

WHAT IS INDUSTRIAL ORGANIZATION?

What is industrial organization? It might help to start by clarifying the meaning of “industrial.” According to *Webster’s New World Dictionary*, “industry” refers to “manufacturing productive enterprises collectively, especially as distinguished from agriculture” (definition 5a). “Industry” also means “any large-scale business activity,” such as the tourism industry, for example (definition 4b).

This double meaning is a frequent source of confusion regarding the object of industrial organization. For our purpose, “industrial” should be interpreted in the sense of Webster’s definition 4b. That is, industrial organization applies equally well to the steel industry and to the tourism industry; as far as industrial organization is concerned, there is nothing special about manufacturing.

Industrial organization is concerned with the *workings of markets and industries, in particular the way firms compete with each other*. The study of how markets operate, however, is the object of microeconomics; it has been said that “there is no such subject as industrial organization,” meaning that industrial organization is nothing but a chapter of microeconomics.¹ The main reason for considering industrial organization as a separate subject is its emphasis on the study of the firm strategies that are characteristic of market interaction: price competition, product positioning, advertising, research and development, and so forth. Moreover, whereas microeconomics typically focuses on the extreme cases of monopoly and perfect competition, industrial organization is concerned primarily with the intermediate case of oligopoly, that is, competition between a few firms (more than one, as in monopoly, but not as many as in competitive markets). For the preceding reasons, a more appropriate definition of the field would be something like “economics of imperfect competition.” But the term “industrial organization” was adopted and we are not going to change it.

1.1 AN EXAMPLE

Examples are often better than definitions. In this section, we examine the case of a pharmaceutical firm, Glaxo Wellcome. This example touches on a number of issues of interest to industrial organization. It thus provides a useful introduction to the next section, where we look in a more systematic way at the main questions addressed by industrial organization.

Zantac, the well-known ulcer and heartburn medicine produced by Glaxo Wellcome, is the largest-selling prescription drug in the world, with sales of \$1.6 billion. It costs relatively little to produce Zantac. However, the drug is sold at a very high price—that is, the price margin set by Glaxo Wellcome is very high. Why? An obvious answer is that the seller wants to maximize profits and is able to do so by increasing price.

This begs a second question: Why is Glaxo Wellcome able to increase prices without losing a significant number of customers? One possible answer is that there are relatively few substitutes for Zantac. In other words, Glaxo Wellcome has a significant degree of market power in its therapeutical area (ulcers).

If Glaxo Wellcome's Zantac is so successful, why have other firms not imitated it? In part, because Glaxo Wellcome holds a number of patents that protect its blockbuster drug—or better, used to hold. As the following news item suggests, the years of Zantac's exclusivity have gradually come to an end.

Novopharm has won permission from the U.S. Federal Court of Appeals to market a generic version of Glaxo Wellcome's ulcer drug Zantac. The court ruled against Glaxo Wellcome's claim that Novopharm's drug infringes its patent rights.

Glaxo Wellcome is fighting seven other cases against generic versions of Zantac.²

A generic is a chemically equivalent drug that is sold under the generic chemical name (ranitidine, in the case of Zantac) rather than under the brand name. Notwithstanding innumerable claims that generic Zantac has the same effect as branded Zantac, the latter still manages to command a large market share while selling at a much higher price. In July 1999, RxUSA, a discount drug seller, was quoting a 30-tablet box of 300-mg Zantac at \$85.95. For a little more than that, \$95, one could buy a 250-tablet box of 300-mg generic Zantac (ranitidine)—that is, for 7.5 times less per tablet.

Zantac, moreover, is not the only drug in its therapeutical area; there are several alternatives to Zantac, such as SmithKline's Tagamet. Reviews of clinical trials indicate that there is little difference in the success rates of one drug over the others; in other words, one drug can easily be substituted for any of the others. Why then isn't price competition more intense? The following quote offers a possible answer.

BELLYACHE BATTLES. We knew that the battle for your bellyaches would be big, but we had no idea it would be so bloody. Hundreds of millions of dollars are being poured into

advertising designed to establish brand loyalty for either Tagamet HB or Pepcid AC. Zantac 75 will join the fray shortly.

