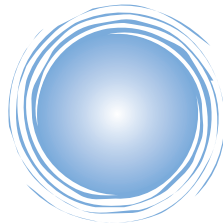




# Macroeconomics

Fifth Edition



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International Edition contributions by  
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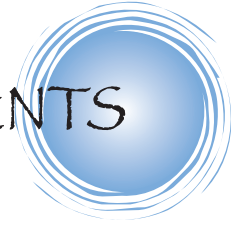
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# CONTENTS



<b>PART I</b>	<b>Introduction and Measurement Issues</b>	<b>19</b>
<i>Chapter 1</i>	Introduction	20
	What Is Macroeconomics?	20
	Gross Domestic Product, Economic Growth, and Business Cycles	21
	Macroeconomic Models	25
	Microeconomic Principles	28
	Disagreement in Macroeconomics	29
	What Do We Learn from Macroeconomic Analysis?	30
	Understanding Recent and Current Macroeconomic Events	33
	Chapter Summary	51
	Key Terms	51
	Questions for Review	52
	Problems	53
	Working with the Data	54
<i>Chapter 2</i>	Measurement	55
	Measuring GDP: The National Income and Product Accounts	55
	Nominal and Real GDP and Price Indices	64
	<b>MACROECONOMICS IN ACTION: Comparing Real GDP Across Countries and the Penn Effect</b>	<b>72</b>
	<b>MACROECONOMICS IN ACTION: House Prices and GDP Measurement</b>	<b>73</b>
	Savings, Wealth, and Capital	75
	Labor Market Measurement	76
	<b>MACROECONOMICS IN ACTION: Alternative Measures of the Unemployment Rate</b>	<b>78</b>
	Chapter Summary	80
	Key Terms	80
	Questions for Review	82
	Problems	82
	Working with the Data	85
<i>Chapter 3</i>	Business Cycle Measurement	86
	Regularities in GDP Fluctuations	86

	MACROECONOMICS IN ACTION: Economic Forecasting and the Financial Crisis	89
	Comovement	90
	The Components of GDP	96
	Nominal Variables	99
	Labor Market Variables	102
	MACROECONOMICS IN ACTION: Jobless Recoveries	104
	Seasonal Adjustment	106
	MACROECONOMICS IN ACTION: The Great Moderation and the 2008–2009 Recession	107
	Comovement Summary	109
	Chapter Summary	110
	Key Terms	110
	Questions for Review	111
	Problems	112
	Working with the Data	112
<b>PART II</b>	<b>A One-Period Model of the Macroeconomy</b>	<b>113</b>
<i>Chapter 4</i>	Consumer and Firm Behavior: The Work–Leisure Decision and Profit Maximization	114
	The Representative Consumer	115
	The Representative Firm	134
	MACROECONOMICS IN ACTION: How Elastic is Labor Supply?	135
	MACROECONOMICS IN ACTION: Henry Ford and Total Factor Productivity	145
	THEORY CONFRONTS THE DATA: Total Factor Productivity and the U.S. Aggregate Production Function	146
	Chapter Summary	149
	Key Terms	150
	Questions for Review	151
	Problems	152
	Working with the Data	154
<i>Chapter 5</i>	A Closed-Economy One-Period Macroeconomic Model	155
	Government	156
	Competitive Equilibrium	156
	Optimality	163
	Working with the Model: The Effects of a Change in Government Purchases	169
	THEORY CONFRONTS THE DATA: Government Spending in World War II	171
	Working with the Model: A Change in Total Factor Productivity	172

THEORY CONFRONTS THE DATA: Total Factor Productivity, Real GDP, and Energy Prices	177
MACROECONOMICS IN ACTION: Government Expenditures and the American Recovery and Reinvestment Act of 2009	180
A Distorting Tax on Wage Income, Tax Rate Changes, and the Laffer Curve	184
A Model of Public Goods: How Large Should the Government Be?	191
Chapter Summary	195
Key Terms	195
Questions for Review	196
Problems	197
Working with the Data	199

## Chapter 6 Search and Unemployment 200

Labor Market Facts	201
MACROECONOMICS IN ACTION: Unemployment and Employment in the United States and Europe	205
A Diamond-Mortensen-Pissarides Model of Search and Unemployment	207
Working with the DMP Model	217
MACROECONOMICS IN ACTION: Unemployment Insurance and Incentives	219
THEORY CONFRONTS THE DATA: Productivity, Unemployment, and Real GDP in the United States and Canada: The 2008–2009 Recession	225
A Keynesian DMP Model	227
MACROECONOMICS IN ACTION: The Natural Rate of Unemployment and the 2008–2009 Recession	231
Chapter Summary	232
Key Terms	233
Questions for Review	233
Problems	234
Working with the Data	235

## PART III Economic Growth 237

### Chapter 7 Economic Growth: Malthus and Solow 238

Economic Growth Facts	239
The Malthusian Model of Economic Growth	244
The Solow Model: Exogenous Growth	255
THEORY CONFRONTS THE DATA: The Solow Growth Model, Investment Rates, and Population Growth	268
MACROECONOMICS IN ACTION: Resource Misallocation and Total Factor Productivity	270

