

Macroeconomics

STEVEN E. LANDSBURG / LAUREN J. FEINSTONE

Booming Economy Brings Jobs and We

WASHINGTON — The government released new economic data today revealing that gross domestic product, or GDP, grew at an annual rate of 3.4% in the last quarter of the calendar year. An administration spokesman took credit for the increase, claiming that the President's policies had clearly borne fruit.

Congressman Granville Smith (R-Washington) greeted the news with enthusiasm.

Congress to appropriate new funds to subsidize He re-
dicted that help to stening more j enues.
The ne right on t good new

which is a full two points lo this time last year. Retail

PERSPECTIVES

Money Supply Raise Specter of Inflation

's that third-quarter money g set by the Federal Reserve Bo rrupted financial markets, le leaders to call for the F nd take the steam out of the p, a member of the Fe vernors, rejected the prop preliminary. "Fed actions s tesap. "The main goal is t

Budget Talks Stall President Threatens Veto

In a move to reduce spending and prevent tax increases, House Majority Whip John Macintosh rejected the President's budget proposal out of hand today, offering in its place a far leaner budget that omitted many of the President's favored spending programs. Macintosh argued that unless spending is cut drastically, taxes will have to be raised either now or in the future, threatening to cut off economic growth and prosperity.

Meanwhile, missed the r completely threatened t it reaches there ap toward which week the

Treasury Secretary Warns of Recession Calls for Higher Spending

Treasury Secretary Pamela Cobble told reporters that unless the government acts quickly to increase spending, a recession may be just around the corner. "We spend more now for useful projects, or we'll end spending more later to pay unemployment benefits," Ms. Cobble.
Congressional leaders warned that Ms. Cobble's proposed spending programs could lead to higher er deficits, or higher interest rates.

Macroeconomics

STEVEN E. LANDSBURG

University of Rochester

LAUREN J. FEINSTONE

The McGraw-Hill Companies, Inc.

NEW YORK ST. LOUIS SAN FRANCISCO AUCKLAND BOGOTÁ CARACAS
LISBON LONDON MADRID MEXICO CITY MILAN MONTREAL NEW DELHI
SAN JUAN SINGAPORE SYDNEY TOKYO TORONTO

McGraw-Hill

A Division of The McGraw-Hill Companies



Macroeconomics

Copyright © 1997 by The McGraw-Hill Companies, Inc. All rights reserved. Printed in the United States of America. Except as permitted under the United States Copyright Act of 1976, no part of this publication may be reproduced or distributed in any form or by any means, or stored in a data base or retrieval system, without the prior written permission of the publisher.

This book was printed on acid-free paper.

1 2 3 4 5 6 7 8 9 0 VNH VNH 9 0 9 8 7

ISBN 0-07-020496-9

This book was set in Times Roman by GTS Graphics, Inc.

The editors were Lucille H. Sutton, Adrienne D'Ambrosio, and Elaine Rosenberg; the production supervisor was Leroy A. Young.

The design manager was Charles A. Carson.

The designer was Edward A. Butler.

Drawings were done by Fine Line Illustrations.

Von Hoffmann Press, Inc. was printer and binder.

Library of Congress Cataloging-in-Publication Data

Landsburg, Steven E.

Macroeconomics / Steven E. Landsburg, Lauren Feinstone.

p. cm.

Includes index.

ISBN 0-07-020496-9

I. Macroeconomics. I. Feinstone, Lauren J., 1952-

II. Title.

HB172.5.L36 1997

339—dc21

96-45453

INTERNATIONAL EDITION

Copyright © 1997. Exclusive rights by The McGraw-Hill Companies, Inc. for manufacture and export. This book cannot be re-exported from the country to which it is consigned by McGraw-Hill. The International Edition is not available in North America.

When ordering this title, use ISBN 0-07-020496-9.

<http://www.mhcollege.com>

About The Authors

Steven E. Landsburg is an associate professor teaching at the University of Rochester. He has also taught at Colorado State University, Cornell University, the University of Iowa, and the University of Chicago. He is the author of two previous books about economics, *Price Theory and Applications* and *The Armchair Economist*. His monthly columns on economic matters have appeared in *Forbes* and the *Washington Post* and are currently appearing in *Slate*.

