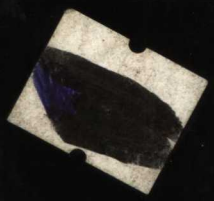
N. GREGORY MANKIW



macroeconomics

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Harvard University

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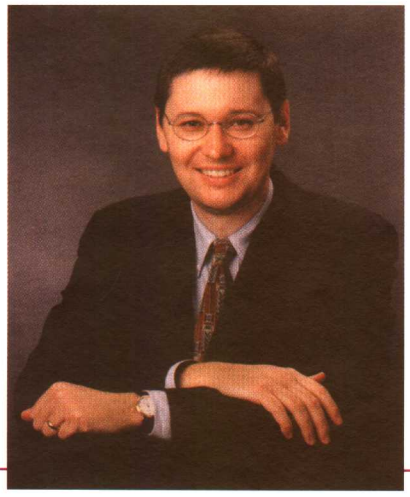

about the author

N. Gregory Mankiw is Professor of Economics at Harvard University. He began his study of economics at Princeton University, where he received an A.B. *summa cum laude* in 1980. After earning a Ph.D. in economics from MIT, he began teaching at Harvard in 1985 and was promoted to full professor in 1987. Today, he regularly teaches both undergraduate and graduate courses in macroeconomics.

Professor Mankiw is a prolific writer and a regular participant in academic and policy debates. His research ranges across many fields within economics and includes work on price adjustment, consumer behavior, financial markets, monetary and fiscal policy, and economic growth. In addition to his duties at Harvard, he has served as Director of the Monetary Economics Program of the National Bureau of Economic Research, as an adviser to the Federal Reserve Bank of Boston and the Congressional Budget Office, and as a columnist for *Fortune* magazine. He is also author of the popular introductory textbook, *Principles of Economics*.

Professor Mankiw lives in Wellesley, Massachusetts, with his wife Deborah and their children, Catherine, Nicholas, and Peter.

Those branches of politics, or of the laws of social life, on which there exists a collection of facts sufficiently sifted and methodized to form the beginning of a science should be taught *ex professo*. Among the chief of these is Political Economy, the sources and conditions of wealth and material prosperity for aggregate bodies of human beings. . . .

The same persons who cry down Logic will generally warn you against Political Economy. It is unfeeling, they will tell you. It recognises unpleasant facts. For my part, the most unfeeling thing I know of is the law of gravitation: it breaks the neck of the best and most amiable person without scruple, if he forgets for a single moment to give heed to it. The winds and waves too are very unfeeling. Would you advise those who go to sea to deny the winds and waves—or to make use of them, and find the means of guarding against their dangers? My advice to you is to study the great writers on Political Economy, and hold firmly by whatever in them you find true; and depend upon it that if you are not selfish or hard-hearted already, Political Economy will not make you so.

—John Stuart Mill

1867

An economist must be "mathematician, historian, statesman, philosopher, in some degree. . . . as aloof and incorruptible as an artist, yet sometimes as near the earth as a politician." So remarked John Maynard Keynes, the great British economist who, as much as anyone, could be called the father of macroeconomics. No single statement summarizes better what it means to be an economist.

As Keynes's assessment suggests, students who aim to learn economics need to draw on many disparate talents. The job of helping students find and develop these talents falls to instructors and textbook authors. When writing this textbook for intermediate-level courses in macroeconomics, my goal was to make macroeconomics understandable, relevant, and (believe it or not) fun. Those of us who have chosen to be professional macroeconomists have done so because we are fascinated by the field. More important, we believe that the study of macroeconomics can illuminate much about the world and that the lessons learned, if properly applied, can make the world a better place. I hope this book conveys not only our profession's accumulated wisdom but also its enthusiasm and sense of purpose.

This Book's Approach

Although macroeconomists share a common body of knowledge, they do not all have the same perspective on how that knowledge is best taught. Let me begin this new edition by recapping four of my objectives, which together define this book's approach to the field.

First, I try to offer a balance between short-run and long-run issues in macroeconomics. All economists agree that public policies and other events influence the economy over different time horizons. We live in our own short run, but we also live in the long run that our parents bequeathed us. As a result, courses in macroeconomics need to cover both short-run topics, such as the business cycle and stabilization policy, and long-run topics, such as economic growth, the natural rate of unemployment, persistent inflation, and the effects of government debt. Neither time horizon trumps the other.

