Canadian Edition

THIRD EDITION

MACROeconomics

N. GREGORY MANKIW
WILLIAM SCARTH

Canadian Edition

THIRD EDITION

MACROeconomics

N. GREGORY MANKIW
Harvard University

WILLIAM SCARTH
McMaster University

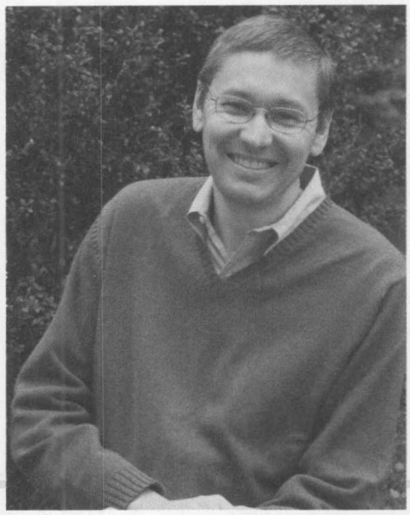
Worth Publishers

Publishers: Catherine Woods and Craig Bleyer
Senior Acquisitions Editor: Sarah Dorger
Development Editor: Marie McHale
Associate Managing Editor: Tracey Kuehn
Project Editor: Norma Beasley/TSI Graphics
Marketing Manager: Scott Guile
Production Manager: Barbara Anne Seixas
Art Director: Babs Reingold
Interior Design: Vicki Tomaselli
Cover Designer: Kevin Kall
Author Photos: Hilary Rochelle (Mankiw), McMaster Public Relations Office (Scarth)
Composition, Illustrations, and Layout: TSI Graphics
Printing and Binding: RR Donnelley
Cover Art: Leslie Wayne, *Talking to Myself*

ISBN-13: 978-0-7167-6132-7
ISBN-10: 0-7167-6132-7

Printed in the United States of America
First printing 2007

Worth Publishers
41 Madison Avenue
New York, NY 10010
www.worthpublishers.com

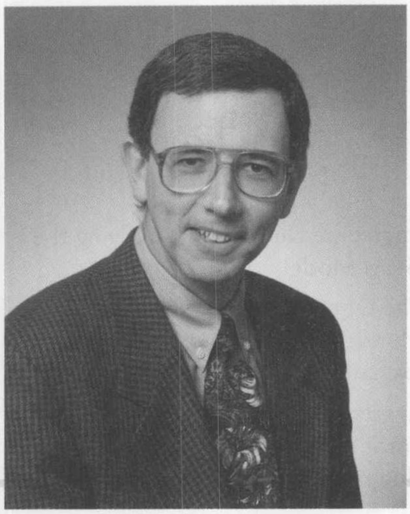


about the authors

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. 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. He is also author of the popular introductory textbook, *Principles of Economics* (Thomson South-Western).

Professor Mankiw is a regular participant in academic and policy debates. His research ranges across macroeconomics 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 been a research associate of the National Bureau of Economic Research, a member of the Brookings Panel on Economic Activity, and an adviser to the Federal Reserve Bank of Boston and the Congressional Budget Office. From 2003 to 2005 he was chairman of the President's Council of Economic Advisers.

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



William M. Scarth is Professor of Economics at McMaster University. His introduction to the subject came at Queen's University, where he obtained the Gold Medal in economics upon graduating with his B.A. After receiving M.A. and Ph.D. degrees at the universities of Essex and Toronto, he began teaching at McMaster where he has received both the President's Best Teacher Award and the McMaster Student Union Lifetime Achievement Award. He has held a number of visiting positions at other universities in Canada, Australia, and England.

Professor Scarth has published many articles in academic journals, often writing on such topics as the stabilization policy problems faced by small open economies and the challenges posed by the desire to generate—and share fairly—rising living standards. He is also the author of other textbooks—one that introduces graduate students to advanced methods in macroeconomics, and two introductory books. In addition to research and teaching at McMaster, he is a Research Fellow at the C. D. Howe Institute, Canada's leading non-profit policy institute.

Professor Scarth lives in Dundas, Ontario, with his wife, Kathy. They enjoy the frequent visits of their grown sons, Brian and David.

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

preface

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, our 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. We 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 us begin this new edition by recapping four of our objectives, which together define this book's approach to the field.

First, we 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, we 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 we incorporate many of the contributions of the classical economists before Keynes and the new classical economists of the past three 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, we 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, we 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, we 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, we 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, we 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 David Dodge (Governor of the Bank of Canada), our current Finance Minister, many former Canadian politicians and central bankers, government initiatives in other countries, and even the policies of Henry Ford. 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 Third Edition?

