Part I
Foundations

We begin our study of industrial organization by reviewing the basic building blocks of market analysis. The first chapter provides a road map for the entire enterprise. Here, we describe the central aim of industrial organization, namely, the investigation of firm behavior and market outcomes in settings of less than perfect competition. We emphasize that an understanding of strategic interaction is a critical component of this analysis.

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 basic supply and especially demand considerations. They also permit us to present the notions of consumer surplus, producer surplus, and total surplus that are necessary for any complete valuation of market outcomes.

Having introduced the concept of market power and its exploitation in Chapter 2, Chapter 3 focuses on how we might identify those markets in which such abuse us likely to be a problem. Structural measures of concentration are a common way to make this identification and so, this is an obvious place to introduce such measures as the *n*-firm concentration ratio and the Herfindahl–Hirschman Index. However, we also take the additional step of introducing the most explicit measure of monopoly price distortions, namely, the Lerner Index. This includes an extended empirical application explaining the many attempts at measuring the economy-wide welfare loss from such distortions beginning with Harberger (1954).

Finally, in Chapter 4 we turn to a discussion of some of the reasons that cause markets to exhibit the structural conditions that make perfect competition unlikely. Chief among these are cost considerations and it is in this chapter that we explore cost concepts most formally. We review the notion of marginal cost that has already been introduced and then turn our attention to those remaining cost concepts that most directly relate to market structure such as sunk costs, average cost, and both scale and scope economies. We also explore the implications of endogenous sunk cost as emphasized by Sutton (1991). As in Chapter 3, chapter 4 also includes an empirical application based on the early work of Christensen and Greene (1976). Our aim here is twofold. First, we wish to show formally how to derive a cost function from the application of profit-maximizing principles to a specified production function. Second, we wish to introduce the basic notion of regression analysis and how one can (and should) use theory to guide and inform empirical investigations.

1
Industrial Organization: What, How, and Why

A sample of business news stories from the late 1990s and early twenty-first century includes the following: Coke and Pepsi found themselves in the middle of a severe price war. Visa and MasterCard were found guilty of trying to monopolize the bank credit card business. Complaints from computer manufacturers, Dell and Gateway, led to the discovery of an international cartel in dynamic random access memory (DRAM) and subsequent guilty pleas. Companies from all industries, but especially those in the finance and telecommunications sector, e.g., AOL and Time-Warner, had embarked on a huge merger spree in which two or more firms consolidated into one.

Students often feel that there is a considerable gap between stories like those just described and the economics they study in the classroom. This is so despite the fact that most modern texts include real world applications. Indeed, it is difficult to think of a contemporary economics textbook that does not include examples drawn from the practical business experience. Nevertheless, it is still far from unusual to hear remarks such as "economics is too abstract" or "this wasn't covered in the microeconomics that I studied."

This book is very much in keeping with the modern practice of illustrating the applications of economic theory. Our aim is, however, more ambitious than just showing that economics can illuminate the everyday events of the business world. Our goal is to develop a way of thinking about such experiences—a mental framework that permits students to form hypotheses about the mechanisms underlying such events and to consider how to test those hypotheses against empirical evidence. Of course, we cannot offer a framework for analyzing all economic phenomena, but we can develop one that applies to a large class of events including the ones described above. That framework rests solidly on modern game theory and the class of events to which it most readily applies falls under the heading of industrial organization.

1.1 WHAT IS INDUSTRIAL ORGANIZATION?

What is industrial organization? For a large number of people, the answer to that question is far from clear. Indeed, on a recent and long, cross-Pacific flight the question elicited a wide set of responses when put to several of our fellow passengers. Most supposed that the field had something to do with business. A few thought it was rooted in psychology and

possibly applied to human resource management. One thought it dealt with the pattern of international trade. Actually, each of these answers has a grain of truth. Yet each is also wide of the mark. While the field of industrial organization does touch on many aspects of business life, it has come to have a fairly precise meaning in economics. Simply put, industrial organization is that branch of economics that is concerned with the study of imperfect competition.

Since you are reading this book, the chances are very good that you have had some economics classes, especially microeconomics classes, already. As a result, you have probably been exposed to the concept of perfect competition—that somewhat utopian vision of markets populated by numerous small firms and characterized by economic efficiency. You are also likely to have read about the most obvious counter-example, a pure monopoly. The case of a market dominated by one firm alone offers a clear contrast to the ideal of perfect competition. But what happens when the truth lies, as it almost always does, between these two polar extremes. What happens when there are two, or three, or several firms? How do competitive forces play out when each firm faces only a limited number of rivals? Will prices be driven to (marginal) costs, or will advertising and other promotional tactics avert this outcome? Will research and development of new products and processes be the major source of competitive pressure? If so, how do monopolies come about? If firms can obtain monopoly power, can they also devise strategies to maintain such power? Is it possible to keep new competitors from coming into the market?

Industrial organization forms the analytical core that economists use to answer these and many other related questions. Economists long ago worked out the analytics of perfect competition. What happens under the more common setting of imperfect competition—how close to or how far from working like the perfectly competitive market—is much less settled. This less settled domain is the field of industrial organization.

There is a good reason why industrial organization does not yield clear and simple answers regarding what happens in imperfectly competitive markets. When we describe a market as less than perfectly competitive that still leaves open a wide range of possibilities. It could be a duopoly market with only two firms, or perhaps a market dominated by one large firm competing with many very small ones. The products of the different firms may be identical, as in the case of cement manufacturers, or perhaps highly differentiated, as in the case of cosmetics. Entry by new firms may be easy, as in the restaurant business, or difficult, as in the automobile industry. This variety of possible market characterizations means that it is very difficult to make broad, unambiguous statements about imperfectly competitive markets.

Matters become even more complicated when we consider the decisions that the management of an imperfectly competitive firm must make. Start with perhaps a simple case such as a florist setting the price for a dozen roses. Should the price rise on Valentine's Day? Should the price for a dozen be exactly 12 times the price of a single rose? Or should the prospective buyer of flowers get a break if he or she buys in quantity?

