

MACROECONOMICS

Roger E. A. Farmer

University of California—Los Angeles



South-Western College Publishing

an International Thomson Publishing company ITP®

Cincinnati • Albany • Boston • Detroit • Johannesburg • London • Madrid • Melbourne • Mexico City
New York • Pacific Grove • San Francisco • Scottsdale • Singapore • Tokyo • Toronto

CONTENTS

PART 1 INTRODUCTION AND MEASUREMENT 1

1 What This Book Is About 2

INTRODUCTION 2

A Unified Approach to Macroeconomics 2

The Three Major Questions 3

ECONOMIC GROWTH 4

Growth Is a Recent Phenomenon 4

Measuring Economic Growth 5

Real and Nominal Gross Domestic Product 6

Economic Growth and Standards of Living 6

BUSINESS CYCLES 8

Defining Business Cycles 8

Measuring Business Cycles 9

Importance of the Business Cycle 11

INFLATION 12

Measuring Inflation 12

The Importance of Inflation 12

ECONOMIC MODELS	13
The Difference Equation	14
The Rocking Horse Model	16
Unified Theory	16

CONCLUSION	17
------------	----

KEY TERMS	18
-----------	----

PROBLEMS FOR REVIEW	18
---------------------	----

2 Measuring the Economy 19

INTRODUCTION	19
--------------	----

DIVIDING UP THE WORLD ECONOMY	20
Open and Closed Economies	20
Sectors of the Domestic Economy	20

MEASURING GROSS DOMESTIC PRODUCT	21
Income, Expenditure, and Product	21
The Circular Flow of Income	22
Consumption, Investment, and Saving	22
Wages and Profits	24

THE COMPONENTS OF GROSS DOMESTIC PRODUCT	25
Saving and Investment in a Closed Economy	25
Saving and Investment in an Open Economy	27
Government and the Private Sector	28

MEASURING WEALTH	31
Stocks and Flows	31
Real and Financial Assets	31
Balance Sheet Accounting	32
American National Wealth	32

THE LINK BETWEEN GROSS DOMESTIC PRODUCT AND WEALTH	33
Gross Versus Net Domestic Product	33
Stock and Flow Accounting	35

CONCLUSION	37
------------	----

KEY TERMS	37
-----------	----

PROBLEMS FOR REVIEW	38
---------------------	----

3 Macroeconomic Facts 40

INTRODUCTION	40
--------------	----

TRANSFORMING ECONOMIC DATA 41

Measuring Variables 41

Separating Growth from Cycles 42

Removing a Trend 42

Detrending Methods 44

The Importance of Detrending 44

QUANTIFYING BUSINESS CYCLES 46

Peaks and Troughs 46

The Correlation Coefficient 46

Persistence 48

Coherence 49

MEASURING UNEMPLOYMENT 52

Participation and the Labor Force 52

Employment and Unemployment 53

MEASURING INFLATION 53

Price Indices 53

Measuring the GDP Deflator 56

Inflation and the GDP Deflator 58

Inflation and the Business Cycle 58

CONCLUSION 60

KEY TERMS 60

PROBLEMS FOR REVIEW 61

**PART 2 THE CLASSICAL APPROACH TO AGGREGATE DEMAND
AND SUPPLY 65****4 The Theory of Aggregate Supply 66**

INTRODUCTION 66

PRODUCTION AND THE DEMAND FOR LABOR 66

The Production Function 67

Markets and Firms 68

Competition and the Determination of Wages and Prices 68

The Nominal Wage and the Real Wage 68

Maximizing Profits 69

The Labor Demand Curve 69

THE DEMAND FOR COMMODITIES AND THE SUPPLY OF LABOR 70

Maximizing Utility 71

The Labor Supply Curve 73

Factors That Shift Labor Supply 73

THE CLASSICAL THEORY OF AGGREGATE SUPPLY	76
Putting Together Demand and Supply	76
What Is Special About the Equilibrium?	77
The Walras Law	78
Who Holds the Money?	79

USING CLASSICAL THEORY	79
Business Fluctuations	79
Preferences, Endowments, and Technology	79
The Real Business Cycle School	80