The positive response to the previous edition of this text suggested that radical change was neither necessary nor desired by instructors. We have, however, improved the book in numerous ways. Most obviously, the book has been updated, but we have also refined the pedagogy and coverage. One change is organizational. The chapters on economic growth are now separated into their own part, appearing after the complete development of the classical model. This reorganization was adopted to highlight the importance of growth, since its coverage seemed a trifle buried between other topics in the previous edition. The new ordering is also appealing since it keeps the growth material from complicating the development of the classical model. The new organization first presents the classical theory of income, prices, trade, foreign debt, and structural unemployment. Then, since the classical model is the starting point for both growth theory and business cycle theory, the book proceeds to cover both of these broad topics.

In addition to the reorganization, we have included discussion of many new events, data, and ideas. This new material has not simply been added. In making the changes we have consistently focused on our primary objective—to have theory and policy analysis truly integrated. Here is a list of some of the notable features of this new edition, in the order that they appear:

- Chapter 1 has a new FYI box on Nobel-Prize-winning macroeconomists.
- Chapter 2 has a new case study about long-term trends in labour-force participation.

- Chapter 3 has incorporated the Cobb-Douglas production function into the main text, rather than leaving it for an appendix. It also includes a new case study about the fundamental link between labour productivity and real wages.
- Chapter 4 has a new FYI box on the role of credit and debit cards in the monetary system.
- Chapter 5 includes a case study on the record size of the overall U.S. trade deficit, a new FYI box that explains the irrelevance of bilateral trade balances, and a new case study on why capital doesn't flow to poor countries. With rising concern about the sustainability of U.S. fiscal policy, the appendix—which formally connects saving, investment, the current account and long-run living standards—is more relevant than ever. This analytical material on foreign debt is directly linked to the ongoing policy debate on the relevance of "trickle-down" economics.
- Chapter 6 has a new case study on how people's perceptions of happiness depend on the inflation and unemployment rates. It also contains updated coverage of the difference between Canadian and U.S. unemployment rates, and a new discussion of European labour markets, focusing on the variation of unemployment rates across countries and the decline in hours worked over time. Finally, there has been a major addition to the appendix on efficiency-wage theory, and the connection between tax rates and the level of the "natural" unemployment rate. This theory is directly related to policy discussions on rising income inequality, "percolate-up" economics, and on the presumption of anti-globalization protesters—that low-income support policy is not possible in the modern world that permits mobile capitalists to escape taxes.
- Chapter 7 has a new section discussing alternative perspectives on the role of population growth in the process of economic growth.
- Chapter 8 involves many changes. There are new case studies on how information technology raised productivity growth during the 1990s, on the connection between foreign trade and growth, on the colonial origins of the modern institutions that foster economic growth, and on Joseph Schumpeter's concept of "creative destruction" (including both historical and recent applications). Also, there are new sections on the role of factor accumulation (as opposed to increased production efficiency) in explaining international differences in living standards, and on how a simple endogenous growth model can be used to illustrate the possible amount by which tax cuts might raise the productivity growth rate.
- Chapter 11 includes a new FYI box discussing the possibility of a liquidity trap. The recently added appendix, entitled "Aggregate Demand Theory Without the LM Curve," has become ever-more relevant given the Bank of Canada's operating practices. This appendix explains how the Bank's policy practice affects the slope of the aggregate demand curve and the built-in stability features of the economy.

- Chapter 12 includes new sections on speculative attacks, currency boards, dollarization, and the "impossible trinity"—the inconsistency of allowing free flows of capital, conducting independent monetary policy, and fixing the exchange rate. Also, there is a new case study on the debate about the Chinese currency. Finally, The debate about whether Canada's flexible exchange rate is or is not a "shock absorber" is given thorough treatment in the appendix—which covers several extensions to the Mundell-Fleming model (supply-side effects of the exchange rate, flexible prices, and exchange-rate expectations).
- Chapter 13 has a new FYI box on the reliability of estimates of the natural rate of unemployment, and a new appendix that explores—more analytically—how some of the models developed in the book are related to one another.
- Chapter 14 has new case studies on the remarkable macroeconomic stability of the 1990s, and the Taylor rule approach to monetary policy.
- Chapter 15 involves an updated discussion of government debt. It focuses on how the rising debt problem has been reversed in recent years, how big a "fiscal dividend" we can expect from this policy of fiscal retrenchment, and how our government has settled on a target for the debt-to-GDP ratio of 20% by 2020. There is also a new FYI box on how taxes affect incentives.
- Chapter 16 includes a new section on what new research linking psychology and economics teaches us about consumer behaviour, and on the imprecise link between happiness and increased spending on positional goods. It also contains a new case study about policies designed to increase saving.
- Chapter 17 has a new section on alternative views of the stock market, discussing both the efficient markets hypothesis and Keynes's analogy of the beauty contest.
- Chapter 19 has a new case study summarizing research on the magnitude of menu costs in supermarket chains.