Second, I integrate the insights of Keynesian and classical theories. Although Keynes's *General Theory* provides the foundation for much of our current understanding of economic fluctuations, it is important to remember that classical economics provides the right answers to many fundamental questions. In this book I incorporate many of the contributions of the classical economists before Keynes and the new classical economists of the past two decades. Substantial coverage is given, for example, to the loanable-funds theory of the interest rate, the quantity theory of money, and the problem of time inconsistency. At the same time, however, I recognize that many of the ideas of Keynes and the new Keynesians are necessary for understanding economic fluctuations. Substantial coverage is given also to the *IS–LM* model of aggregate demand, the short-run

tradeoff between inflation and unemployment, and modern theories of wage and price rigidity.

Third, I present macroeconomics using a variety of simple models. Instead of pretending that there is one model that is complete enough to explain all facets of the economy, I encourage students to learn how to use and compare a set of prominent models. This approach has the pedagogical value that each model can be kept relatively simple and presented within one or two chapters. More important, this approach asks students to think like economists, who always keep various models in mind when analyzing economic events or public policies.

Fourth, I emphasize that macroeconomics is an empirical discipline, motivated and guided by a wide array of experience. This book contains numerous case studies that use macroeconomic theory to shed light on real-world data or events. To highlight the broad applicability of the basic theory, I have drawn the case studies both from current issues facing the world's economies and from dramatic historical episodes. The case studies analyze the policies of Alan Greenspan, George Bush, Henry Ford, and Alexander Hamilton. They teach the reader how to apply economic principles to issues from fourteenth-century Europe, the island of Yap, the land of Oz, and today's newspaper.

What's New in the Fourth Edition?

I have improved this book in its fourth edition in several ways. Most obviously, the book has been updated to incorporate new events, data, and ideas. Since the third edition was written, the Treasury Department introduced inflation-indexed bonds, Japan experienced a deep recession, Europe adopted a common currency, and capital flight forced several Asian currencies to collapse. As always, new research has refined our understanding of economic growth and fluctuations. Although the basics of macroeconomic theory are much the same as they were three years ago, enough has changed in the details and practice of macroeconomics to warrant publishing a new edition.

In addition, the book's coverage, pedagogy, and organization have been further refined. The analysis of economic growth, now in Chapters 4 and 5, includes a more extensive discussion of the new theories of endogenous growth. The chapter on government debt and budget deficits, Chapter 15, has been expanded to examine more fully the debates over this important policy issue. The chapter on recent developments in the theory of economic fluctuations, Chapter 19, which discusses real business cycle theory and new Keynesian economics, has been moved to the end of the book, although instructors who wish to cover this material earlier can continue to do so. Throughout the book, new case studies have been added, and some old ones have been omitted or revised. Together with various editors and students, I have scrutinized each sentence of the book to see whether it can be made clearer.

Finally, all the changes that I made, and the many others that I considered, were evaluated keeping in mind the benefits of brevity. From my own experience as a student, I know that long books are less likely to be read. My goal in

this book is to offer the clearest, most up-to-date, most accessible course in macroeconomics in the fewest words possible.

The Arrangement of Topics

This new edition maintains the strategy of first examining the long run when prices are flexible and then examining the short run when prices are sticky. That is, it begins with classical models of the economy and explains fully the long-run equilibrium before discussing deviations from that equilibrium. This strategy has several advantages:

- Because the classical dichotomy permits the separation of real and monetary issues, the long-run material is easier for students to understand.
- When students begin studying short-run fluctuations, they understand fully the long-run equilibrium around which the economy is fluctuating.
- Beginning with market-clearing models makes clearer the link between macroeconomics and microeconomics.
- Students learn first the material that is less controversial among macroeconomists.

When I proposed this organizational strategy in the first edition, some instructors greeted it with skepticism. But this skepticism has faded with time and experience. Many instructors have reported to me that this organization greatly simplifies the teaching of macroeconomics.

I move now from strategy to tactics. What follows is a whirlwind tour of the book.

