

EIGHTH CANADIAN EDITION

MACROECONOMICS

Abel | Bernanke | Croushore | Kneebone

 Pearson

Macroeconomics

ANDREW B. ABEL
UNIVERSITY OF PENNSYLVANIA

BEN S. BERNANKE

DEAN CROUSHORE
UNIVERSITY OF RICHMOND

RONALD D. KNEEBONE
UNIVERSITY OF CALGARY

EIGHTH CANADIAN EDITION



VICE PRESIDENT, EDITORIAL: Anne Williams
MARKETING MANAGER: Leigh Anne Graham
CONTENT MANAGER: Madhu Ranadive
PROJECT MANAGER: Sarah Gallagher
CONTENT DEVELOPER: Cheryl Finch
PRODUCTION SERVICES: Cengage® Publisher Services

PERMISSIONS PROJECT MANAGER: Joanne Tang
PHOTO PERMISSIONS RESEARCH: Sohail Akhter,
Aptara Corporation Ltd.
TEXT PERMISSIONS RESEARCH: Anjali Singh
COVER DESIGNER: Cengage Publisher Services
COVER IMAGE: © Bildagentur Zoonar GmbH / Shutterstock

Pearson Canada Inc., 26 Prince Andrew Place, Don Mills, Ontario M3C 2T8.

Copyright © 2019, 2016, 2012, 2009, 2006, 2003, 1999 Pearson Canada Inc. All rights reserved.

Printed in the United States of America. This publication is protected by copyright, and permission should be obtained from the publisher prior to any prohibited reproduction, storage in a retrieval system, or transmission in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise. For information regarding permissions, request forms, and the appropriate contacts, please contact Pearson Canada's Rights and Permissions Department by visiting <https://www.pearson.com/ca/en/contact-us/permissions.html>.

Authorized adaptation from *Macroeconomics*, Ninth Edition, Copyright © 2014, Pearson Education, Inc., Hoboken, New Jersey, USA. Used by permission. All rights reserved. This edition is authorized for sale only in Canada.

Attributions of third-party content appear on the appropriate page within the text.

Unless otherwise indicated herein, any third-party trademarks that may appear in this work are the property of their respective owners and any references to third-party trademarks, logos, or other trade dress are for demonstrative or descriptive purposes only. Such references are not intended to imply any sponsorship, endorsement, authorization, or promotion of Pearson Canada products by the owners of such marks, or any relationship between the owner and Pearson Canada or its affiliates, authors, licensees, or distributors.

If you purchased this book outside the United States or Canada, you should be aware that it has been imported without the approval of the publisher or the author.

978-0-13-464635-0

10 9 8 7 6 5 4 3 2 1

Library and Archives Canada Cataloguing in Publication

Abel, Andrew B., 1952-, author

Macroeconomics / Andrew B. Abel (University of Pennsylvania), Ben S. Bernanke, Dean Croushore (University of Richmond), Ronald D. Kneebone (University of Calgary). — Eighth Canadian edition.

Includes index.

ISBN 978-0-13-464635-0 (hardcover)

1. *Macroeconomics*—Textbooks. 2. Textbooks. I. Bernanke, Ben, author II. Kneebone, Ronald D. (Ronald David), 1955-, author III. Croushore, Dean Darrell, 1956-, author IV. Title.

HB172.5.A24 2018

339

C2017-903782-X



ABOUT THE AUTHORS

ANDREW B. ABEL

The Wharton School of the
University of Pennsylvania

Ronald A. Rosenfeld Professor of Finance at The Wharton School and professor of economics at the University of Pennsylvania, Andrew Abel received his A.B. *summa cum laude* from Princeton University and his Ph.D. from the Massachusetts Institute of Technology.

He began his teaching career at the University of Chicago and Harvard University and has held visiting appointments at both Tel Aviv University and The Hebrew University of Jerusalem.

A prolific researcher, Abel has published extensively on fiscal policy, capital formation, monetary policy, asset pricing, and Social Security—as well as serving on the editorial boards of numerous journals. He has been honored as an Alfred P. Sloan Fellow, a Fellow of the Econometric Society, and a recipient of the John Kenneth Galbraith Award for teaching excellence. Abel has served as a visiting scholar at the Federal Reserve Bank of Philadelphia, as a member of the Panel of Economic Advisers at the Congressional Budget Office, and as a member of the Technical Advisory Panel on Assumptions and Methods for the Social Security Advisory Board. He is also a Research Associate of the National Bureau of Economic Research and a member of the Advisory Board of the Carnegie-Rochester–NYU Conference Series.

BEN S. BERNANKE

Brookings Institution

Ben Bernanke is currently Distinguished Fellow in Residence with the Economic Studies Program at the Brookings Institution. From February 2006 to January 2014, he was Chairman of the Board of Governors of the Federal Reserve System. Before that, he served as Chair of the President's Council of Economic Advisors from June 2005 to January 2006 and was a Governor of the Federal Reserve System from August 2002 to June 2005. Prior to his work in public service, he was the Howard Harrison and Gabrielle Snyder Beck Professor of Economics and Public Affairs at Princeton University. He received his B.A. in economics from Harvard University *summa cum*

laude—capturing both the Allyn Young Prize for best Harvard undergraduate economics thesis and the John H. Williams prize for outstanding senior in the Economics Department. Like coauthor Abel, he holds a Ph.D. from the Massachusetts Institute of Technology.

Bernanke began his career at the Stanford Graduate School of Business in 1979. In 1985 he moved to Princeton University, where he served as chair of the Economics Department from 1995 to 2002. He has twice been visiting professor at MIT and once at New York University, and has taught in undergraduate, M.B.A., M.P.A., and Ph.D. programs. He has authored more than 60 publications in macroeconomics, macroeconomic history, and finance.

Bernanke has served as a visiting scholar and advisor to the Federal Reserve System. He is a Guggenheim Fellow and a Fellow of the Econometric Society. He has also been variously honored as an Alfred P. Sloan Research Fellow, a Hoover Institution National Fellow, a National Science Foundation Graduate Fellow, and a Research Associate of the National Bureau of Economic Research. He has served as editor of the *American Economic Review*.

DEAN CROUSHORE

Robins School of Business,
University of Richmond

Dean Croushore is professor of economics and Rigsby Fellow at the University of Richmond. He received his A.B. from Ohio University and his Ph.D. from Ohio State University.

Croushore began his career at Pennsylvania State University in 1984. After teaching for 5 years, he moved to the Federal Reserve Bank of Philadelphia, where he was vice president and economist. His duties during his 14 years at the Philadelphia Fed included heading the macroeconomics section, briefing the bank's president and board of directors on the state of the economy and advising them about formulating monetary policy, writing articles about the economy, administering two national surveys of forecasters, and researching current issues in monetary policy. In his role at the Fed, he created the Survey of Professional Forecasters (taking over the defunct ASA/NBER survey and revitalizing it) and developed the Real-Time Data Set for Macroeconomists.

Croushore returned to academia at the University of Richmond in 2003. The focus of his research in recent years has been on forecasting and how data revisions affect monetary policy, forecasting, and macroeconomic research. Croushore's publications include articles in many leading economics journals and a textbook on money and banking. He is associate editor of several journals and visiting scholar at the Federal Reserve Bank of Philadelphia.

RONALD D. KNEEBONE

Department of Economics and the
School of Public Policy, University of Calgary

Professor of Economics at the University of Calgary, Ron Kneebone received his B.A. in economics and political science before earning a Ph.D. in economics from McMaster University.

Kneebone began his academic career at Wilfrid Laurier University. He joined the faculty at the University of Calgary in 1989. He has taught courses in economic

principles and intermediate and senior undergraduate macroeconomic theory, as well as macroeconomic theory at the Ph.D. level. He has been recognized as a superior teacher in the Department of Economics eight times and has twice won the Faculty of Social Sciences Distinguished Teacher Award.

Kneebone is a former associate editor of *Canadian Public Policy/Analyse de Politiques*, Canada's foremost journal examining economic and social policy. He is currently Director of Economic & Social Policy Research and Director of the Master of Public Policy Program in The School of Public Policy.

