

Arthur O'Sullivan

# URBAN Economics

Ninth Edition



Mc  
Graw  
Hill  
Education

# *Urban Economics*

---

NINTH EDITION

*Arthur O'Sullivan*

Department of Economics  
Lewis & Clark College





## URBAN ECONOMICS, NINTH EDITION

Published by McGraw-Hill Education, 2 Penn Plaza, New York, NY 10121. Copyright © 2019 by McGraw-Hill Education. All rights reserved. Printed in the United States of America. Previous editions © 2012, 2009, and 2007. No part of this publication may be reproduced or distributed in any form or by any means, or stored in a database or retrieval system, without the prior written consent of McGraw-Hill Education, including, but not limited to, in any network or other electronic storage or transmission, or broadcast for distance learning.

Some ancillaries, including electronic and print components, may not be available to customers outside the United States.

This book is printed on acid-free paper.

1 2 3 4 5 6 7 8 9 LCR 21 20 19 18

ISBN 978-0-078-02178-7

MHID 0-078-02178-2

Portfolio Manager: *Katie Hoenicke*

Product Developer: *Kevin White*

Marketing Manager: *Virgil Lloyd*

Content Project Manager: *Maria McGreal*

Buyer: *Sue Culbertson*

Design: *MPS Limited*

Content Licensing Specialist: *Shannon Manderscheid*

Cover Image: *Shutterstock/Taras Vyshnya*

Compositor: *MPS Limited*

All credits appearing on page or at the end of the book are considered to be an extension of the copyright page.

### **Library of Congress Cataloging-in-Publication Data**

O'Sullivan, Arthur, author.

Urban economics / Arthur O'Sullivan, Department of Economics, Lewis & Clark College.

Ninth edition. | New York, NY : McGraw-Hill Education, [2018]

LCCN 2017038923 | ISBN 9780078021787 (alk. paper)

LCSH: Urban economics.

LCC HT321 .O88 2018 | DDC 330.9173/2--dc23 LC record

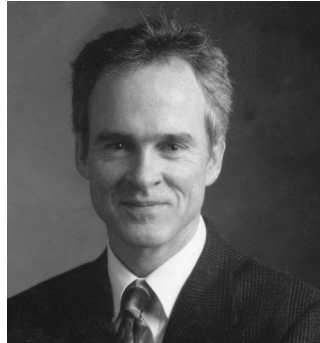
available at <https://lccn.loc.gov/2017038923>

The Internet addresses listed in the text were accurate at the time of publication. The inclusion of a website does not indicate an endorsement by the authors or McGraw-Hill Education, and McGraw-Hill Education does not guarantee the accuracy of the information presented at these sites.

*To Professor Ed Whitelaw, the most talented teacher I've ever known.  
It has been almost 30 years since I've been in Ed's class, but whenever  
I start thinking about how to teach some new material,  
my first thought is "How would Ed present this material?"*

*This page intentionally left blank*

# About the Author



**ARTHUR O'SULLIVAN** is a professor of Economics at Lewis and Clark College in Portland, Oregon. After receiving his B.S. degree in economics from the University of Oregon, he spent two years in the Peace Corps, working with city planners in the Philippines. He received his Ph.D. degree in economics from Princeton University in 1981 and taught at the University of California, Davis, and Oregon State University, winning teaching awards at both schools. He is the Robert B. Pamplin Junior Professor of Economics at Lewis and Clark College in Portland, Oregon, where he teaches microeconomics and urban economics. He is the coauthor of the introductory textbook, *Economics: Principles and Tools*, currently in its eighth edition.

Professor O'Sullivan's research explores economic issues concerning urban land use, environmental protection, and public policy. His articles appear in many economics journals, including *Journal of Urban Economics*, *Regional Science and Urban Economics*, *Journal of Environmental Economics and Management*, *National Tax Journal*, *Journal of Public Economics*, and *Journal of Law and Economics*.

*This page intentionally left blank*

# Preface

This book is designed for a course in urban economics, the discipline that lies at the intersection of geography and economics. Economics is the study of choice, exploring the decisions of optimizing households, firms, governments, and other organizations. Urban economics places these choices in a geographical context.

- A household chooses the utility-maximizing residential location.
- A firm chooses the profit-maximizing production site.