Part One: Introduction

The introductory material in Part One is brief so that students can get to the core topics quickly. Chapter 1 discusses the broad questions that macroeconomists address and the economist's approach of building models to explain the world. Chapter 2 introduces the key data of macroeconomics, emphasizing gross domestic product, the consumer price index, and the unemployment rate.

Part Two: The Economy in the Long Run

Part Two examines the long run over which prices are flexible. Chapter 3 presents the basic classical model of national income. In this model, the factors of production and the production technology determine the level of income, and the marginal products of the factors determine its distribution to households. In addition, the model shows how fiscal policy influences the allocation of the economy's resources among consumption, investment, and government purchases, and it highlights how the real interest rate equilibrates the supply and demand for goods and services.

Chapters 4 and 5 make the classical analysis of the economy dynamic by using the Solow growth model to examine the evolution of the economy over time. The Solow model provides the basis for discussing why the standard of living varies so widely across countries and how public policies influence the level and growth of the standard of living. Chapter 5 also introduces the student to the modern theories of endogenous growth.

Chapter 6 relaxes the assumption of full employment by discussing the dynamics of the labor market and the natural rate of unemployment. It examines various causes of unemployment, including job search, minimum-wage laws, union power, and efficiency wages. It also presents some important facts about patterns of unemployment.

Money and the price level are introduced in Chapter 7. Because prices are assumed to be fully flexible, the chapter presents the prominent ideas of classical monetary theory: the quantity theory of money, the inflation tax, the Fisher effect, the social costs of inflation, and the causes and costs of hyperinflation.

The study of open-economy macroeconomics begins in Chapter 8. Maintaining the assumption of full employment, this chapter presents models to explain the trade balance and the exchange rate. Various policy issues are addressed: the relationship between the budget deficit and the trade deficit, the macroeconomic impact of protectionist trade policies, and the effect of monetary policy on the value of a currency in the market for foreign exchange.

Part Three: The Economy in the Short Run

Part Three examines the short run when prices are sticky. It begins in Chapter 9 by introducing the model of aggregate supply and aggregate demand as well as the role of stabilization policy. Subsequent chapters refine the ideas introduced here.

Chapters 10 and 11 look more closely at aggregate demand. Chapter 10 presents the Keynesian cross and the theory of liquidity preference and uses these models as building blocks for developing the *IS–LM* model. Chapter 11 uses the *IS–LM* model to explain economic fluctuations and the aggregate demand curve. It concludes with an extended case study of the Great Depression.

The study of short-run fluctuations continues in Chapter 12, which focuses on aggregate demand in an open economy. This chapter presents the Mundell–Fleming model and shows how monetary and fiscal policies affect the economy under floating and fixed exchange-rate systems. It also discusses the debate over whether exchange rates should be floating or fixed.

Chapter 13 looks more closely at aggregate supply. It examines various approaches to explaining the short-run aggregate supply curve and discusses the short-run tradeoff between inflation and unemployment.

Part Four: Macroeconomic Policy Debates

Once the student has command of standard long-run and short-run models of the economy, the book uses these models as the foundation for discussing some of the key debates over economic policy. Chapter 14 considers the debate over

how policymakers should respond to short-run economic fluctuations. It emphasizes two broad questions. Should monetary and fiscal policy be active or passive? Should policy be conducted by rule or by discretion? The chapter presents arguments on both sides of these questions.

Chapter 15 focuses on the various debates over government debt and budget deficits. It gives some sense of the magnitude of government indebtedness, discusses why measuring budget deficits is not always straightforward, recaps the traditional view of the effects of government debt, presents Ricardian equivalence as an alternative view, and discusses various other perspectives on government debt. As in the previous chapter, students are not handed conclusions but are given the tools to evaluate the alternative viewpoints on their own.

Part Five: More on the Microeconomics Behind Macroeconomics

After developing theories to explain the economy in the long run and in the short run and then applying those theories to macroeconomic policy debates, the book turns to several topics that refine our understanding of the economy. The last four chapters analyze more fully the microeconomics behind macroeconomics. These chapters can be presented at the end of a course, or they can be covered earlier, depending on an instructor's preferences.

