

George
J.
Stigler

THE
ORGANIZATION
OF
INDUSTRY

THE ORGANIZATION OF
INDUSTRY

GEORGE J. STIGLER

Charles R. Walgreen Distinguished
Service Professor of American Institutions
The University of Chicago

1968



RICHARD D. IRWIN, INC., Homewood, Illinois
IRWIN-DORSEY LIMITED, Nobleton, Ontario

© RICHARD D. IRWIN, INC., 1968

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of the publisher.

FIRST PRINTING, JULY, 1968

Library of Congress Catalog Card No. 68-30846

PRINTED IN THE UNITED STATES OF AMERICA

PREFACE

The main content of this book is a reprinting of 17 articles I have written over the past two decades in the area of industrial organization. I have reprinted the articles as they appeared, and added commentaries in numerous cases; this seemed more appropriate than seeking to graft present views, where they differ, on an earlier position. There is also a substantial amount of previously unpublished material, some written years ago and some prepared especially for this volume.

Although the main topics in industrial organization are touched upon, the touch is often light. The ratio of hypothesis to reasonably persuasive confirmation is distressingly high in all economic literature, and it must be my chief if meager defense that I am not the worst sinner in the congregation.

June, 1968

GEORGE J. STIGLER

TABLE OF CONTENTS

1. What Is Industrial Organization?	1
---	---

PART I. WHAT IS COMPETITION? AND MONOPOLY?

✓2. Competition	5
3. Price and Nonprice Competition	23
4. The Measurement of Concentration	29
5. A Theory of Oligopoly	39

PART II. THE DETERMINANTS OF CONCENTRATION

6. Barriers to Entry, Economies of Scale, and Firm Size	67
✓7. The Economies of Scale	71
✓8. Monopoly and Oligopoly by Merger	95
✓9. The Dominant Firm and the Inverted Umbrella	108
10. Imperfections in the Capital Market	113
11. A Note of Patents	123

PART III. TOPICS IN MARKET BEHAVIOR

12. The Division of Labor Is Limited by the Extent of the Market	129
13. A Note on Profitability, Competition, and Concentration ..	142
14. A Theory of Delivered Price Systems	147
15. A Note on Block Booking	165
16. The Economics of Information	171
17. Information in the Labor Market	191
18. The Kinky Oligopoly Demand Curve and Rigid Prices	208
19. Administered Prices and Oligopolistic Inflation	235

PART IV. ANTITRUST POLICY

20. Restraints on Trade in the Common Law	255
---	-----

viii • *TABLE OF CONTENTS*

21. The Economic Effects of the Antitrust Laws	259
22. Mergers and Preventive Antitrust Policy	296

APPENDIX

Monopolistic Competition in Retrospect	309
--	-----

INDEX

Index	325
-------------	-----

Chapter

I

WHAT IS INDUSTRIAL ORGANIZATION?

Let us start this volume on a higher plane of candor than it will always maintain: there is no such subject as industrial organization. The courses taught under this heading have for their purpose the understanding of the structure and behavior of the industries (goods and service producers) of an economy. These courses deal with the size structure of firms (one or many, “concentrated” or not), the causes (above all the economies of scale) of this size structure, the effects of concentration on competition, the effects of competition upon prices, investment, innovation, and so on. But this is precisely the content of economic theory—price or resource allocation theory, now often given the unfelicitous name of microeconomics.

The reasons that courses emerge in industrial organization separate from those in economic theory are nevertheless mostly honorable:

1. Economic theory is sufficiently formal, and contains sufficient apparatus, so that a course in theory cannot go into detailed studies of empirical measurement of cost curves, concentration, etc.—so a course in industrial organization does go into these matters.
2. A course in theory, for the same reason, cannot go into public policy questions—in particular, those proposed by antitrust laws and public regulation—and so the course in industrial organization takes on these chores.

(There is also a less honorable reason for the separate field of industrial organization: much of its literature has been so nontheoretical, or even antitheoretical, that few economic theorists were attracted to it.) Neither policy nor empirical measurement provides a clean distinction between industrial organization and economic theory, however, and numerous chapters in my *Theory of Price* could perfectly well have come here.

By tradition only a portion of the economic system is included in industrial organization: one excludes labor markets, agricultural industries, retail markets, financial markets, and foreign trade. Each of these

fields contains enough materials and problems to fuel its own specialists and courses. The tradition will not stop us from making several reconnaissances in force.

PART I

What Is Competition? And Monopoly?