CONCLUSION	84
------------	----

KEY TERMS	85
-----------	----

PROBLEMS FOR REVIEW	85
---------------------	----

APPENDIX: A QUANTITATIVE EXAMPLE OF EQUILIBRIUM	87
---	----

5 Aggregate Demand and the Classical Theory of the Price Level 89

INTRODUCTION	89
--------------	----

THE THEORY OF THE DEMAND FOR MONEY	90
The Historical Development of the Theory	90
The Theory of the Demand for Money	90
Budget Constraints and Opportunity Cost	91
The Benefit of Holding Money	92
Aggregate Demand and the Demand and Supply of Money	93

THE CLASSICAL THEORY OF THE PRICE LEVEL	96
The Role of Price Level in the Theory of Aggregate Supply	96
The Price Level and the Labor Demand and Supply Diagram	96
The Production Function Diagram	96
The Aggregate Supply Diagram	97
The Complete Classical Theory of Aggregate Demand and Supply	99
Classical Theory and the Neutrality of Money	99

USING THE CLASSICAL THEORY TO UNDERSTAND THE DATA	101
The Classical Explanation of Inflation	101
Assessing the Classical Explanation of Inflation	104

CONCLUSION	108
------------	-----

KEY TERMS	109
-----------	-----

PROBLEMS FOR REVIEW	109
---------------------	-----

APPENDIX: A QUANTITATIVE EXAMPLE OF AGGREGATE DEMAND AND SUPPLY	110
---	-----

6 Saving and Investment 112

INTRODUCTION 112

SAVING, INVESTMENT, AND THE CAPITAL MARKET 113

Saving and Investment 113

Animal Spirits or Fundamentals? 113

Consumption Smoothing 115

Borrowing Constraints 115

THE THEORY OF INVESTMENT 116

The Production Possibilities Set 116

The Real and the Nominal Rate of Interest 117

Maximizing Profits 118

Borrowing and Investment 118

The Investment Demand Curve 119

HOUSEHOLDS AND THE SAVING SUPPLY CURVE 121

Indifference Curves 121

The Intertemporal Budget Constraint 121

Present Value 121

Borrowing and Lending to Smooth Consumption 121

The Saving Supply Curve 123

EQUATING DEMAND AND SUPPLY 125

Saving and Investment in a Closed Economy 125

Productivity and the Investment Demand Curve 126

Animal Spirits and the Investment Demand Curve 128

The Baby Boom, Pensions, and Savings 129

SAVING AND INVESTMENT IN AN OPEN ECONOMY 131

Equilibrium in the World Capital Market 132

World Saving and the Government Budget Deficit 133

CONCLUSION 133

KEY TERMS 135

PROBLEMS FOR REVIEW 135

APPENDIX: THE MATHEMATICS OF SAVING AND INVESTMENT 136

PART 3 THE MODERN APPROACH TO AGGREGATE DEMAND AND SUPPLY 139**7 Unemployment 140**

INTRODUCTION 140

UNEMPLOYMENT	141
Frictional Unemployment	141
APPROACHES TO EXPLAINING UNEMPLOYMENT	141
Efficiency Wages	141
Nominal Rigidities and Menu Costs	142
Nominal Rigidities and Wage Contracts	142
Search Theory	143
REASONS FOR UNEMPLOYMENT	143
A Model of Search	144
The Aggregate Labor Market and the Natural Rate of Unemployment	146
What's "Natural" About the Natural Rate	147
UNEMPLOYMENT AND THE BUSINESS CYCLE	148
Unemployment and Changes in the Price Level	149
Unemployment and Aggregate Supply in the Short Run and the Long Run	149
Getting from the Short Run to the Long Run	151
Unemployment and the Neutrality of Money	153
UNEMPLOYMENT AND ECONOMIC POLICY	154
The Labor Market in the Great Depression	156
Unemployment in North America and Europe	156
Policies to Alleviate Unemployment	159
Measuring Variables	41
CONCLUSION	160
KEY TERMS	161
PROBLEMS FOR REVIEW	161
APPENDIX: THE ALGEBRA OF THE NATURAL RATE	162

8. The Demand for Money 165

INTRODUCTION	165
THE OPPORTUNITY COST OF HOLDING MONEY	166
Liquidity Preference	166
Balance Sheets of Firms and Households	166
Wealth and Income	167
THE UTILITY THEORY OF MONEY	169
Two Properties of the Utility of Money	169
Allocating Wealth	170
Establishing Equilibrium	171
USING THE THEORY OF MONEY DEMAND	172
The Mathematics of the Utility Theory of Money	172
Evidence for the Modern Theory	173

