



Macroeconomics

Sixth Edition

Robert J. Gordon

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Robert J. Gordon

Stanley G. Harris Professor in the Social Sciences

Northwestern University

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Developmental Editor: Lisa Pinto
Project Coordination, Text and Cover Design: Proof Positive/Farrowlyne
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MACROECONOMICS, Sixth Edition

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Guide to Symbols

[Note: For most variables, the level is indicated by an uppercase letter (X) while the growth rate is indicated by a lowercase letter (x). Each such variable is listed only once in this list by the appropriate uppercase letter (X).]

Symbol	Chapter Where Introduced	Definition
Δ	3	The change in a magnitude
a	3	Real autonomous consumption expenditure
A	3	Real autonomous expenditure
A	12	Autonomous growth factor; multifactor productivity
A	18	Assets held in life-cycle hypothesis
b	4-Appendix	Dollar change of A_p in response to a one percentage-point change in the interest rate
b'	5-Appendix	Dollar change of A_p in response to a one percentage-point change in the interest rate, taking into account the indirect effect of the interest rate on the foreign exchange rate
b	12	Elasticity of output with respect to capital input
b	15	Broker's fee in Baumol's theory of money demand
B	10	Dollar amount of government bonds outstanding
c	3	Marginal propensity to consume
c	15	Fraction of bank deposits held as currency by the public
C	2	Real personal consumption expenditures
C	15	Currency held by the public
d	5	Response of the exchange rate to a change in the interest rate
d	12	Depreciation rate
D	13	Nominal government debt (ΔD = nominal government deficit)
D	15	Demand deposits (accounts at banks or thrift institutions that allow checks to be written)
e	5	Real foreign exchange rate
e'	14	Nominal foreign exchange rate
e	15	Fraction of deposits that banks hold as reserves
E	2	Real expenditures ($E = C + I + G + NX$)
f	4	Dollar change of the demand for real money in response to a one percentage-point change in the interest rate
F	2	Real government transfer payments
g	9-Appendix	Slope of the short-run Phillips curve (SP)
G	2	Real government purchases of goods and services
h	4	Dollar change of the demand for real money in response to a one-dollar change in real income, holding the interest rate constant
h	7	Response of output to a price surprise in the Friedman-Lucas supply function
h	11	Response of unemployment to the output ratio
H	10	High-powered money (same as the monetary base; consists of currency plus bank reserves)
i	10	Nominal or market interest rate
I	2	Real gross private investment
j	9-Appendix	Coefficient of adjustment of expectations

k	3	Spending multiplier
k_1	4-Appendix	Multiplier for autonomous spending in <i>IS-LM</i> model
k_2	4-Appendix	Multiplier for real money supply in <i>IS-LM</i> model
k	17	Marginal propensity to consume for permanent income
K	12	Capital stock
L	4	Money demand function
L	17	Age at death in life-cycle hypothesis
M	4	Nominal money supply
n	3-Appendix	Response of net exports to a change in real income
N	12	Labor input, usually measured in person-hours
NX	2	Real net exports
P	4	Price index or price deflator
r	3	Real interest rate
R	2	Real government tax revenue
R	17	Age at retirement in life-cycle hypothesis
s	3-Appendix	Marginal propensity to save ($s = 1 - c$)
s	12	Average propensity to save; ratio of saving to income
S	2	Real private saving, including business firms and households
t	3-Appendix	Income tax rate
t	5	Ratio of net government tax revenues to GDP
T	2	Real government tax revenue net of transfers ($T = R - F$)
u	5	Response of net exports to a change in the exchange rate
u	18	Real user cost of capital
U	9-Appendix	Actual unemployment rate
v	18	Capital-output ratio in accelerator theory of investment
V	4	Velocity of money ($V \equiv PY/M$)
W	6	Nominal wage rate
X	8	Nominal GDP ($X = PY$)
\hat{x}	9-Appendix	Excess nominal GDP growth ($\hat{x} = x - y^N$)
Y	2	Real income, real output, real GDP
\hat{Y}	9-Appendix	Log of ratio of actual to natural real GDP expressed as a percent
z	9-Appendix	The contribution of supply shocks to the inflation rate

Frequently used superscripts

e	7	Expected, as in expected rate of inflation (p^e)
d	4	Demand, as in demand for real balances (M/P) ^d
f	5	Foreign, as in foreign interest rate (r^f)
N	9	Natural, as in natural rate of unemployment (U^N)
s	4	Supply, as in the nominal money supply (M^s)
$*$	12	Desired, as in desired capital stock (K^*)