Consider Jody Adams, the chef at one of the Boston area's top restaurants, Rialto. Jody must choose the complete menu of entrees and appetizers that the restaurant will serve at the start of each season as well as set the price of each menu entry. In making this choice, she must evaluate the cost and availability of different ingredients. For example, what seafood and vegetables are in season and can be served fresh? What price should she set for a la carte items and for the fixed price meal? Should she make available special dishes for those with food allergies? How extensive a wine list should she maintain? These decisions make clear that product design decisions are certainly as important as pricing decisions. A critical design choice by Microsoft to package its Web browser, Internet Explorer with its Windows

operating system and to sell the two as one product was perhaps the primary reason for Internet Explorer's success against Netscape. It also played a major role in the government's later decision to pursue antitrust charges against Microsoft.

Price and product design choices are not the only decisions that firms make, however. Another choice concerns promotional effort. For example, in 2002 the soft-drink giant, Pepsi, paid over $200 million to replace Coca Cola for the rights to be the official soft drink of the National Football League.[1] By winning this contract, Pepsi gained the right to use the logos of the Super Bowl and other league properties, in ads, signs, and banners. However, for this right it paid more than double the amount Coca-Cola had been paying. Was this a wise decision? A similar decision concerns what markets to enter. Southwest Airlines decided in the late 1990s that the time was right to begin service to points in the Northeast. What made this the right time and what tactics should Southwestern have employed to guarantee the success of this venture?

Firms make tough decision like the ones just discussed on a daily basis. Industrial organization economists analyze those decisions and try to derive some predictions from that analysis to help us understand market outcomes. We also try to test those predictions using modern econometric analysis.

1.2 HOW WE STUDY INDUSTRIAL ORGANIZATION

One reason that analyzing imperfect competition is difficult is because of the interdependence that characterizes the firms' decisions in their markets. When Southwest Airlines considers offering service to Boston, it has to recognize that this will have a non-trivial effect on the other airlines that serve the Boston market. They may react by cutting fares, or by changing their flight times, or perhaps by cutting back on the Boston service so as to avoid a glut on the market. Similarly, when Pepsi thinks about putting in a high bid to become the National Football League's official soft drink, it has to wonder how Coke will respond. Will it bid even higher? If it does, should Pepsi raise its bid still further? Or what if Coke decides to respond to the advertising advantage that Pepsi gains by launching a price war in the soft drink market?

Imperfect competition is played out against a background of interdependence or, what economists call, a setting of strategic interaction. This means that determining a firm's optimal behavior is also difficult. Because the firms are likely to be aware of the interdependency of their actions, each firm will wish to take into account its rivals' response to its action. Yet that response will also depend on how the rivals think the first firm will react to their reaction and so on. A firm in this situation needs to "put itself in its rival's shoes" to see how the rival will respond to different actions that the firm could take. The firm must do this in order to figure out what its best course of action is. To understand the logic of strategic interaction we use game theory. Game theory provides us with the necessary framework for an analysis of settings in which the participants or players recognize that what they do affects other players and, in turn, what other players do affects them. It is for this reason that much of the recent work in industrial organization uses game theory to understand market outcomes under imperfect competition. While not all of the analysis in this book relies

[1] See B. McKay and S. Fatsis, "Pepsi Scores One on Coke, Gaining Sponsorship Rights to the NFL," *Wall Street Journal*, March 29, 2002, p. B5.

on game theory, a good bit of our discussion is aimed at developing and applying the logic of game theory to market settings.

Game theory permits us to analyze strategic interaction in both a clear and logically consistent manner. For this reason, it has become an indispensable tool in industrial organization. It is equally important, however, to recognize that game theory and, more generally, the understanding of strategic interaction serves a broader goal of understanding what industrial organization is about. This perhaps is best expressed by reference to a quote from John Maynard Keynes who wrote insightfully, "the theory of economics does not furnish a body of settled conclusions immediately applicable to policy. It is a method rather than a doctrine, an apparatus of the mind, a technique of thinking which helps its possessor to draw

Reality Checkpoint

Show Time!

Perhaps no example of strategic interaction is more common than the annual or even seasonal game television networks play in scheduling their programming. The objective is to get the highest "average audience" rating as calculated by the A. C. Nielsen Company and defined as the percentage of homes with a television that is tuned to a program during an average minute of prime time viewing. This value determines the advertising fees that a network can charge and, hence, is crucial to the network's profit. Indeed, scheduling strategy is understood throughout the broadcast entry as a crucial element in network success and a variety of well-known tactics have emerged over the years. These include: (1) *quick openers*—starting the evening with one's strongest shows to set up the rest of the viewing night; (2) *infant protection*—the avoidance of scheduling promising new shows to compete with strong rival programming and/or using an existing strong network show to serve as a lead-in for the new one; (3) *counterprogramming*—scheduling say a police show in a slot where the major competition is a comedy; and (4) *bridging*—scheduling shows an hour long or longer so that competing shows of an hour's length begin in the middle of the scheduled program.

For example, the current ratings champ on network television is Fox's *American Idol* now in its sixth year and which runs on both Tuesday and Wednesday evenings from January to May. Indeed, *Idol* is so popular that it could lose half of its audience and still be rated in the top ten. It also serves as a strong lead-in for an already popular Fox show, *House*.

Part of the response of other networks has been to reschedule their best shows to avoid being crushed. ABC moved its hit *Lost* from a 9:00 p.m. start on Wednesdays to a 10:00 p.m. start after *Idol* finishes. ABC also decided to reschedule its popular reality show *Dancing with the Stars* so that it runs on Monday and Tuesday evenings and does not start until May when *Idol* goes off the air. NBC similarly moved its shows *Earl* and *The Office* from Tuesday nights to Thursday nights to escape the *Idol* juggernaut.

Industry executives openly admit that the anticipation of the arrival of *Idol* in January makes it particularly difficult for new shows that premier in September. The slots the networks have most available for a new show are precisely those vacated by the existing shows, namely, the ones that compete directly with *Idol*. This means that any new show that starts on Tuesday or Wednesday nights in September has to fear that it is living on borrowed time and ratings unless it can quickly establish a loyal following. Even then, its best hope is that it will be moved in January away from the *Idol* dominated times. Otherwise, the new show is likely to suffer the same fate of all but a few *Idol* contestants: "I don't mean to be rude, but . . ."