Lauren J. Feinstone has been a member of the faculty at the University of Rochester and the Economics Institute in Boulder, Colorado. She received a Ph.D. in economics from the University of Chicago. In 1988–1989, she was a Senior Economist on the President's Council of Economic Advisers, with primary responsibility for international macroeconomics. She is the author of the international finance chapter in the *Economic Report of the President* issued in February 1989.

To Cayley Elizabeth

P r e f a c e

Macroeconomics today is a different subject than it was just a few decades ago. Old controversies have been resolved, new ones have arisen, and in the process some widespread areas of consensus have emerged. We believe that the paradigm of intertemporal choice is the basis for this emerging consensus in macroeconomics and that the new paradigm is sufficiently developed to serve as the unifying theme of an undergraduate textbook. This is that textbook.

Our strategy is to first develop a basic model whose component pieces are largely noncontroversial and then show how variations in certain key assumptions can lead to alternative conclusions. This enables us to emphasize the existence of an established body of knowledge without denying the controversies that remain.

The fundamental model is one of intertemporal exchange and production. This allows us, right from the start, to address the dynamic issues which are the basis for the modern approach to macroeconomics. As we introduce different sectors of the economy, we repeatedly return to the intertemporal aspects, using these as a unifying theme.

The book's chapters can be roughly classified into "building-block" chapters, "application" chapters, and "institutional" chapters. The building-block chapters introduce the microeconomic foundations of macroeconomics in an environment with flexible prices and perfect information. They include chapters on the dynamic elements of borrowing and lending (Chapter 3), consumption (Chapters 4 and 5), investment (Chapter 7), and labor (Chapter 9). These components are added to the model one at a time, so that the student is able to master equilibrium and comparative statics first in a pure endowment economy and then in successively richer models. Throughout, we emphasize supply, demand, and equilibrium—tools that will be familiar to some students but are developed from scratch with macroeconomic examples.

Early in the development, we incorporate the international economy, highlighting the parallel economics of trade across nations and trade between individuals. We also add another building block—a government sector—and address the traditional concerns of macroeconomics, including government expenditure and taxation (Chapter 6) and the market for money (Chapter 9). Along the way we highlight such issues as the debate surrounding Ricardian equivalence and the causes of inflation.

The application chapters combine these building blocks into more substantial structures—the theory of long-run economic growth (Chapter 8) and the theory of business cycles and short-run income determination (Chapters 11 through 14). Because growth theory requires only some of the building blocks, we have been able to position it even before all of the building blocks are in place. Some instructors will want to cover this chapter in sequence; others will prefer to complete the building-

block Chapters 9 and 10 (and possibly some of the subsequent application Chapters 11 through 14) before returning to the topic of growth. We have carefully tailored the presentation so that instructors can follow either sequence without any loss of continuity. Let a thousand flowers bloom.

In the application Chapters 11 through 14, we first discuss some of the evidence and controversies involved in defining, measuring, and predicting business cycles. In Chapter 11, we use this material to call attention to some of the inadequacies of a flexible-price, full-information model. With this as motivation, we integrate the original building blocks into more sophisticated models, incorporating sticky wages (Chapter 12), sticky prices (Chapter 13), and monetary misperceptions (Chapter 14). We emphasize the question of what governments can and cannot do, and how the answer depends critically on what one believes about the existence and nature of distortions in the economy. At the same time, we insist that despite their different policy implications, all of these models are variations on a single theme. We eschew a pedagogy of “dueling models” with nothing in common, which can leave students with the impression that macroeconomists typically have nothing to say to each other. Instead, we provide a common language in which all schools of macroeconomic thought can be communicated and compared.

While we encourage students to think abstractly, we also encourage them to remember that the purpose of abstract thought is ultimately to understand the real world. Real-world institutions and history are referenced repeatedly in every chapter. A few chapters are exclusively devoted to tying the model to reality; these institutional chapters cover, among other topics, the national income accounts (Chapter 2), the money supply process (Chapter 15), and the making of economic policy (Chapter 17). A separate chapter on international finance (Chapter 16) is both an introduction to important real-world institutions and a new sort of building block, which (as we show the student) can be used to embellish the models and analysis elsewhere in the book.

We believe that students learn best by working problems. We have provided a large number of problems, at every level of difficulty. Within the chapters are exercises which should be easy for any student who has understood the preceding few paragraphs; students can use these exercises to slow themselves down and make sure they have grasped one point before rushing on to the next. The end-of-chapter problem sets call for deeper thought and understanding.