As we'll see throughout the book, the incorporation of locational concerns into models of optimization behavior provides important insights into the nature of cities and the causes of urban problems such as poverty, congestion, segregation, and crime. The geographical perspective also helps us evaluate the merits of alternative policies to address these urban problems.

The book is organized into five parts. Part I introduces the field of urban economics and reviews six key concepts of microeconomics that are used repeatedly throughout the book. Part II explores a variety of market forces that cause firms and people to cluster in cities of various size and scope. Part III looks at the spatial organization of cities, exploring the economic and public-policy forces that determine the spatial distribution of activity within cities. Part IV explores the two components of the urban transportation system—cars and roads, and public transit. Part V looks at local government, exploring the rationale for local government in a federal system of government, and taking a closer look at two particular public goods—education and public safety.

The text is designed for use in undergraduate courses in urban economics and urban affairs. It could also be used for graduate courses in urban planning, public policy, and public administration. All of the economic concepts used in the book are covered in the typical intermediate microeconomics course. For readers whose exposure to microeconomics is limited to an introductory course—or readers could benefit from a review of microeconomics concepts—Chapter 24 (“Models of Microeconomics”) provides a review of the key concepts developed in an intermediate course.



## CHANGES FOR THE 9TH EDITION

The text has been thoroughly revised to provide a clear and concise presentation of the field of urban economics. While the overall sequence of topics in the book has not changed, the changes in individual chapters are substantial and too numerous to list. The best way to get a sense of the changes is to consult the Table of Contents.

## WEB SITE

The web site for the book [www.mhhe.com/osullivan9e](http://www.mhhe.com/osullivan9e) has color versions of the maps in the book, PowerPoint presentations, and lecture notes.

# Acknowledgments

I am indebted to many people who read the book and suggested ways to improve the coverage and the exposition. In particular I would like to thank those instructors who participated in surveys and reviews that were indispensable in the development of the Ninth Edition of *Urban Economics*. The appearance of their names does not necessarily constitute their endorsement of the text or its methodology.

Oliver D. Cooke  
*Richard Stockton College of New Jersey*

Steven R. Nivin  
*St. Mary's University*

Jonathan Diskin  
*Earlham College*

Joseph Michael Pogodzinski  
*San Jose State University*

Kristie A. Feder  
*Bard College*

Jeffrey Pompe  
*Francis Marion University*

Gary Frimann  
*Gavilan College*

Margaret A Ray  
*University of Mary Washington*

Anthony Joseph Greco  
*University of Louisiana-Lafayette*

Jesse J. Richardson, Jr  
*Virginia Tech*

Peter E. Howe  
*Cazenovia College*

Paul Rivera  
*Wheaton College*

Haydar Kurban  
*Howard University*

Frederica Shockley  
*California State University, Chico*

Thomas J. Muench  
*State University of New York Stony Brook*

John D. Wong  
*Wichita State University*

In addition, dozens of instructors provided feedback and suggestions for earlier editions of the book.