Sources: B. Carter, "For Fox Rivals, 'American Idol' Remains a Schoolyard Bully," *New York Times*, February 20, 2007, p. C1.

correct conclusions."[2] The same can be said of modern industrial organization. It is a technique of thinking. To be precise, it is a means of thinking strategically and applying the insights of such analysis to model imperfect competition.

Of course, no model is a complete description of reality. A complete detailing of each aspect of the actual marketplace would be far too lengthy and unwieldy to be of much use. Instead, any market model is like a road map. It is a deliberate simplification of a very complicated terrain, omitting some features and thereby emphasizing others. The aim of the model is to capture and make transparent the essential features of the interaction among firms. In this light, to say that the real world is more complicated than the model is no criticism. Indeed, if the modeling achieves its aim of making clear the underlying structure and the principles governing the market outcome, then its abbreviated portrait of the real world is its strength.

Whether or not a particular theoretical model is a good proxy for real world outcomes can be determined by testing the predictions of the model against actual data and observational evidence. Armed with ever-increasingly sophisticated statistical techniques, such testing has also become an essential part of the field of modern industrial organization. Throughout this book, you will find numerous Reality Checkpoints designed to illustrate the applicability of the concepts in question. In addition, you will find a number of recent empirical studies offering evidence on the validity of the various models.

The combination of theory and evidence provide a useful guide to the likely outcome of strategic interaction in a variety of settings. In each such case studied, the basic interpretation of the model and associated data is that "this is how to think about what happens in an imperfectly competitive market when." This is how we do industrial organization.

1.3 WHY? ANTITRUST AND INDUSTRIAL ORGANIZATION THEORY

The text of the principal U.S. antitrust statutes is given in the Appendix to this chapter. Suffice to say at this point that such legislation came early to the United States with the passage of the first major antitrust law—the Sherman Act—in 1890. This predates much of the formal modeling of imperfect competition and, certainly its dissemination. However, economists had had an intuitive grasp of the potential problems of monopoly power as far back as Adam Smith. In his classic, *The Wealth of Nations* (1776), Smith had written on both collusion among ostensibly rival firms and on the raw exercise of monopoly power:

> People of the same trade seldom meet together, even for merriment or diversion, but the conversation ends in a conspiracy against the public, or in some contrivance to raise prices.
>
> The monopolists, by keeping the market constantly understocked, by never fully supplying the effectual demand, sell their commodities much above the natural price.

By the late nineteenth century, many Americans had become convinced that a few large firms and trusts, such as Standard Oil and American Tobacco, had exploited their market power in just the ways Smith had forecast. A consensus emerged—one that has endured throughout the history of antitrust legislation—that some form of legal framework was needed to maintain competition in the market place. Moreover, while few people had any understanding of formal economics, there was a reasonably wide familiarity with the sentiments of Adam Smith.

[2] Keynes (1935).

Thus it was that popular sentiment, reinforced by shrewd Smithian insight, led to the enactment of the first U.S. antitrust law, the 1890 Sherman Act. Indeed, it is somewhat remarkable just how directly the concerns of Adam Smith are reflected in the two primary sections of the Sherman Act. Section 1 prohibits contracts, combinations, and conspiracies "in restraint of trade." Section 2 makes illegal any attempt to monopolize a market. The view that government institutions were necessary to achieve these aims was also later reflected in the Clayton and Federal Trade Commission Acts.

Antitrust policy, in the beginning, focused primarily on prosecuting and preventing collusive agreements to raise prices under the authority of Section 1. Early cases such as the *Trans-Missouri Freight Association* and the *Addyston Pipe* case of 1897 and 1898 respectively, established this tradition and it remains a centerpiece of antitrust policy to this day[3] as evidenced by the successful prosecution of agricultural products giant, Archer Daniels Midland, the world's two largest auction houses, Sotheby's and Christie's, the international pharmaceutical giant, Hoffman-LaRoche, and the DRAM manufacturers mentioned at the start of this chapter.

However, unlike the Section 1 statute, the enforcement of Section 2 on monopolization has been more limited. Despite wide public perception that many of the giant firms emerging from the Industrial Revolution had abused and exploited their monopoly power, it was 12 years before one of these, the Standard Oil Company of New Jersey, was prosecuted under Section 2.[4] That case eventually led to the famous Supreme Court ruling in 1911 that Standard Oil had illegally monopolized the petroleum refining industry. Similar findings against other trusts, including most notably the Tobacco Trust,[5] followed quickly. Yet unlike the price-fixing cases, these monopolization decisions were less clear about what actions were illegal. In particular, the court established a "rule of reason" framework for monopolization cases that permitted the courts to examine not only whether monopolization of an industry had occurred but, if so, what the market context was surrounding the formation of that monopoly and the business practices used to achieve it. Only if this additional inquiry found an explicit intent to monopolize or an obvious exploitation of monopoly power was there a true violation.

Practically speaking, the rule of reason approach meant that there was a lot of ambiguity in exactly what actions were illegal. This had two important results. First, those who feared that such a legal framework might weaken antitrust enforcement were motivated to pursue additional reforms so that Section 2 of the Sherman Act would not become a "paper-toothed tiger."[6] This led in 1914 to the passage of the Clayton Act meant to stop monopolization in its incipiency by limiting the use of a number of business practices such as rebates, tying, and exclusive contracts that were employed by Standard Oil in establishing its dominance. Section 7, which was later amended in the 1950s, was passed to prevent anticompetitive mergers.

It also led to passage of the Federal Trade Commission Act in 1914 that established an administrative agency, the Federal Trade Commission (FTC), endowed with powers of investigation and adjudication to handle Clayton Act violations. As later amended this act also outlawed "unfair methods of competition" and "unfair and deceptive acts or practices." Creation of the FTC gave antitrust policy a second arm of law enforcement in addition to that provided by the Justice Department (DOJ).

[3] *United States v. Trans-Missouri Freight Association*, 166 U.S. 290 (1897) and *United States v. Addyston Pipe & Steel Co.*, 85 F. 271 (6 Cir. 1898).

