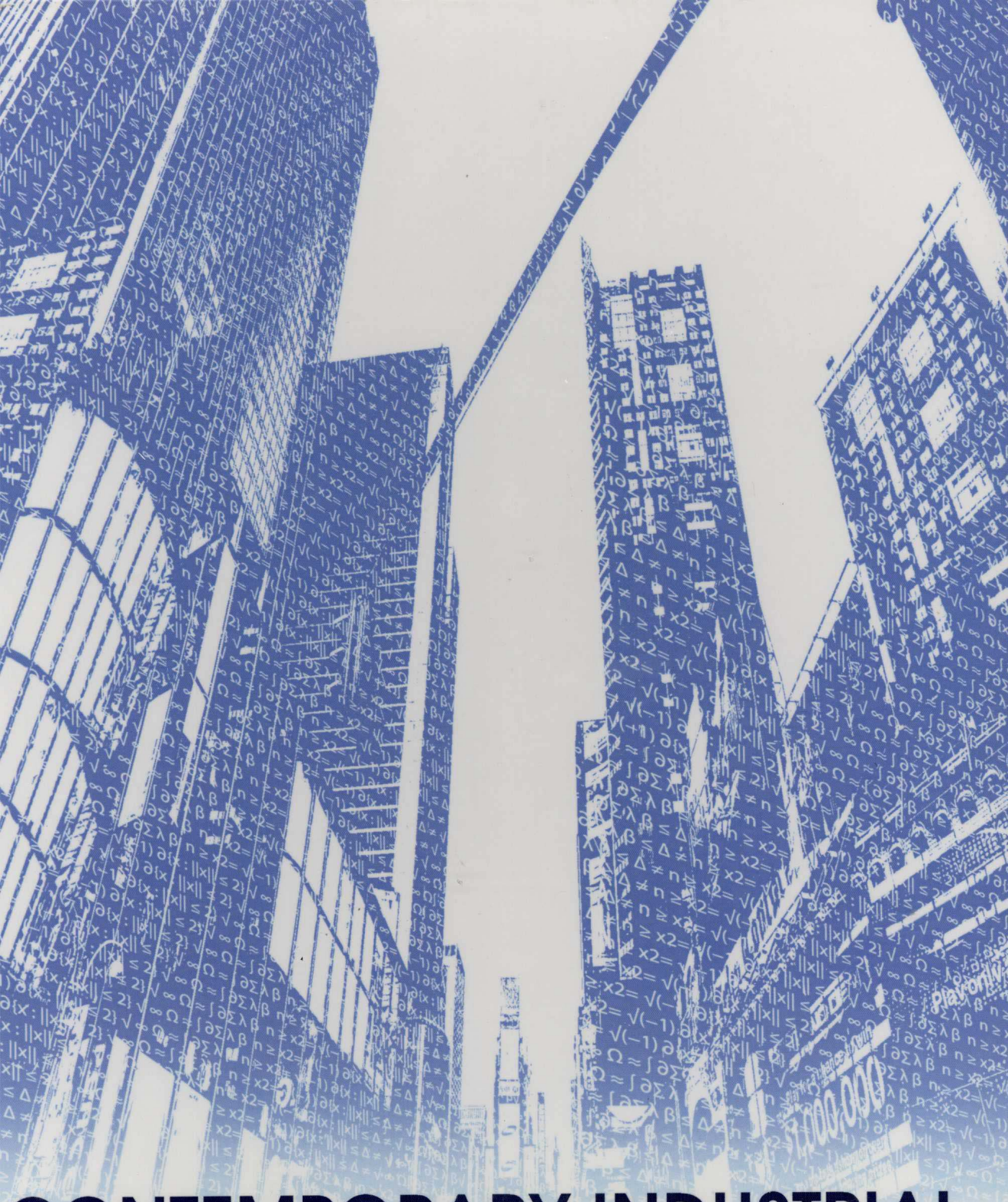

CONTEMPORARY INDUSTRIAL ORGANIZATION

A Quantitative Approach

Lynne Pepall | Dan Richards | George Norman

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This book was set in 10/12 Times Roman by Laserwords and printed and bound by the Hamilton Printing Company. The cover was printed by the Hamilton Printing Company.

This book is printed on acid-free paper.