**Richard Arnott**  
*Boston College*

**Randall Bartlett**  
*Smith College*

**Charles Becker**  
*Department of Economics, Duke University*

**Charles Berry**  
*University of Cincinnati*

**Bradley Braun**  
*University of Central Florida*

**Jerry Carlino**  
*University of Pennsylvania*

**Paul Carrillo**  
*George Washington University*

**Suparna Chakraborty**  
*Dept. of Economics and Finance,  
Zicklin School of Business,  
Baruch College, CUNY*

**Brian J. Cushing**  
*West Virginia University*

**Maria N. DaCosta**  
*University of Wisconsin-Eau Claire*

**Joseph Daniel**  
*University of Delaware*

**Minh Quang Dao**  
*Eastern Illinois University*

**Gilles Duranton**  
*University of Toronto*

**Steven Durlauf**  
*University of Wisconsin*

**Ingrid Gould Ellen**  
*Wagner School, New York University*

**Erwin F. Erhardt, III**  
*University of Cincinnati*

**David Figlio**  
*University of Oregon*

**Edward J. Ford**  
*University of South Florida*

**Tom Fullerton**  
*University of Texas at El Paso*

**Andrew Gold**  
*Trinity College*

**Alan Day Haight**  
*SUNY-Cortland*

**Brid Gleeson Hanna**  
*Rochester Institute of Technology*

**Julia L. Hansen**  
*Western Washington University*

**Daryl Hellman**  
*Northeastern University*

**Barry Hersh**  
*Steven L. Newman Real Estate Institute,  
Baruch College, City University of New York*

**Diane Hite**  
*Auburn University*

**Bruce K. Johnson**  
*Centre College*

**Christopher K. Johnson**  
*University of North Florida*

**Stanley Keil**  
*Ball State University*

**Sukoo Kim**  
*Washington University*

**MaryJane Lenon, Ph.D.**  
*Providence College, Providence, RI*

**James P. LeSage**  
*Texas State University-San Marcos*

**Kenneth Lipner**  
*Florida International University*

**Roxanne Ezzet-Lofstrom**  
*University of Texas at Dallas*

**Vijay Mathur**  
*Cleveland State University*

**Dr. Warren McHone**  
*University of Central Florida*

**Kevin J. Murphy**  
*Oakland University*

**James K. O'Toole**  
*California State University, Chico*

**Bruce Pietrykowski**  
*University of Michigan-Dearborn*

**Florenz Plassmann**  
*Binghamton University, State University  
of New York*

**Michael J. Potepan**  
*San Francisco State University*

**David A. Quart**  
*NYU-Wagner Graduate School of  
Public Service*

**Steven Raphael**  
*University of California, San Diego*

**Donald Renner**  
*Minnesota State University*

**Jesse J. Richardson, Jr.**  
*Virginia Tech*

**Craig Rogers**  
*Canisius College*

**Jonathan Rork**  
*Vassar College*

**Stuart S. Rosenthal**  
*Syracuse University*

**Jeffrey Rous**  
*University of North Texas*

**William A. Schaffer**  
*Georgia Institute of Technology*

**Steve Soderlind**  
*Saint Olaf College*

**Dean Stansel**  
*Florida Gulf Coast University*

**Mary Stevenson**  
*University of Massachusetts, Boston*

**Will Strange**  
*University of Toronto*

Edward F. Stuart  
*Northeastern Illinois University*

Timothy Sullivan  
*Towson University*

Jacques-Francois Thisse  
*Universite Catholique de Louvain-la-Neuve*

Wendine Thompson-Dawson  
*University of Utah*

Mark R. Wolfe  
*University of California, Berkeley*

Anthony Yezer  
*George Washington University*

King Yik  
*Idaho State University*

John Yinger  
*Syracuse University*

**Arthur O'Sullivan**

# The McGraw-Hill Series Economics

## ESSENTIALS OF ECONOMICS

Brue, McConnell, and Flynn  
**Essentials of Economics**  
*Fourth Edition*

Mandel  
**Economics: The Basics**  
*Third Edition*

Schiller  
**Essentials of Economics**  
*Tenth Edition*

## PRINCIPLES OF ECONOMICS

Asarta and Butters  
**Principles of Economics**

Colander  
**Economics, Microeconomics, and  
Macroeconomics**  
*Tenth Edition*

Frank, Bernanke, Antonovics, and Heffetz  
**Principles of Economics,  
Principles of Microeconomics,  
Principles of Macroeconomics**  
*Seventh Edition*

Frank, Bernanke, Antonovics, and Heffetz  
**Streamlined Editions: Principles of  
Economics, Principles of Microeconomics,  
Principles of Macroeconomics**  
*Third Edition*

Karlan and Morduch  
**Economics, Microeconomics, and  
Macroeconomics**  
*Second Edition*

McConnell, Brue, and Flynn  
**Economics, Microeconomics,  
Macroeconomics**  
*Twenty-First Edition*

McConnell, Brue, and Flynn  
**Brief Editions: Microeconomics  
and Macroeconomics**  
*Second Edition*

Samuelson and Nordhaus  
**Economics, Microeconomics, and  
Macroeconomics**  
*Nineteenth Edition*

Schiller  
**The Economy Today, The Micro Economy  
Today, and The Macro Economy Today**  
*Fifteenth Edition*

Slavin  
**Economics, Microeconomics, and  
Macroeconomics**  
*Eleventh Edition*