Kneebone's research interests lie mainly in the macroeconomic aspects of public finances. He has published articles on the problems for government budget financing associated with the three-level structure of Canadian government, on the history of government fiscal and monetary relations in Canada, and on the characteristics of Canadian government fiscal policy choices. More recently he has published research on issues related to homelessness and social assistance policies. For joint work, he was awarded the Douglas Purvis Memorial Prize for the best published work in Canadian public policy in 1999/2000.

BRIEF CONTENTS

Applying Macroeconomics to the Real World xiii

Symbols Used in This Book xiv

Preface xv

Part I: Introduction 1

Chapter 1: Introduction to Macroeconomics 1

Chapter 2: The Measurement and Structure of the Canadian Economy 17

Part II: Long-Run Economic Performance 47

Chapter 3: Productivity, Output, and Employment 47

Chapter 4: Consumption, Saving, and Investment 91

Chapter 5: Saving and Investment in the Open Economy 130

Chapter 6: Long-Run Economic Growth 161

Chapter 7: The Asset Market, Money, and Prices 199

Part III: Business Cycles and Macroeconomic Policy 228

Chapter 8: Business Cycles 228

Chapter 9: The *IS-LM-FE* Model: A General Framework for Macroeconomic Analysis 244

Chapter 10: Exchange Rates, Business Cycles, and Macroeconomic Policy in the Open Economy 294

Chapter 11: Classical Business Cycle Analysis: Market-Clearing Macroeconomics 352

Chapter 12: Keynesian Business Cycle Analysis: Non-Market-Clearing Macroeconomics 391

Part IV: Macroeconomic Policy: Its Environment and Institutions 440

Chapter 13: Unemployment and Inflation 440

Chapter 14: Monetary Policy and the Bank of Canada 472

Chapter 15: Government Spending and Its Financing 504

Appendix: Some Useful Analytical Tools 538

Glossary 545

Name Index 553

Subject Index 555

This page intentionally left blank

CONTENTS

Applying Macroeconomics to the Real World	xiii
Symbols Used in This Book	xiv
Preface	xv

Part I: Introduction 1

Chapter 1:

INTRODUCTION TO MACROECONOMICS 1

1.1 What Macroeconomics Is About 1

1.2 What Macroeconomists Do 6

A Closer Look 1.1: Developing and Testing an Economic Theory 9

1.3 Why Macroeconomists Disagree 10

Chapter Summary	14
Key Terms	15
Review Questions	15
Numerical Problems	15
Analytical Problems	16

Chapter 2:

THE MEASUREMENT AND STRUCTURE OF THE CANADIAN ECONOMY 17

2.1 National Income Accounting: The Measurement of Production, Income, and Expenditure 17

2.2 Gross Domestic Product 20

A Closer Look 2.1: Natural Resources, the Environment, and the National Income Accounts 22

2.3 Saving and Wealth 29

Summary 1: Measures of Aggregate Saving 31

2.4 Real GDP, Price Indexes, and Inflation 34

A Closer Look 2.2: Does CPI Inflation Overstate Increases in the Cost of Living? 38

2.5 Interest Rates 39

Chapter Summary	41
Key Terms	42
Key Equations	43
Review Questions	43
Numerical Problems	44
Analytical Problems	45

Part II: Long-Run Economic Performance 47

Chapter 3:

PRODUCTIVITY, OUTPUT, AND EMPLOYMENT 47

3.1 How Much Does the Economy Produce? The Production Function 48

APPLICATION: THE PRODUCTION FUNCTION AND PRODUCTIVITY GROWTH IN CANADA 49

3.2 The Demand for Labour 56

Summary 2: Comparing the Benefits and Costs of Changing the Amount of Labour 59

Summary 3: Factors That Shift the Aggregate Labour Demand Curve 64

3.3 The Supply of Labour 64

Summary 4: Factors That Shift the Aggregate Labour Supply Curve 70

3.4 Labour Market Equilibrium 70

APPLICATION: OUTPUT, EMPLOYMENT, AND THE REAL WAGE DURING OIL PRICE SHOCKS 72

APPLICATION: TECHNOLOGICAL CHANGE AND WAGE INEQUALITY 74

3.5 Unemployment 78

Chapter Summary	83
Key Diagram 1: The Production Function	85
Key Diagram 2: The Labour Market	86
Key Terms	87

Key Equations 87
 Review Questions 87
 Numerical Problems 88
 Analytical Problems 90

Chapter 4: CONSUMPTION, SAVING, AND INVESTMENT 91

4.1 Consumption and Saving 92

A Closer Look 4.1: Surveying Households 96

APPLICATION: STOCK MARKET WEALTH, HOUSING WEALTH, AND CONSUMER SPENDING 98

A Closer Look 4.2: Interest Rates 101

4.2 Investment 106

Summary 5: Determinants of Desired National Saving 106

A Closer Look 4.3: Investment and the Stock Market 110

Summary 6: Determinants of Desired Investment 115

4.3 Goods Market Equilibrium 116

Chapter Summary 122
 Key Diagram 3: Saving–Investment 125
 Key Terms 126
 Key Equations 126
 Review Questions 126
 Numerical Problems 127
 Analytical Problems 129

Chapter 5: SAVING AND INVESTMENT IN THE OPEN ECONOMY 130

5.1 Balance of Payments Accounting 131

Summary 7: Equivalent Measures of a Country's International Trade and Lending 138

5.2 Goods Market Equilibrium in an Open Economy 138

5.3 Saving and Investment in a Small Open Economy 139

APPLICATION: DOMESTIC AND FOREIGN INTEREST RATES 140

APPLICATION: GLOBALIZATION AND THE CANADIAN ECONOMY 146

5.4 Saving and Investment in Large Open Economies 148

5.5 The Twin Deficits 151

Chapter Summary 153
 Key Diagram 4: National Saving and Investment in a Small Open Economy 155
 Key Diagram 5: National Saving and Investment in Large Open Economies 156
 Key Terms 157
 Key Equations 157
 Review Questions 158
 Numerical Problems 158
 Analytical Problems 159

Chapter 6: LONG-RUN ECONOMIC GROWTH 161

6.1 The Sources of Economic Growth 162

APPLICATION: GROWTH ACCOUNTING AND THE EAST ASIAN “MIRACLE” 165

6.2 Growth Dynamics: The Neoclassical Growth Model 168

Summary 8: The Fundamental Determinants of Long-Run Living Standards 177

6.3 Government Policies to Raise Long-Run Living Standards 187

A Closer Look 6.1: Economic Growth and Democracy 188

Chapter Summary 193
 Key Diagram 6: The Neoclassical Growth Model 194
 Key Terms 195
 Key Equations 195
 Review Questions 196
 Numerical Problems 196
 Analytical Problems 197

Chapter 7: THE ASSET MARKET, MONEY, AND PRICES 199

7.1 What Is Money? 199

7.2 Portfolio Allocation and the Demand for Assets 203

APPLICATION: THE U.S. HOUSING CRISIS AND ITS AFTERMATH 208

7.3 The Demand for Money 211

Summary 9: Macroeconomic Determinants of the Demand for Money 215

7.4 Asset Market Equilibrium 218

7.5 Money Growth and Inflation 221

A Closer Look 7.1: Measuring Inflation Expectations 223

Chapter Summary 225
 Key Terms 225
 Key Equations 226
 Review Questions 226
 Numerical Problems 226
 Analytical Problems 227

Part III: Business Cycles and Macroeconomic Policy 228

Chapter 8: BUSINESS CYCLES 228

- 8.1 What Is a Business Cycle?** 229
- 8.2 The Canadian Business Cycle: The Historical Record** 230
- 8.3 Business Cycle Facts** 232
- Summary 10:** The Cyclical Behaviour of Key Macroeconomic Variables (The Business Cycle Facts) 234
- 8.4 Business Cycle Analysis: A Preview** 241

Chapter Summary 242
 Key Terms 243
 Review Questions 243
 Analytical Problems 243

Chapter 9: THE *IS-LM-FE* MODEL: A GENERAL FRAMEWORK FOR MACROECONOMIC ANALYSIS 244

- 9.1 The *FE* Line: Equilibrium in the Labour Market** 245
- Summary 11:** Factors That Shift the Full-Employment (*FE*) Line 247
- 9.2 The *IS* Curve: Equilibrium in the Goods Market** 247
- Summary 12:** Factors That Shift the *IS* Curve 251
- 9.3 The *LM* Curve: Asset Market Equilibrium** 252
- Summary 13:** Factors That Shift the *LM* Curve 256
- 9.4 General Equilibrium in the Complete *IS-LM-FE* Model** 259
- APPLICATION: OIL PRICE SHOCKS REVISITED** 262
- 9.5 Price Adjustment and the Attainment of General Equilibrium** 263