These drugs were blockbusters as prescription ulcer treatments; now that they are available over-the-counter for heartburn, their manufacturers have really taken off the gloves.³

In other words, advertising plays a very important role. In fact, the advertising budgets of large pharmaceutical companies are of the same order of magnitude as their research budgets. It is not the product's worth that matters, but rather what consumers—and doctors, who frequently act as agents for the final consumer—think the product is worth.

Glaxo Wellcome may complain about the advance of generics producers who are gradually eroding Zantac's market share. But Zantac itself was also, to a great extent, a so-called "me-too" drug. Tagamet, introduced by SmithKline in 1977, was the truly revolutionary drug in ulcer therapy. Zantac, which came a few years later, was sufficiently different that it did not infringe SmithKline's patent rights, but was sufficiently similar to allow Glaxo to compete head-to-head with Tagamet.

At the time of the introduction of Zantac, Glaxo was an independent company. Since then, it has merged with Wellcome to form Glaxo Wellcome. The merger was heralded as the creator of important synergies: It linked up similar avenues of research into prescription drugs previously sought by both companies.

We have very complementary product lines, with Glaxo's strength in respiratory and gastrointestinal medications and Wellcome's in antiviral remedies. So there's the chance for synergies.

More specific synergy has emerged recently. Glaxo has reported that a combination of Wellcome's AZT and Glaxo's 3TC, an anti-hepatitis B drug now in clinical trials, works better against AIDS than either drug alone.⁴

The Glaxo Wellcome Zantac example illustrates several issues that industrial organization is concerned with (see following, in italics): Glaxo Wellcome is a firm that commands a significant degree of *market power* in the anti-ulcer and heartburn therapeutic segment (the relevant *market definition*). Glaxo Wellcome, which resulted from the *merger* of Glaxo and Wellcome, established its position by means of a clever *R&D strategy* that allowed it to enter an industry already dominated by SmithKline; and by means of an aggressive *marketing strategy* that increased its market share. For a time, Zantac's position was protected by *patent rights*. This is no longer the case, meaning that *differentiating the product* with respect to the incoming rivals (generics producers) is now a priority.

In the next section, we consider these and other important issues, organizing them into a set of central questions addressed by industrial organization.

1.2 CENTRAL QUESTIONS

The example in the previous section suggests a number of issues, all centered around the notion of market power. In this section, we attempt to formulate the object of industrial organization in a more systematic way. One can say that the goal of industrial organization is to address the following four questions: (1) Is there market power? (2) How do firms acquire and maintain market power? (3) What are the implications of market power? (4) Is there a role for public policy regarding market power?

Because all of these questions revolve around the notion of market power, it may be useful to make this notion more precise. **Market power** may be defined as the ability to set prices above cost, specifically above incremental or marginal cost, that is, the cost of producing one extra unit.^a So, for example, if Glaxo Wellcome spends \$10 to produce a box of Zantac and sells it for \$50, then we say that it commands a substantial degree of market power.

IS THERE MARKET POWER?

Understandably, this is an important question, in fact, a crucial one. If there is no market power, then there is little point in the study of industrial organization.

Over the years, many empirical studies have attempted to measure the extent of market power. Assuming that costs are proportional to output, a good approximation of the extent of market power can be obtained from data on prices, output, and profit rates.^b One famous study along these lines found that the extent of market power in the American economy is very low, a conclusion that follows from observing relatively low profit rates.⁵ This finding is consistent with one of the central tenets of the Chicago school: As long as there is free entry into each industry, the extent of market power is never significant. If a firm were to persistently set prices above cost, a new firm would find it profitable to enter the market and undercut the incumbent. Therefore, market power cannot persist, the argument goes.^c

Not every economist agrees with this view, either at a theoretical or at an empirical level. From an empirical point of view, an alternative approximation to the value of marginal cost is obtained by dividing the increase in cost from year t to year $t + 1$ by the increase in output in the same period. Based on this approach, a study estimates that prices may be as much as three times higher than marginal cost.⁷