## ECONOMICS OF SOCIAL ISSUES

Guell  
**Issues in Economics Today**  
*Eighth Edition*

Register and Grimes  
**Economics of Social Issues**  
*Twenty-First Edition*

## ECONOMETRICS AND DATA ANALYTICS

Gujarati and Porter  
**Basic Econometrics**  
*Fifth Edition*

Gujarati and Porter  
**Essentials of Econometrics**

*Fourth Edition*

Hilmer and Hilmer  
**Practical Econometrics**

*First Edition*

Prince  
**Predictive Analytics for Business Strategy**

*First Edition*

#### MANAGERIAL ECONOMICS

Baye and Prince  
**Managerial Economics and  
Business Strategy**

*Ninth Edition*

Brickley, Smith, and Zimmerman  
**Managerial Economics and  
Organizational Architecture**

*Sixth Edition*

Thomas and Maurice  
**Managerial Economics**

*Twelfth Edition*

#### INTERMEDIATE ECONOMICS

Bernheim and Whinston  
**Microeconomics**

*Second Edition*

Dornbusch, Fischer, and Startz  
**Macroeconomics**

*Twelfth Edition*

Frank  
**Microeconomics and Behavior**

*Ninth Edition*

#### ADVANCED ECONOMICS

Romer  
**Advanced Macroeconomics**

*Fifth Edition*

#### MONEY AND BANKING

Cecchetti and Schoenholtz  
**Money, Banking, and Financial Markets**

*Fifth Edition*

#### URBAN ECONOMICS

O'Sullivan  
**Urban Economics**

*Ninth Edition*

#### LABOR ECONOMICS

Borjas  
**Labor Economics**

*Seventh Edition*

McConnell, Brue, and Macpherson  
**Contemporary Labor Economics**

*Eleventh Edition*

#### PUBLIC FINANCE

Rosen and Gayer  
**Public Finance**

*Tenth Edition*

#### ENVIRONMENTAL ECONOMICS

Field and Field  
**Environmental Economics:  
An Introduction**

*Seventh Edition*

#### INTERNATIONAL ECONOMICS

Appleyard and Field  
**International Economics**

*Ninth Edition*

Pugel  
**International Economics**

*Sixteenth Edition*

# Brief Contents

*Preface*    vii

*Acknowledgments*    ix

Part I  
INTRODUCTION AND KEY CONCEPTS    1

*Chapter 1*    Introduction    3

*Chapter 2*    Key Concepts of Urban Economics    10

Part II  
MARKET FORCES IN THE DEVELOPMENT OF CITIES    29

*Chapter 3*    Trading and Factory Towns    31

*Chapter 4*    Agglomeration Economies    44

*Chapter 5*    Where Do Cities Develop?    65

*Chapter 6*    Consumer Cities and Central Places    79

*Chapter 7*    Cities in a Regional Economy    94

*Chapter 8*    The Urban Labor Market    109

*Chapter 9*    The First Cities    129



	Part III URBAN LAND USE AND HOUSING	139
<hr/>		
<i>Chapter 10</i>	Land Rent and Manufacturing Land	141
<i>Chapter 11</i>	Office Space and Tall Buildings	155
<i>Chapter 12</i>	Housing Prices and Residential Land Use	175
<i>Chapter 13</i>	Spatial Distribution of Employment and Residence	199
<i>Chapter 14</i>	The Monocentric City and Urban General Equilibrium	210
<i>Chapter 15</i>	Neighborhoods	224
<i>Chapter 16</i>	Land Use Policy	242
<i>Chapter 17</i>	Urban Housing and Public Policy	263
	Part IV URBAN TRANSPORTATION	285
<hr/>		
<i>Chapter 18</i>	Cars and Roads	287
<i>Chapter 19</i>	Urban Public Transit	307
	Part V LOCAL GOVERNMENT, EDUCATION, AND CRIME	323
<hr/>		
<i>Chapter 20</i>	The Role of Local Government	325
<i>Chapter 21</i>	Local Government Revenue	340
<i>Chapter 22</i>	Education	361
<i>Chapter 23</i>	Crime and Public Policy	381
<i>Chapter 24</i>	Models of Microeconomics	402

