INTERNATIONAL EDITION

Macroeconomics

FIFTH EDITION

Stephen D. Williamson

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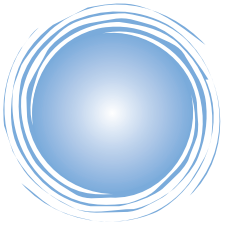
Macroeconomics

Fifth Edition



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CONTENTS

This book follows a modern approach to macroeconomics by building macroeconomic models from microeconomic principles. As such, it is consistent with the way that macroeconomic research is conducted today.

This approach has three advantages. First, it allows deeper insights into economic growth processes and business cycles, the key topics in macroeconomics. Second, an emphasis on microeconomic foundations better integrates the study of macroeconomics with approaches that students learn in courses in microeconomics and in field courses in economics. Learning in macroeconomics and microeconomics thus becomes mutually reinforcing, and students learn more. Third, in following an approach to macroeconomics that is consistent with current macroeconomic research, students will be better prepared for advanced study in economics.

What's New in the Fifth Edition

The first four editions of *Macroeconomics* had an excellent reception in the market. In the fifth edition, I build on the strengths of the first four editions, while producing a framework for students of macroeconomics that captures all of the latest developments in macroeconomic thinking, applied to recent economic events and developments in macroeconomic policy. The financial crisis in 2008–2009, the resulting worldwide recession, and the responses of monetary and fiscal policy to these events have introduced a rich array of macroeconomic issues that have been addressed in the fourth edition, and further in this revision. The book has been adapted to show how existing macroeconomic theory allows us to organize our thinking about the recent financial crisis and recession. As well, new material has been added to deepen the student's knowledge of the financial market factors that were important in recent events, and to examine and critically evaluate some of the unusual recent policy interventions by the U.S. government and the Federal Reserve System.

In more detail, the key changes in the fifth edition are:

- Chapter 6, "Search and Unemployment," is entirely new. This chapter presents an accessible version of the search and matching model for which Peter Diamond, Dale Mortensen, and Christopher Pissarides received the Nobel Prize in 2010. This basic search model has become a workhorse for research in labor economics and macroeconomics over the last 30 years. This model allows us to understand the determinants of unemployment, and to successfully address some puzzles regarding the recent behavior of labor markets in the United States, following the financial crisis.

- Chapter 11, "A Real Intertemporal Model with Investment," contains a new section, "Sectoral Shocks and Labor Market Mismatch," which is important for understanding some features of the 2008–2009 recession and the recovery from the recession.
- In Chapter 12, "Money, Banking, Prices, and Monetary Policy," the approach to money demand has been simplified, and new material has been added on monetary policy rules, the liquidity trap, and quantitative easing. This material is critical for understanding monetary policy in the United States and other countries during and since the financial crisis.
- In Chapter 13, "Business Cycles with Flexible Prices and Wages," a new section is included on "A New Monetarist Model: Financial Crises and Deficient Liquidity," which captures some causes of the financial crisis and explores the appropriate policy responses.
- Chapters 15 and 16, which cover international economics, have been revised extensively. In particular, an addition to Chapter 16 is the treatment of a New Keynesian sticky-price open economy model.
- New end-of-chapter problems have been added.
- New "Theory Confronts the Data" and "Macroeconomics in Action" features have been added to cover recent macroeconomic events and macroeconomic policy issues, particularly as they relate to the financial crisis, and the 2008–2009 recession.
- The "Working with the Data" sections at the end of each chapter have been revised extensively so students can use the FRED database, provided by the Federal Reserve Bank of St. Louis.

Structure

The text begins with Part I, which provides an introduction and study of measurement issues. Chapter 1 describes the approach taken in the book and the key ideas that students should take away. It previews the important issues that will be addressed throughout the book, along with some recent issues in macroeconomics, and the highlights of how these will be studied. Measurement is discussed in Chapters 2 and 3, first with regard to gross domestic product, prices, savings, and wealth, and then with regard to business cycles. In Chapter 3, we develop a set of key business cycle facts that will be used throughout the book, particularly in Chapters 13 and 14, where we investigate how alternative business cycle theories fit the facts.

Our study of macroeconomic theory begins in Part II. In Chapter 4, we study the behavior of consumers and firms in detail. In the one-period model developed in Chapter 5, we capture the behavior of all consumers and all firms in the economy with a single representative consumer and a single representative firm. The one-period model is used to show how changes in government spending and total factor productivity affect aggregate output, employment, consumption, and the real wage, and we analyze how proportional income taxation matters for aggregate activity and government tax revenue. In Chapter 6, a one-period search model of unemployment is studied, which can capture some important details of labor market behavior in a macroeconomic context. This search model permits an understanding of the determinants of unemployment, and an explanation for some of the recent unusual labor market behavior observed in the United States.