A Closer Look 9.1: Trend Money Growth and Inflation 267

9.6 The Aggregate Demand Curve 272

Summary 14: Factors That Shift the *AD* Curve 275

Chapter Summary 278
 Key Diagram 7: The *IS-LM-FE* Model 280
 Key Diagram 8: The Aggregate Demand Curve 281
 Key Terms 282
 Review Questions 282
 Numerical Problems 283
 Analytical Problems 284

Appendix 9.A: A Worked-Out Numerical Exercise for Solving the *IS-LM* Model 286

Appendix 9.B: Algebraic Version of the *IS-LM-FE* Model 288

Chapter 10: EXCHANGE RATES, BUSINESS CYCLES, AND MACROECONOMIC POLICY IN THE OPEN ECONOMY 294

10.1 Exchange Rates 295

A Closer Look 10.1: The Effective Exchange Rate 296

Summary 15: Terminology for Changes in Exchange Rates 299

A Closer Look 10.2: McParity 300

10.2 How Exchange Rates Are Determined: A Supply-and-Demand Analysis 302

Summary 16: Determinants of the Exchange Rate (Real or Nominal) 306

Summary 17: Determinants of Net Exports 306

10.3 The International Asset Market: Interest Rate Parity 307

APPLICATION: EXPLAINING THE MOVEMENTS IN CANADIAN AND U.S. INTEREST RATES 311

10.4 The *IS-LM-FE* Model for an Open Economy 312

Summary 18: International Factors That Shift the *IS* Curve 317

10.5 Macroeconomic Policy in a Small Open Economy with Flexible Exchange Rates 318

10.6 Fixed Exchange Rates 323

10.7 Choosing an Exchange Rate System 332**APPLICATION: PROVINCIAL FISCAL POLICIES** 333**APPLICATION: MACROECONOMIC POLICY
RESPONSES TO THE 2008–2009 FINANCIAL CRISIS** 336

Chapter Summary 338

Key Diagram 9: The *IS–LM–FE* Model of a Small Open
Economy 341

Key Terms 343

Key Equations 343

Review Questions 343

Numerical Problems 344

Analytical Problems 345

**Appendix 10.A: An Algebraic Version of the
Open-Economy *IS–LM–FE* Model** 346**Chapter 11:****CLASSICAL BUSINESS CYCLE ANALYSIS:
MARKET-CLEARING MACROECONOMICS** 352**11.1 Business Cycles in the Classical
Model** 353**APPLICATION: CALIBRATING THE BUSINESS
CYCLE** 356**11.2 Money in the Classical Model** 366**A Closer Look 11.1:** Money and Economic Activity
at Christmastime 368**11.3 The Misperceptions Theory and the
Non-neutrality of Money** 369**A Closer Look 11.2:** Are Price Forecasts
Rational? 376

Chapter Summary 381

Key Diagram 10: The Upward-Sloping Short-Run
Aggregate Supply Curve 384Key Diagram 11: The Misperceptions Version of the
AD–AS Model 385

Key Terms 387

Key Equation 387

Review Questions 387

Numerical Problems 387

Analytical Problems 389

Chapter 12:**KEYNESIAN BUSINESS CYCLE ANALYSIS:
NON-MARKET-CLEARING MACROECONOMICS** 391**12.1 Nominal-Wage Rigidity** 392**12.2 Monetary and Fiscal Policy in the
Keynesian Model** 397**12.3 Criticisms of the Nominal-Wage Rigidity
Assumption** 405**12.4 Price Stickiness** 406**12.5 The Keynesian Theory of Business Cycles
and Macroeconomic Stabilization** 411**A Closer Look 12.1:** The Classical–Keynesian
Debate and the 2008–2009 Recession 421

Chapter Summary 422

Key Diagram 12: The Keynesian Version of the *AD–AS*
Model 425

Key Terms 426

Review Questions 426

Numerical Problems 427

Analytical Problems 429

Appendix 12.A: Real-Wage Rigidity 431**Appendix 12.B: Aggregate Demand Policies
and the Position on the Aggregate
Demand Curve** 437**Part IV: Macroeconomic Policy:
Its Environment and
Institutions** 440**Chapter 13:****UNEMPLOYMENT AND INFLATION** 440**13.1 Unemployment and Inflation: Is There a
Trade-Off?** 441**A Closer Look 13.1:** The Lucas Critique 453**13.2 The Problem of Unemployment** 454**13.3 The Problem of Inflation** 460**A Closer Look 13.2:** Indexed Contracts 463**A Closer Look 13.3:** The Sacrifice Ratio 466

Chapter Summary 468

Key Terms 469

Key Equation 469

Review Questions 469

Numerical Problems 470

Analytical Problems 470

Chapter 14:**MONETARY POLICY AND THE BANK OF
CANADA** 472**14.1 Principles of Money Supply
Determination** 473

14.2 Monetary Control in Canada 481

A Closer Look 14.1: The Bank of Canada's
Response to the 2007–2009 Financial Crisis 487

**14.3 The Conduct of Monetary Policy: Rules
versus Discretion** 491

APPLICATION: SHOOTING AT TARGETS 496

Chapter Summary 500
Key Terms 501
Key Equations 502
Review Questions 502
Numerical Problems 502
Analytical Problems 503

Chapter 15:**GOVERNMENT SPENDING AND ITS
FINANCING** 504**15.1 The Government Budget: Some Facts
and Figures** 504

A Closer Look 15.1: Government Budgets by
Province and Territory 511

**15.2 Government Spending, Taxes, and the
Macroeconomy** 512

APPLICATION: THE POVERTY TRAP 518

15.3 Government Deficits and Debt 521

A Closer Look 15.2: How Large Is the Government
Debt? 522

15.4 Deficits and Inflation 531

Chapter Summary 533
Key Terms 534
Key Equations 534
Review Questions 534
Numerical Problems 535
Analytical Problems 536

Appendix 15.A: The Debt–GDP Ratio 537**Appendix: Some Useful Analytical Tools** 538

A.1 Functions and Graphs 538
A.2 Slopes of Functions 539
A.3 Elasticities 540
A.4 Functions of Several Variables 541
A.5 Shifts of a Curve 541
A.6 Exponents 542
A.7 Growth Rate Formulas 542
Problems 543

Glossary 545**Name Index** 553**Subject Index** 555

Summary Tables

Summary 1	Measures of Aggregate Saving	31
Summary 2	Comparing the Benefits and Costs of Changing the Amount of Labour	59
Summary 3	Factors That Shift the Aggregate Labour Demand Curve	64
Summary 4	Factors That Shift the Aggregate Labour Supply Curve	70
Summary 5	Determinants of Desired National Saving	106
Summary 6	Determinants of Desired Investment	115
Summary 7	Equivalent Measures of a Country's International Trade and Lending	138
Summary 8	The Fundamental Determinants of Long-Run Living Standards	177
Summary 9	Macroeconomic Determinants of the Demand for Money	215
Summary 10	The Cyclical Behaviour of Key Macroeconomic Variables (The Business Cycle Facts)	234
Summary 11	Factors That Shift the Full-Employment (<i>FE</i>) Line	247
Summary 12	Factors That Shift the <i>IS</i> Curve	251
Summary 13	Factors That Shift the <i>LM</i> Curve	256
Summary 14	Factors That Shift the <i>AD</i> Curve	275
Summary 15	Terminology for Changes in Exchange Rates	299
Summary 16	Determinants of the Exchange Rate (Real or Nominal)	306
Summary 17	Determinants of Net Exports	306
Summary 18	International Factors That Shift the <i>IS</i> Curve	317