# Contents

<i>Preface</i>	vii
<i>Acknowledgments</i>	ix

## Part I INTRODUCTION AND KEY CONCEPTS 1

---

<i>Chapter 1</i>	<b>Introduction</b>	3
1.	<i>Urban Economics and Cities</i>	3
2.	<i>Census Definitions</i>	6
	Urban Population	6
	Metropolitan Area aka Core-Based Statistical Area	8
	Principal City	8
	<i>References and Reading</i>	9
<i>Chapter 2</i>	<b>Key Concepts of Urban Economics</b>	10
1.	<i>Opportunity Cost</i>	10
2.	<i>Marginal Principle</i>	12
3.	<i>Nash Equilibrium</i>	13
	Nash Equilibrium in a Model of Supply and Demand	13
	Nash Equilibrium in Location	15
	Nash Equilibrium and Spatial Variation in Prices	16
4.	<i>Comparative Statics</i>	17
	Comparative Statics for Choice Variables	17
	Comparative Statics for Market Equilibrium	18
5.	<i>Pareto Efficiency</i>	20
	Pareto Efficiency in an Exchange Economy	21
	Market Equilibrium and Pareto Efficiency	22
	Pareto Inefficiency in the Urban Economy	22

6. <i>Self-Reinforcing Changes</i>	23
<i>Review the Concepts</i>	24
<i>Apply the Concepts</i>	25

## Part II

### MARKET FORCES IN THE DEVELOPMENT OF CITIES

---

<i>Chapter 3</i>	<b>Trading and Factory Towns</b>	31
1. <i>A Model of Backyard Production</i>	31	
2. <i>Comparative Advantage and a Trading Town</i>	32	
Comparative Advantage and Trade	32	
Scale Economies in Exchange, Trading Firms, and Trading Towns	34	
Trading Cities in Urban History	35	
3. <i>Scale Economies and a Factory Town</i>	36	
The Price of Factory Shoes	36	
The Market Area of a Factory	38	
Factory Towns	39	
<i>Review the Concepts</i>	40	
<i>Apply the Concepts</i>	41	
<i>References and Reading</i>	43	
<i>Chapter 4</i>	<b>Agglomeration Economies</b>	44
1. <i>Agglomeration Economies</i>	44	
Sharing an Intermediate Input	44	
Tapping a Common Labor Pool	46	
Skills Matching	49	
Sharing Knowledge	50	
Other Benefits of City Size	51	
2. <i>Equilibrium Size of a Cluster</i>	52	
Agglomeration Diseconomies	52	
Equilibrium vs. Efficient Cluster Size	53	
3. <i>Empirical Evidence and Examples</i>	54	
Empirical Evidence for Agglomeration Economies	54	
Economic Effects of Million-Dollar Plants	55	
Evidence of Knowledge Spillovers	56	
Single-Industry Clusters	57	
Corporate Headquarters and Functional Specialization	58	
Agglomeration and the Product Cycle: The Radio Industry in New York	59	
Nursery Cities	60	

<i>Review the Concepts</i>	60	
<i>Apply the Concepts</i>	61	
<i>References and Reading</i>	63	
<b>Chapter 5 Where Do Cities Develop?</b>		<b>65</b>
1. <i>Transport-Intensive Firms</i>	65	
Resource-Oriented Firms	66	
Market-Oriented Firms	68	
2. <i>The Principle of Median Location</i>	69	
Illustration: Intercity Location Choice	69	
The Median Location and Large Cities	70	
Transshipment Points and Port Cities	71	
3. <i>Labor, Energy, and Agglomeration Economies</i>	72	
Labor Cost	73	
Energy Technology	73	
Agglomeration Economies	74	
U.S. Manufacturing Belt—Growth and Decline	74	
<i>Review the Concepts</i>	75	
<i>Apply the Concepts</i>	76	
<i>References and Reading</i>	77	
<b>Chapter 6 Consumer Cities and Central Places</b>		<b>79</b>
1. <i>Monopolistic Competition in Location</i>	79	
Structure of Monopolistic Competition	80	
Effects of Market Entry	81	
2. <i>Cities as Entertainment Machines</i>	82	
Minimum Market Size	83	
City Size and Product Variety	84	
Cities as Entertainment Machines	85	
3. <i>Central Place Theory</i>	86	
Simplifying Assumptions	86	
The Central Place Hierarchy	87	
Insights from Central Place Theory	88	
Relaxing the Assumptions	90	
<i>Review the Concepts</i>	91	
<i>Apply the Concepts</i>	91	
<i>References and Reading</i>	93	