Frequently used subscripts

0	3-Appendix	Autonomous component, as in autonomous net exports (NX_0)
0	4	Initial situation prior to a change
1	4	New situation after a change
p	3	Planned, as in planned expenditures (E_p)
u	3	Unplanned, as in unintended inventory investment (I_u)

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Macroeconomics

with love, for Julie

To the Instructor

Students come to their intermediate macroeconomics course in the early 1990s already aware that something is wrong with the U.S. economy. The post-1973 productivity growth slowdown continues without relief, raising questions as to whether this generation of college students will be the first to fail to exceed its parents' standard of living. Deepening the long-standing malaise about economic growth is the end of the long economic expansion of 1982–90 and its replacement by a prolonged slump. However, the recent recession may ultimately be defined in the official chronology, it has been followed by a recovery of unprecedented weakness. Unemployment rose during the weak recovery of 1991–92, while plant closings and “restructuring” layoffs continued. Real GDP per person in mid-1992 was lower than three years earlier, so the average standard of living fell. Monetary policy pushed interest rates to the lowest levels in twenty years without yet reigniting the vigorous GDP growth characteristic of previous postwar recoveries.

The sluggish or declining standard of living reflected both the business cycle downturn of the early 1990s and the longer-run productivity growth problem, reaffirming that the intermediate macroeconomics course should be about both business cycles and growth. This Sixth Edition of *Macroeconomics* reaffirms the strengths of preceding editions giving students first a solid grounding in the theory of business cycles, unemployment, and inflation. It then introduces growth theory and the productivity slowdown not as isolated topics, but in a unique integrated treatment that links them to long-run aspects of fiscal policy and international economics. To meet the challenges of teaching macro in the 1990s, the Sixth Edition represents the most substantial revision to date, introducing a new approach that places problems of the U.S. economy in an *international perspective*, while breaking new ground in its treatment of stabilization policy and the economy's weak response to monetary stimulus.

Changes in the Sixth Edition

The new international perspective on the U.S. economy is achieved by integrating foreign trade into the basic income-determination theory, by a greatly expanded treatment of open-economy macro in Chapter 5, and by the twenty innovative *International Perspective* boxes that compare U.S. macro performance and problems with those of other leading industrial nations. The treatment of stabilization policy is changed from a contest between rules and discretion to a systematic assessment of alternative rules, while the 1991–92 period is shown

to raise new questions about the efficacy of monetary policy and the potential of short-run fiscal policy. Other important new features are an expanded treatment of new classical economics, now given equal prominence to new Keynesian economics; a simplified presentation of core theory; and a new concluding chapter that both reviews the evolution of events and ideas while tying the book's conclusions back to the puzzles posed in the first chapter.

Internationalization of Macroeconomics

Macroeconomics, Sixth Edition, integrates international macroeconomics throughout the text. Unlike most other books, net exports are introduced at the very beginning rather than tacked on later. Net exports and the foreign sector appear in the circular-flow treatment of national income accounting in Chapter 2, and in the expenditure function of the Keynesian cross model, multiplier, and *IS* curve in Chapter 3. Net exports are included among the variables that can shift the *IS* curve in the *IS-LM* model of Chapter 4.

A new open-economy chapter (Chapter 5) falls directly after the development of the *IS-LM* model, introducing capital mobility, the balance of payments, exchange rate systems, and the links between exchange rates, interest rates, and net exports. Also included is the Mundell-Flemming version of *IS-LM* analysis, applied to both fixed and flexible exchange rate systems and to both small and large open economies. A new appendix provides an algebraic version of the *IS-LM* model for the open economy.

Addressing concerns about U.S. competitiveness and the slow growth of the U.S. standard of living, the growth chapter (Chapter 12), is set in an international context, adding a treatment of the new endogenous growth theory and of convergence in levels of productivity and standards of living.

As well as international macroeconomics being discussed throughout in the development of the basic theory, international concerns are brought in throughout the text. A unique new feature is the set of twenty International Perspective boxes that compare the United States with other major developed nations, particularly Germany and Japan. Starting in Chapter 1 with an overview that compares the U.S. with Europe and Japan, these boxes compare such topics as government deficits, procyclical productivity fluctuations, money growth and inflation, nominal and real interest rates, long-term unemployment, long-run growth performance and the productivity slowdown, debt-GDP ratio, purchasing-power parity, the instability of velocity, policy credibility, and other major issues. Almost every box is illustrated with a graph that vividly illustrates how the United States compares with other nations. All International Perspective boxes are listed on the front endpapers of the book.