Key Diagrams

Key Diagram 1	The Production Function	85
Key Diagram 2	The Labour Market	86
Key Diagram 3	Saving–Investment	125
Key Diagram 4	National Saving and Investment in a Small Open Economy	155
Key Diagram 5	National Saving and Investment in Large Open Economies	156
Key Diagram 6	The Neoclassical Growth Model	194
Key Diagram 7	The <i>IS–LM–FE</i> Model	280
Key Diagram 8	The Aggregate Demand Curve	281
Key Diagram 9	The <i>IS–LM–FE</i> Model of a Small Open Economy	341
Key Diagram 10	The Upward-Sloping Short-Run Aggregate Supply Curve	384
Key Diagram 11	The Misperceptions Version of the <i>AD–AS</i> Model	385
Key Diagram 12	The Keynesian Version of the <i>AD–AS</i> Model	425

Applying Macroeconomics to the Real World

APPLICATIONS

- Application** The Production Function and Productivity Growth in Canada 49
- Application** Output, Employment, and the Real Wage During Oil Price Shocks 72
- Application** Technological Change and Wage Inequality 74
- Application** Stock Market Wealth, Housing Wealth, and Consumer Spending 98
- Application** Domestic and Foreign Interest Rates 140
- Application** Globalization and the Canadian Economy 146
- Application** Growth Accounting and the East Asian “Miracle” 165
- Application** The U.S. Housing Crisis and Its Aftermath 208
- Application** Oil Price Shocks Revisited 262
- Application** Explaining the Movements in Canadian and U.S. Interest Rates 311
- Application** Provincial Fiscal Policies 333
- Application** Macroeconomic Policy Responses to the 2008–2009 Financial Crisis 336
- Application** Calibrating the Business Cycle 356
- Application** Shooting at Targets 496
- Application** The Poverty Trap 518

A CLOSER LOOK

- A Closer Look 1.1** Developing and Testing an Economic Theory 9
- A Closer Look 2.1** Natural Resources, the Environment, and the National Income Accounts 22
- A Closer Look 2.2** Does CPI Inflation Overstate Increases in the Cost of Living? 38
- A Closer Look 4.1** Surveying Households 96
- A Closer Look 4.2** Interest Rates 101
- A Closer Look 4.3** Investment and the Stock Market 110
- A Closer Look 6.1** Economic Growth and Democracy 188
- A Closer Look 7.1** Measuring Inflation Expectations 223
- A Closer Look 9.1** Trend Money Growth and Inflation 267
- A Closer Look 10.1** The Effective Exchange Rate 296
- A Closer Look 10.2** McParity 300
- A Closer Look 11.1** Money and Economic Activity at Christmastime 368
- A Closer Look 11.2** Are Price Forecasts Rational? 376
- A Closer Look 12.1** The Classical–Keynesian Debate and the 2008–2009 Recession 421
- A Closer Look 13.1** The Lucas Critique 453
- A Closer Look 13.2** Indexed Contracts 463
- A Closer Look 13.3** The Sacrifice Ratio 466
- A Closer Look 14.1** The Bank of Canada’s Response to the 2007–2009 Financial Crisis 487
- A Closer Look 15.1** Government Budgets by Province and Territory 511
- A Closer Look 15.2** How Large Is the Government Debt? 522

Symbols Used in This Book

A	productivity	W	nominal wage
B	government debt	Y	total income or output
$BASE$	monetary base	\bar{Y}	full-employment output
C	consumption		
CA	current account balance	a	individual wealth or assets
CU	currency in circulation	c	individual consumption; consumption per worker
DEP	bank deposits	cu	currency–deposit ratio
E	worker effort	d	depreciation rate
G	government purchases	e	real exchange rate
I	investment	\bar{e}_{nom}	nominal exchange rate
INT	net interest payments	g	growth rate of GDP
K	capital stock	e_{nom}	official value of nominal exchange rate
KA	capital account balance	i	nominal interest rate
M	money supply	i^m	nominal interest rate on money
MC	marginal cost	k	capital–labour ratio
MPK	marginal product of capital	n	growth rate of labour force
MPN	marginal product of labour	p_K	price of capital goods
$MRPN$	marginal revenue product of labour	r	expected real interest rate
N	employment, labour	r^w	world real interest rate
\bar{N}	full-employment level of employment	r_{a-t}	expected after-tax real interest rate
NFP	net factor payments	res	reserve–deposit ratio
NM	non-monetary assets	s	individual saving; saving rate
NX	net exports	t	income tax rate
P	price level	u	unemployment rate
P^e	expected price level	\bar{u}	natural unemployment rate
$PVLC$	present value of lifetime consumption	uc	user cost of capital
$PVLR$	present value of lifetime resources	w	real wage
R	real seignorage revenue	y	individual labour income; output per worker
RES	bank reserves	π	inflation rate
S	national saving	π^e	expected inflation rate
S_{pvt}	private saving	η_Y	income elasticity of money demand
S_{govt}	government saving	τ	effective tax rate
T	taxes		
TR	transfers		
V	velocity		

PREFACE

I became involved in the writing of this textbook for two reasons. One is that, although writing a textbook is hard, it can also be rewarding. It is a wonderful feeling to receive notes from students and instructors telling me that they felt they learned a lot from the book and that it changed or clarified how they understand macroeconomic events. The second reason is that, as an instructor, I found existing textbooks either were too advanced and narrow in presentation, or cast ideas and concepts in a way that was so simple that they inaccurately represented the issues students were observing in the real world on a daily basis. I wanted a textbook that did a better job of balancing the need for theoretical rigour with the need to explain events as they were observed in reality. The opportunity to modify the U.S. edition of *Macroeconomics* to better describe and evaluate macroeconomic events in ways relevant to Canadian students gave me the chance to be involved in the writing of the textbook I wanted to teach from.

NEW AND UPDATED COVERAGE

What is taught in intermediate economics courses—and how it is taught—has changed substantially in recent years. Previous editions of *Macroeconomics* played a major role in these developments. The eighth Canadian edition tightens its focus on the critical issues of macroeconomics, and introduces changes to better fit with how instructors teach intermediate macroeconomics.

Key changes with this edition include:

- ***The Fiscal Policy Multiplier.*** New with this edition we include, in Chapter 12, a detailed discussion of the size of the fiscal policy multiplier. This issue has gained considerable attention in part because, in a very low interest rate environment, monetary policy loses some of its ability to influence real outcome. Many governments have responded by emphasizing the use of fiscal policy as a way of stimulating a stagnating economy. This new discussion draws on multiplier calculations in the appendix to Chapter 12 to examine under what conditions one might expect the fiscal policy multiplier to be large or small.
- ***The Laffer Curve.*** With this edition, Chapter 15 now includes a discussion of the Laffer Curve, the relationship between tax revenue and tax rates. Our discussion explains the logic of the Laffer Curve and also directs attention to recent empirical work that tests whether, in fact, tax rates could be lowered as a way of increasing tax revenue.
- ***Measuring GDP.*** New approaches taken by Statistics Canada to measure GDP required a significant revision of Chapter 2. The new approach used to measure GDP by summing incomes is explained and is illustrated with recent data taken from the national accounts.

In addition, this edition has updated existing discussions of the effects of oil price shocks, the measures and consequences of government debt, the changing nature of foreign investment, the lessons learned from the 2007–2009

financial crisis for the regulation of the financial sector, and much more. In short, the eighth Canadian edition of *Macroeconomics* is tighter, more focused, and better designed to support instructors in making the most effective presentation of the macroeconomic models emphasized in intermediate macroeconomics courses.

FEATURES

In the eighth Canadian edition of *Macroeconomics*, we have added—and subtracted—material to keep the text focused and up-to-date while building on the strengths that underlie the book’s lasting appeal, including:

- ***Real-world applications.*** A perennial challenge for instructors is to help students make active use of the economic ideas developed in the text. The rich variety of applications in this book shows by example how economic concepts can be put to work in explaining real-world issues, such as increasing wage inequality, the productivity slowdown, sources of international financial crises, and alternative approaches to making monetary policy. *The eighth Canadian edition has updated the best applications of previous editions but has also removed applications that are less relevant and of less interest to current students.*

The ultimate test of a model or theory is its practical relevance. We dedicate a significant portion of each chapter to showing how the theory can be applied to real events and issues. Thus, we present additional information and topics designed to enhance students’ understanding of the economic theories presented in that chapter in boxes entitled “A Closer Look” or “Applications.” Examples include changes to housing prices on consumption spending (Chapter 4), comparing Canadian and foreign levels of direct investment (Chapter 5), and discussing the issues and complications involved in measuring the size of government debt (Chapter 15). Throughout the book we have provided the source of all data we presented in graphs and tables. Providing this information enables instructors and students to update tables and figures and to find their own data series to answer questions related to those discussed in the text.