<i>Chapter 7</i>	<i>Cities in a Regional Economy</i>	94
1.	<i>Urban Utility and City Size</i>	94
	The Urban Utility Curve	94
	Regional Equilibrium: Cities Are Not Too Small	96
	Regional Equilibrium: Cities May Be Too Large	97
	Regional Equilibrium: Efficient Cities?	98
2.	<i>Differences in City Size</i>	99
	Equilibrium City Sizes in a Regional Economy	99
	The Rank-Size Rule	100
3.	<i>Urban Economic Growth</i>	101
	Innovation and Regionwide Utility	102
	Human Capital and Economic Growth	103
	<i>Review the Concepts</i>	104
	<i>Apply the Concepts</i>	106
	<i>References and Reading</i>	107
<i>Chapter 8</i>	<i>The Urban Labor Market</i>	109
1.	<i>Urban Labor Supply and Demand</i>	109
	The Labor Supply Curve	109
	The Labor Demand Curve	111
	The Employment Multiplier	112
	Multipliers in Small and Large Cities	115
2.	<i>Comparative Statics: Changes in Demand and Supply</i>	116
	Market Effects of an Increase in Labor Demand	116
	Who Gets the New Jobs?	117
	Market Effects of an Increase in Labor Supply	118
	Simultaneous Changes in Demand and Supply	120
3.	<i>Public Policy: Taxes and Sports</i>	121
	Taxes and Firm Location Choices	121
	Tax Incentive Programs	122
	Geographically Targeted Subsidies: Empowerment and Enterprise Zones	123
	Sport Stadiums and Mega-Events	123
	<i>Review the Concepts</i>	124
	<i>Apply the Concepts</i>	126
	<i>References and Reading</i>	127
<i>Chapter 9</i>	<i>The First Cities</i>	129
1.	<i>Jericho</i>	129
2.	<i>Catalhoyuk</i>	131

3. <i>Babylonia</i>	132
The Ecological Setting	133
Religious Beliefs	133
Religious Offerings and Temple Enterprises	134
Transactions and Writing	135
<i>References and Reading</i>	137

Part III  
URBAN LAND USE AND HOUSING 139

---

*Chapter 10* Land Rent and Manufacturing Land 141

1. <i>Fertility and the Leftover Principle</i>	141
Land Rent, Market Value, and the Price of Land	141
Willingness to Pay for Agricultural Land	142
Competition and the Leftover Principle	144
2. <i>Manufacturing: Land Price and Location</i>	144
Freight Cost versus Labor Cost	145
The Intracity Truck	147
Intercity Truck and Highways in a Beltway City	148
Manufacturing Rent and the Spatial Distribution of Manufacturing	149
<i>Review the Concepts</i>	150
<i>Apply the Concepts</i>	151
<i>References and Reading</i>	153

*Chapter 11* Office Space and Tall Buildings 155

1. <i>The Price of Office Space</i>	155
Interaction Travel Cost for Office Firms	155
Willingness to Pay for Office Space	157
Labor Accessibility, Wages, and the Willingness to Pay for Office Space	158
Office Subcenters	160
2. <i>Building Height and Land Prices</i>	160
The Price of Office Space and Building Height	160
Profit-Maximizing Building Height	161
The Willingness to Pay for Land	162
Input Substitution	164
3. <i>Skyscraper Games</i>	166
A Model of Competition to Be the Tallest	166
Nash Equilibrium versus Pareto Efficiency	168