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Library of Congress Cataloging-in-Publication Data

Pepall, Lynne, 1952-
Contemporary industrial organization : a quantitative approach / Lynne Pepall, Daniel J. Richards, George Norman.
p. cm.
Includes bibliographical references and index.
ISBN 978-0-470-59180-2 (hardback)
1. Industrial organization (Economic theory)-Mathematical models. 2. Industrial organization. I. Richards, Daniel Jay. II. Norman, George, 1946- III. Title.
HD2326.P4667 2010
338.6-dc22

2010037959

Printed in the United States of America
10 9 8 7 6 5 4 3 2 1

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Preface

We are happy to offer a more consistently mathematical version of our textbook, ***Industrial Organization: Contemporary Theory and Empirical Applications,*** now in its fourth edition (IO/4e). In that text, we have always had to face the difficult task of balancing the tension between making modern industrial analysis accessible to a wide spectrum of students while also presenting the formal abstract modeling that truly gives the analysis its power. The more overtly mathematical quality of this new version avoids this conflict. At the same time we want to reassure users of the IO/4e on two fronts. First, those whose students found even that text mathematically challenging should know that we are hard at work writing a version that is more broadly accessible. Second, in both the the new text here and the one under way, we have kept the organization virtually identical to that of IO/4e. This is, we plan to offer an alternative, less mathematical exposition of this same material. Those moving from IO/4e to either of these new texts will not face a change in organization.

The change from IO/4e begins in Chapters 2 and 3. There we provide a basic yet thorough review of the notions of consumer and producer surplus, welfare loss, and scale and scope economies, all in a formal mathematical fashion. This includes the rigorous derivation of the cost function starting with a Cobb-Douglas production relation. In the latter case, we continue to show how key parameter estimates are related to the elasticity of substitution and the conditional factor demand equations. As in IO/4e, we then present an empirical application of this material using Christiansen and Greene's (1976) well-known translog model.

Chapter 4 follows with a formal discussion of the measurement of market structure and power. This includes a derivation of the Lerner Index and Hall's (1988) growth theory modification that permits direct empirical estimation of this index. We follow this with a presentation of the many attempts to estimate the aggregate welfare loss from monopoly power, beginning with Harberger (1954).

Chapters 5 and 6 address pricing and product design strategies. The first of these focuses on the standard price discrimination topics of personalized pricing, menu pricing, and group pricing—here again, presented with formal derivations. The second examines horizontal and vertical differentiation as well as bundling and tying. It also includes Stavins' (2001) empirical analysis of airline price discrimination.

Chapters 7 and 8 introduce the reader to the basic models of oligopoly. Chapter 7 presents the single-period version of both the Cournot and Bertrand models. The latter case includes Hotelling's (1929) analysis of price competition with spatially (horizontally) differentiated products. We also discuss the difference between strategic substitutes (Cournot) and strategic complements (Bertrand) that characterize these two models. The chapter concludes with a review of the empirical investigation of price competition in the southern California retail gasoline market presented by Hastings (2004).

Chapter 8 follows with an analysis of dynamic games. It begins with the familiar Stackelberg analysis, then moves on to consider an alternative game of sequential quality

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choice in a vertically differentiated market. This sets the scene for a discussion of first- and second-mover advantage and, more fundamentally, the notions of credibility and subgame perfection.

Chapters 9, 10, and 11 address, in order, the three major areas of antitrust litigation. Chapter 9 addresses the issues of predation and entry deterrence. This includes a discussion of predatory pricing and also other techniques, such as long-term contracts, that may be employed to drive rivals from the market. Here we emphasize the critical need for the predator to be able to commit to its strategy for the predation to be successful, as in Dixit's (1980) capacity expansion model. Such commitment may, of course, be easier in the context of imperfect and asymmetric information—as in Milgrom and Roberts (1982). All of these issues and models are addressed here. The chapter ends with a presentation of the Ellison and Ellison (2010) study of possible predation in the pharmaceutical industry.

Chapter 10 is an extended examination of collusion and antitrust policy. It begins with an exploration of the ways in which multiple equilibria and indefinite repetition can permit firms to reach and sustain a cooperative equilibrium. It continues by providing evidence on the impact of cartels, including a detailed presentation of Kwoka's (1997) study of the Washington, DC real estate cartel. This is followed by analysis of optimal antitrust policy toward cartels, including the recent use of leniency policies that offer immunity to the first cartel member to cooperate with authorities. We also describe recent experimental evidence on leniency programs provided by Hinloopen and Soetevent (2006). Chapter 11 examines the impact of horizontal mergers. It begins with the "merger paradox" and possible theoretical modifications that make mergers profitable, such as cost savings or analyzing the mergers as a sequential process. We then present the basic elements of computerized merger simulation.

Chapters 12 and 13 address the topic of vertical relations between (and within) firms. The first of these two chapters analyzes the potential procompetitive and anticompetitive effects of vertical mergers. Specific topics include double marginalization, price discrimination, and foreclosure. It concludes with a presentation of the empirical analysis of vertical integration in the ready-mix concrete industry by Hortaçsu and Syverson (2007). Chapter 13 follows with an examination of vertical restraints, particularly resale price maintenance and exclusive dealing or territorial restrictions. It includes analysis of the role vertical restraints may play in fostering promotion and service efforts and the use of vertical restrictions to suppress competition. It also includes an empirical study, namely, Sass' (2005) investigation of the impact of vertical restrictions in the U.S. beer industry.