- ***Broad modern coverage.*** From its conception, *Macroeconomics* has responded to students’ desires to investigate and understand a wider range of macroeconomic issues than permitted by the course’s traditional emphasis on short-run fluctuations and stabilization policy. This book provides a modern treatment of these traditional topics but also gives in-depth coverage of other important macro issues, such as the determinants of long-run economic growth, international trade and capital flows, labour markets, and the political and institutional framework of policymaking. This comprehensive coverage also makes the book a useful tool for instructors with differing views about course coverage and topic sequence.
- ***Reliance on a set of core economic ideas.*** Although we cover a wide range of topics, we avoid developing a new model or theory for each issue. Instead, we emphasize the broad applicability of a set of core economic ideas (such as the production function, the trade-off between consuming today and saving for tomorrow, and supply–demand analysis). Using these core ideas, we build a theoretical framework that encompasses all the macroeconomic analyses presented in the book: long-run and short-run, open economy and closed economy, and classical and Keynesian.

- ***A balanced presentation.*** Macroeconomics is full of controversies, many of which arise from the split between classicals and Keynesians (of the old, new, and neo- varieties). Sometimes, the controversies overshadow the broad common ground shared by the two schools. We emphasize that common ground.

First, we pay greater attention to long-run issues (on which classicals and Keynesians have less disagreement). Second, we develop the classical and Keynesian analyses of short-run fluctuations within a single overall framework, in which we show that the two approaches differ principally in their assumptions about how quickly wages and prices adjust. Where differences in viewpoint remain—for example, in the search versus efficiency-wage interpretations of unemployment—we present and critique both perspectives. This balanced approach exposes students to all the best ideas in modern macroeconomics. At the same time, an instructor of either classical or Keynesian inclinations can easily base a course on this book.
- ***Innovative pedagogy.*** The eighth Canadian edition, like its predecessors, provides useful tools to help students study, understand, and retain the material. Described in more detail later in the Preface, these tools include Summary tables, Key Diagrams, Key Terms, and Key Equations to aid students in organizing their study; and three types of problems for practice and to develop understanding.

A FLEXIBLE ORGANIZATION

The basic structure of the text is unchanged from previous editions. In Part I (Chapters 1 and 2), we introduce the field of macroeconomics and discuss issues of measurement. In Part II (Chapters 3–7), we focus on long-run issues, including productivity, saving, investment, growth, and inflation. We devote Part III (Chapters 8–12) to the study of short-run economic fluctuations and stabilization policy. Finally, although we discuss macroeconomic policy throughout the book, in Part IV (Chapters 13–15) we look at issues and institutions of policymaking in greater detail. In the Appendix at the end of the book, we review useful algebraic and graphical tools.

We recognize that instructors have different preferences about what to include in their courses and that their choices may be constrained by their students' backgrounds and the length of the term. The text is designed to be flexible in accommodating these different needs. In planning how to use *Macroeconomics* in your course, you might find the following suggestions useful:

- ***Core chapters.*** We recommend that every course include these six chapters:
 - Chapter 1 Introduction to Macroeconomics
 - Chapter 2 The Measurement and Structure of the Canadian Economy
 - Chapter 3 Productivity, Output, and Employment
 - Chapter 4 Consumption, Saving, and Investment
 - Chapter 7 The Asset Market, Money, and Prices
 - Chapter 9 The *IS–LM–FE* Model: A General Framework for Macroeconomic Analysis

Chapters 1 and 2 provide an introduction to macroeconomics, including national income accounting. The next four chapters on the list make up the

analytical core of the book: Chapter 3 introduces the labour market, Chapters 3 and 4 together develop the goods market, and Chapter 7 discusses the asset market. Chapter 9 combines the three markets into a general equilibrium model usable for short-run analysis (in either classical or Keynesian mode).

To a syllabus containing the above six chapters, the instructor can add various combinations of other chapters according to the course focus. The following are some possible choices:

- ***International macroeconomic issues.*** Most instructors will want to add two open-economy chapters to the six chapters listed. Chapter 5 discusses saving, investment, and the trade balance in both small and large open economies with full employment. Chapter 10 discusses exchange-rate determination and macroeconomic policy in an open-economy model in which short-run deviations from full employment are possible. Each of these chapters directly follows its closed-economy partner.
- ***Short-run, fixed price focus.*** Instructors who prefer to emphasize short-run issues (business cycle fluctuations and stabilization policy) within the context of a fixed price model can omit Chapter 6 without loss of continuity. They could also go directly from Chapters 1 and 2 to Chapters 8 and 9, which introduce business cycles and the *IS-LM-FE* framework. Although the presentation in Chapters 8 and 9 is self-contained, it will be helpful for instructors who skip Chapters 3–7 to provide some background and motivation for the various behavioural relationships and equilibrium conditions.
- ***Short-run, flexible price focus.*** Instructors who want to build on the short-run model can deepen their analysis by adding Chapters 11 and 12. In these chapters the role of price expectations is introduced into the classical and the Keynesian models, allowing for examination of the implications of rational expectations for stabilization policies.
- ***Classical emphasis.*** For instructors who want to teach the course with a modern classical emphasis, Chapter 11 provides a self-contained presentation of classical business cycle theory. Other material of interest includes the Friedman–Phelps interpretation of the Phillips curve (Chapter 13), the role of credibility in monetary policy (Chapter 14), and Ricardian equivalence with multiple generations (Chapter 15).
- ***Keynesian emphasis.*** Instructors who prefer a Keynesian emphasis can omit Chapter 11 (classical business cycle analysis); however, they will find it useful to first present those sections of Chapter 11 that introduce and discuss the implications of the theory of rational expectations. As noted, if a short-run focus is preferred, Chapter 5 (full-employment analysis of the open economy) and Chapter 6 (long-term economic growth) may also be omitted without loss of continuity.

LEARNING AIDS

The text contains many features aimed at helping students understand, apply, and retain important concepts:

- ***Detailed, colour graphs.*** The book is liberally illustrated with *data graphs*, which emphasize the empirical relevance of theory, and *analytical graphs*,

which guide students through the development of model and theory in a well-paced, step-by-step manner. Both types of graphs include descriptive captions that summarize the details of events shown in the graph. Our use of colour in analytical graphs is demonstrated in Figure 3.9, which shows the effects of a shifting curve on a set of endogenous variables. Note that the original curve is in black, and its new position is in teal, with arrows indicating the direction of the shift. A teal “shock box” indicates the reason for the shift, and a grey “result box” lists the main effects of the shock on endogenous variables. We consistently use these and similar conventions to make it easier for students to gain a clear understanding of the analysis.

- **Key Diagrams.** Key Diagrams, a unique study feature found at the end of selected chapters, are self-contained descriptions of the most important analytical graphs in the book (see the list in the Contents for their locations). For each Key Diagram we present the graph (the production function, Chapter 3, or the *IS-LM-FE* diagram, Chapter 9, for example) and define and describe its elements in words and equations. We then present an analysis of what the graph reveals and discuss the factors that shift the curves in the graph.
- **Summary tables.** Throughout the book summary tables compile the main results of analyses. These summary tables reduce the amount of time the student must spend learning and writing results, allowing a greater concentration on understanding and applying these results.
- **End-of-chapter review materials.** To facilitate review, at the end of each chapter the student will find a chapter summary, covering the chapter’s main points; a list of key terms, with page references; an annotated list of key equations; and review questions for self-testing.
- **End-of-chapter problems.** An extensive set of problems for practice and review (more than 160 in all) includes *numerical problems*, which have explicit numerical solutions and are especially useful for checking students’ understanding of basic relationships and concepts; and *analytical problems*, which ask students to use or extend theories qualitatively. Answers are provided in the Instructor’s Manual.
- **Review of useful analytical tools.** Although we use no mathematics beyond high school algebra, some students will find helpful a review of the main analytical tools used in the book. The Appendix (at the end of the text) succinctly discusses functions of one and several variables, graphs, slopes, exponents, and formulas for finding the growth rates of products and ratios.
- **Glossary.** The Glossary at the end of the text includes definitions of all key terms (set in boldface in the chapters and listed at the end of each chapter) and refers the student to the page on which the term is fully defined and discussed.