With a basic knowledge of static macroeconomic theory from Part II, we proceed in Part III to the study of the dynamic process of economic growth. In Chapter 7 we discuss a set of economic growth facts, which are then used to organize our thinking in the context of models

of economic growth. The first growth model we examine is a Malthusian growth model, consistent with the late-eighteenth century ideas of Thomas Malthus. The Malthusian model predicts well the features of economic growth in the world before the Industrial Revolution, but it does not predict the sustained growth in per capita incomes that occurred in advanced countries after 1800. The Solow growth model, which we examine next, does a good job of explaining some important observations concerning modern economic growth. Finally, Chapter 7 explains growth accounting, which is an approach to disentangling the sources of growth. In Chapter 8, we discuss income disparities across countries in light of the predictions of the Solow model, and introduce a model of endogenous growth.

In Part IV, we first use the theory of consumer and firm behavior developed in Part II to construct (in Chapter 9) a two-period model that can be used to study consumption–savings decisions and the effects of government deficits on the economy. Chapter 10 extends the two-period model to include credit market imperfections, an approach that is important for understanding the recent global financial crisis, fiscal policy, and social security. The two-period model is then further extended to include investment behavior and to address a wide range of macroeconomic issues in the real intertemporal model of Chapter 11. This model will then serve as the basis for much of what is done in the remainder of the book.

In Part V, we include monetary phenomena in the real intertemporal model of Chapter 11, so as to construct a monetary intertemporal model. This model is used in Chapter 12 to study the role of money and alternative means of payment, to examine the effects of changes in the money supply on the economy, and to study the role of monetary policy. Then, in Chapters 13 and 14, we study theories of the business cycle with flexible wages and prices, as well as New Keynesian business cycle theory. These theories are compared and contrasted, and we examine how alternative business cycle theories fit the data and how they help us to understand recent business cycle behavior in the United States.

Part VI is devoted to international macroeconomics. In Chapter 15, the models of Chapters 9 and 11 are used to study the determinants of the current account surplus, and the effects of shocks to the macroeconomy that come from abroad. Then, in Chapter 16, we show how exchange rates are determined, and we investigate the roles of fiscal and monetary policy in an open economy that trades goods and assets with the rest of the world.

Finally, Part VII examines some important topics in macroeconomics. In Chapter 17, we study in more depth the role of money in the economy, the effects of money growth on inflation and aggregate economic activity, banking, and deposit insurance. Then, in Chapter 18, we see how central banks can cause inflation, because they cannot commit themselves to a low-inflation policy. We also study in this chapter how inflation has been reduced over the last 25 years in the United States, and how current monetary policy exposes the U.S. economy to the risk of future inflation.

Features

Several key features enhance the learning process and illuminate critical ideas for the student. The intent is to make macroeconomic theory transparent, accessible, and relevant.

Real-World Applications

Applications to current and historical problems are emphasized throughout in two running features. The first is a set of "Theory Confronts the Data" sections, which show how macroeconomic theory comes to life in matching (or sometimes falling short of matching) the characteristics of

real-world economic data. A sampling of some of these sections includes consumption smoothing and the stock market; productivity, unemployment, and real GDP in the United States and Canada; the 2008–2009 recesssion; and interest rate spreads and aggregate economic activity.

The second running feature is a series of "Macroeconomics in Action" boxes. These real-world applications relating directly to the theory encapsulate ideas from front-line research in macroeconomics, and they aid students in understanding the core material. For example, some of the subjects examined in these boxes are the natural rate of unemployment and the 2008–2009 recession; business cycle models and the Great Depression; and New Keynesian models, the zero lower bound, and quantitative easing.

Art Program

Graphs and charts are plentiful in this book, as visual representations of macroeconomic models that can be manipulated to derive important results, and for showing the key features of important macro data in applications. To aid the student, graphs and charts use a consistent two-color system that encodes the meaning of particular elements in graphs and of shifts in curves.

End-of-Chapter Summary and List of Key Terms

Each chapter wraps up with a bullet-point summary of the key ideas contained in the chapter, followed by a glossary of the chapter's key terms. The key terms are listed in the order in which they appear in the chapter, and they are highlighted in bold typeface where they first appear.