Evidence from particular industries also suggests that the extent of market power may be significant. Take, for example, the U.S. airline industry. A 1996 U.S. government report analyzed average fares in 43 large airports. In ten of these airports, one or a few airlines hold a tight control over takeoff and landing slots. The report found that, on average, fliers were paying 31% more at these airports than at the remaining 33 airports.⁸ In other words, the report provides evidence that airlines that manage to control the critical asset of airport access hold a significant degree of market power. More recently, in response to a proposed merger between Staples and Office Depot, the Federal Trade Commission examined prices of office supplies in areas with one, two, or more competing

^a A rigorous definition of marginal cost and other cost concepts is given in chapter 2. If costs are proportional to output, then marginal cost is equal to unit cost.

^b The profit rate is given by revenues minus cost divided by costs: $r = (R - C)/C$. If costs are proportional to output, then costs are given by unit cost times output, $UC \cdot Q$ (Q is output), whereas revenues are given by $R = P \cdot Q$ (P is price). It follows that $r = (P - UC)/UC$, so r is a good measure of the gap between price and unit cost (which in this case is also equal to marginal cost).

^c The theory of **contestable markets** formalizes this argument.⁶

superstores. In areas where only one chain operates, the study concludes, prices can be up to 15% higher than in other areas.

Further examples could be supplied. These would not necessarily be representative of what takes place in every market. To be sure, in a large number of industries, firms hold little or no market power (see chapter 6). The point is that there are *some* industries where market power exists to a significant extent.

HOW DO FIRMS ACQUIRE AND MAINTAIN MARKET POWER?

Market power translates into higher profits. Creating and maintaining market power is therefore an important part of a firm's value-maximization strategy.

How do firms acquire market power? One way is through legal protection from competition, so that high prices can be set without new competitors entering the market. For example, in the 1960s, Xerox developed the technology of plain-paper photocopying and patented it. Given the legal protection provided by Xerox's patents, it could raise prices to a significant level without attracting competition (see box 16.1).

Firm strategy may also play an important role in establishing market power. Take, for example, the case of the British Sky Broadcasting Group (BSkyB). BSKyB, which broadcasts by satellite, is one of the contenders for the British digital TV market. Its competitors include ONdigital, which is based on terrestrial broadcasting, and a consortium of cable operators. In May 1999, BSKyB introduced an aggressive package that includes a free set-top decoder box, free Internet access, and a 40% discount on telephone charges.⁹ The idea of BSKyB's marketing plan is to preempt its rivals by creating an early lead in installed base of subscribers, a lead that eventually will give BSKyB a persistent advantage over the competition. In fact, following the announcement of the new package, BSKyB's shares were up by 12%, whereas ONdigital's slid by 1.8%. Still, there is concern that BSKyB's move may trigger a price war that could hurt the profits of every firm in the industry. In fact, ONdigital reacted by saying it also will provide free set-top boxes.

Creating market power is only one part of the story. A successful firm also must be able to maintain market power. Patents expire. Imitation takes place. Protected industries are deregulated. What can incumbents do to maintain their position? The airline industry provides an example. In 1998, Japan deregulated its airline industry. Skymark Airlines and Air Do entered a market that, for 35 years, was dominated by incumbents Japan Airlines (JAL) and All Nippon Airlines (ANA). The latter have responded to this entry by engaging in an aggressive price war—to the delight of consumers. But the incumbents' response goes beyond this. ANA and JAL carry out maintenance of the upstarts' planes, for there are no independent servicing companies in Japan. There is a fear that ANA and JAL will refuse to service additional planes introduced by Skymark and Air Do and that, eventually, the industry will return to its old ways—high fares and high profits.¹⁰

In the United States, American Airlines is fighting a court battle over alleged predatory pricing against entrants into its Dallas/Forth Worth hub. American did manage to drive out three competitors: Vanguard, Sun Jet, and Western Pacific. Fares on the route

between Dallas and Kansas City, for example, fell from \$108 to \$80 when Vanguard entered the market. After Vanguard exited, American gradually raised fares to up to \$147 in 1996.¹¹ Joel Klein, head of the antitrust division at the Justice Department, thinks American's strategy achieved more than just driving current rivals out of the market—it also sent a clear signal to potential future entrants: “A sophisticated economist compared it to choosing between two fields with ‘no trespassing’ signs. One has two dead bodies in it, the other has no dead bodies in it. Which field would you feel ready to trespass?” Reputation for toughness is a reliable means of maintaining a position of market power.