There are many other learning aids, including glossary items in the margins and “special warnings” to alert the students to points of particular subtlety. Special warnings are marked with the symbol below.



Supplements

The supplements that accompany *Macroeconomics* include a Study Guide prepared by William Weber of Eastern Illinois University as well as an Instructor’s Manual, a Testbank in printed and computerized versions, Excel spreadsheet software by Tim

Yaeger of Humboldt State, and a set of overhead transparencies. Contact your local McGraw-Hill representative for additional information.

Acknowledgments

The following reviewers made invaluable contributions:

J. Lon Carlson, Illinois State University
A. Edward Day, University of Central Florida
Sharon J. Erenburg, Eastern Michigan University
David W. Findlay, Colby College
Edward N. Gamber, Lafayette College
Fred Graham, The American University
David R. Hakes, University of Missouri, St. Louis
John Huizinga, The University of Chicago
Manfred W. Kell, Claremont McKenna College
Marc Lieberman, Vassar College
Robert G. Murphy, Boston College
Thomas F. Pogue, University of Iowa
Esther-Mirjam Sent, University of Notre Dame
David E. Spencer, Brigham Young University
Christopher J. Waller, Indiana University, Bloomington

We are indebted to the superior editorial and production support we've received at McGraw-Hill. Our development editor Ed Millman was absolutely superb, and Elaine Rosenberg juggled all the production tasks. Lucille Sutton nursed the project to completion. They all did great jobs.

Steven E. Landsburg
Lauren J. Feinstone

Contents in Brief

	Preface	xxi
Chapter 1:	Introduction	1
Chapter 2:	Income, Output, and Expenditure	7
Chapter 3:	Borrowing and Lending	39
Chapter 4:	Consumption	65
Chapter 5:	Interest Rates and Equilibrium	107
Chapter 6:	The Government	143
Chapter 7:	Investment	183
Chapter 8:	Economic Growth	216
Chapter 9:	Labor	255
Chapter 10:	Money	297
Chapter 11:	The Neoclassical Model	331
Chapter 12:	The Sticky Wage Model	363
Chapter 13:	The Sticky Price Model	397
Chapter 14:	Monetary Misperceptions and the Role of Expectations	431
Chapter 15:	Monetary Institutions	467
Chapter 16:	Exchange Rates	497
Chapter 17:	Economic Policy	529
	Index	543

Contents

Preface	xxi
Chapter 1	1
Introduction	
1-1 What Is Macroeconomics?	1
1-2 The Plan of This Book	3
The Fundamental Variables	3
The Basic Model	3
Using the Model	5
1-3 Models and Reality	6
Chapter 2	7
Income, Output, and Expenditure	
2-1 Income	8
Income and Welfare	9
Measuring Income	11
Problems in Measuring Income Directly	12
Dealing with Measurement Problems	13
2-2 Output	14
Measuring Output	14
Problems in Measuring Output Directly	14
2-3 Relating Output to Income	17
Relating Measured Output to Measured Income	18
Net Factor Payments Abroad	19
2-4 Expenditure	20
Measuring Expenditure	20
2-5 The Relationship among Income, Output, and Expenditure	21
Saving	22
Taxes	23
The Circular Flow of Economic Activity	23
2-6 Income and Expenditure in an Open Economy	24
Measuring Net Exports	25
2-7 Growth	26
Problems in Measuring Growth	26
Measuring Real Income: Real GDP	28
Measuring Real Growth	30
	xi

2-8 The Price Level and Inflation	32
Measuring the Price Level and Inflation	33
Summary	35
Problem Set	36
Chapter 3	39
<hr/>	
Borrowing and Lending	
3-1 Bonds and Loans	40
Borrowing and Lending	40
Bonds	40
Net Lending and Borrowing	42
Banks and the Bond Market	43
3-2 Interest Rates	44
Nominal Interest Rates	44
Real Interest Rates	44
Foreign Interest Rates	45
The One-Period, Risk-Free Real Interest Rate	46
3-3 The Price of Current and Future Consumption	48
The Price of Current Consumption	49
The Price of Future Consumption	50
The Price of a Bond	51
Comparing Streams of Payments	55
3-4 Additional Applications	57
Corporate Stocks	57
Durable Goods	58
Cash versus Credit	59
Government Debt	60
Summary	61
Problem Set	62
Chapter 4	65
<hr/>	
Consumption	
4-1 Intertemporal Opportunities	66
Some Simplifying Assumptions	66
Income Streams	67
The Intertemporal Budget Line	68
Intertemporal Choice	71
The Gains from Trade in Bonds	71
4-2 Effects of Changes in the Interest Rate	73
The Case of a Net Borrower	74
The Case of a Net Lender	78
The Case of the Representative Agent	80