SUPPLEMENTS

The following instructor supplements are available for downloading from a password-protected section of Pearson Canada’s online catalogue (<http://catalogue.pearsoned.ca>). Navigate to your book’s catalogue page to view a list of those supplements that are available. See your local sales representative for details and access.

- **Instructor's Manual:** This manual contains valuable resources including teaching notes, suggested topics for class discussion, and solutions to all end-of-chapter problems.
- **Computerized Test Bank:** Pearson's computerized test banks allow instructors to filter and select questions to create quizzes, tests, or homework. Instructors can revise questions or add their own, and may be able to choose print or online options. These questions are also available in Microsoft Word format.
- **PowerPoint Presentations:** PowerPoint presentations offer an outline of the key points for each chapter.
- **Image Library:** This image library consists of all figures from the text.

ACKNOWLEDGMENTS

These days a textbook is not the lonely venture of its author or co-authors but is the joint project of dozens of skilled and dedicated people. We extend special thanks to Megan Farrell, Acquisitions Editor; Leigh Anne Graham, Director Product Marketing; and Cheryl Finch, Content Developer. Each of these people contributed greatly to the project. We also thank many others at Pearson Canada and in the United States for their effort and craft.

We benefited from the advice of numerous colleagues at universities across Canada, the Bank of Canada, and Statistics Canada who patiently directed us to data sources and research studies. We appreciate the contributions of reviewers and colleagues who offered valuable comments on succeeding drafts of the book in all eight editions thus far:

REVIEWERS

Iris Au
University of Toronto

Patrick Coe
Carleton University

Alison Coffin
Memorial University

Anupam Das
Mount Royal University

Alexander Gainer
University of Alberta

Philippe Ghayad
Dawson College

Mustapha Ibn Boamah
University of New Brunswick

Robert J. McKeown
University of Toronto

Amy Peng
Ryerson University

Gabriela Sabau
Memorial University

Rizwan Tahir
McMaster University

Andrew Wong
University of Alberta

Ayoub Yousefi
King's University College at Western University

We are grateful to Mark Gertler, Rick Mishkin, and Steve Zeldes for valuable assistance with the first U.S. edition, and to reviewers of the U.S. editions. We are also grateful to several cohorts of students at the University of Pennsylvania, Princeton University, and the University of Calgary who—not entirely of their own free will but none the less very graciously—assisted us in the development of this textbook.

Last and most important, we thank our families for their patience and support. We dedicate this book to them.

Philadelphia A.B.A.

Princeton B.S.B.

Calgary R.D.K.

This page intentionally left blank

Chapter 1

Introduction to Macroeconomics

1.1 WHAT MACROECONOMICS IS ABOUT

Macroeconomics is the study of the structure and performance of national economies and of the policies that governments use to try to affect economic performance. The issues that macroeconomists address include the following:

- *What determines a nation's long-run economic growth?* In 1870, income per capita in Norway was smaller than in Argentina. But today, income per capita is more than twice as high in Norway as in Argentina. Why do some nations' economies grow quickly, providing their citizens with rapidly improving living standards, while other nations' economies are relatively stagnant?
- *What causes a nation's economic activity to fluctuate?* After 17 years of strong economic growth, the Canadian economy began to falter in 2008. By the end of 2009, output in Canada had fallen by 2% from its level at the end of 2007. Even if they grow on average, why do economies sometimes experience sharp short-run fluctuations, lurching between periods of prosperity and periods of hard times?
- *What causes unemployment?* During the 1930s, one-fifth of the workforce in Canada was unemployed. A decade later, during World War II, less than 2% of the workforce was unemployed. Why does unemployment sometimes reach very high levels? Why, even during times of relative prosperity, is a significant fraction of the workforce unemployed?
- *What causes prices to rise?* The rate of inflation in Canada crept steadily upward during the 1970s, and reached 11% per year in the early 1980s before dropping to 3% per year in the mid-1980s, and to less than 2% per year in the early 1990s. Germany's inflation experience has been much more extreme: Although Germany has earned a reputation for low inflation in recent decades, following its defeat in World War I, it experienced an 18-month period (July 1922–December 1923) during which prices rose by a factor of several billion! What causes inflation, and what can be done about it?

- *How does being part of a global economic system affect nations' economies?* According to many observers, economic growth in Canada in the 1990s was boosted by rapid growth abroad, which added to the demand for Canadian products. On the other hand, in 2007 a crisis began to develop in the U.S. financial market that would quickly impact the Canadian economy by threatening the stability of Canadian financial institutions and causing a significant fall in Canadian exports. How do economic links between nations, such as international trade and borrowing, affect the performance of individual economies and the world economy as a whole?
- *Can government policies be used to improve a nation's economic performance?* Governments raise a great deal of revenue by taxing individuals and firms. We as citizens have deemed it appropriate that the government spend that revenue on goods and services. These include national defence, police, and education. How do government decisions about how to raise revenue—for example, by income taxes versus by borrowing—affect the overall economy? How do government spending choices—for example, on infrastructure as opposed to income support for the elderly—affect the economy? How should economic policy be conducted in order to keep the economy as prosperous and stable as possible?

Macroeconomics seeks to offer answers to such questions, which are of great practical importance and are constantly debated by politicians, the press, and the public. In the rest of this section, we consider these key macroeconomic issues in more detail.

LONG-RUN ECONOMIC GROWTH

If you've ever travelled in a developing country, you probably couldn't help but observe the difference in living standards relative to those of such countries as Canada. The problems of inadequate food, shelter, and health care experienced by the poorest citizens of rich nations often represent the average situation for the people of a developing country. From a macroeconomic perspective, the difference between rich nations and developing nations may be summarized by saying that rich nations have, at some point in their history, experienced extended periods of rapid economic growth but that poorer nations either have never experienced sustained growth or have had periods of growth offset by periods of economic decline.

In part, the long-term growth of the Canadian economy is the result of a rising population, which has meant a steady increase in the number of available workers. But another significant factor is the increase in the amount of output that can be produced with a given amount of labour. The amount of output produced per unit of labour input—for example, per worker or per hour of work—is called **average labour productivity**. Average labour productivity, defined in this case as output per employed worker, has changed a great deal over time. In 2016, for example, the average Canadian worker produced nearly six times as much output as the average worker in 1921, despite working fewer hours over the course of the year. Because today's typical worker is so much more productive, Canadians enjoy a significantly higher standard of living than would have been possible 96 years ago.

The rates of growth of output and, particularly, of output per worker ultimately determine whether a nation will be rich or poor; therefore, understanding what

determines growth is one of the most important goals of macroeconomics. Unfortunately, explaining why economies grow is not easy. Why, for example, did resource-poor Japan and South Korea experience growth rates that transformed them in a generation or two from war-torn nations to industrial powers, whereas several resource-rich nations of Latin America and Africa have had erratic or even negative growth in recent years? Although macroeconomists have nothing close to a complete answer to the question of what determines rates of economic growth, they do have some ideas to offer. In Chapter 6, we will present a model that economists use to try to better understand why over the course of many decades some economies grow faster than others. As rising output is closely correlated with improved living standards, it is small wonder that this area of study has been a focus of macroeconomists for a long time.¹

BUSINESS CYCLES

The history of Canadian output is one of steady growth when measured over the long term but growth that is sometimes interrupted by short periods of slower (and sometimes negative) growth and short periods of more rapid growth. These periods of slower than normal and faster than normal growth are known by economists as *business cycles*: short, but sometimes sharp, contractions and expansions in economic activity.²

The most volatile period in the history of Canadian output was between 1914 and 1945, a period marked by two world wars and the two deepest recessions in Canadian history, the second of which was so severe that it is known as the Great Depression. During the Great Depression the unemployment rate in Canada exceeded 20%, a level of unemployment not experienced since. But even relatively mild downturns in the economy, known as recessions, mean hard economic times for many people. Not surprisingly, recessions are a major concern for politicians; after all, almost every politician wants to be re-elected, and his or her chances are better if the country's economy is expanding rather than contracting.

