COMPETITORS AND COMPETITION

6

The domestic U.S. airline industry experienced its ups and downs during the 1990s. The decade began with a mild recession. With demand for airline travel on the decline, domestic carriers found themselves with empty seats. The airlines recognized that the marginal cost of filling an empty seat was negligible, and some carriers slashed prices in the hopes of filling their planes. The resulting price wars exacerbated the decline in profits. The industry took a financial beating, with aggregate industry losses exceeding $4 billion in 1992. The economic recovery of the mid-1990s lifted the industry. Seats on popular routes filled up. Flying at or near capacity, the carriers were able to raise prices for all passenger classes. When an airline did have empty seats, it utilized the Internet to selectively reduce prices on a short-term basis, rather than slash them across the board. The record losses of the early 1990s were replaced by record profits, with the industry earning a combined $4 billion in 1999. As the economy softened in 2000 and especially in 2001, the airlines once again struggled to fill planes and resist the temptation to discount their airfares. The September 11 attack threatened the solvency of many of the major airlines, and necessitated a government bailout to keep them flying. By early 2003, the fate of several big carriers, including United and USAir, was in doubt.

This brief history illustrates the interplay among competitors in a concentrated market. The major players understood the need to avoid deep discounting, but also understood the economics of empty seats. As demand rose and fell, their ability to avoid price wars rose and fell with it. The events of September 11 plunged the industry into a tailspin from which it could not recover without substantial reorganization.

Part Two of this book is concerned with competition. The first part of this chapter discusses a prerequisite for analyzing competition: identifying the competitors and defining the market. The second part considers four different ways in which firms compete: perfect competition, monopoly, monopolistic competition, and oligopoly. Chapters 7 through 9 present advanced concepts in competitive strategy, including the effect of commitments on competition, the dynamics of competition, and entry. Chapter 10 discusses how to use the material in Part Two to assess competition in specific markets.

◆ ◆ ◆ ◆ ◆ Competitor Identification and Market Definition

Most managers can readily identify their competitors. Even so, it is worthwhile to develop both qualitative and quantitative methods for identifying competitors. These methods force managers to carefully identify the features that define the markets they compete in, and often reveal the nature of competition.

A given firm may compete in several input and output markets simultaneously. It is important to analyze each market separately, because the competitors and the nature of competition may be quite different in each one. For example, a coal mining operation in a small town in northern England may have little or no competition in the market for labor, an input, but may face many competitors in the market for coal, its output.

The Basics of Competitor Identification

Antitrust agencies, such as the U.S. Department of Justice (DOJ), may be the leading experts on competitor identification. They must determine whether merging firms will achieve market power and raise prices, and whether existing monopolists are abusing their power. Doing so requires the identification of potential competitors who could limit such harmful activities. The DOJ uses a simple conceptual guideline to identify competitors. According to the DOJ, an analyst has identified all of the competitors of a given firm if a merger among those firms would facilitate a *small but significant nontransitory increase in price*. This is known as the *SSNIP* criterion. For example, if a merger among Audi, BMW, and Mercedes would permit the three German luxury car makers to boost prices by, say, 5 percent, then we would conclude that the three firms compete with each other, but do not compete with other car makers. On the other hand, we might suspect that competition from Lexus, Cadillac, and Volvo would limit the ability of the German car makers to raise prices. If this is the case, then the list of competitors must expand to include these non-German luxury nameplates.

Putting Competitor Identification into Practice

The SSNIP criterion is very sensible, but it is often not very practical. One cannot wait until all the candidate firms in a market have merged before determining who is competing with whom. Even so, the SSNIP criterion points to the kind of evidence needed to identify competitors. Specifically, the SSNIP criterion suggests that two firms directly compete if a price increase by one causes many of its customers to do business with the other. This is the essence of the economic concept of substitutes.

In general, two products X and Y are substitutes if, when the price of X increases and the price of Y stays the same, purchases of X go down and purchases of Y go up. When asked to identify competitors, most managers would probably name substitutes. For example, a manager at Mercedes would probably name Lexus and Acura as competitors. In fact, when Lexus and Acura entered in the 1980s with relatively low prices, they took considerable business away from Mercedes. When Mercedes and other German luxury car makers reduced their prices in the early 1990s, they regained market share from Lexus and Acura.

Managers often draw a distinction between *direct competitors* and *indirect competitors*. When firms are direct competitors, the strategic choices of one directly affect the performance of the other. This would be the case for Mercedes and Lexus. When firms are indirect competitors, the strategic choices of one also affect the performance of the other, but only through the strategic choices of a third firm.[1] For example, consider competition between Mercedes sedans and Jeep Grand Cherokees. If Mercedes reduces the prices on its sedans, Volvo may lower the price on its sedans. The latter price reduction might affect the sales of Jeep Grand Cherokees, because Volvos and Jeeps are substitutes, even though Mercedes and Jeeps are not. Thus, Mercedes and Jeep may be indirect competitors.

At an intuitive level, products tend to be close substitutes when three conditions hold:

1. They have the same or similar *product performance characteristics.*
2. They have the same or similar *occasions for use.*
3. They are sold in the same *geographic market.*

A product's performance characteristics describe what it does for consumers. Though highly subjective, listing product performance characteristics often clarifies whether products are substitutes. Mercedes and Volvo sedans have the following product performance characteristics in common:

- Seat five comfortably
- High "curb appeal" and prestigious name
- High reliability
- Powerful acceleration and sure handling and braking
- Plenty of features, such as leather seats and a compact disc player

Based on this short list, we can assume that the products are in the same market. We would probably exclude Jeeps from this market, however.