Chapter 16 presents the various theories of consumer behavior, including the Keynesian consumption function, Fisher's model of intertemporal choice, Modigliani's life-cycle hypothesis, and Friedman's permanent-income hypothesis. Chapter 17 examines the theory behind the investment function. Chapter 18 provides additional material on the money market, including the role of the banking system in determining the money supply and the Baumol-Tobin model of money demand. Chapter 19 discusses advances in the theory of economic fluctuations, including the theory of real business cycles and new Keynesian theories of sticky prices; these recent theories apply microeconomic analysis in an attempt to better understand short-run economic fluctuations.

Epilogue

The book ends with a brief epilogue that reviews the broad lessons about which most macroeconomists agree and discusses some of the most important open questions. Regardless of which chapters an instructor chooses to cover, this capstone chapter can be used to remind students how the many models and themes of macroeconomics relate to one another. Here and throughout the book I emphasize that, despite the disagreements among macroeconomists, there is much that we know about how the economy works.

Alternative Syllabus

Instructors differ in the emphasis they place on various topics and in the sequence of topics they prefer. I have, therefore, tried to make this book as flexible as possible. Many of the chapters are self-contained. Instructors can change the emphases of their courses by rearranging chapters or by omitting some chapters entirely.

One example of an alternative syllabus is presented here. This syllabus maintains the strategy of first examining the economy in the long run when prices are flexible, but it introduces sticky prices and short-run fluctuations earlier in the course. It does this by deferring all open-economy macroeconomics until after the study of fluctuations and deferring the study of economic growth until the end of the course. It omits altogether the chapters on microfoundations and, therefore, allows the instructor to spend more time on the other topics.

Introduction

1. The Science of Macroeconomics
2. The Data of Macroeconomics

Income, Unemployment, and Inflation in the Long Run

3. National Income: Where It Comes From and Where It Goes
6. Unemployment
7. Money and Inflation

Short-Run Economic Fluctuations

9. Introduction to Economic Fluctuations
10. Aggregate Demand I
11. Aggregate Demand II
13. Aggregate Supply

Macroeconomic Policy

14. Stabilization Policy
15. Government Debt and Budget Deficits

Open-Economy Macroeconomics

8. The Open Economy
12. Aggregate Demand in the Open Economy

Economic Growth

4. Economic Growth I
5. Economic Growth II

Epilogue

Learning Tools

I am pleased that students have found the previous editions of this book user-friendly. I have tried to make this fourth edition even more so.

Case Studies

Economics comes to life when it is applied to understanding actual events. Therefore, the numerous case studies (many new or revised in this edition) are

an important learning tool. The frequency with which these case studies occur ensures that a student does not have to grapple with an overdose of theory before seeing the theory applied. Students report that the case studies are their favorite part of the book.

FYI Boxes

These boxes present ancillary material "for your information." I use these boxes to clarify difficult concepts, to provide additional information about the tools of economics, and to show how economics relates to our daily lives. Several are new or revised in this edition.

Graphs

Understanding graphical analysis is a key part of learning macroeconomics, and I have worked hard to make the figures easy to follow. I often use comment boxes within figures that describe briefly and draw attention to the important points that the figures illustrate. They should help students both learn and review the material.

Mathematical Notes

I use occasional mathematical footnotes to keep more difficult material out of the body of the text. These notes make an argument more rigorous or present a proof of a mathematical result. They can easily be skipped by those students who have not been introduced to the necessary mathematical tools.

Chapter Summaries

Every chapter ends with a brief, nontechnical summary of its major lessons. Students can use the summaries to place the material in perspective and to review for exams.

Key Concepts

Learning the language of a field is a major part of any course. Within the chapter, each key concept is in **boldface** when it is introduced. At the end of the chapter, the key concepts are listed for review.

Questions for Review

After studying a chapter, students can immediately test their understanding of its basic lessons by answering the Questions for Review.

Problems and Applications

Every chapter includes Problems and Applications designed for homework assignments. Some of these are numerical applications of the theory in the chapter. Others encourage the student to go beyond the material in the chapter by addressing new issues that are closely related to the chapter topics.

Chapter Appendixes

Several chapters include appendixes that offer additional material, sometimes at a higher level of mathematical sophistication. These are designed so that professors can cover certain topics in greater depth if they wish. The appendixes can be skipped altogether without loss of continuity.