The nature of competition and monopoly, and their relationship to the number of firms in an industry and their comparative sizes, is our first problem. Skipping the history of the competitive concept,¹ the materials are:

CHAPTER 2

Competition (*International Encyclopedia of the Social Sciences*),² with three new addenda.

CHAPTER 3

Price and Non-Price Competition (*Journal of Political Economy*, 1968), a comparison of the two types of competition.

CHAPTER 4

The Measurement of Concentration, with addenda on oligopoly theory.

CHAPTER 5

A Theory of Oligopoly (*Journal of Political Economy*, 1964), an attempt to deal with the most difficult problem in price theory, with an amendment.

¹ It is given in "Perfect Competition, Historically Contemplated," *Journal of Political Economy*, February 1957.

² Reprinted by permission of Crowell-Collier and Macmillan, Inc. No part of this chapter may be reproduced without their written permission.

Chapter

2

COMPETITION

Competition may be the spice of life, but in economics it has been more nearly the main dish. Competition has been a major force in the organization of production and the determination of prices and incomes, and economic theory has accorded commensurate importance to the concept.

Competition enters all major areas of man's life, and generally connotes rivalry between two or more men or groups for a given prize. Competition is often an end in itself. Sporting events are clear illustrations: we should be shocked if two teams called off the event or arranged a tie, and divided the prize. Indeed the prize is a minor goal in a true sporting event.

In economic life competition is not a goal: it is a means of organizing economic activity to achieve a goal. The economic role of competition is to discipline the various participants in economic life to provide their goods and services skilfully and cheaply.

I. PERFECT COMPETITION

Market Competition

When one asks (as Cournot was the first to do in a precise way, in 1838) whether the competition of three merchants will serve better than two, or why two (or three) do not combine into a monopoly, the answers prove to be elusive. But one can partially evade such questions by posing a very extreme degree of competition, which the economist calls perfect competition.

A main requirement of perfect competition is that the largest firm in an industry makes a trifling fraction of the industry's sales (or purchases), from which it follows that there be many firms in the industry. No definite number has been found for the maximum share of one firm

compatible with competition; presumably the largest firm in a competitive industry can be larger, the more elastic the industry demand and the easier the conditions of entry by new firms.

These many firms, no one or few of which account for an appreciable share of the industry's output, are assumed to act independently. This can be viewed as a second condition for perfect competition, or as an inevitable corollary of the large numbers in the absence of legal controls over the industry. For it is a fact that there are insuperable difficulties in organizing an effective combination of many persons, when it is profitable for each person secretly to depart from the agreement (as is generally the case in economic life).

Such large numbers suggest, what is true, that (perfect) economic competition is *impersonal*. In the economic race, there are 1,000 or 100,000 runners, and each gets a prize proportional to his efforts. The fortunes of any one firm are independent of what happens to any other firm: one farmer is not benefited if his neighbor's crop is destroyed. The essence of perfect competition, therefore, is not strong rivalry but rather the utter dispersion of power to influence market behavior. The power, for example, to restrict quantities sold and raise prices is effectively annihilated when it is divided among a thousand men, just as a gallon of water is effectively annihilated if it is spread over a thousand acres.

A third condition of perfect competition is complete knowledge of offers to buy and sell by the participants in the market. This condition serves just the opposite purpose of the preceding condition. The assumption that traders act independently serves to keep them apart, and hence numerous; the assumption that each seller knows what various buyers will pay, and vice versa, is necessary to keep the parties together—in the same market. If seller A and buyer B dealt only with one another in ignorance of all other traders, and similarly for every other pair of buyers and sellers, each transaction would represent an exchange under bilateral monopoly.

These conditions of perfect competition are enough to insure that a single price will rule in a market—in fact perfect knowledge is enough for this purpose—and that this price is affected only negligibly by the actions of any one or few buyers or sellers. (It is sometimes additionally assumed that the product of all sellers be homogeneous, but this can also be viewed as part of the definition of the market or industry.) The definition of perfect competition is therefore sometimes expressed in the

equivalent form: the demand curve facing any one seller is infinitely elastic; and the supply curve facing any buyer is infinitely elastic.

To these basic conditions of perfect competition—numerous traders on each side of the market, independence of action, and perfect knowledge—it is necessary to add *divisibility* of the commodity or service being traded. If the units are lumpy, it is possible that minor discontinuities will emerge that allow some small market power to individuals.¹

These conditions of perfect competition pertain to a single market, whether of shoes or bonds or carpenter's services. So far as the presence or absence of monopoly power is concerned, it is not necessary to look at any other market. For this reason these conditions pertain to what may be called *market* competition.