	MACROECONOMICS IN ACTION: Recent Trends in Economic Growth in the United States	271
	Growth Accounting	272
	MACROECONOMICS IN ACTION: Development Accounting	279
	Chapter Summary	281
	Key Terms	282
	Questions for Review	282
	Problems	283
	Working with the Data	285
<i>Chapter 8</i>	Income Disparity Among Countries and Endogenous Growth	286
	Convergence	287
	THEORY CONFRONTS THE DATA: Is Income Per Worker Converging in the World?	292
	MACROECONOMICS IN ACTION: Measuring Economic Welfare: Per Capita Income, Income Distribution, Leisure, and Longevity	293
	Endogenous Growth: A Model of Human Capital Accumulation	294
	MACROECONOMICS IN ACTION: Education and Growth	303
	Chapter Summary	305
	Key Terms	305
	Questions For Review	305
	Problems	306
	Working with the Data	307
<b>PART IV</b>	<b>Savings, Investment, and Government Deficits</b>	<b>309</b>
<i>Chapter 9</i>	A Two-Period Model: The Consumption–Savings Decision and Credit Markets	310
	A Two-Period Model of the Economy	311
	THEORY CONFRONTS THE DATA: Consumption Smoothing and the Stock Market	327
	The Ricardian Equivalence Theorem	339
	MACROECONOMICS IN ACTION: The Economic Growth and Tax Relief Reconciliation Act and National Saving	349
	THEORY CONFRONTS THE DATA: Government Financing Arithmetic: Are Government Budget Deficits Sustainable?	351
	Chapter Summary	354
	Key Terms	355
	Questions for Review	356
	Problems	357
	Working with the Data	359
<i>Chapter 10</i>	Credit Market Imperfections: Credit Frictions, Financial Crises, and Social Security	360
	Credit Market Imperfections and Consumption	362

	Credit Market Imperfections, Asymmetric Information, and the Financial Crisis	365
	THEORY CONFRONTS THE DATA: Asymmetric Information and Interest Rate Spreads	367
	Credit Market Imperfections, Limited Commitment, and the Financial Crisis	369
	THEORY CONFRONTS THE DATA: The Housing Market, Collateral, and Consumption	372
	THEORY CONFRONTS THE DATA: Low Real Interest Rates and the Financial Crisis	379
	Social Security Programs	381
	MACROECONOMICS IN ACTION: Transitions from Pay-As-You-Go to Fully Funded Social Security	387
	Chapter Summary	388
	Key Terms	389
	Questions for Review	389
	Problems	390
	Working with the Data	392
<i>Chapter 11</i>	A Real Intertemporal Model with Investment	393
	The Representative Consumer	394
	The Representative Firm	400
	THEORY CONFRONTS THE DATA: Investment and the Interest Rate Spread	412
	Government	414
	Competitive Equilibrium	415
	The Equilibrium Effects of a Temporary Increase in $G$ : Stimulus, the Multiplier, and Crowding Out	426
	MACROECONOMICS IN ACTION: The Total Government Spending Multiplier: Barro vs. Romer	430
	The Equilibrium Effects of a Decrease in the Current Capital Stock $K$	432
	The Equilibrium Effects of an Increase in Current Total Factor Productivity $z$	433
	The Equilibrium Effects of an Increase in Future Total Factor Productivity, $z'$ : News About the Future and Aggregate Economic Activity	436
	THEORY CONFRONTS THE DATA: News, the Stock Market, and Investment Expenditures	437
	Credit Market Frictions and the Financial Crisis	439
	THEORY CONFRONTS THE DATA: Interest Rate Spreads and Aggregate Economic Activity	441
	Sectoral Shocks and Labor Market Mismatch	443



THEORY CONFRONTS THE DATA: The Behavior of Real GDP,  
Employment, and Labor Productivity in the 1981–1982 and  
2008–2009 Recessions 446

Chapter Summary 449                      Problems 451  
Key Terms 450                              Working with the Data 453  
Questions for Review 450

**PART V Money and Business Cycles 455**

*Chapter 12* Money, Banking, Prices, and Monetary Policy 456

What Is Money? 457

A Monetary Intertemporal Model 458

A Level Increase in the Money Supply and Monetary  
Neutrality 472

Shifts in Money Demand 475

THEORY CONFRONTS THE DATA: Instability in the Money Demand  
Function 478

The Short-Run Non-Neutrality of Money: Friedman–Lucas Money  
Surprise Model 480

The Zero Lower Bound and Quantitative Easing 490

MACROECONOMICS IN ACTION: Empirical Evidence on  
Quantitative Easing 493

Chapter Summary 496                      Problems 499  
Key Terms 497                              Working with the Data 500  
Questions for Review 498