In different chapters of this text, especially in chapters 10 to 17, we examine a large set of strategies that firms may deploy to create and maintain their market power.

WHAT ARE THE IMPLICATIONS OF MARKET POWER?

From the firm's point of view, market power implies greater profits and greater firm value. From a social welfare point of view—or from a policymaker point of view, if we believe policymakers pursue the collective good—the implications are more complicated.

The first-order effect of a high price is a transfer from consumers to firms:^d For each extra dollar in price, each buyer is transferring one extra dollar to the seller. If regulators put a greater weight on consumer welfare than on profits, then this transfer should be seen as a negative outcome. In fact, antitrust and competition policies are to a great extent motivated by the goal of protecting consumers from these transfers (see the next section).

In addition to a transfer effect, however, a high price implies an inefficient allocation of resources. High airfares, for example, mean that there are potential fliers who refrain from buying tickets even though the cost of carrying them as passengers would be very low. From a social point of view, it would be efficient to fly many of these potential travelers: Although the value they derive from flying is lower than the price (hence they don't fly), that value is greater than the cost of flying (which is much lower than price). The loss that results from the absence of these sales is the *allocative inefficiency* implied by market power.^e

“The best of all monopoly profits is the quiet life”:¹² A monopolist does not need to be bothered with competition. More generally, firms with greater market power have less incentive to be cost efficient, one may argue. For example, European airlines are known to be less efficient than North American airlines. To a great extent, this efficiency gap results from the more intense competition in the North American market. In other words, market power implies a second type of inefficiency—*productive inefficiency*, which we define as the increase in cost that results from market power.^f

When market power is artificially maintained by government intervention, a third type of inefficiency may result—rent seeking. By **rent seeking**, we mean the unproductive resources spent by firms in attempting to influence policymakers. Consider, for example,

^d By “first-order,” we mean the effect that is quantitatively most significant.

^e A rigorous definition of this concept is given in chapter 2.

^f Again, we defer the more precise definition to the next chapter. The discussion of the preceding hypothesis (market power leads to productive inefficiency) can be found in chapter 3.

the following news article regarding AT&T's effort to maintain its position in the cable television market:

This summer, AT&T Corp. faced the specter of cities around the country requiring it to open its cable television lines to rival Internet companies. . . . The threat never really materialized. Why not? It depends on whom you ask.

AT&T attributes its success to its ability to explain the issues to local officials . . . [Others have a different opinion:] "It comes down to bribery or threats," says Greg Simon, co-director of Opennet Coalition, a group of companies that has launched its own lobbying effort to promote open access.¹³

Another example of large amounts of resources spent in attempting to influence decision makers is the recent Microsoft case. Netscape, Sun Microsystems, and Microsoft itself would not have spent the vast amounts that they did if the operating system industry were not as profitable as it is—thus the idea that rent seeking is a consequence of market power.

The preceding discussion supports the view that market power, good as it might be for firms, is bad for society. First, it makes firms richer at the expense of consumers. Second, it decreases economic efficiency (allocative and productive efficiency). Third, it induces firms to waste resources to achieve and maintain market power. However, from a *dynamic* point of view, an argument can be made in favor of market power:

As soon as we go into the details and inquire into the individual items in which progress was most conspicuous, the trail leads not to the doors of those firms that work under conditions of comparatively free competition but precisely to the doors of the large concerns.¹⁴

This argument is one of the central points of the Austrian school, led by its greatest exponent, J. Schumpeter, author of the preceding quotation. It is examined in greater detail in chapter 16. Like the Chicago school, the Austrian school is quite radical when it comes to market power. However, whereas a Chicago economist would argue that market power does not exist, a Schumpeterian would rather say that market power exists—and it's a good thing that it does, for market power is a precondition for technical progress.