All the changes that we made, and the many others that we considered, were evaluated keeping in mind the benefits of brevity. From our own experience as students, we know that long books are less likely to be read. Our goal in this book has been to offer the clearest, most up-to-date, most accessible course in macroeconomics in the fewest words possible.

The Canadian Perspective

Maintaining brevity was not our only concern as we wrote this book. We were determined to strengthen the other feature of the earlier editions that have been most appreciated by users—that the book truly integrates theory and policy. All important policy issues are covered in this way. To mention just a few:

- the role of tax incentives and disinflation in stimulating saving and investment,

- the importance of credibility and time-consistency, 时间一致性
- how the Bank of Canada pursues price stability and thereby affect the economy's built-in stability properties,
- the reasons for the large changes in the value of the Canadian dollar,
- how the benefits of lower interest rates and lower debt can be measured,
- the spillover effects of provincial fiscal policies,
- the implications of the aging baby-boom generation,
- calculation of the "sacrifice ratio,"
- challenges to the natural-rate hypothesis,
- the different implications of unanticipated and anticipated fiscal policies,
- how fiscal policy can be used to simultaneously lower unemployment and raise productivity growth—despite the constraint imposed by globalization.

Systematically relating macro theory to the "big" issues in Canadian policy debates is one of the ways we hope to transfer our excitement about our discipline to as many readers as possible.

Finally, there are two important things concerning the new Canadian edition that are not in the book itself. With this edition, two of the many supplements are available in Canadian editions. Students will value the *Student Guide and Workbook,* and instructors will be grateful for the Test Bank.

The Arrangement of Topics

This 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 [i:kwi'libriəm] before discussing deviations from that equilibrium. This strategy has several advantages. First, because the classical dichotomy permits the separation of real and monetary issues, the long-run material is easier for students to understand. Second, when students begin studying short-run fluctuations, they understand fully the long-run equilibrium around which the economy is fluctuating. Third, beginning with market-clearing models makes clearer the link between macroeconomics and microeconomics. Fourth, students learn first the material that is less controversial among macroeconomists. For all these reasons, the strategy of beginning with long-run classical models simplifies the teaching of macroeconomics.

Let's now move 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.

Money and the price level are introduced in Chapter 4. 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 5. 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, the effect of monetary policy on the value of a currency in the market for foreign exchange, and the effects of government debt reduction and tax reform on standards of living.

Chapter 6 relaxes the assumption of full employment by discussing the dynamics of the labour 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 and policy options concerning less-skilled workers.

Part Three, Growth Theory: The Economy in the Very Long Run

Part Three makes the classical analysis of the economy dynamic by developing the tools of modern growth theory. Chapter 7 introduces the Solow growth model as a description of how the economy evolves over time. This chapter emphasizes the roles of capital accumulation and population growth. Chapter 8 then adds technological progress to the Solow model. It uses the model to discuss growth experiences around the world as well as public policies that influence the level and growth of the standard of living. Finally, Chapter 8 introduces students to the modern theories of endogenous growth.

Part Four, Business Cycle Theory: The Economy in the Short Run

Part Four 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. Several extensions to the basic model are covered in the appendix.

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 and challenges to the natural-rate hypothesis.

Part Five: 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, and to evaluate the debate on the "fiscal dividend."

Part Six: 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 behaviour, including the Keynesian consumption function, Fisher's model of intertemporal choice, Modigliani's life-cycle hypothesis, Friedman's permanent-income hypothesis, Hall's random-walk hypothesis, and Laibson's model of instant gratification. 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, monetary policy indicators, 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.

陆

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 we emphasize that, despite the disagreements among macroeconomists, there is much that we know about how the economy works.

