, and Expected Inflation 465 • The
Liquidity Trap 467 • Putting Things
Together: The Liquidity Trap and
Deflation 470

22-2 The Great Depression 471

The Initial Fall in Spending 472 • The
Contraction in Nominal Money 473 •
The Adverse Effects of Deflation 475 •
The Recovery 476

22-3 The Japanese Slump 477

The Rise and Fall of the Nikkei 479 •
The Failure of Monetary and Fiscal Policy
480 • What Comes Next? 482

Chapter 23

High Inflation 489

23-1 Budget Deficits and Money
Creation 490

23-2 Inflation and Real Money
Balances 492

23-3 Deficits, Seignorage, and
Inflation 494

The Case of Constant Nominal Money
Growth 495 • Dynamics and Increasing
Inflation 497 • Hyperinflations and
Economic Activity 498

23-4 How Do Hyperinflations
End? 499

The Elements of a Stabilization Program
499 • Can Stabilization Programs Fail?
500 • The Costs of Stabilization 500

23-5 Conclusions 501

Back to Policy 507

Chapter 24

Should Policy Makers Be Restrained? 509

24-1 Uncertainty and Policy 510

How Much Do Macroeconomists Actually
Know? 510 • Should Uncertainty Lead
Policy Makers to Do Less? 512 •
Uncertainty and Restraints on Policy
Makers 513

24-2 Expectations and Policy 514

Hijackings and Negotiations 514 •
Inflation and Unemployment Revisited
515 • Establishing Credibility 516 •
Time Consistency and Restraints on Policy
Makers 517

24-3 Politics and Policy 518

Games Between Policy Makers and Voters 519 • Games Between Policy Makers 521 • Back to the Balanced-Budget Amendment 521 • The Case Against a Balanced-Budget Amendment 522 • The Case for a Balanced-Budget Amendment 522

Chapter 25

Monetary Policy: A Summing Up 529

25-1 The Optimal Inflation Rate 530

The Costs of Inflation 531 • The Benefits of Inflation 533 • The Optimal Inflation Rate: The Current Debate 535

25-2 The Design of Monetary Policy 535

Money Growth Targets and Target Ranges 535 • Money Growth and Inflation Revisited 536 • Inflation Targeting and Interest Rate Rules 539

25-3 The Fed in Action 542

The Mandate of the Fed 542 • The Organization of the Fed 542 • The Instruments of Monetary Policy 543 • The Practice of Monetary Policy 544

Chapter 26

Fiscal Policy: A Summing Up 549

26-1 The Government Budget Constraint 550

The Arithmetic of Deficits and Debt 550 • Current Versus Future Taxes 553 • The Evolution of the Debt-to-GDP Ratio 555

26-2 Four Issues in Fiscal Policy 558

Ricardian Equivalence 558 • Deficits, Output Stabilization, and the Cyclically Adjusted Deficit 559 • Wars and

Deficits 560 • The Dangers of Very High Debt 562

26-3 The U.S. Budget 563

Surpluses and the Low U.S. Saving Rate 566 • Surpluses and the Aging of America 566

Epilogue 571

Chapter 27

Epilogue: The Story of Macroeconomics 571

27-1 Keynes and the Great Depression 572

27-2 The Neoclassical Synthesis 572

Progress on All Fronts 573 • Keynesians Versus Monetarists 574

27-3 The Rational Expectations Critique 575

The Three Implications of Rational Expectations 576 • The Integration of Rational Expectations 577

27-4 Current Developments 579

New Classical Economics and Real Business Cycle Theory 579 • New Keynesian Economics 579 • New Growth Theory 580

27-5 Common Beliefs 581

Appendix 1

An Introduction to National Income and Product Accounts A-1

Appendix 2

A Math Refresher A-6

Appendix 3

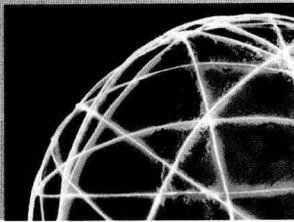
An Introduction to Econometrics A-12

Glossary

G-1

Index

I-1



Boxes

FOCUS

Gathering Macro Data	16
Real GDP, Technological Progress, and the Price of Computers	27
Did Spain Really Have a 24% Unemployment Rate in 1994?	30
Consumer Confidence and the 1990–1991 Recession	57
The Paradox of Saving	60
Semantic Traps: Money, Income, and Wealth	67
The Demand for Money and the Interest Rate: The Evidence	70
Bank Runs	77
Deficit Reduction: Good or Bad for Investment?	100
The Clinton-Greenspan Policy Mix	102
German Unification and the German Monetary-Fiscal Tug of War	104
The Current Population Survey	117
Henry Ford and Efficiency Wages	122
How Long Lasting Are the Real Effects of Money?	148
Theory Ahead of the Facts: Milton Friedman and Edmund Phelps	170
The Japanese Unemployment Rate	171
Did the U.S. Natural Rate of Unemployment Decrease in the 1990s and, If So, Why?	173
Okun's Law Across Countries	185
The Construction of PPP Numbers	206
The Reality of Growth: A Workingman's Budget in 1851	210
Capital Accumulation and Growth in France in the Aftermath of World War II	226
Social Security, Social Security Reform, and Capital Accumulation in the United States	231
The Diffusion of New Technology: Hybrid Corn	253
The New Economy and Productivity Growth	259
Hong Kong and Singapore: A Tale of Two Cities	261
Technological Progress, Unemployment, and the U.S. Expansion in the 1990s	276
Occupations with the Largest Job Growth, and Occupations with the Largest Job Decline, 1998–2008	279
European Unemployment, Productivity Growth, and Technological Change	282
Nominal Interest Rates and Inflation Across Latin America in the Early 1990s	305
The Vocabulary of Bond Markets	313