It is traditional, however, to enlarge the conditions of competition so that they will insure an optimal allocation of resources, by specifying the nature of the movement of resources among markets and industries. This enlarged concept, which may be termed *industrial* competition, is our next subject.

The Mobility of Resources (Industrial Competition)

If a productive resource is to be utilized efficiently, it must be equally productive in all of its uses—clearly if its (marginal) product is less in one use than another, output is not being maximized. Hence two additional conditions have commonly been made a part of perfect competition: resources are mobile among uses; and their owners are informed as to yields in these various uses.

First, the mobility of resources. A vast galaxy of private and public barriers to the mobility of resources has been erected in various times and places: boycotts; certificates of convenience and necessity; patent licenses; settlements laws; franchises; licensing of occupations; etc. Such barriers are all actually or potentially incompatible with competition. But it is not necessary for competition that the movement of resources be

¹ The need for divisibility was demonstrated by Edgeworth with the following example. Let each servant work for only one master, and each master employ only one servant. Let each servant demand at least \$50 per unit of time, and each master offer at most \$100. If the number of servants and masters is large and equal, the wage rate will be indeterminate between \$50 and \$100. More important; one servant can drive the wage rate to \$100 by withdrawing from the market (and similarly a master could drive the rate to \$50), so even one of a thousand servants or masters can affect the rate. See Edgeworth, 1881, p. 46; Stigler, 1957, pp. 8–9. (A Bibliography for this chapter appears on p. 16.)

free: the retraining of a worker, or the transportation of a tool, may be costly without interfering with competition.

Second, the adequacy of information. We must enlarge our earlier condition of full information to include knowledge of the yields on resources in alternative employments. From another viewpoint, we may say that ignorance is a barrier to profitable movement of resources.

If these conditions are fulfilled, the maximum possible output (measured by value) will be obtained from a productive resource. If this be true for each resource, the output of the economy is at a maximum. This famous theorem (labeled "on maximum satisfaction" by Walras and Marshall) is subject to a qualification, as all interesting propositions are: the *private* marginal product of a productive resource (the amount its owner receives and hence what governs its allocation) must equal the *social* marginal product (private marginal product plus or minus the effects on others). Of course, the maximum value output is dependent upon the distribution of income (which affects the demands for goods and hence their prices).

Time and Competition

What we have termed *industrial* competition—competition including mobility of resources—obviously has an implicit time dimension. It takes time to move resources out of unprofitable fields, especially if the resources are specialized and durable so that only through disentangling depreciation funds can the resources be withdrawn. It takes time, too, to construct a new factory or shop if one wishes to enter an industry. Comparable statements can be made about the geographical and occupational mobility of labor. Similarly, time is a factor in the completeness of knowledge. It takes time to learn which industries or jobs are most remunerative, or to learn the prices quoted by various sellers (or the quality of service and product), and one's knowledge is more complete and reliable, the more thorough the search for information and the larger the experience on which it is based.

Capital embodied in specialized and durable equipment will not be transferred to other uses except at extreme price differentials in the short run, even though in the long run the slightest differential in returns may be sufficient to move capital funds. Conversely, only under extreme incentives will new establishments be created virtually overnight, as we sometimes observe in wartime.

This fact that it is more expensive to do things very quickly than at slower pace does not qualify the proposition that resources will tend to

be put where they earn the most, but we are reminded of the implicit proviso: allowance being made for the cost of moving the resources.

The differences in returns to a resource in various uses can be very great in the short run, but will decline to a minimum level set by the cost of the most efficient method of moving resources. There is implicit in economic literature a widespread belief that these minimum costs of movement of resources are very small relative to their returns, so little imprecision arises from neglecting them entirely. This may be true, but it has not been demonstrated. The belief nevertheless led economists (for example, J. B. Clark) to postulate instantaneous and costless mobility as the pure case of perfect industrial competition. It seems preferable to say that minimum differentials in returns to resources are achieved only in the long run. Market competition is not so intimately related to time. One's information about price bids and offers improves somewhat as he searches the market more thoroughly—itself a time-consuming process—but the changing conditions of supply and demand lead to changes in prices which make the old information obsolete.

II. THE THEORY OF COMPETITIVE PRICES

The competitive structure of industry will lead to the establishment of competitive prices. Competitive prices are characterized by two main properties. The property of clearing markets is that of distributing existing supplies efficiently; the property of equalizing returns to resources is that of directing production efficiently.