Questions for Review

These questions are intended as self-tests for students after they have finished reading the chapter material. The questions relate directly to ideas and facts covered in the chapter, and answering them will be straightforward if the student has read and comprehended the chapter material.

Problems

The end-of-chapter problems will help the student in learning the material and applying the macroeconomic models developed in the chapter. These problems are intended to be challenging and thought-provoking.

"Working with the Data" Problems

These problems are intended to encourage students to learn to use the FRED database at the St. Louis Federal Reserve Bank, accessible at http://research.stlouisfed.org/fred2/. FRED assembles most important macroeconomic data for the United States (and for some other countries as well) in one place, and allows the student to manipulate the data and easily produce charts. The problems are data applications relevant to the material in the chapter.

Notation

For easy reference, definitions of all variables used in the text are contained on the end papers.

Mathematics and Mathematical Appendix

In the body of the text, the analysis is mainly graphical, with some knowledge of basic algebra required; calculus is not used. However, for students and instructors who desire a more rigorous treatment of the material in the text, a mathematical appendix develops the key models and

results more formally, assuming a basic knowledge of calculus and the fundamentals of mathematical economics. The Mathematical Appendix also contains problems on this more advanced material.

Flexibility

This book was written to be user-friendly for instructors with different preferences and with different time allocations. The core material that is recommended for all instructors is the following:

Chapter 1. Introduction

Chapter 2. Measurement

Chapter 3. Business Cycle Measurement

Chapter 4. Consumer and Firm Behavior: The Work–Leisure Decision and Profit Maximization

Chapter 5. A Closed-Economy One-Period Macroeconomic Model

Chapter 9. A Two-Period Model: The Consumption–Savings Decision and Credit Markets

Chapter 11. A Real Intertemporal Model with Investment

Some instructors find measurement issues uninteresting, and may choose to omit parts of Chapter 2, though at the minimum instructors should cover the key national income accounting identities. Parts of Chapter 3 can be omitted if the instructor chooses not to emphasize business cycles, but there are some important concepts introduced here that are generally useful in later chapters, such as the meaning of correlation and how to read scatter plots and time series plots.

Chapter 6 is a chapter new to this edition, and introduces a search model of unemployment. This is a one-period framework, which fits with the emphasis of Part II on static models, but the model allows for an explicit treatment of the determinants of unemployment by including a search friction. The model allows for an interesting treatment of labor market issues, but it is possible to skip this chapter if the instructor and students prefer to focus on other topics.

Chapters 7 and 8 introduce economic growth at an early stage, in line with the modern role of growth theory in macroeconomics. However, Chapters 7 and 8 are essentially self-contained, and nothing is lost from leaving growth until later in the sequence—for example, after the business cycle material in Chapters 13 and 14. Though the text has an emphasis on microfoundations, Keynesian analysis receives a balanced treatment. For example, we study a Keynesian coordination failure model in Chapter 13, and examine a New Keynesian sticky price model in Chapter 14. Keynesian economics is fully integrated with flexible-wage-and-price approaches to business cycle analysis, and the student does not need to learn a separate modeling framework, as for example the New Keynesian sticky price model is simply a special case of the general modeling framework developed in Chapter 12. Those instructors who choose to ignore Keynesian analysis can do so without any difficulty. Instructors can choose to emphasize economic growth or business cycle analysis, or they can give their course an international focus. As well, it is possible to deemphasize monetary factors. As a guide, the text can be adapted as follows:

Focus on Models with Flexible Wages and Prices. Omit Chapter 14 (New Keynesian Economics: Sticky Prices).

Focus on Economic Growth. Include Chapters 7 and 8, and consider dropping Chapters 12, 13, and 14, depending on time available.

Focus on Business Cycles. Drop Chapters 7 and 8, and include Chapters 6, 12, 13, and 14.

International Focus. Chapters 15 and 16 can be moved up in the sequence. Chapter 15 can follow Chapter 11, and Chapter 16 can follow Chapter 12.

Advanced Mathematical Treatment. Add material as desired from the Mathematical Appendix.

Supplements

The following materials that accompany the main text will enrich the intermediate macroeconomics course for instructors and students alike.