Macroeconomists put a lot of effort into trying to determine what causes business cycles and deciding what can or should be done about them. In Chapter 8 we describe the features of business cycles in Canada, and in Chapters 9–12 we compare different macroeconomic explanations for cyclical fluctuations. Using those explanations as a guide, we also evaluate the policy options that are available for mitigating the negative effects of the business cycle.

UNEMPLOYMENT AND PRICE INSTABILITY

The hard economic times suffered by people over the course of a business cycle are felt in many ways, both personal and economic. At a macroeconomic level, the economic costs are often measured by two key variables: unemployment and price instability.

¹ In Chapters 6 and 8 we will look at data describing Canada's economic growth over more than a century. In Chapter 8 we will also look at data describing average labour productivity over the past half-century.

² A more exact definition is given in Chapter 8, where we also provide the dates when contractions and expansions have started and ended in Canada.

By an increase in **unemployment** we mean an increase in the number of people who are available and actively seeking employment but who are unable to find a job. Finding oneself unable to earn a living and support one's family is an obvious and serious hardship. Less obvious, perhaps, is the hardship suffered when the economy experiences volatility in the rate of growth in prices. Price instability can take either of two forms. **Inflation** is an ongoing increase in the prices of goods and services. **Deflation** is an ongoing decrease in prices. Canadians who lived through the high rates of inflation (in excess of 10% per year) during the 1970s and an older generation who lived during the Great Depression and saw prices (and wages) fall by 6% per year know that there are significant costs to be borne. So policymakers continually guard against the threat of prolonged periods of deflation, such as Japan has experienced since the 1990s, and the opposite threat of runaway inflation, such as that observed in recent years in countries like Zimbabwe, where prices have risen so quickly that economists have labelled it "hyperinflation."

We look closely at the determinants of unemployment and inflation, and the relationship between the two, in Chapter 13. To better our understanding of inflation, in Chapter 7 we examine the role of money and the crucial role of financial institutions in the economy.

THE INTERNATIONAL ECONOMY

Today, every major economy is an **open economy**, or one that has extensive trading and financial relationships with other national economies. (A **closed economy** does not interact economically with the rest of the world.) Macroeconomists study patterns of international trade and borrowing to better understand the links among national economies. For example, an important topic in macroeconomics is how international trade and borrowing relationships can help transmit business cycles from country to country.

The Canadian economy has always been heavily dependent on international trade in goods and services. Being able to sell goods abroad (that is, to **export**) is an advantage to Canadian manufacturers, as they are able to grow far larger than they would were they dependent on selling only to the relatively small Canadian market. Being able to buy goods from other countries (to **import**) is a great advantage for Canadian consumers, who are as a result able to choose from the best the world has to offer. Imagine how much poorer Canadians would be without the ability to purchase fresh fruit imported from Mexico during the winter months, or how much poorer Canadian wheat farmers would be without the ability to grow amounts of wheat far in excess of Canadian needs and export the rest of their crop to other countries.

The value of goods and services that Canadian firms export and the value of goods and services Canadians import need not be the same. When the value of exports exceeds the value of imports, a **trade surplus** exists. When the opposite occurs, when value of imports exceeds the value of exports, a **trade deficit** exists. An important influence on the trade balance is the **exchange rate**. The exchange rate is the number of Canadian dollars that can be purchased with one unit of foreign currency. Although exchange rates are quoted between many currencies, the Canada–U.S. exchange rate is the most important to Canada because of the very large volume of trade between the two countries.

The development of the Canadian economy has been heavily influenced by the free flow of financial capital across international borders. During the 1870s, when

Canada was building intercontinental railways and the infrastructure of a new country, and again during the 1950s and 1960s, when the Canadian economy was growing quickly thanks to external demand for our natural resources, it was the savings of foreigners that was funding these investments. More recently, Canadian savers have benefited from being able to invest in fast-growing countries such as China and India.

The long-term impact of international trade and the inflow and outflow of financial capital on the Canadian economy is the focus of Chapter 5. The role of trade and financial flows (including the crucial role played by exchange rates) in the Canadian business cycle is the subject of Chapter 10.

MACROECONOMIC POLICY

A nation's economic performance depends on many factors, including its natural and human resources, its capital stock (buildings and machines), its technology, and the economic choices made by its citizens, both individually and collectively. Another important factor affecting economic performance is the set of macroeconomic policies pursued by the government.

Macroeconomic policies attempt to affect the performance of the economy as a whole. The two major types of macroeconomic policies are fiscal policy and monetary policy. **Fiscal policy**, which is determined at the federal, provincial, and municipal levels, concerns government spending and taxation. **Monetary policy**, which is under the control of a government institution known as the central bank, affects short-term interest rates and the growth rate of the nation's money supply. In Canada, the central bank is the Bank of Canada.

The fiscal policy choices made by governments play a huge role in our daily lives. These choices determine, for example, the level and type of taxes we pay. As well, these choices matter for determining who pays these taxes: What share of taxes is paid by high-income Canadians and what share, if any, is paid by those with low incomes? Fiscal policy choices also matter for funding health care, education, and social assistance. Finally, fiscal policy choices involve decisions about the size of government deficits (the imbalance between government spending and revenues) and debt (the accumulation of annual budget imbalances). Fiscal policy choices—along with the constraint put on those choices by the reluctance of Canadians to pay taxes and the critical importance of interest rates for indebted governments—are the focus of Chapter 15. Fiscal policy choices are central to our discussion in Chapters 9–12 as well because these choices may matter for how our governments respond to the business cycle.

The choices made by the Bank of Canada with respect to monetary policy are also important to our daily lives. The interest rate paid on a student loan, car loan, or mortgage is determined by monetary policy. So too is the rate of return earned on savings toward retirement. The crucial role of monetary policy choices in ensuring the stability of financial institutions—and so protecting the savings of households—was highlighted during the world financial crisis of 2007–2009. For reasons like these, most macroeconomists agree that monetary policy plays a pivotal role in determining the success of a modern industrialized economy such as Canada's. Developing an understanding of monetary policy is the focus of Chapters 7 and 14. And, like fiscal policy, monetary policy choices are central to our discussion in Chapters 9–12 because these choices may matter for how our governments respond to the business cycle.

AGGREGATION

Macroeconomics is one of two broad areas within the field of economics, the other being microeconomics. Macroeconomics and microeconomics have many basic economic ideas and methods in common; the difference between them is the level at which the economy is studied. Microeconomists focus on individual consumers, workers, and firms, each of whom is too small to have an impact on the national economy. Macroeconomists ignore the fine distinctions among the many different kinds of goods, firms, and markets that exist in the economy and, instead, focus on national totals. For example, in their analyses, macroeconomists don't care whether consumers are buying an iPhone or a Samsung Galaxy, beef or chicken, Pepsi or Coke. Instead, they add consumer expenditures on all goods and services to get an overall total called aggregate consumption. The process of summing individual economic variables to obtain economywide totals is called **aggregation**. The use of aggregation and the emphasis on aggregate quantities, such as aggregate consumption, aggregate investment, and aggregate output, are the primary factors that distinguish macroeconomics from microeconomics.

1.2 WHAT MACROECONOMISTS DO

How do macroeconomists use their skills, and what do they do with all the data they gather and the theories they develop? Besides teaching economics, macroeconomists engage in a wide variety of activities, including forecasting, macroeconomic analysis, and basic research.

MACROECONOMIC FORECASTING

Many people believe that economists spend most of their time trying to forecast the performance of the economy. In fact, except for a relatively small number of forecasting specialists, forecasting is a minor part of what macroeconomists do. One reason macroeconomists don't emphasize forecasting is that on the whole, they're not terribly good at it! Although short-range forecasters have some success, long-range forecasting is difficult, not only because our understanding of how the economy works is imperfect but also because of the impossibility of taking into account *all* the factors—many of them not strictly economic—that might affect future economic trends. Here are some questions that a forecaster, in trying to project the course of the economy, might have to try to answer: What oil price will the Organization of the Petroleum Exporting Countries (OPEC) decide on at its next meeting? Will there be a severe drought in agricultural regions, with adverse effects on food quantities and prices? When will new technologies that are being developed come to market? Because answers to such questions are highly uncertain, macroeconomic forecasters rarely offer a single prediction. Instead, they usually combine a “most likely” forecast with “optimistic” and “pessimistic” alternative scenarios.