Shifts in Emphasis: New Classical Macro; Inflation and Unemployment

To address concerns of some users and nonusers of previous editions, this edition creates a more balanced treatment of schools of macroeconomic thought. The new classicals now have their own chapter (Chapter 7), receiving equal

billing and space with the new Keynesians. That new chapter contains an expanded treatment of the real business cycle model, which is integrated with the theory of how the production function and the *AS* curve shift in response to supply shocks (previously in Chapter 10).

The treatment of the new Keynesians has been edited to reduce the number of theories presented. Finally, the chapter on rules and activism is reoriented to stress the difficulties of implementing either approach, with the 1990–92 recession and weak recovery as a topical example.

The dynamic *SP-DG* model of inflation and the output ratio has been condensed from two chapters to a single Chapter 9, leaving room for a greatly expanded coverage of classical inflation theory in a new Chapter 10. This discussion includes new treatments of money and inflation in the long run, and of the links among hyperinflation, money creation, government deficits, and the government budget constraint. A separate discussion of unemployment (Chapter 11) now includes international comparisons, including the theories to explain persistently high European unemployment in the 1980s. Money demand and supply are combined in Chapter 15, and the former Chapters 15 and 17 are combined in a completely new treatment of policy rules and activism that includes such topics as credibility, time inconsistency, and the advantages of alternative rules.

Core Analytical Treatment Improved

Previous strengths of the treatment of core theory, including the emphasis on applications and case studies, and the full array of pedagogical tools are not only retained but enhanced.

- The traditional income-expenditure and *IS-LM* models are presented concisely, with the *IS* and *LM* curves crossing by page 91 in the text. New to this edition is a substantial simplification of the theoretical treatment. The running numerical example is dropped from the text and graphs of Chapters 3 and 4, allowing a more concise presentation. Instead, the running numerical example is converted into end-of-chapter problems. The text is kept free of algebraic clutter by providing end-of-chapter appendices for Chapters 3 (income-expenditure), 4 (*IS-LM*), 5 (open-economy *IS-LM*), 9 (*SP-DG* dynamic inflation model), and 12 (production function). Thus instructors can mix and match a graphical, algebraic, or integrated treatment as they wish.
- The previous two-frame treatment of the income-expenditure model (Keynesian cross and induced saving-autonomous spending) is condensed to a single frame containing the familiar Keynesian cross, reducing the information students must absorb—and saving space. This new conciseness allows the development of the *IS* curve to be moved from Chapter 4 to Chapter 3; previous material on monetary accommodation and the policy mix is moved from Chapter 5 to Chapter 4.
- The *IS-LM* model is set in an international context throughout, since planned spending includes net exports. The treatment is enriched by including in the new Chapter 5 a diagrammatic treatment of the *IS-LM*

model in an open-economy setting, contrasting the different effects of monetary and fiscal policy under fixed and flexible exchange rates.

- As before, the organizational feature that sets off this text from every other is its presentation of wage and price adjustment in an *early* and *unified* set of chapters. The presentation of the *AS-AD* model in Chapter 6 begins a unique four-chapter unit that takes the student through the development of modern macroeconomics and shows how each theory (old and new classical, old and new Keynesian) developed in response to the inadequacies of its predecessors. Chapter 9 follows with a model of inflation dynamics that is explicitly derived from the *AS-AD* diagram and treats demand and supply disturbances symmetrically.

New Concluding Chapter

Unlike the previous editions and most other textbooks, which just stop in mid-air, this book has a concluding chapter that comes full circle to the six macroeconomic puzzles posed at the beginning and asks, what have we learned, what do we know, and what are the remaining “macro mysteries”? The chapter reviews the main aspects of U.S. economic performance since the 1920s by highlighting the events that have been so dramatic that they shaped the evolution of macro theory and ideas, both domestic and international. The student will find the economy’s performance since 1923 displayed in novel four-tier diagrams that show on a single page how the key variables behaved: three such diagrams cover 1923–47, 1947–70, and 1970–92.

New Pedagogical Features

Notation. Users of this book will be the first to be able to teach their intermediate macro students that GDP rather than GNP is the nation’s basic measure of economic activity, and that real GDP is now measured in 1987 dollars, not 1982 dollars. But these updates, with data current through 1992:Q2, are just the beginning. This edition retains capital letters for levels and lowercase letters for growth rates but switches from Q to Y for real GDP, Y to X for nominal GDP, X to NX for net exports, and x to z for supply shocks. DD , SS , and QQ curves are renamed AD , SAS , and LAS .

Improved art program. All diagrams have been completely replotted, using modern computer technology to insure accuracy, and take into account the July 1992 revisions in the National Income and Product Accounts. Theoretical diagrams have been redrawn and in many cases include new explanatory boxed labels to explain the meaning of shifts and new equilibrium points. Color is used consistently in diagrams, with blue lines identifying demand curves and black lines identifying supply curves.