Glossary

To help students become familiar with the language of macroeconomics, a glossary of more than 250 terms is provided at the back of the book.

Supplements for Students

Worth Publishers and I have been delighted at the positive feedback we have received on the supplements that accompany the book. There are two supplements for students that instructors can use in their courses.

Student Guide and Workbook

Roger Kaufman (Smith College) has revised his superb study guide for students. This guide offers various ways for students to learn the material in the text and assess their understanding.

- *Fill-In Questions* give students the opportunity to review and check their knowledge of the key terms and concepts in the chapter.
- *Multiple-Choice Questions* allow students to test themselves on the chapter material.
- *Exercises* guide students step by step through the various models using graphs and numerical examples.
- *Problems* ask students to apply the models on their own.
- *Questions to Think About* require critical thinking as well as economic analysis.
- *Data Questions* ask students to obtain and learn about readily available economic data.

Macroeconomics 4e Companion Website, Featuring MacroBytes

David Weil (Brown University) has updated his innovative software package for students, and Worth Publishers has made it available over the Internet. *MacroBytes* provides a range of activities to aid and motivate the student throughout the course.

- *Data Plotter.* Students can explore macroeconomic data with time-series graphs and scatterplots.
- *Macro Models.* These modules provide simulations of the models presented in the book. Students can change the exogenous variables and see the outcomes in terms of shifting curves and recalculated numerical

values of the endogenous variables. Each module contains exercises that instructors can assign as homework.

- *2001: A Game for Macroeconomists.* The game allows students to become President of the United States in the year 2001 and to make macroeconomic policy decisions based on news events, economic statistics, and approval ratings. It gives students a sense of the complex interconnections that influence the economy. It is also fun to play.

In addition to *MacroBytes,* the *Macroeconomics 4e Companion Website* also offers a wealth of resources, including interactive flash cards, online quizzing (with results stored for the instructor), "Economics in the News" essays, example test questions with outlined answers, and links to some of my other writings.

The *Macroeconomics 4e* Website and *MacroBytes* can be found on the Internet at http://www.worthpublishers.com/mankiw

Supplements for Instructors

Additional supplements are available from Worth Publishers to help instructors enhance their courses.

Instructor's Resources

Patricia Pollard (Federal Reserve Bank of St. Louis) and Andrew John (University of Virginia) have revised their impressive resource manual for instructors. For each chapter of this book, the manual contains notes to the instructor, a detailed lecture outline, additional case studies, and coverage of advanced topics. Instructors can use the manual to prepare their lectures, and they can reproduce whatever pages they choose as handouts for students.

Solutions Manual

John Fernald (Federal Reserve Board) has updated the *Solutions Manual* for all of the Questions for Review and Problems and Applications. The manual also contains the answers to selected questions from the *Student Guide and Workbook.*

Test Bank

Nancy Jianakoplos (Colorado State University) has updated the *Test Bank* so that it now includes over 1000 multiple-choice questions to accompany the text. Several short numerical problems are also provided for each chapter. The *Test Bank* is available both as a printed book and on disks. The disks include a test-generation program and are available in both Windows and Macintosh formats.

PowerPoint Presentation Slides

All of the text figures will be available in editable PowerPoint™ Presentation format and accessable via the Internet at http://www.worthpublishers.com/mankiw

Transparencies

Overhead transparencies are available for key figures and tables in the book, including all those that present data. In addition, instructors can obtain enlarged transparency master copies of all the figures in the text to prepare their own overhead transparencies for use in class.

Translations

The English-language version of this book has been used in dozens of countries. To make the book more accessible for students around the world, editions are now (or will soon be) available in 14 other languages: Armenian, Chinese (simplified), French, German, Greek, Hungarian, Italian, Japanese, Korean, Mandarin, Portuguese, Romanian, Russian, and Spanish. Instructors who would like information about these translations should contact Worth Publishers.

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When writing and revising this book, I benefitted from the input of many reviewers and colleagues in the economics profession. I would like to thank each of those who, for this or previous editions, gave up their scarce time to help me improve the economics or pedagogy of this text:

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