Does the fact that macroeconomics can't be used to make highly accurate forecasts of economic activity mean that it's a pointless field of study? Some people may think so, but that's really an unreasonable standard. Meteorology is an example of a field in which forecasting is difficult (will it *definitely* be nice this weekend?) but in which there is also a lot of useful knowledge (meteorologists helped

discover the depletion of the earth's ozone layer and pointed out its dangers). Similarly, cardiologists cannot usually predict if or when a patient will have a heart attack—they can only talk about probabilities. Like meteorologists and doctors, economists deal with a system whose complexity makes gaining a thorough understanding difficult and forecasting the system's behaviour even more difficult. Rather than predicting what will happen, most macroeconomists are engaged in analyzing and interpreting events as they happen (macroeconomic analysis) or in trying to understand the structure of the economy in general (macroeconomic research).

MACROECONOMIC ANALYSIS

Macroeconomic analysts monitor the economy and think about the implications of current economic events. Many analysts are employed in the private sector, such as in banks or large corporations. Private sector analysts try to determine how general economic trends will affect their employers' financial investments, their opportunities for expansion, the demand for their products, and so on.

The public sector, which in Canada includes the federal, provincial, and municipal governments, the Bank of Canada, and international agencies such as the World Bank and the International Monetary Fund, also employs many macroeconomic analysts. The main function of public sector analysts is to assist in policymaking—for example, by writing reports that assess various macroeconomic problems and by identifying and evaluating possible policy options. Among Canadian policymakers, the officials who set monetary policy may call on the aid of economists employed by the Bank of Canada, and federal and provincial cabinets have the advice of the professional staffs of numerous departments and agencies. Economic policymakers also often go outside the government to seek the advice of macroeconomists from business or academia.

If a country has many well-trained macroeconomic analysts, as is true in Canada, does that mean its macroeconomic policies will always be intelligent and far-sighted? The answer, unfortunately, is no. Because of the complexity of the economy, macroeconomic policy analysis, like macroeconomic forecasting, is often difficult and uncertain. Perhaps even more important, though, *politicians, not economists, usually make economic policy*. Politicians are typically less concerned with the abstract desirability of a policy than with the policy's immediate effects on their constituents. Thus, in recent years, international talks intended to reduce trade barriers have sometimes failed because the governments of many developed countries found it politically inadvisable to reduce high subsidy payments to their farmers—despite economists' nearly universal opposition to both trade barriers and farm price support payments.

Although the technical advice provided by macroeconomic analysts isn't the sole basis on which macroeconomic policy is made, such advice is probably necessary for making good policy decisions, especially if dramatic changes are being considered. In recent years, for example, a number of countries in Eastern Europe have undertaken significant and successful reforms of their economies, reforms that have been guided by the advice of macroeconomic analysts to open markets to trade, to minimize tax rates and inflation, and so on. In Venezuela and Zimbabwe, on the other hand, radical changes have been introduced despite those changes being universally dismissed by macroeconomic analysts as harmful to those nations' economies.

MACROECONOMIC RESEARCH

Macroeconomic research takes an amazing variety of forms, from abstract mathematical analysis to psychological experimentation to massive number-crunching projects in which supercomputers are used to process large amounts of economic data. Nevertheless, the goal of all macroeconomic research is to make general statements about how the economy works. The general insights about the economy gained from successful research form the basis for the analyses of specific economic problems, policies, or situations.

How is macroeconomic research carried out? As in many other fields, macroeconomic research proceeds primarily through the formulation and testing of theories. An **economic theory** is a set of ideas about the economy that has been organized in a logical framework. Most economic theories are developed in terms of an **economic model**, which is a simplified description of some aspect of the economy, usually expressed in mathematical form. Economists evaluate an economic model or theory by applying four criteria:

1. Are its assumptions reasonable and realistic?
2. Is it understandable and manageable enough to be used in studying real problems?
3. Does it have implications that can be tested by **empirical analysis**? That is, can its implications be evaluated by comparing them with data obtained in the real world?
4. When the implications and the data are compared, are the implications of the theory consistent with the data?

For a theory or model—of any type, not just economic—to be useful, the answer to each of these questions must be yes. Unfortunately, though, economists may not always agree in their evaluation of a particular model, which means that controversies about the best way to model a given economic situation sometimes persist.

We present a summary of the main steps in developing and testing an economic theory or model in A Closer Look 1.1 (p. 9).

At the heart of any economic theory are descriptions of how our economic *actors*—households, firms, and government—make the choices they do. For example, what prompts members of a household to offer to work a certain number of hours per day but not more or less than that, and what motivates a firm to hire additional workers? These are questions we examine in Chapter 3. How does a change in income, interest rates, or wealth influence the decision of how many goods and services to purchase? What does this mean for saving? Why does a firm choose to invest in new machinery or factories? These questions are the focus of Chapter 4. What motivates government to raise or lower taxes and how does the Bank of Canada respond to increases in inflation? Chapters 14 and 15 look at these important issues.

Having developed an economic theory that summarizes how economic actors are predicted to respond to changes in their economic environment, a macroeconomist is able to conduct experiments. For the most part, macroeconomists are not allowed to run experiments in the manner of physicists or chemists. That is, we're not allowed to conduct experiments on our "subjects" because they are human beings and companies as opposed to the molecules and atoms that are the subject

A CLOSER LOOK 1.1

DEVELOPING AND TESTING AN ECONOMIC THEORY

To illustrate the process of developing and testing an economic theory, suppose that we want to develop a theory that explains the routes people take when they commute from home to work and back. Such a theory would be useful, for example, to a traffic planner who is concerned about how a proposed housing development will affect traffic patterns. Here are the steps we would take:

STEP 1. State the research question.

EXAMPLE: What determines traffic flows in the city during rush hours?

STEP 2. Make provisional assumptions that describe the economic setting and the behaviour of the economic factors. These assumptions should be simple yet capture the most important aspects of the problem.

EXAMPLE: The setting is described by the map of the city. The assumption about behaviour is that commuters choose routes that minimize driving time.

STEP 3. Work out the implications of the theory.

EXAMPLE: Use the map of the city to plot a route that minimizes driving time between home and place of work.

STEP 4. Conduct an empirical analysis to compare the implications of the theory with the data.

EXAMPLE: Conduct a survey of commuters to identify (1) home locations, (2) work locations, and (3) routes taken to work. Then, see whether the routes predicted by the model are generally the same as those reported in the commuter survey.

STEP 5. Evaluate the results of your comparisons.

If the theory fits the data well: Use the theory to predict what would happen if the economic setting or economic policies change.

EXAMPLE: Use the minimum-driving-time assumption to evaluate the traffic effects of a new housing development by figuring out which routes the residents of the development are likely to take.

If the theory fits the data poorly: Start from scratch with a new model. Repeat steps 2–5.

EXAMPLE: Change the provisional behavioural assumption to the following: Commuters choose the route that minimizes the distance they must drive (not the time they spend driving).

If the theory fits the data moderately well: Either make do with a partially successful theory or modify the model with additional assumptions and then repeat steps 3–5.

EXAMPLE: A possible modification of the minimum-driving-time assumption is that commuters will choose more scenic over less scenic routes, if driving time is not increased by more than a certain number of minutes. To test the model with this modified assumption, you must determine which routes are more scenic (those that pass a lake) and which are less scenic (those that pass a garbage dump).

of experiments in physics and chemistry.³ Instead, macroeconomists conduct their experiments using their economic models. In fact, we'll be conducting many such experiments in this book.

The experiments conducted by macroeconomists are called **comparative static experiments**. They are conducted in the following way. *First*, the economic model is assumed to be in **equilibrium**. That is to say, we begin by

³ Having said that, microeconomists are sometimes allowed to run experiments on humans. From 1974 to 1979 economists were let loose to run an experiment (called MINCOME) in which the residents of the town of Dauphin, Manitoba, were given the opportunity to participate in an economic experiment: a family with no income would receive a payment equal to 60% of a measure of poverty. The aim of the experiment was to determine how this unconditional income might affect people's decision about how much to work and how it might affect poverty levels. For an interesting discussion and analysis of this experiment, see Evelyn Forget, "The Town with No Poverty: The Health Effects of a Canadian Guaranteed Annual Income Field Experiment," *Canadian Public Policy*, Volume 37, No. 3, September 2011, pp. 283–305.