THE LM CURVE	175
The Supply of Money	175
The Price Level	176
Deriving the LM Curve	176
The Importance of the LM Curve	177
The Algebra of the LM Curve	178
Monetary Policy and the LM Curve	179
CONCLUSION	179
KEY TERMS	181
PROBLEMS FOR REVIEW	181
APPENDIX: THE ALGEBRA OF THE DEMAND FOR MONEY	182

9 The Money Supply 184

INTRODUCTION	184
A SHORT HISTORY OF MONEY	184
How Banks Create Money	185
The Development of Fiat Money	186
THE ROLE OF THE CENTRAL BANK	187
The Federal Reserve System	188
How the Federal Reserve System Operates	188
Open Market Operations	190
THE MONETARY BASE AND THE MONEY MULTIPLIER	191
Who Holds the Monetary Base	192
The Money Supply and the Monetary Base	192
CONCLUSION	193
KEY TERMS	194
PROBLEMS FOR REVIEW	194

10 IS-LM and Aggregate Demand 195

INTRODUCTION	195
EQUILIBRIUM IN THE CAPITAL MARKET	
The Real Interest Rate and the Nominal Interest Rate	196
The IS Curve	199
Investment, Saving, and the Nominal Interest Rate	199
DERIVING THE IS CURVE	200
The IS Curve in a Graph	201
Variables That Shift the IS Curve	202

Government Purchases and the IS Curve	202
Taxes, Transfers, and the IS Curve	204
Shifts in the Investment Schedule and the IS Curve	205
IS-LM AND THE KEYNESIAN THEORY OF AGGREGATE DEMAND	206
Rational Expectations: Which Variables Are Exogenous?	207
IS-LM Equilibrium	207
The Keynesian Aggregate Demand Curve	209
Fiscal Policy and the Aggregate Demand Curve	211
Monetary Policy and the Aggregate Demand Curve	211
AGGREGATE DEMAND AND SUPPLY	213
What Causes Business Cycles	213
Could the Great Depression Happen Again?	216
The Government Role in Stabilizing Business Cycles	217
CONCLUSION	217
KEY TERMS	218
PROBLEMS FOR REVIEW	218
APPENDIX: THE ALGEBRA OF THE KEYNESIAN THEORY OF AGGREGATE DEMAND	220
11 The Open Economy	222
INTRODUCTION	222
FIXED AND FLEXIBLE EXCHANGE RATES	222
Exchange Rate Regimes	222
Real Exchange Rates and Purchasing Power Parity	225
Nominal Exchange Rates and Interest Rate Parity	227
MANAGING AN OPEN ECONOMY	230
The Capital Markets and the Exchange Rate	230
Long-Run Equilibrium in a Fixed Exchange-Rate System	232
Long-Run Equilibrium in a Flexible Exchange-Rate System	234
FIXED VERSUS FLEXIBLE RATES	235
Open Economy Macroeconomics	235
Inflation and the Vietnam War	237
The Problems of Monetary Union in Europe	238
International Economics: Europe Versus North America	239
CONCLUSION	240
KEY TERMS	240
PROBLEMS FOR REVIEW	241

PART 4 DYNAMIC MACROECONOMICS 243**12 Debt, Deficits, and Economic Dynamics 244**