[4] *Standard Oil Co. of New Jersey v. United States*, 221 U.S. 1 (1911). See also, Posner (1971).

[5] *United States v. American Tobacco Co.*, U.S. 221 U.S. 106 (1911).

[6] Berki (1966), p. ix.

The second major result stemming from adoption of a rule of reason approach emerged later with the *U.S. Steel* case of 1920. In that case, the Court made clear that in its view "the law does not make mere size an offense or the existence of unexerted power an offense—it does not compel competition nor require all that is possible."[7] As a result, the Court found U.S. Steel—a firm that through a series of mergers had grown to control over 70 percent of U.S. steel-making capacity—innocent of any antitrust violations.

The U.S. Steel decision had a major impact on both the steel industry and the U.S. legal framework. For our purposes, however, the reason that this case was so important is that it served as a major intellectual stimulus to the field of industrial organization. For the conclusion to which many analysts were led by the 1920 decision was that without a good economic road map by which to understand imperfect competition, the making of antitrust policy was a difficult proposition at best. It was the subsequent effort to provide that road map that initiated the field that we now call industrial organization.

Economists such as Edward Chamberlin (1933) and Edward Mason (1939), both at Harvard, led the way. In their view the microeconomics of the time offered little guidance either to policy makers or the legal system as to what evidence might be useful in determining the likely outcome that a market would produce. The Supreme Court's dismissal of the government charges of monopolization in the U.S. Steel case was based on an argument that no exploitation of monopoly power or intent to monopolize had been shown. Only U.S. Steel's large market share had been documented and, "*the law does not make mere size an offense*" [emphasis added]. Unless there was good reason to believe that a large market share offered strong evidence of monopolization, or until there was a coherent argument that identified other observable characteristics that in turn implied illegal behavior, the court's decision had a fair bit of justification.

More generally, economists at that time realized that any informed legal judgment would require some practical way to determine from observable evidence whether the industry in question was closer to perfect competition or closer to monopoly. Accordingly, they viewed the highest priority of industrial economics to be the determination of whether and how one could infer illegal behavior from either firm size or other structural features. It was to provide this policy guide that the field of industrial organization began to emerge. The very name of the field—industrial organization—dates from this time.

Early work therefore focused on a set of key questions: how is the production of the industry organized? How is the market structured? How many firms are there and how large are they relative to each other? Are there clear barriers to entry? It was recognized from the outset, however, that answering these questions would not be enough to provide the legal framework needed by legislators and courts to determine whether or not the antitrust laws had been violated. Achieving this goal required not only that an industry's structural features be revealed but that clear links between structure and market outcomes also be identified. That is, industrial economists needed to obtain data on prices, profits, and market structure, and then use these data to identify statistical relationships between various market structures, on the one hand, and industrial performance, on the other.

This was the agenda explicitly announced by Edward Mason who, in 1939 wrote, "The problem, as I see it, is to reduce the voluminous data concerning industrial organization to some sort of order through a classification of market structures. Differences in market structure are ultimately explicable in terms of technological factors. The economic problem,

[7] *United States v. United States Steel Corporation*, 251 U.S. 417 (1920).

however, is to explain, through an examination of the structure of markets and the organization of firms, differences in competitive practices including price, production and investment policies."[8] In sum, the early industrial organization economists viewed their goal as one of establishing links between market structure, on the one hand, and the conduct of firms in the market, on the other. In turn, that conduct would determine the likely outcome or performance of the market in terms of economic efficiency or general social welfare. For this reason, this early approach is typically referred to as the Structure–Conduct–Performance or SCP approach. Presumably, if the outcome for a particular industry given its structure was sufficiently bad, legal action was justified either to alter the conduct that structure would otherwise generate or, if necessary, to change the structure itself.

The basic principle behind the SCP paradigm was that perfect competition and monopoly are usefully viewed as opposite ends of a spectrum of market structures along which all markets lie. One natural measure of market structure is the degree of concentration, or the percentage of market output produced by the largest firms in an industry. Accordingly, the practice of industrial economics at that time became one of, first, accurately describing the structure of different markets and, second, deriving empirical relations between structures and outcomes in terms of price–cost margins, innovative efforts, and other performance measures. Research focused on examining statistically the broad hypotheses on market structure and performance implied by the SCP paradigm. Here, structure was often identified with the degree of concentration or the percentage of total market output accounted for by the few largest firms. Finding a road map for policy was interpreted to mean providing numerical answers to questions such as how much would a bit more concentration or a bit higher entry barriers raise price above cost.

In pursuit of the SCP quest, the 1930s and 1940s witnessed numerous studies attempting to document and to measure the link between industrial performance, say profitability, and an industry's structural features, such as concentration. In some respects, this goal was met. For example, looking at a cross-section of industries each with a different structure and a different overall profitability, scholars found some positive correlation between the industry's profit rate and extent to which production was concentrated in the hands of just a few firms. Further studies found a similar positive link between advertising and profitability. The first finding gave support to the view that an industry in which there was more than one but still just a few, large firms was indeed somewhat close to the monopoly pole. The second finding was interpreted as evidence that firms used advertising to build customer loyalty and, thus, to deter other firms from entering the market. In turn, this permitted the incumbent firms to enjoy monopoly power and profit.

1.3.1 The "New" Sherman Act and the Dominance of Structure-based Analysis

The early findings of SCP scholars increasingly seemed to suggest that perhaps a firm's "mere size" could imply a legal offense if it is sufficiently large. The real question then became whether or not these developments would influence antitrust law. This question was answered in the affirmative with the 1945 *Alcoa* decision.

Alcoa was by far the largest aluminum manufacturer in North America. It had been prosecuted for antitrust violations a number of times prior to the 1945 case. In fact, so large a

[8] Mason (1939), pp. 61–74.

number of Supreme Court justices in 1945 had had previous litigation experience with Alcoa that they could not participate in this proceeding with the result that the Supreme Court lacked a quorum to hear the case. Hence, the 1945 decision was issued by a special panel of three circuit court judges. In a key decision, this panel overturned the finding of innocence by the lower district court and found Alcoa guilty of monopolization under Section 2 of the Sherman Act. An explicit consideration for the Court was the issue of size.[9] Alcoa's market share depended critically on how one measured the market, and much attention was given to this issue. Ultimately, the Court defined Alcoa's relevant market to be primary aluminum ingot production. Using this definition, the Court found that Alcoa supplied 90 percent of the market. In effect, this decision was a major policy validation of the SCP approach.