4. <i>The Spatial Distribution of Office Activity</i>	169
<i>Review the Concepts</i>	171
<i>Apply the Concepts</i>	172
<i>References and Reading</i>	173
<b>Chapter 12 Housing Prices and Residential Land Use</b>	<b>175</b>
1. <i>Job Accessibility</i>	175
Utility Maximization with Commuting Cost and Housing	175
Commuting Distance and the Price of Housing	177
The Convex Housing-Price Curve	179
The Algebra of the Convex Housing-Price Curve	181
Job Accessibility within a Metropolitan Area	181
2. <i>Crime, Environmental Quality, Schools</i>	184
Crime and Housing Prices	184
Air Quality and Housing Prices	186
School Productivity and Housing Prices	187
3. <i>Housing Production and the Price of Residential Land</i>	188
Profit-Maximizing Quantity of Housing	188
The Price of Residential Land	189
4. <i>Population Density</i>	191
Sources of Variation in Population Density	192
Population Density within Cities	192
Population Density across Cities	193
<i>Review the Concepts</i>	194
<i>Apply the Concepts</i>	196
<i>References and Reading</i>	197
<b>Chapter 13 Spatial Distribution of Employment and Residence</b>	<b>199</b>
1. <i>The Spatial Distribution of Employment and Residence</i>	199
Commuting Patterns	199
Five-Kilometer Shares and Median Locations	200
Employment Density	201
Employment Subcenters	202
2. <i>Suburbanization and Sprawl</i>	204
Decentralization of Population	204
Sprawl and Density Facts	205

The Consequences of Low Density	206
Policy Responses to Sprawl?	208
<i>Review and Apply the Concepts</i>	208
<i>References and Reading</i>	209
<b>Chapter 14 The Monocentric City and Urban General Equilibrium</b>	<b>210</b>
1. <i>The Monocentric Model</i>	210
The Industrial Revolution and the Monocentric City	211
Land Use in the Monocentric City	212
Centralized Employment	214
2. <i>General-Equilibrium Model</i>	215
Interactions between the Land and Labor Markets	215
The General Equilibrium Effects of the Streetcar	216
The Streetcar and Land Rent	218
Changes in Employment and Residential Density	219
The General Equilibrium Effects of Rising Sea Level	219
<i>Review the Concepts</i>	221
<i>Apply the Concepts</i>	222
<i>References and Reading</i>	223
<b>Chapter 15 Neighborhoods</b>	<b>224</b>
1. <i>Segregation: Income, Education, Race</i>	224
Income Segregation	225
Education Segregation	226
Racial Segregation	226
2. <i>Sorting for Local Public Goods</i>	229
Diversity in Demand for Local Public Goods	229
Diversity in the Demand for the Taxed Good	231
3. <i>Bidding for Favorable Neighbors</i>	232
A Model of Bidding for Favorable Neighbors	233
Mixing and Perfect Integration	236
Land Prices and Locational Equilibrium	236
Lot Size and Public Policy	237
<i>Review the Concepts</i>	238
<i>Apply the Concepts</i>	239
<i>References and Reading</i>	241



<i>Chapter 16</i>	<i>Land Use Policy</i>	242
1.	<i>Zoning: History &amp; Legal Basis</i>	242
	A Brief History of Zoning in the United States	243
	The Legal Basis for Zoning	244
2.	<i>The Role of Zoning</i>	245
	Zoning to Mitigate Environmental Externalities	245
	Zoning to Prevent Fiscal Deficits	246
	Zoning to Mitigate Density Externalities	248
	The Market Effects of Low-Density Zoning	249
3.	<i>Limits on Residential Development</i>	250
	Limits on Building Permits	250
	Development Taxes	251
	Growth Boundary	252
	The Market Effects of Land-Use Regulations	254
4.	<i>Growth Control and Labor Markets</i>	255
	Residential Limits and the Urban Economy	256
	An Urban Growth Boundary and the Regional Economy	257
	<i>Review the Concepts</i>	259
	<i>Apply the Concepts</i>	260
	<i>References and Reading</i>	261
<i>Chapter 17</i>	<i>Urban Housing and Public Policy</i>	263
1.	<i>Filtering: Durability and Submarkets</i>	263
	The Filtering Model of Housing	263
	Supply of High-Quality Housing	265
	Supply of Low-Quality Housing	265
	Applying the Filtering Model: Limit on Building Permits	267
	Filtering and Gentrification	269
2.	<i>Supply-Side Public Policy</i>	269
	Public Housing	269
	Subsidies for Private Housing	271
	Filtering and Crowding Out	273
3.	<i>Demand-Side Public Policy</i>	273
	Housing Vouchers and Efficiency	274
	The Market Effects of Vouchers	275
	Subsidies for Mortgage Interest	276
4.	<i>Homelessness and Public Policy</i>	279
	<i>Review the Concepts</i>	280
	<i>Apply the Concepts</i>	282
	<i>References and Reading</i>	283