INTRODUCTION 244

DEBT AND DEFICITS 245

The Relationship of the Debt to the Deficit 245

MODELING THE GROWTH OF GOVERNMENT DEBT 248

Using GDP as a Unit of Measurement 248

Using Graphs to Analyze Difference Equations 249

Stable and Unstable Steady States 251

Summarizing the Mathematics of Difference Equations 252

THE SUSTAINABILITY OF THE BUDGET DEFICIT 252

The Budget Equation Before 1979 254

The Budget Equation After 1979 255

DIFFERENT PERSPECTIVES ON DEBT AND DEFICITS 258

Ricardian Equivalence 258

The Relationship Between the Budget and the Rate of Interest 259

CONCLUSION 260

KEY TERMS 261

PROBLEMS FOR REVIEW 261

13 Neoclassical Growth Theory 263

INTRODUCTION 263

THE SOURCES OF ECONOMIC GROWTH 265

Production Functions and Returns to Scale 266

The Neoclassical Theory of Distribution 267

The Theory of Distribution and the Cobb-Douglas Function 267

Growth Accounting 268

THE NEOCLASSICAL GROWTH MODEL 271

Three Stylized Facts 271

Assumptions of the Neoclassical Growth Model 272

Simplifying the Model 273

Diminishing Marginal Product 274

Three Steps to the Neoclassical Growth Equation 275

Graphing the Neoclassical Growth Equation 276

THE EFFECTS OF PRODUCTIVITY GROWTH 278

Measuring Labor in Efficiency Units 278

Measuring Variables Relative to Labor 279

CONCLUSION 281

KEY TERMS 281

PROBLEMS FOR REVIEW 282

APPENDIX: THE GROWTH EQUATION WITH PRODUCTIVITY GROWTH 283

14 Endogenous Growth Theory 284

INTRODUCTION 284

THE NEOCLASSICAL MODEL AND THE INTERNATIONAL ECONOMY 285

Modeling World Trade 285

The Neoclassical Growth Model with Open Capital Markets 286

The Neoclassical Growth Model with Closed Capital Markets 288

Convergence 293

THE MODEL OF LEARNING BY DOING 294

Endogenous and Exogenous Theories of Growth 294

The Technology of Endogenous Growth 295

Social and Private Technology 295

LEARNING BY DOING AND ENDOGENOUS GROWTH 299

Endogenous Growth 299

Predictions of Comparative Growth Rates 299

Endogenous Growth and Economic Policy 302

Modified Theories of Learning by Doing 303

CONCLUSION 304

KEY TERMS 304

PROBLEMS FOR REVIEW 305

15 Unemployment, Inflation, and Growth 307

INTRODUCTION 307

THE CLASSICAL APPROACH TO INFLATION AND GROWTH 308

Natural Paths and Natural Rates 308

The Classical Dynamic Aggregate Demand Curve 309

The Classical Dynamic Aggregate Supply Curve 310

The Wage Equation in the Classical Model 312

THE NEOCLASSICAL APPROACH TO INFLATION AND GROWTH 313

Aggregate Supply and the Real Wage 313

The Dynamic Neoclassical Aggregate Supply Curve 316

The Neoclassical Wage Equation 317

Wage Adjustment and the Phillips Curve 319

THE NEOCLASSICAL MODEL 320
Inflation and Growth When Expectations Are Fixed 322
Inflation and Growth Under Changing Expectations 323
More Realistic Theories of Aggregate Demand 323

CONCLUSION 326

KEY TERMS 327

PROBLEMS FOR REVIEW 327

16 Expectations and Macroeconomics 329

INTRODUCTION 329

POSTWAR ECONOMIC HISTORY OF THE UNITED STATES 329

Inflation 331

The Phillips Curve 331

Why the Phillips Curve Shifted Its Position 332

The Natural Rate Hypothesis (NAIRU) 334

THE NEOCLASSICAL MODEL 336

Determining Growth and Inflation 336

Short-Run Growth and Inflation 337

Long-Run Growth and Inflation 338

EXPLAINING EXPECTATIONS ENDOGENOUSLY 339

Rational Expectations 340

Expected Price Inflation Is Too Low 341

Expected Price Inflation Is Too High 342

Rational Expectations of Price Inflation 342

Rational Expectations and Learning 344

FEDERAL RESERVE SYSTEM MONETARY POLICY 344

Arthur Burns and the Build-Up of Inflation 344

The Volcker Recession and the Removal of Inflation 346

Monetary Policy Under Alan Greenspan 347

CONCLUSION 348

KEY TERMS 349

PROBLEMS FOR REVIEW 349

17 What We Know and What We Don't 352

INTRODUCTION 352

WHAT WE KNOW 352

The Causes of Economic Growth 352

Studying Business Cycles 353

The Causes of Business Cycles 354
The Causes of Inflation 355
How Inflation Is Related to Growth 356

THE RESEARCH FRONTIER 356
Research on Growth Theory 357
Research on Business Cycles 357
Inflation, Growth, and the Monetary Transmission Mechanism 358

THE FUTURE 358

Appendix A Utility Theory and Indifference Curves 359

Appendix B Logarithms 362

Appendix C Data for the United States Economy 364

Glossary 369

Index 377