Other cases also reflecting a newly found concern over market domination by large firms soon followed. In 1946, the Supreme Court found the big three tobacco companies, American Tobacco, Ligget & Myers, and R. J. Reynolds, that controlled 75 percent of domestic cigarette production, guilty of monopolization.[10] A number of similar cases continued over the next twenty years, culminating with such well-known ones as the 1962 *Brown Shoe* case and the 1964 case against the Grinnell Corporation. All of these cases gave increasing weight to market structure as an indictment of proposed or past actions.[11] The (in)famous price discrimination case of *Utah Pie* (1967) may also be read as an indictment of any outcome in which a few large firms come to dominate the market.[12] In that case, the Court viewed the pricing strategies of the bigger nationwide companies to be evidence of predatory intent against a smaller firm primarily because the shares of the larger firms grew over a four-year period. In short, the period from 1945 into the late 1960s reflects the growing dominance of the SCP framework as the major intellectual influence on antitrust policy.[13]

As noted, this "New" Sherman Act policy found its intellectual support in the cross-industry analyses of the SCP approach. Because our understanding of the potential pitfalls of empirical research has grown tremendously as has our ability to do much more sophisticated empirical analysis that avoids those pitfalls, it is probably fair to say that these early studies are no longer highly regarded by economists. There are, in fact, many problems with these early findings some of which we will discuss more fully below. It should be equally clear, however, that historically the early SCP studies were quite influential. Indeed, their influence ranged beyond the U.S. Particularly after the Second World War, the influential role of the U.S. served to spread the U.S. antitrust approach. This was particularly true for Japan and West Germany. In both countries, the sustained presence of U.S. forces was accompanied by strong decartelization measures. However, explicit legislation aimed at preserving competition found support in other countries as well. (See, e.g., Please 1954.) Britain passed its Monopolies Act in 1948. In 1957, the initial Common Market agreement, the Treaty of Rome, that established the European Community for Steel and Coal included in both its Articles 65 and 66 explicitly forbade agreements aimed at restricting the "normal operation of competition" and even outlawed "unauthorized concentrations" of market power (Resch 2005). These policy initiatives reflected a similar, and probably earlier spread of the SCP approach to industrial economists around the world. (See for example, Stern 1955.)

[9] *United States v. Aluminum Co. of America (ALCOA)*, 148 F.2d 416 (2 Cir. 1945).

[10] *American Tobacco Company v. United States*, 328 U.S. 781 (1946).

[11] *Brown Shoe Co. v. United States*, 370 U.S. 294 (1962) and *United States v. Grinnell Corp.*, 236 F.Supp. 244 (D.R.I. 1964).

[12] *Utah Pie Co. v. Continental Baking Co., et al.*, 386 U.S. 685 (1967).

[13] For an excellent survey of antitrust history see Mueller (1996).

However, there was at least one key difference between American antitrust policy and that of its international associates. Outside the U.S. there was a general suspicion unfettered competition was not necessarily the ideal to which antitrust policy ought to aspire. Instead, there was some presumption that state regulation and even state ownership were useful tools for curbing the abuse of market power. In this context, it is worthwhile noting that the U.S. is a much larger country than say, Canada, or even Japan and the U.K. Hence, its markets tend to be bigger as well. As a result, if the minimum size necessary for efficient operation is the same in all countries, firms that achieve that size will have much larger market share in nations outside the U.S. In turn, this gives more potential for market abuse and Europeans may have been particularly sensitive to this concern. Faced with a choice between large efficient firms that may abuse their power or small, inefficient ones that cannot, the third option of large firms directed by the state on behalf of the public may have seemed a good alternative.

1.3.2 The Tide Changes: The Chicago School and Beyond

Matters began to change in the 1970s. In part, this reflected a growing awareness among academic scholars that the SCP paradigm had important failings. One of these was that the vast array of empirical findings that the SCP researchers had amassed was actually subject to different interpretations. For example, consider the frequent finding that firms with large market shares tend to earn greater profit. This could be taken as a verification of the basic SCP view that the larger a firm's market share, the greater its monopoly power and the higher its profit. However, a more benign interpretation of this evidence is also possible. It could be that the most efficient or the lowest-cost firm gains the largest share of the market, so that both large size and healthy profit are simply reflections of a firm's superior technology or talent.[14]

Other problems also became important. While accounting profit is easily obtained measuring the truly relevant economic profit is far more difficult. Other measurement issues such as defining the relevant market and distinguishing between short run and long run can also be difficult to resolve.

What was really unsatisfactory about the SCP approach, however, was that in considering its middle link—firm conduct—little or no attention was paid to strategic interaction. Something of an exception in this regard was the work of Joseph Bain (1956), a former student of Edward Mason, who made many important contributions to the field. A skilled scholar with a keen eye for actual business practice, Bain was among the first to realize that an industry could not be completely defined by its concentration. In particular, Bain understood that beyond the market configuration of the industry's existing firms we also needed to understand the ability of new firms to enter the market. Even a highly concentrated industry might be forced to price competitively if there were new firms ready and able to enter and compete away the profit of any firm pricing above the competitive level. This was an important insight. Indeed, this idea played a central role in the "contestability" theory developed much later by Baumol, Panzar, and Willig (1982). Bain's point though is really a two-edged sword. The ease with which new firms can enter is at least partially the result of actions taken by

[14] As shown later, this is a standard result in a Cournot model in which costs differ across firms. Specifically, if P is market price, η is the market demand elasticity at that price, and c_i and s_i are the ith firm's unit cost and market share, respectively, then it must be the case that: $\frac{P - c_i}{P} = \frac{s_i}{\eta}$. Lower cost firms will have larger market shares, larger profit margins, and larger total profit.

the firms already in the market. That is, incumbent firms can pursue strategic actions meant to influence the entry decisions of other, potential rivals. In this case, structure is an outcome of conduct but one can not easily address this issue within the SCP framework. For all these problems, the cross-industry scholarship that provided the foundation for the aggressive antitrust policy of the 1950s and 1960s began to fall sharply in disfavor.