IS THERE A ROLE FOR PUBLIC POLICY REGARDING MARKET POWER?

In the context of industrial organization, the primary role of public policy is to avoid the negative consequences of market power. Public policy in this area can be broadly divided into two categories: regulation and antitrust (or competition policy).⁸ Regulation refers to the case in which a firm detains monopoly or near-monopoly power, and its actions (e.g., the price it sets) are directly under a regulator's oversight. For example, until 1996,

⁸ The terminology "antitrust" is more common in the United States, whereas "competition policy" is the corresponding European term.

AT&T needed regulatory approval each time it changed its long-distance telephone rates. Antitrust policy (or competition policy) is a much broader field. The idea is to prevent firms from taking actions that increase market power in a detrimental way. A couple of examples may help.

In May 1999, shareholders of Exxon Corp. and Mobil Corp. overwhelmingly approved the plan to merge the two companies. Lee Raymond and Lucio Noto, the two chairmen and chief executives, claim that size and market power are not the motivation for the merger, rather it's the cost savings that will be achieved—\$2.8 billion annually, they estimate.¹⁵ “If anybody thinks that this company will have monopolistic power in this environment, when we have less than 4% of world production and 11% of world sales, they are dreaming,” says Mr. Noto. U.S. antitrust regulators don't seem to share the same opinion. They are expected to require Exxon and Mobil to divest some refineries and retail outlets, especially in areas where the two companies hold a greater market share.

On the other side of the pond, U.K.'s Office of Fair Trading (OFT), one of Britain's competition watchdogs, has recently examined the actions taken by The Times newspaper. Over a period of six or seven years, The Times followed very aggressive pricing strategies that nearly drove some of its rivals to bankruptcy. Although the “victims”—The Independent, The Daily Telegraph, and The Guardian—survived the alleged predatory attacks, The Times' market share increased significantly. The OFT decided not to impose any penalty, as there was insufficient evidence of intent to drive rivals out of the market. However, it mandated The Times to inform the OFT of future plans to reduce prices, and to justify the rationale for such price cuts.

The previous two examples provide an idea of the variety of situations that may fall under the scope of public policy. The overall rationale is to prevent and remedy situations where market power may reach unreasonable levels, to the detriment of society—consumers in particular. Over the course of the next chapters, we examine several other areas for policy intervention motivated by the goal of curbing market power.

As was stated before, the Chicago school takes a very different approach. The claim is that, in a world of free competition, market power is never very significant. In fact, the few situations where market power does exist result precisely from government intervention. In other words, the Chicago school reverses the order of causation: It's not that market power prompts government intervention but the exact opposite—government intervention creates market power, protecting the interests of firms and not those of consumers. As Milton Friedman, a leader of the Chicago school, stated:

Because we all believed in competition 50 years ago, we were generally in favor of antitrust. We've gradually come to the conclusion that, on the whole, it does more harm than good. [Antitrust laws] tend to become prey to the special interests. Right now, who is promoting the Microsoft case? It is their competitors, Sun Microsystems and Netscape.¹⁶

Industrial Policy

In addition to regulation and antitrust (or competition policy), some countries have followed policies targeted at particular firms or groups of firms. Of particular importance is **industrial policy**. The goal of industrial policy is very different from that of regulation and antitrust. Whereas the latter attempt to promote competition, the former is geared toward strengthening the market position of a firm or industry, particularly with respect to foreign firms. For example, much of the success of Airbus Industrie, a consortium backed by four European countries, is the result of the support it has received from the respective governments over the past three decades. Starting from a market share of less than 10% in the 1970s, Airbus is now competing head-to-head with Boeing, the industry's main competitor.

Industrial policy is generally not favored by economists. In practice, it amounts to governments picking winners among a number of potential firms and industries. But why should governments know better than the market who the promising firms and industries are? A frequent argument in support of industrial policy is the example of MITI, the Japanese Ministry of Industry and Foreign Trade. True, the prowess of the Japanese export sector is a success story and owes a great deal to the role played by MITI. For example, MITI's support was an important factor in the emergence of Japan as a leader in semiconductors. But together with the success stories, there is also a fair number of flops: For example, the 1980's project to develop a "fifth generation computer," which would leapfrog the American competitors, led to very poor results.¹⁷ For these reasons, and as a matter of consistency, when talking about public policy we will restrict our attention in this text to regulation and antitrust.