The Clearing of Markets

A competitive price is one which is not perceptibly influenced by any one buyer or seller. When we say that such prices are fixed by “supply and demand” what we mean is that the ensemble of all buyers and sellers determine price.

Since every buyer can purchase all he wishes of the good or service at the market price, there are no queues or unsatisfied demands (given the price). Since every seller can sell all he wishes at this market price, there are no undisposable stocks, other than inventories which are voluntarily held for future periods. The competitive price, then, clears the market—it equates the quantities offered by sellers and sought by buyers.

Whenever we find a persistent queue among buyers, we know that the price is being held *below* the level which clears the market, and which we naturally call an equilibrium price. For example, when hous-

ing is unavailable under rent controls, we know that rents are below the equilibrium level. Whenever we find stocks held by sellers to be in excess of inventory needs, we know price is *above* the equilibrium level. The vast stocks of agricultural products held by the U.S. government are evidence that the prices of these products (more precisely, the amounts the government will lend on the products) are above the equilibrium level.

The importance of prices that clear markets is that this is the method by which goods and services are put in the hands of the people who most urgently wish them. If a price is held too low, some buyers who set a lower value on the commodity will get it while others in the queue who set a higher value get none. If the price is set too high, goods that buyers would be glad to purchase at a lower price go unsold even though (if a minimum price is imposed on a competitive industry) sellers would prefer to sell at this lower price.

The Equalization of Returns

It is part of the definition of industrial competition that every resource in an industry earns as much, but no more than, it would earn in other industries. The self-interest of the owners of productive resources (including, of course, that most important resource, the laborer) leads them to apply their resources where they yield the most, and thus to enter unusually attractive fields and abandon unattractive fields.

This equalization of returns, however, can be shown to imply that the prices of goods and services equal their (marginal) costs of production. The cost of a productive service to an industry is the amount that must be paid to attract it away from other uses—its foregone alternatives (which has given this most basic concept of cost the label of the alternative or opportunity cost theory). If the amount the productive resource earns in an industry is in excess of this cost, clearly other units of the resource presently outside the industry could earn more if they enter. Conversely, if the productive resource is earning less than its cost or alternative product, it will leave the industry. Hence if price exceeds cost, resources will flow in and lower price (and perhaps raise cost by raising the prices of the resources), and if price is less than cost, resources will flow out of the industry and increase price (and perhaps reduce costs).

The equality of the *marginal* products of a resource in all its uses is the condition for efficient production, as we have remarked. The equality of *average* products has often been substituted, with a regrettable loss of logic: consider the catastrophic waste (of capital) in having equal out-

put per worker in two industries when the capital equipment per worker is 10 times as large in one industry as in the other. But if the *marginal product* of a resource is equal in its various uses, it follows that *marginal cost* must equal price. The resources necessary to produce one more unit of product A could produce an equal value of B, so the marginal cost of A—which is the foregone alternative of producing B—is equal to the value of A that it produces. Marginal cost, formally defined as an increment of cost divided by the increment of product associated with the increment of cost, and not the more easily measured average cost (total cost divided by output) is the economist's fundamental criterion of competitive price—and of optimum price.

Marshall's Period Analysis

The alternative uses open to a resource depend upon the time available for its redeployment (or, more fundamentally, how much one is willing to spend on its movement). This principle, joined to an empirical observation that one can alter the rate of operation of a plant much sooner than one can build a new plant or wear out an existing one, provide the bases for the standard (Marshallian) theory of long- and short-run competitive prices.

In the short run, defined as the period within which one cannot appreciably alter the number of plants (physical production units), the only method of varying output is to work a given plant more or less intensively. The so-called variable productive factors (labor, materials, fuel, etc.) are the only resources with effective alternative uses in this period, and therefore the only services whose returns enter into marginal costs. The returns to the productive factors embodied in the plant are called quasi-rents. So long as quasi-rents are greater than zero, it will be more profitable to operate a plant than to close it down.

The long run is defined as the period within which the entrepreneur can make any desired decision—including the decision to leave one industry and enter another. In this period all resources are variable in quantity, and therefore the returns to all factors enter into marginal cost.

The Marshallian apparatus permits very useful simplifications in price theory, but only if its underlying empirical assumption is fulfilled: the long-run adjustments of the firm are of negligible magnitude in the short run (and hence can be neglected) and the short-run adjustments do not appreciably affect the long-run costs. When these conditions are not met—they fail, for example, if discharge of workers this period will lead to higher wage rates next period—the full analysis of the short run