Chapter 14 examines the theoretical and empirical issues that surround advertising. We begin with a derivation of the Dorfman-Steiner condition, then turn to the informational content of advertising as originally suggested by Nelson (1970) and later extended by many others. We also examine the incentive of a firm to suppress the informational content of advertising (Andersen and Renault, 2006) and the role of advertising in competition (Grossman and Shapiro, 1984). The chapter ends with a description of Ackerberg's (2001) study of advertising, information, and prestige based on the introduction of Yoplait's low-fat yogurt product line in two Midwest cities.

Chapters 15 and 16 are devoted to the analysis of research and development R&D. Chapter 15 begins by laying out a taxonomy of possible innovations and then examining the replacement and efficiency effects and their role in R&D competition, particularly allowing for the role of uncertainty. We also examine R&D competition when there are spillovers. This allows us to consider the policy question of whether R&D cooperation

should be permitted. We then present Keller's (2002) empirical study of technological spillovers across regional markets.

Chapter 16 then follows with an examination of patent policy. It examines optimal patent policy models such as Nordhaus (1969) and continues with Reinganum (1989), Gilbert and Shapiro (1990), Klemperer (1990), and Gallini (1992). This segues naturally to a discussion of patent races, patent thickets, and patent licensing. The chapter concludes with the Hall and Ziedonis (2001) study of the impact of patent law and patent policy in the semiconductor industry.

Network effects are the topic of Chapter 17. Here, we begin with the theoretical model of Rohlfs (1974) and continue with a model of price competition and network externalities in a spatial framework. We then take on issues of compatibility and industry standards, starting with the model of Katz and Shapiro (1985) and continuing with the analysis of Besen and Farrell (1994). A presentation of Gandal's (1994) study of network effects in the early spreadsheet market concludes this chapter.

Finally, in Chapter 18, we return to the idea of strategic commitment. Here, we review the nature of strategic substitutes and complements and the advantages (and disadvantages) that an agent gains from being able to commit irrevocably to a specific strategy. This, of course, forces us to confront the classic issues raised by Fudenberg and Tirole (1984) regarding "fat cat," "puppy dog," and "lean and hungry look" strategies. Exploring the role of strategic commitment also allows us to introduce a new topic—namely, strategic trade analysis—in which national commitments can be so crucial.

One result of all of these changes is that this new book is a little shorter than IO/4e. In our view, this is a reflection of the fact that it is also tighter. We have made every effort to write a consistently rigorous but accessible text in which topics are organized in a manner that motivates and facilitates progression from one chapter to the next. It should serve as a relatively complete, but concise, introduction to modern industrial economics.

As always, we owe substantial debts to many faculty and students who have contributed ideas, suggested coverage, and corrections. While we cannot possibly name all those who so contributed, we do want to acknowledge those individuals whose help was especially important. This includes: David Audtretsch, Giacomo Calzolari, Phoebe Chan, Jim Dana, Glen Ellison, Sara Fisher-Ellison, Paolo Garella, Sebastian Gay, Christos Genakos, Justine Hastings, Jun Ishii, John Kwoka, Corinne Langinier, Quihong Liu, George Lobell, Jill McCluskey, Michael Noel, Jennifer Offenberg, Jennifer Reinganum, James Roberts, Michael Salinger, Phillip Schmitt-Dengler, Jay Shimshack, Dean Showalter, Joanna Stavins, Tom Vukina, and Madeline Zavodny.

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Part I
Microeconomic Foundations

These first four chapters review the basic microeconomic building blocks of industrial economics. Chapter 1 describes the basic analytic framework, especially the critical feature of strategic interaction that we use to investigate firm behavior and market outcomes in settings of less-than-perfect competition. In Chapter 2, we review the basic microeconomics of the two polar textbook cases of perfect competition and pure monopoly. These two cases help introduce the notions of consumer surplus, producer surplus, and overall efficiency that are necessary for an economic evaluation of market outcomes. Chapter 3 presents the fundamentals of cost analysis. Specifically, it describes how one may derive a cost function from the underlying production technology. This permits us to give precision to measures of scale economies—both for single-product and multiproduct firms. These and other measures are, of course, important determinants of the equilibrium market structure. Finally, in Chapter 4 we turn to a direct discussion of market structure and market power. We emphasize the distinction between these two concepts. We also make clear the measurement problems that afflict any measure of market power as well as the endogenity of structural indices in particular.

At the end of this section, students should have a solid grasp of microeconomic fundamentals, particularly as they apply to issues of imperfect competition. This includes welfare analysis, the measurement of deadweight loss, and price-cost distortions. It also includes an understanding of the nexus from production technology to cost functions, and to equilibrium market structure. Students will also recognize the importance of strategic interaction for determining the outcome in specific market settings. However, the analytics of such interaction are deferred to Part III. In addition, students will understand that these concepts have empirical content as we present both the classic Christensen and Greene (1976) analysis of railway cost functions and the series of empirical papers on the welfare cost of monopoly that followed Harberger's (1954) original study.

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