4-3 Consumption Demand Curves	82
The Demand Curve for Current Consumption	83
The Demand Curve for Future Consumption	85
Aggregate Demand	86
4-4 Effects of Changes in the Endowment Point	88
Shocks to Current Income	89
Shocks to Future Income	95
Permanent Income Shocks	95
The Role of Wealth	98
Some Evidence on Consumption Smoothing	101
Summary	102
Problem Set	103
Chapter 5	107
Interest Rates and Equilibrium	
5-1 The Endowment Economy	108
Supply	109
The Market Demand for Current Consumption	110
5-2 Equilibrium in the Endowment Economy	112
Getting to Equilibrium: Market Forces	112
The Market for Future Consumption	114
5-3 Comparative Statics	116
An Increase in Future Income	117
An Increase in Current Income	120
A War	121
A Permanent Increase in Income	123
General Changes in Income	124
5-4 Interest Rates: Recent History	125
5-5 The Open Economy	127
World Supply and Demand Curves	128
Trade Deficits and Trade Surpluses	129
5-6 Comparative Statics in the Open Economy	133
An Increase in Domestic Future Income	133
An Increase in Domestic Current Income	134
Opening an Economy to Trade	135
The U.S. Trade Balance: Recent History	138
Summary	139
Problem Set	140
Chapter 6	143
The Government	
6-1 Government Spending	144
Government Budgets	145

6-2 Markets versus Governments	146
Failures of the Marketplace	146
Equity	148
Failures of the Government	150
6-3 Government Spending in the Endowment Economy	151
Categories of Government Spending	151
Temporary Spending versus Permanent Spending	153
Comparative Statics	154
Government Spending in the United States	159
6-4 Taxation	160
6-5 Debt and Deficits	162
The History of Government Debt in the United States	162
Taxation versus Deficits	164
The Geometry of Ricardian Equivalence	166
6-6 Ricardian Equivalence and Reality	168
A Bad Argument against Ricardian Equivalence	168
Good Arguments against Ricardian Equivalence	171
Do Government Budget Deficits Matter?	176
Summary	179
Problem Set	180
Chapter 7	183
Investment	
7-1 Capital, Investment, and Production	184
Capital and Investment	184
The Volatility of Investment	185
Production	186
The Production Function	187
Firms	189
7-2 The Demand for Capital and Investment	190
The Demand for Capital	190
The Demand for Investment	192
Aggregate Investment Demand	194
Depreciation	194
7-3 Equilibrium and the Market Interest Rate	196
Aggregate Supply	196
Aggregate Demand	197
Equilibrium Explored	198
Saving versus Investment	199
7-4 Comparative Statics	201
An Increase in Future Income	201
An Increase in the Marginal Product of Capital	203
An Increase in Supply	204

7-5 Measuring Investment	204
Measured Real Net Investment	206
Why Has Measured Real Net Investment Decreased since the 1970s?	207
7-6 International Investment	208
Measuring International Investment	209
Do International Investment Positions Matter?	211
Summary	211
Problem Set	212
Chapter 8	215
<hr/>	
Economic Growth	
8-1 Growth in the Neoclassical Model	216
How the Capital Stock Grows from One Period to the Next	217
How the Capital Stock Grows in the Long Run	219
Economic Growth	219
Comparative Statics	221
Economic Growth and Population Growth	222
8-2 The Solow Model of Economic Growth	223
Returns to Scale	223
The Per-Worker Production Function	224
Why the Capital-Labor Ratio Evolves	225
Depreciation and Population Growth	225
Saving and Investment	228
The Transformation Curve	230
How the Capital-Labor Ratio Evolves	231
Economic Growth	232
Comparative Statics	233
The Solow Model So Far	237
8-3 International Evidence	238
8-4 Enriching the Model	241
Increasing Returns to Scale	241
Population Growth and Technological Progress	243
8-5 Evaluating Growth	244
Consumption versus Investment	244
Future Generations	246
The Golden Rule	246
Income versus Welfare	250
Summary	251
Problem Set	252
Chapter 9	255
<hr/>	
Labor	
9-1 A Very Simple Model	256
The Production Function	257