Moreover, the weaknesses in the SCP paradigm was accompanied by a discomfort that many felt concerning the more aggressive antitrust enforcements mentioned above. In the *Brown Shoe* case, for example, the Court disallowed the merger of two firms (Brown and Kinney) even though they only controlled about 5 percent of the national market (though a greater percent of individual local markets). Similarly, the *Utah Pie* case seemed to be a decision that did more to protect a specific competitor (Utah Pie) than to protect competitive forces.

The rising concern over flaws in both the SCP approach and the public policy it had fostered made possible a counter-movement led by lawyers and economists from the Chicago School such as Richard Posner, Robert Bork, and Sam Peltzman. These and other scholars began to point out that many of the practices that the courts had been viewing as harmful to competition and economic welfare could, when viewed through the lens of corporate strategy and tactics, be seen as actually improving economic efficiency and bringing benefits to consumers. This work initially focused on the vertical relationships either between a firm and its suppliers or between a firm and its distributors. Many such vertical contracts include restrictions such as those that grant franchisees exclusive territories, or that require distributors to sell at some minimum price. Chicago School economists argued that there were good economic reasons for these practices and that these restrictions actually brought benefits to consumers. Gradually, these arguments were successful and many practices that had been previously found to be *per se* or outright illegal the court now began to review for their "reasonability" on a case-by-case method.[15]

The Chicago School influence on vertical relationships soon spread to more of antitrust policy. In 1974, the U.S. Supreme Court rejected the government's efforts to block a large merger in a case involving the General Dynamics Corporation.[16] Many mergers that would previously have been prevented soon followed justified on both grounds of cost savings and the potential for new entrants to constrain any attempt by the newly merged firm to exercise monopoly power. The government also lost several key cases accusing large firms such as Kodak and IBM of monopolization in violation of the Sherman Act. In addition, the precedent of the *Utah Pie* case was firmly rejected during these subsequent years. It became increasingly clear—most notably in the case involving a complaint by Zenith Corporation charging that seven Japanese television manufacturers had attempted to drive out competitors—that in the courts' view, efforts to eliminate rivals by pricing below cost rarely made sense.[17]

The Chicago School's contributions are difficult to underestimate and its legal influence is felt to this day. These scholars were right to point out the need to examine the logic and reasonability of a firm's conduct. However, they were hampered by the fact that, as of that time, no language or framework in which to view such strategic behavior on a consistent basis had yet been developed. Yet such a framework was emerging. Building on the work of Von Neumann and Morgenstern (1944) and Nash (1951), Nobel Prize laureates Richard

[15] *See Continental T.V. Inc. v. GTE Sylvania, Inc*., 433 U.S. 36 (1977), *State Oil v. Khan, et al*., 522 U.S. 3 (1997) and, recently, *Leegin Creative Leather Products, Inc. v. PSKS, Inc*., 551 U.S. _____(2007).

[16] *United States v. General Dynamics Corp*., 415 U.S. (1974).

[17] *Matsuhita Electric Industrial Co. v. Zenith Radio Corp*., 475 U.S. 574 (1986).

Selten, John Harsanyi, Michael Spence, and Thomas Schelling all made a number of crucial contributions that permitted game theory to become the language for modeling strategic interaction. As we noted earlier, the period since the 1980s has witnessed the rapid spread of game theory to analyze virtually every aspect of imperfect competition. As a result, the field of industrial organization has again been transformed and now reflects, at least in part, what some call a Post-Chicago view and what others simply refer to as the "new IO."[18]

We have already noted that there is much to be said for pursuing a game-theoretic understanding of the strategic interaction of firms. What is important to note at this point is that it was game theory that allowed us a way to model and analyze firm behavior in imperfectly competitive markets. Moreover, as game theoretic analysis spread through modern industrial organization its insights have, to some extent, led to a diminution of the Chicago School's impact. However, it would be wrong to identify the advent of game theory models and the new Post-Chicago approach as a total rejection of the Chicago School's work. For example, the Merger Guidelines adopted jointly by the Federal Trade Commission and the Justice Department have deep roots in the Cournot–Nash game theoretic model that we describe more fully in Chapter 15. While these guidelines are far from permissive, they still allow for many more mergers than would ever have legally occurred in the "New Sherman Act" years of the 1950's and 1960's.

These developments have been accompanied by similar ones elsewhere. In 1997, the European Union adopted the Treaty of Amsterdam that amended the earlier Common Market treaties in keeping with its goal of full economic integration. Articles 81 and 82 of the treaty replaced articles 65 and 66 of the earlier Treaty of Rome and implemented language that was perhaps even more similar to that of the U.S. to be implemented by the European Commission Director-General for Competition. This reflected the widespread recognition that adoption of a common antitrust policy for all union members became a real necessity as European firms increasingly operated across European borders. Like its U.S. counterpart, European antitrust policy has incorporated much of the post-SCP learning. This has been perhaps particularly true for the courts that have questioned a number of early Commission decisions.

However, important distinctions do remain between the U.S. and European approaches with respect to specific cases with Europe taking typically pursuing stricter and more aggressive enforcement. Thus, in 2001 the European Commission blocked GE's acquisition of Honeywell International even though the U.S. had already approved that merger somewhat earlier. Somewhat similarly, Microsoft was ordered by the European Commission in 2003 to offer a version of its Windows operating system that did not automatically include Microsoft's Media Player the media software as well as to provide the technical information to others that would allow them to develop programs fully compatible with the Windows platform. When Microsoft did not comply satisfactorily with these orders, the Commission levied substantial fines totaling hundreds of millions of dollars. While the U.S. had earlier found Microsoft guilty of antitrust violations, nothing in the final settlement of that case seemed nearly as harsh. These decisions and others perhaps reflect the historically greater mistrust Europeans have of large corporations that we mentioned earlier. They also show that debate about both the appropriate underlying economic analysis and the appropriate public policy remains lively and important.