Alternative Routes through the Text

Although we have organized the material in the way that we prefer to teach intermediate-level macroeconomics, we understand that other instructors have different preferences. We tried to keep this in mind as we wrote the book, so that it would offer a degree of flexibility. Here are a few ways that instructors might consider rearranging the material:

- Some instructors are eager to cover short-run economic fluctuations. For such a course, we recommend covering Chapters 1 through 4 so students are grounded in the basics of classical theory and then jumping to Chapters 9 through 13 to cover the model of aggregate demand and aggregate supply.
- Some instructors are eager to cover long-run economic growth. These instructors can cover Chapters 7 and 8 immediately after Chapter 3.
- An instructor who wants to defer open-economy macroeconomics can put off Chapters 5 and 12 without loss of continuity.
- An instructor who wants to emphasize the microeconomic foundations of macroeconomics can teach chapters 16, 17, and 18 early in the course, such as immediately after chapter 6 (or even earlier).

Experience with previous editions suggests this text complements well a variety of approaches to the field.

Learning Tools

We are pleased that students have found the previous edition of this book user friendly. We have tried to make this third 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 important learning tools that are integrated closely with the theoretical material presented in each chapter. 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 favourite part of the book.

FYI Boxes

These boxes present ancillary material "for your information." We 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. A particularly useful FYI box appears below.

Graphs

Understanding graphical analysis is a key part of learning macroeconomics, and we have worked hard to make the figures easy to follow. We use four colours and comment boxes within figures that describe briefly and draw attention to the

FYI Macroeconomic Data for Canada

While the text contains many graphs and tables containing data pertaining to the Canadian economy (see, in particular, the convenient graphs on the inside front and bank covers of the book), readers of both the text and the study guide will want to have convenient access to the latest observations that emerge after these books have been published. We indicate the most straightforward options here.

The most recent observations on many major series are available on Statistics Canada's website:

http://www.statcan.ca

You can either click on *Subjects* and then the category you want (such as labour, prices, national accounts), or you can click on *Summary Tables,* and enter the keyword you want (such as unemployment rate). While convenient, this free-access site provides only the most recent observations. Entire historical times series can be had in either of two ways.

First, on your own university website, you can go to the library page and click on *e-resources.* Then, after selecting economics, you should find the *Canadian Economic Observer*—a summary publication produced by Statistics Canada. Once at this page, click on *Canadian Economic Observer Historical Supplement* (choosing the HTML view option). You can then choose from the various tables that are available. The series reference numbers in these tables are the ones that are given in the source entries for each table in this text.

Your second option for full historical series is that you can go to the website of the Computing in the Humanities and Social Sciences (CHASS) facility at the University of Toronto:

http://datacenter2.chass.utoronto.ca/cansim/

Once at this site, you can click on *subscribing universities* to ensure that your university has access to this service. Most Canadian universities do. Then, click on *Cansim Quick Starts,* and choose one of the many options (such as labour force, Bank of Canada Monetary Aggregates, *GDP, CPI,* interest rates, budget deficits, exchange rates).

Other useful websites are:

http://www.fin.gc.ca

The Federal Department of Finance site has a *Frequently Asked Questions* section, as well as the annual *Budget* documents (each Spring) and the annual *Fiscal Update* (each fall).

http://bankofcanada.ca/

The Bank of Canada site has useful *Frequently Asked Questions* as well (under the *Monetary Policy* heading). Further, the last four years of data on most macroeconomic series of general interest are included in the tables at the end of each of the quarterly issues of the Bank of Canada *Review.* This publication is available by clicking on *Publications and Research,* and then on *Periodicals.*

http://www.cabe.ca

The Canadian Association of Business Economists site gives links to many interesting sources of information, including the macroeconomic analyses provided by the economics departments of Canada's major chartered banks.

important points that the figures illustrate. Both innovations should help students both learn and review the material.

Mathematical Notes

We use occasional mathematical footnotes to keep more difficult material out of the body of the text. These notes make an argument more rigourous 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

Student Guide and Workbook

The study guide, by Roger Kaufman and William Scarth, 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.

Companion Web Site (www.worthpublishers.com/mankiw6)

Students may find the following features of the site produced for the associated U.S. edition of the text useful:

- *Self-Tests:* Students can test their knowledge of the material by taking multiple-choice tests on any chapter.
- *Student Tutorials:* Mannig Simidian has developed *Mankiw's Macroeconomics Modules: A PowerPoint Tutorial,* an animated set of tutorial slides for students. For each chapter, key points are highlighted, and students are offered another way to learn the material. Dynamic macroeconomic models come alive with shifting curves, colorful equations, graphics, and humor.

The following items on the website pertain to the U.S. economy. Nevertheless, since much of the book covers items which are not specific to the small open economy case, Canadian students may find these items instructive.

- *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.
- *2012: A Game for Macroeconomists.* The game allows students to become President of the United States in the year 2012 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.