The Labor Model	259
Changes in the Environment	259
The Model versus Reality	263
9-2 The Model with Borrowing and Lending	263
Changes in Current and Future Nonlabor Income	264
Changes in Current and Future Productivity	265
Temporary Changes versus Permanent Changes	265
Changes in the Interest Rate	267
A Summary of Four Effects	267
Historical Evidence	268
9-3 The Labor Market	273
Real and Nominal Wage Rates	273
The Demand for Labor	273
The Supply of Labor	273
Equilibrium	275
Comparative Statics	276
The Government	281
9-4 The Goods Market with Labor	284
The Supply of Goods	284
Equilibrium in the Goods Market	284
Comparative Statics	285
9-5 Trends in Real Wages	289
Real Wages and Real Compensation	289
Real Compensation and Productivity	291
Comparison with Economic Growth	292
Summary	293
Problem Set	294
Chapter 10	297
Money	
10-1 The Price Level and the Price of Money	298
The Price Level	299
The Price of Money	299
The Quantity of Money	300
10-2 The Demand for Money	300
Real Money Holdings	301
The Money Demand Equation	302
Demand versus Quantity Demanded	303
Determinants of the Demand for Money	304
10-3 The Supply of Money and Equilibrium	306
Changes in Supply	306
Changes in Real Income	309
Other Factors That Change Money Demand	312
Testing the Theory	313

10-4 Inflation	315
Inflation around the World	317
The Onset of Inflation	317
Expected versus Unexpected Inflation	320
10-5 The Role of Government	321
The Algebra of Seigniorage	322
The Inflation Tax	323
10-6 Money and Interest Rates	326
Summary	327
Problem Set	328
Chapter 11	331
The Neoclassical Model	
11-1 The Neoclassical Model: An Overview	332
The Locations of the Curves	334
Market Clearing in the Neoclassical Model	335
11-2 Inadequacies of the Neoclassical Model	335
The Real–Nominal Dichotomy	336
Market Clearing and Unemployment	337
Market Clearing and Recessions	339
Market Clearing and the Government	339
11-3 What Is a Business Cycle?	343
Permanent Effects of Recessions	345
What Happens during Business Cycles?	346
Business Cycles Are Worldwide	348
Have Business Cycles Changed?	349
Are Business Cycles a Problem?	351
11-4 Business Cycles and the Neoclassical Model	352
A Supply Shock	352
A Shock to Productivity	354
A Demand Shock	355
A Monetary Shock	357
International Shocks	357
Where Do We Go from Here?	359
Summary	360
Problem Set	361
Chapter 12	363
The Sticky Wage Model	
12-1 The Sticky Wage Model: An Overview	364
Real versus Nominal Wages	364
The Labor Market with Sticky Wages	365
The Goods Market	368

The Complete Sticky Wage Model	372
Effect of a Change in the Price Level	373
12-2 Comparing the Models	376
The Real–Nominal Dichotomy	376
Involuntary Unemployment	378
Business Cycles	380
12-3 Government Actions	389
Fiscal Policy	389
An Increase in the Money Supply	393
Conclusion: The Role of Government	393
Summary	394
Problem Set	395
Chapter 13	397
<hr/>	
The Sticky Price Model	
13-1 Sticky Prices	398
Why Sticky Prices?	398
The Money Market with Sticky Prices	401
The <i>LM</i> Curve	403
Money Supply Shocks and the <i>LM</i> Curve	405
Price Level Shocks and the <i>LM</i> Curve	406
Money Demand Shocks and the <i>LM</i> Curve	407
A Digression: The Sticky Inflation-Rate Model	408
13-2 Sticky Price Equilibrium	409
The Goods Market in the Sticky Price Model	409
Adding the Government	412
The Complete Sticky Price Model	412
Comparative Statics	413
The Short Run versus the Long Run	418
13-3 Comparing the Models	419
The Real–Nominal Dichotomy	419
Involuntary Unemployment	419
Business Cycles	420
13-4 Government Actions	423
Fiscal Policy	423
Does the U.S. Government Believe the Sticky Price Model?	426
Summary	428
Problem Set	429
Chapter 14	431
<hr/>	
Monetary Misperceptions and the Role of Expectations	
14-1 Inflation and Unemployment	432
The Phillips Curve	432
The Phillips Curve and Economic Theory	433