[18] Schmalensee (1988) provides a survey of the then "new IO" that is still relevant. Kovacic and Shapiro (2000) survey the influence of game theory on modern antitrust policy. Kwoka and White (2004) offer a discussion of recent antitrust cases.

In short, concerns over antitrust policy have been a major motivation for industrial economists since the modern inception of that policy in the late nineteenth century, through the emergence of the SCP approach in the mid-twentieth century and continuing to the present, Post-Chicago paradigm that is so prominent at the start of the twenty-first century. Throughout this time, competition has been regarded as a cornerstone of a free-market economy both in the U.S. and elsewhere. Hence, we want to know how firms compete when they have market power, what implication that competition has, and what the role of public policy might be in helping imperfectly competitive markets achieve outcomes closer to the competitive ideal. To put it as succinctly as possible, the reason why we study industrial organization is to understand market competition in all its dimensions.

Summary

Industrial organization is the study of imperfect competition. Industrial economists are interested in markets that we actually encounter in the real world. However, these real world markets come in many shapes and flavors. For example, some are comprised of a few large firms, some have one large firm and many smaller ones. In some, the products are greatly differentiated while in others they are nearly identical. Some firms compete largely by trying to keep prices as low as possible. In other markets, advertising and other forms of non-price competition are the dominant tactics. This range of possibilities has meant that over time, industrial economics has become a field rich with practical insights regarding real business behavior and public policy. This book is all about these developments.

Firms in imperfectly competitive industries need to make strategic decisions—that is, decisions that will have identifiable impacts on other participants in the market, be they rival firms, suppliers, or distributors. As a result, making any such choice must inevitably involve some consideration of how these other players in the game will react. Examples of such strategic choice variables include price, product design, decisions to expand capacity, and whether or not to invest heavily in research and development of a new product. This book presents the modern analysis of market situations involving such strategic interaction—an analysis that is rooted in non-cooperative game theory. We use this analysis to examine such issues as why there are so many varieties of cereals, or how firms maintain a price-fixing agreement, or how advertising and product innovation affect the nature of competition. We also describe how the predictions of these models have been tested.

Our interest is in more than just determining the profit-maximizing strategies that firms in a particular market context should adopt. As economists we are interested in the market outcomes that result when firms adopt such strategies, and whether those outcomes are close to those of the competitive ideal. If not, we then need to ask whether and how public policy can improve market allocations. Our hope is to convey the value of economic research and the gains from learning "to think like an economist." More generally, we hope to demonstrate the vitality and relevance of industrial organization, both in theory and in practice.

Problems

1. List three markets that you think are imperfectly competitive. Explain your reasoning.
2. Explain why a perfectly competitive market does not reflect a setting of strategic interaction.
3. The Appendix to this chapter lists the current, major antitrust laws of the U.S. Review Sections 2 and 7 of the Clayton Act. What potential threats to competition do these sections address?
4. Suppose that sophisticated statistical research provides clear evidence that, all else equal, worker productivity increases as industrial concentration increases. How would you interpret this finding?
5. Why do you think that the U.S. courts have consistently disallowed any form of price-fixing agreement among different firms but been more tolerant of market dominance by one firm?

References

Bain, Joseph. 1956. *Barriers to New Competition*. Cambridge, MA: Harvard University Press.

Baumol, W. J., J. C. Panzar, and R. D. Willig. 1982. Contestable Markets and the Theory of Market Structure. New York: Harcourt Brace Jovanovich.

Berki, S., ed. 1996. *Antitrust Policy: Economics and Law*. Boston: D.C. Heath and Company.

Chamberlin, E. H. 1933. *The Theory of Monopolistic Competition*. Cambridge, MA: Harvard University Press.

Kaysen, Carl and Donald Turner. 1959. *Antitrust Policy*. Cambridge, MA: Harvard University Press.

Keynes, J. M. 1935. *The General Theory of Employment, Interest and Money*. New York: Harcourt Brace and Company.

Kovacic, W. E. and C. Shapiro. 2000. "Antitrust Policy: A Century of Legal and Economic Thinking." *Journal of Economic Perspectives* 14: 43–60.

Kwoka, J. E. and L. J. White. 2004. *The Antitrust Revolution: Economics, Competition, and Policy*. 4th edition. Oxford: Oxford University Press.

Mason, E. S. 1939. "Price and Production Policies of Large Scale Enterprise." *American Economic Review* 29: 61–74.

Mueller, Dennis C. 1996. "Lessons from the United State's Antitrust History." *International Journal of Industrial Organization* 14: 415–45.

Nash, J. 1951. "Noncooperative Games." *Annals of Mathematics* 54: 286–95.

Please, A. 1954. "Some Aspects of European Monopoly Legislation." *Journal of Industrial Economics* 3 (December): 34–46.

Posner, R. 1971. "A Statistical Study of Antitrust Enforcement." *Journal of Law and Economics* 13 (October).

Resch, A. 2005. "Phases of Competition Policy in Europe." University of California at Berkeley, Institute of European Studies, Working Paper 050401.

Schelling, T. 1959. *The Strategy of Conflict*. New York: Oxford University Press.

Schmalensee, R. 1988. "Industrial Economics: An Overview." *Economic Journal* 98: 643–81.

Stern, E. H. "Industrial Production and Profits in the United Kingdom and the United States." *Economic Journal* 3 (August): 1955.

Von Neumann, J. and O. Morgenstern. 1944. *Theory of Games and Economic Behavior*. Princeton: Princeton University Press.

Appendix

Excerpts from Key Antitrust Statutes

THE SHERMAN ACT

Sec. 1 Every contract, combination in the form of trust or otherwise, or conspiracy, in restraint of trade or commerce among the several States, or with foreign nations, is declared to be illegal. Every person who shall make any contract or engage in any combination or conspiracy hereby declared to be illegal shall be deemed guilty of a felony, and, on conviction thereof, shall be punished by fine not exceeding $10,000,000,000 if a corporation, or, if any other person, $350,000, or by imprisonment not exceeding three years, or by both said punishments, in the discretion of the court.