“Learning About Diagrams” boxes. New to this edition is a special type of box called “Learning About Diagrams.” Each of these boxes covers on a single page every aspect of the key schedules, including IS , LM , AS , AD , and SP . Featured are why they slope as they do, and what makes them rotate and shift.

Continuing Themes

Organization

The Sixth Edition of *Macroeconomics* continues from the last edition its integrated treatment of economic growth in the context of long-run policy issues. Unlike other books that introduce the business cycle and national income identities, then shift to long-term growth in Chapter 3 or 4, then double back later to the business cycle, this book maintains its “demand first” organization. The theory flows smoothly through *IS-LM*, *AS-AD*, and the dynamic inflation model derived from *AS-AD*, with minimal diversions.

Also carried over is the integrated treatment of the *AS-AD* model with the debate between classical and Keynesian economists. The evolution of the old classical, old Keynesian, new classical, and new Keynesian models is followed in sequence, with differences and similarities illustrated by different slopes and shifts of the *AS* and *AD* curves.

The twin deficits are introduced as concepts and puzzles in Chapter 1; then a three-chapter unit (Chs. 12-14) combines the theory of long-run growth and the productivity slowdown with long-run issues in the theory of fiscal policy and international macro. In this context, long-term growth is not treated in isolation but is presented as a lively topical subject, linked in a three-chapter unit to the debate over the twin deficits. Money supply, money demand, and monetary policy are treated in a two-chapter unit rather than separated.

Real-World Focus and Case Studies

The Sixth Edition combines core theory and the new International Perspective boxes with a continued emphasis on substantive case studies. These case studies are numbered text sections (not boxes) that appear in the middle of chapters adjacent to the relevant theoretical sections. Such case studies continually remind the student that theories help to explain real-world episodes. As in previous editions, many case studies use consistent data series developed in my own research for the natural unemployment rate, natural real GDP, and the natural employment deficit.

Case studies from the earlier edition have been edited to remove unnecessary material and have been completely updated; two new case studies have been added on important current topics: “The 1990–91 Recession: Has Monetary Policy Lost Its Punch?” (Section 16-9) and “From Feast to Famine in Construction and Real Estate, 1982–92” (Section 18-9). Case studies are listed on the front endpapers.

A Unique Package of Pedagogical Features

The Sixth Edition retains the main pedagogical features of previous editions to aid student understanding.

- Key terms are introduced in boldface type, defined in the margin, and listed at the end of each chapter. A glossary providing an alphabetical list of all terms is found at the end of the book.

- Each chapter is broken up with at least three self-test questions so that students can immediately determine whether they understand what they have read.
- Each chapter ends with a summary, a list of key terms, a new set of questions and problems, and answers to the self-test questions.
- A revised set of data appendixes includes annual data for the U.S. back to 1875, quarterly data back to 1947, and annual data since 1960 for other leading nations.
- Finally, the Instructor's Manual, Student Workbook, and test bank have all been rewritten by two new collaborators.

Ancillary Material

Instructor's manual/test bank (test bank 1)/transparency masters. The Sixth Edition provides a substantially revised test bank of multiple-choice exam questions prepared by Scott Bloom of North Dakota State University and Scott Thompson of American University in Cairo. The Instructor's Manual, completely rewritten by Joseph S. DeSalvo of the University of South Florida, provides suggestions on how to use the book and how to teach each chapter, and how to use the various text appendixes. Also included are answers to discussion questions and problems in the text and additional essay and discussion questions. A set of 95 transparency masters containing key graphs and tables from the text is new to this edition.

Alternate test bank (test bank 2). A brand new alternate test bank with 1500 multiple-choice questions is available with this edition. It was prepared by Scott Bloom of North Dakota State University.

Computerized test banks. The expanded entire test bank contains over 2000 multiple-choice questions and is provided on computer disks suitable for the IBM-PC and compatibles.

Student workbook. An unusually complete student workbook is available. It contains both short objective questions and longer numerical exercises. Blank grids are included to encourage students to work out graphic solutions to numerical problems. The workbook is written by Joseph S. DeSalvo of the University of South Florida, John Gemello of San Francisco State University, and R. Newby Schweitzer of San Francisco State University.

The Gordon software package: data analysis and modeling programs. The software package features both problem sets and "what if" scenarios in which students explore how changes in variables produce different macroeconomic effects, depending on the model used. Data analysis programs let students use the data in the text's data appendixes, plus additional data series. Graphs can be plotted using these data series so that theory can be checked with evidence.