*Chapter 13* Business Cycle Models with Flexible Prices and  
Wages 501

The Real Business Cycle Model 503

A Keynesian Coordination Failure Model 511

MACROECONOMICS IN ACTION: Business Cycle Models and the  
Great Depression 512

A New Monetarist Model: Financial Crises and Deficient  
Liquidity 522

MACROECONOMICS IN ACTION: Uncertainty and Business  
Cycles 532

Chapter Summary 533                      Problems 535  
Key Terms 534                              Working with the Data 536  
Questions for Review 534

*Chapter 14* New Keynesian Economics: Sticky Prices 537

The New Keynesian Model 539

The Nonneutrality of Money in the New Keynesian Model 541

THEORY CONFRONTS THE DATA: Can the New Keynesian Model Under Fluctuations in the Interest Rate Target Explain Business Cycles?	543
THEORY CONFRONTS THE DATA: Keynesian Aggregate Demand Shocks as Causes of Business Cycles	544
The Role of Government Policy in the New Keynesian Model	546
Total Factor Productivity Shocks in the New Keynesian Model	549
MACROECONOMICS IN ACTION: The Timing of the Effects of Fiscal and Monetary Policy	550
The Liquidity Trap and Sticky Prices	553
MACROECONOMICS IN ACTION: New Keynesian Models, the Zero Lower Bound, and Quantitative Easing	555
Criticisms of Keynesian Models	557
MACROECONOMICS IN ACTION: How Sticky Are Nominal Prices?	558
Chapter Summary	559
Key Terms	560
Questions for Review	560
Problems	561
Working with the Data	562

## PART VI **International Macroeconomics** 563

<i>Chapter 15</i>	International Trade in Goods and Assets	564
	A Two-Period Small Open-Economy Model: The Current Account	565
	THEORY CONFRONTS THE DATA: Is a Current Account Deficit a Bad Thing?	569
	Production, Investment, and the Current Account	573
	MACROECONOMICS IN ACTION: The World “Savings Glut”	580
	Chapter Summary	581
	Key Terms	582
	Questions for Review	582
	Problems	583
	Working with the Data	584
<i>Chapter 16</i>	Money in the Open Economy	585
	The Nominal Exchange Rate, the Real Exchange Rate, and Purchasing Power Parity	586
	THEORY CONFRONTS THE DATA: The PPP Relationship for the United States and Canada	588
	Flexible and Fixed Exchange Rates	588
	A Monetary Small Open-Economy Model with a Flexible Exchange Rate	591

THEORY CONFRONTS THE DATA: Why Did the U.S. Currency Appreciate After the Onset of the Financial Crisis?	598
A Monetary Small Open Economy with a Fixed Exchange Rate	599
MACROECONOMICS IN ACTION: Sovereign Debt and the EMU	608
Capital Controls	610
MACROECONOMICS IN ACTION: Do Capital Controls Work in Practice?	614
A New Keynesian Sticky Price Open-Economy Model	615
Chapter Summary	620
Key Terms	621
Questions for Review	622
Problems	623
Working with the Data	624

## PART VII Money, Banking, and Inflation 625

<i>Chapter 17</i>	Money, Inflation, and Banking	626
	Alternative Forms of Money	627
	MACROECONOMICS IN ACTION: Commodity Money and Commodity-Backed Paper Money Yap Stones and Playing Cards	629
	Money and the Absence of Double Coincidence of Wants: The Role of Commodity Money and Fiat Money	630
	Long-Run Inflation in the Monetary Intertemporal Model	634
	MACROECONOMICS IN ACTION: Should the Fed Reduce the Inflation Rate to Zero or Less?	643
	Financial Intermediation and Banking	644
	MACROECONOMICS IN ACTION: Banks, Non-Bank Financial Intermediaries, Too-Big-to-Fail, and Moral Hazard	655
	MACROECONOMICS IN ACTION: Bank Failures and Banking Panics in the United States and Canada	658
	Chapter Summary	660
	Key Terms	660
	Questions for Review	661
	Problems	662
	Working with the Data	663
<i>Chapter 18</i>	Inflation, the Phillips Curve, and Central Bank Commitment	664
	The Phillips Curve	665
	The Phillips Curve, Inflation Forecasting, and the Fed's Dual Mandate	674

MACROECONOMICS IN ACTION: Commitment and Post Financial  
Crisis Monetary Policy in the United States 676

Chapter Summary	677	Problems	678
Key Terms	678	Working with the Data	679
Questions for Review	678		

<i>Appendix</i>	Mathematical Appendix	680
	Chapter 4: Consumer and Firm Behavior	680
	Chapter 5: A Closed-Economy One-Period Macroeconomic Model	684
	Chapter 6: Search and Unemployment	687
	Chapters 7 and 8: Economic Growth	690
	Chapter 9: A Two-Period Model	695
	Chapter 11: A Real Intertemporal Model with Investment	698
	Chapter 12: Money, Banking, Prices, and Monetary Policy	700
	Chapter 17: Money, Inflation, and Banking	705
	Chapter 18: Inflation, the Phillips Curve, and Central Bank Commitment	709
<i>Index</i>		711

# PREFACE



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 recession; 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 microfoundedness, 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](http://www.pearsoninternationaleditions.com/williamson).

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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.



chapter 1  
Introduction

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