Instructor's Manual/Test Bank

Written by the author, the Instructor's Manual/Test Bank provides strong instructor support. The Instructor's Manual portion contains sections on Teaching Goals, which give an aerial view of the chapters; classroom discussion topics, which explore lecture-launching ideas and questions; chapter outlines; and solutions to all Questions for Review and Problems found in the text. The Test Bank portion contains multiple-choice questions and answers. The Test Bank is also available in Test Generator Software (TestGen-EQ with QuizMaster-EQ). Fully networkable, this software is available for Windows and Macintosh. TestGen-EQ's friendly graphical interface enables instructors to easily view, edit, and add questions; export questions to create tests; and print tests in a variety of fonts and forms. Search and sort features let the instructor quickly locate questions and arrange them in a preferred order. QuizMaster-EQ automatically grades the exams, stores results on a disk, and allows the instructor to view or print a variety of reports. The Instructor's Manual and Test Bank can be found on the instructor's portion of the Web site accompanying this book at www.pearsoninternationaleditions.com/williamson.

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About the Author

Stephen Williamson is Robert S. Brookings Distinguished Professor in Arts and Sciences, Washington University in St. Louis, a Research Fellow at the Federal Reserve Bank of St. Louis, and an academic visitor at the Richmond Federal Reserve Bank. He received a B.Sc. in Mathematics and an M.A. in Economics from Queen's University in Kingston, Canada, and his Ph.D. from the University of Wisconsin–Madison. He has held academic positions at Queen's University, the University of Western Ontario, and the University of Iowa, and has worked as an economist at the Federal Reserve Bank of Minneapolis and the Bank of Canada. Professor Williamson has been an academic visitor at the Federal Reserve Banks of Atlanta, Cleveland, Kansas City, Minneapolis, New York, Philadelphia, the Bank of Canada, and the Board of Governors of the Federal Reserve System. He has also been a long-term visitor at the London School of Economics; the University of Edinburgh; Tilburg University, the Netherlands; Victoria University of Wellington, New Zealand; Seoul National University; Hong Kong University; Queen's University; and the University of Sydney. Professor Williamson has published scholarly articles in the *American Economic Review,* the *Journal of Political Economy,* the *Quarterly Journal of Economics,* the *Review of Economic Studies,* the *Journal of Economic Theory,* and the *Journal of Monetary Economics,* among other prestigious economics journals.

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PART I

Introduction and Measurement Issues

Part I contains an introduction to macroeconomic analysis and a description of the approach in this text of building useful macroeconomic models based on microeconomic principles. We discuss the key ideas that are analyzed in the rest of this text as well as some current issues in macroeconomics. Then, to lay a foundation for what is done later, we explore how the important variables relating to macroeconomic theory are measured in practice. Finally, we analyze the key empirical facts concerning business cycles. The macroeconomic theory developed in Parts II to VII is aimed at understanding the key ideas and issues discussed in the introduction, and in showing the successes and failures of theory in organizing our thinking about empirical facts.

This chapter frames the approach to macroeconomics that we take in this text, and it foreshadows the basic macroeconomic ideas and issues that we develop in later chapters. We first discuss what macroeconomics is, and we then go on to look at the two phenomena that are of primary interest to macroeconomists—economic growth and business cycles—in terms of post-1900 U.S. economic history. Then, we explain the approach this text takes—building macroeconomic models with microeconomic principles as a foundation—and discuss the issue of disagreement in macroeconomics. Finally, we explore the key lessons that we learn from macroeconomic theory, and we discuss how macroeconomics helps us understand recent and current issues.

What Is Macroeconomics?

Macroeconomists are motivated by large questions and by issues that affect many people and many nations of the world. Why are some countries exceedingly rich while others are exceedingly poor? Why are most Americans so much better off than their parents and grandparents? Why are there fluctuations in aggregate economic activity? What causes inflation? Why is there unemployment?

Macroeconomics is the study of the behavior of large collections of economic agents. It focuses on the aggregate behavior of consumers and firms, the behavior of governments, the overall level of economic activity in individual countries, the economic interactions among nations, and the effects of fiscal and monetary policy. Macroeconomics is distinct from microeconomics in that it deals with the overall effects on economies of the choices that all economic agents make, rather than on the choices of individual consumers or firms. Since the 1970s, however, the distinction between microeconomics and macroeconomics has blurred in that microeconomists and macroeconomists now use much the same kinds of tools. That is, the **economic models** that macroeconomists use, consisting of descriptions of consumers and firms, their objectives and constraints, and how they interact, are built up from microeconomic principles, and these models are typically analyzed and fit to data using methods similar to those used by microeconomists. What continues to make macroeconomics distinct, though, is the issues it focuses on, particularly **long-run growth** and **business cycles**. Long-run growth refers to the increase in a nation's productive capacity and average standard of living that occurs over a long period