The Gordon Update. The *Gordon Update* will be issued each spring and fall semester, just as it has been since the spring of 1981, to provide a review of

recent events in the context of the theory developed in the text. The *Update* also provides updates on key data series used in the text.

Acknowledgments

I remain grateful to all those who were thanked in the preface of the first five editions. Space limitations prevent me from repeating all of these acknowledgments.

Above all, I am grateful to Joseph DeSalvo of the University of South Florida for his many contributions to the Sixth Edition. Joe identified himself as a sharp critic by writing an extensive review of the previous edition and catching many errors and debatable statements. His first key contribution to this edition has been to read the entire manuscript line by line to catch errors of every sort, from consistent switching of GNP to GDP to questionable statements. He also has written an entire set of end-of-chapter questions and problems, keyed to the many substantive and pedagogical changes made in the book. Finally, he has completely rewritten both the instructor's manual and student workbook. Thanks go also to Scott Bloom at North Dakota State University for writing an entirely new test bank.

The development of the Sixth Edition was greatly aided by a substantial number of reviews of the previous edition by both users and nonusers alike; and their valuable suggestions were incorporated as I wrote. The reviewers of this edition were:

Thomas Bonsor, Eastern Washington University; Janice Boucher, University of South Carolina; David Findlay, Colby College; Frederick Goddard, University of Florida, Gainesville; Dennis Jansen, Indiana University, Bloomington; Richard Kent, Kent State University; John Klein, Georgia State University; Gary Langer, Roosevelt University; John Lapp, North Carolina State University; Jim Lee, Hays State University; W. Douglas McMillin, Louisiana State University; Tom Potiowsky, Portland State University; David Spencer, Brigham Young University; Gabriel Talmain, SUNY Albany; Herbert Werner, University of Missouri, St. Louis; and Diane Zannoni, Trinity College.

Macroeconomics contains a great deal of data, some of it originally created for this book, both in the text and the data appendix. With amazing speed, calm, and accuracy, Dan Aaronson developed all the data, tables, and graphs, with help from John Walthour on the Data Appendix, together with their faithful servants Ronald Rats, Donald Dell, Lance Freedom, and Huey Packard.

Thanks go to the staff at HarperCollins. Bruce Kaplan conceived the reviewing process for the previous edition and contributed a set of priorities for the current revision. Lisa Pinto developed the manuscript and reviewing process with great efficiency and nagged me with unusual graciousness and poise. Immensely aiding timely publication was the nearby location two miles from my house of Proof Positive/Farrowlyne Associates, Inc., where the graphs were produced and where Gail Savage copyedited and coordinated the proofreading and production with great energy, accuracy, and general savvy.

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Robert J. Gordon

To the Student

Macroeconomics is one of the most important topics for college students, because the health of the economy will have an influence on your whole life. The overall level of employment and unemployment will determine the ease with which you find a job after college and with which you will be able to change jobs or obtain promotions in the future. The inflation rate will influence the interest rate you receive on your savings and pay when you borrow money, and also the extent to which the purchasing power of your savings will be eroded by higher prices.

This macroeconomics text will equip you with the principles you need to make sense out of the conflicting and contradictory discussions of economic conditions and policies in newspapers and news magazines. You will be better able to appraise the performance of the President and Congress, and to predict the impact of their policy actions on your family and business.

Who Should Read This Book?

Most college students taking this course will have taken a course in economic principles. But this book has been written to be read by *all* students, even those who have not previously enrolled in an economics course. How is this possible? In Chapters 1–3 we review material covered in every principles course. By the middle of Chapter 3, all students will have learned the concepts essential to understanding the new material to be developed.

This book has been carefully designed to look and read like a principles text. The entire presentation is graphic, with simple ninth-grade algebra used only in the review of elementary ideas. Examples are used frequently. Most chapters have at least one “case study” that gives you a breather from the analysis and shows how the ideas of the chapter can be applied to real-world episodes. “International Perspective” boxes show you how U.S. economic performance compares with that in other nations, such as Germany and Japan. To help with vocabulary problems, new words are set off in boldface type and defined both in the margins and in the Glossary in the back of the book. Many end-of-chapter questions provide numerical examples for you to solve, in order to cement your understanding of the theory. Finally, end-of-chapter appendices for Chapters 3, 4, 5, 9, and 12 provide optional algebraic treatments of the theory, available for assignment by instructors or for those students who want to do independent work that will deepen their command of the material.

A unique feature of this textbook is the set of “Self-Test” questions. These questions, which appear three or four times in each chapter, test your under-