Sec. 2 Every person who shall monopolize, or attempt to monopolize, or combine or conspire with any other person or persons, to monopolize any part of the trade or commerce among the several States, or with foreign nations, shall be deemed guilty of a felony, and, on conviction thereof, shall be punished by fine not exceeding $10,000,000,000 if a corporation, or, if any other person, $350,000, or by imprisonment not exceeding three years, or by both said punishments, in the discretion of the court.

THE CLAYTON ACT, INCLUDING KEY AMENDMENTS OF THE ROBINSON-PATMAN ACT AND CELLER-KEFAUVER ACT

Sec. 2

(a) Price; selection of customers

It shall be unlawful for any person engaged in commerce, in the course of such commerce, either directly or indirectly, to discriminate in price between different purchasers of commodities of like grade and quality, where either or any of the purchases involved in such discrimination are in commerce, where such commodities are sold for use, consumption, or resale within the United States or any Territory thereof or the District of Columbia or any insular possession or other place under the jurisdiction of the United States, and where the effect of such discrimination may be substantially to lessen competition or tend to create a monopoly in any line of commerce, or to injure, destroy, or prevent competition with any person who either grants or knowingly receives the benefit of such discrimination, or with customers of either of them: Provided, That nothing herein contained shall prevent differentials which make only due allowance for differences in the cost of manufacture, sale, or delivery resulting from the differing methods or quantities in which such commodities are to such purchasers sold or delivered: Provided, however, That the Federal Trade Commission may, after due investigation and hearing to all interested parties, fix and establish quantity limits, and revise the same as it finds necessary, as to particular commodities or classes of commodities, where it finds that available purchasers in greater quantities are so few as to render differentials on account thereof unjustly discriminatory or promotive of monopoly in any line of commerce; and the foregoing shall then not be construed to permit differentials based on differences in quantities greater than those so fixed and established: And provided further, That nothing herein contained shall prevent persons engaged in selling goods, wares, or merchandise in commerce from selecting their own customers in bona fide transactions and not in restraint of trade: And provided further, That nothing herein contained shall prevent price changes from time to time where in response to changing conditions affecting the market for or the marketability of the goods concerned, such as but not limited to actual or imminent deterioration of perishable goods, obsolescence of seasonal goods, distress sales under court process, or sales in good faith in discontinuance of business in the goods concerned.

(b) Burden of rebutting prima-facie case of discrimination

Upon proof being made, at any hearing on a complaint under this section, that there has been discrimination in price or services or facilities furnished, the burden of rebutting the prima-facie case thus made by showing justification shall be upon the person charged with a violation of this section, and unless justification shall be affirmatively shown, the Commission is authorized to issue an order terminating the discrimination: Provided, however, That nothing herein contained shall prevent a seller rebutting the prima-facie case thus made by showing that his lower price or the furnishing of services or facilities to any purchaser or purchasers was made in good faith to meet an equally low price of a competitor, or the services or facilities furnished by a competitor.

(c) Payment or acceptance of commission, brokerage, or other compensation

It shall be unlawful for any person engaged in commerce, in the course of such commerce, to pay or grant, or to receive or accept, anything of value as a commission, brokerage, or other compensation, or any allowance or discount in lieu thereof, except for services rendered in connection with the sale or purchase of goods, wares, or merchandise, either to the other party to an agent, representative, or other intermediary therein where such intermediary is acting in fact for or in behalf, or is subject to the direct or indirect control, of any party to such transaction other than the person by whom such compensation is so granted or paid.

(d) Payment for services or facilities for processing or sale

It shall be unlawful for any person engaged in commerce to pay or contract for the payment of anything of value to or for the benefit of a customer of such person in the course of such commerce as compensation or in consideration for any services or facilities furnished by or through such customer in connection with the processing, handling, sale, or offering for sale of any products or commodities manufactured, sold, or offered for sale by such person, unless such payment or consideration is available on proportionally equal terms to all other customers competing in the distribution of such products or commodities.

(e) Furnishing services or facilities for processing, handling, etc.

It shall be unlawful for any person to discriminate in favor of one purchaser against another purchaser or purchasers of a commodity bought for resale, with or without processing, by contracting to furnish or furnishing, or by contributing to the furnishing of, any services or facilities connected with the processing, handling, sale, or offering for sale of such commodity so purchased upon terms not accorded to all purchasers on proportionally equal terms.

(f) Knowingly inducing or receiving discriminatory price

It shall be unlawful for any person engaged in commerce, in the course of such commerce, to be a party to, or assist in, any transaction of sale, or contract to sell, which discriminates to his knowledge against competitors of the purchaser, in that, any discount, rebate, allowance, or advertising service charge is granted to the purchaser over and above any discount, rebate, allowance, or advertising service charge available at the time of such transaction to said competitors in respect of a sale of goods of like grade, quality, and quantity; to sell, or contract to sell, goods in any part of the United States at prices lower than those exacted by said person elsewhere in the United States for the purpose of destroying competition, or eliminating a competitor in such part of the United States; or, to sell, or contract to sell, goods at unreasonably low prices for the purpose of destroying competition or eliminating a competitor.

Sec. 3.

Sale, etc., on agreement not to use goods of competitor

It shall be unlawful for any person engaged in commerce, in the course of such commerce, to lease or make a sale or contract for sale of goods, wares, merchandise, machinery,

supplies, or other commodities, whether patented or unpatented, for use, consumption, or resale within the United States or any Territory thereof or the District of Columbia or any insular possession or other place under the jurisdiction of the United States, or fix a price charged therefore, or discount from, or rebate upon, such price, on the condition, agreement, or understanding that the lessee or purchaser thereof shall not use or deal in the goods, wares, merchandise, machinery, supplies, or other commodity of a competitor or competitors of the lessor seller, where the effect of such lease, sale, or contract for sale or such condition, agreement, or understanding may be to substantially lessen competition or tend to create a monopoly in any line of commerce.

Sec. 7.

No person engaged in commerce or in any activity affecting commerce shall acquire, directly or indirectly, the whole or any part of the stock or other share capital and no person subject to the jurisdiction of the Federal Trade Commission shall acquire the whole or any part of the assets of another person engaged also in commerce or in any activity affecting commerce, where in any line of commerce or in any activity affecting commerce in any section of the country, the effect of such acquisition may be substantially to lessen competition, or to tend to create a monopoly.