1.3 COMING NEXT

There are sixteen chapters to come, divided into six different parts.

Parts one and two are introductory in nature. Part one provides some of the tools required for the study of IO: basic microeconomics (chapter 2), a brief introduction to the theory of the firm (chapter 3), elements of game theory (chapter 4). Part two deals with the extreme cases of monopoly and perfect competition. As suggested at the beginning of the chapter, these models are normally treated in microeconomics courses. For readers with a background in the field, some of the material treated in chapters 5 and 6 may already be familiar.

Insofar as industrial organization is the study of imperfect competition, parts three through six constitute the core of the text. Within these, part three plays a central role, as it introduces the basic theory of oligopoly competition—static models (chapter 7), dynamic models (chapter 8), and the study of the relation between market structure and market power (chapter 9). Part four extends the analysis by considering firm strategies

beyond the simple pricing and output decisions examined in part three. These include price discrimination (chapter 10), vertical relations (chapter 11), product differentiation (chapter 12), and advertising (chapter 13).

Throughout most of the text, we assume a *given* industry structure. Part five takes one step back and looks at the endogenous determinants of industry structure. We begin by looking at how technology and demand conditions influence market structure (chapter 14), and then move on to examine the role played by firm strategy (chapter 15). Part six concludes the text by focusing on technology-intensive industries. In chapter 16, we study how firms compete in research and development (R&D) and how this influences market structure. In chapter 17, we examine industries where networks and standards play an important role.

A Note on Methodology

Most economists analyze industries with reference to a framework known as the **structure-conduct-performance (SCP) paradigm**.¹⁸ First, one looks at the aspects that characterize market structure: the number of buyers and sellers, the degree of product differentiation, and so forth. Second, one pays attention to the typical conduct of firms in the industry: pricing, product positioning and advertising, and so forth. Finally, one attempts to estimate how competitive and efficient the industry is.

Underlying this system is the belief that there is a causal chain between the preceding different components: Market structure determines firm conduct, which in turn determines industry and firm performance. For example, in an industry with very few competitors, each firm is more likely to increase prices or collude with its rivals. And higher prices have the performance implications discussed in the previous section.

Causality also works in the reverse direction. For example, a firm that does not perform well exits the market, so performance influences market structure. Likewise, a firm may price very low to drive a rival out of the market, an instance where conduct influences structure. Finally, government intervention and basic demand and supply conditions also influence the different components of the SCP paradigm.

In chapters 9 and 14, we look at the relation between the different components in the structure-conduct-performance paradigm. However, most of the text centers on the analysis of firm conduct and how it influences firm and industry performance as well as market structure.^h

^h It should be clear that the SCP paradigm is not a model that directly provides answers to the questions listed previously. It is best thought of as a guide that allows one to analyze and understand the workings of different industries. Alternative frameworks have been proposed for the same or similar purposes. Examples include Michael Porter's **five-forces framework** for the analysis of industry competition. The five forces are suppliers, buyers, substitute products, potential entrants, and competition between incumbent firms.¹⁹

SUMMARY

- Industrial organization is concerned with the workings of markets and industries, in particular, the way firms compete with each other.

- Specifically, the central questions addressed by industrial organization are (1) Is there market power? (2) How do firms acquire and maintain market power? (3) What are the implications of market power? (4) Is there a role for public policy as regards market power?

KEY CONCEPTS

- market power
- efficiency
- regulation
- rent seeking
- antitrust and competition policy
- industrial policy
- Chicago school
- Austrian school
- structure-conduct-performance paradigm

REVIEW AND PRACTICE EXERCISE

1.1* Empirical evidence from a sample of more than 600 U.K. firms indicates that, when controlling for the quantity of inputs (i.e., taking into account the quantity of inputs), firm output is increasing in the number of competitors and is decreasing in market share and industry concentration.²⁰ How do these results relate to the ideas presented in the chapter?