A product's occasion for use describes when, where, and how it is used. Both orange juice and cola quench thirst, but because they are used in different ways (orange juice is primarily a breakfast drink and cola is not), they are probably in different markets.

Products with similar characteristics and occasions for use may not be substitutes if they are in different geographic markets. In general, two products are in different geographic markets if (a) they are sold in different locations, (b) it is costly to transport the goods, and (c) it is costly for consumers to travel to buy the goods. For example, a company that mixes and sells cement in Mexico City is not in the same geographic market as a similar company in Oaxaca. The cost of transporting cement over long distances is so large relative to its price that it would not be economical for the Oaxaca cement seller to ship its product to Mexico City, even if cement prices in Mexico City are higher.

---

[1]Indirect competitors may also include firms that are not currently direct competitors but might become so. This definition forces managers to go beyond current sales data to identify potential competitors.

EXAMPLE 6.1

SUBSTITUTES AND COMPETITION IN THE POSTAL SERVICE

One of the few constants about international business is that the postal service is a government-regulated or government-owned monopolist. Among the developed countries, only Holland has fully privatized its postal service. Advocates of maintaining government monopoly control of the postal service claim that it is in their nation's best interest to assure that all residents, regardless of location, have equal access to communication by post. Considering the growth of advertising ("junk") mail, on the one hand, and the availability of alternative modes of communication such as faxes and e-mail on the other, this argument seems questionable. Another justification for government-sponsored postal monopoly is that it is unnecessarily costly for two or more firms to deliver mail to the same addresses. Some arguments for government control, such as some Britishers' concern that a private post office may not wish to depict the Queen on stamps, seem less compelling.

As monopolies, postal services have operated with legendary inefficiency. In the early 1990s, Chicago newspapers routinely reported bags of undelivered mail found abandoned in unlikely places, such as under highway overpasses and in workers' garages. (Fortunately for Chicagoans, the media attention brought substantial improvements in service.) But changes in technology and global competition are beginning to catch up with postal services, and their protected status is at risk.

Government regulations do not limit all forms of competition to the postal service. Businesses increasingly use private express mail service for relatively routine matters. For example, in 2000 there were an estimated 400,000 European express shipments per day. Locally, most big cities have private courier services that deliver mail between downtown office buildings in a few hours or less. Electronic mail, fax, and interactive television also threaten established postal services and have siphoned off billions of dollars of business from European postal services alone. (Following the dictum "If you can't beat 'em, join 'em," the British Post Office recently concluded a trial of an "electronic post office" in partnership with several leading computer firms, including Microsoft and Hewlett-Packard. Rather than use "snail mail," individuals could have letters copied and e-mailed to recipients. After just 11 transactions in 12 months, the idea was abandoned.)

Faced with these competitive pressures, national postal services are seeking to operate more like private businesses, especially in the fiercely competitive international parcel post market. Germany's Deutsche Post went public in the year 2000, acquired international parcel post carrier DHL in 2001, and has been considering further acquisitions with an eye to becoming the world's largest international postal service. Deutsche Post has even considered diversifying into distribution of electricity, gas, and water. Other national postal services have sales offices throughout Europe to compete for international parcel post, and New Zealand's postal service has sales teams that travel the world in search of business. New Zealand's post office has diversified in its home country, opening a bank and funding a venture-capital arm that has invested in several e-commerce firms.

As nations liberalize their postal services and state-owned post offices begin to operate like other big conglomerates, the post offices may eventually lose their protected status for local service. Already, private postal services in Europe may compete with national postal services on mail weighing more than 350 grams. Some foresee the elimination of all barriers to competition. National postal services may even have to compete head to head for local and international business.

Empirical Approaches to Competitor Identification

While the intuitive approach to competitor identification is often sufficient for business decision making, it can be highly subjective and open to criticism. When possible, it is helpful to augment the intuitive approach with data. As pointed out in the Economics Primer, the degree to which products substitute for each other is measured by the cross-price elasticity of demand. If the products in question are X and Y, then the cross-price elasticity measures the percentage change in demand for good Y that results from a 1 percent change in the price of good X. Formally, if η_{yx} denotes the cross-price elasticity of demand of product Y with respect to product X, Q_y the quantity of Y sold, and P_x the price of product X, then

$$\eta_{yx} = (\partial Q_y/Q_y)/(\partial Px/Px)$$

When η_{yx} is positive, it indicates that consumers increase their purchases of good Y as the price of good X increases. Goods X and Y would thus be substitutes. Thanks to the scanner pricing data, it is increasingly possible for firms to directly measure cross-price elasticities of demand.

There are other quantitative approaches to competitor identification. One might observe how prices of different firms change over time—the prices of close competitors tend to be highly correlated. One might obtain data about the purchase patterns of individual consumers to predict where they would turn if their present seller were to raise prices.[2] Finally, one could identify firms in the same Standard Industrial Classification (SIC) as defined by the U.S. Bureau of the Census. SIC codes identify products and services by a seven-digit identifier, with each digit representing a finer degree of classification. For example, within the two-digit category 35 (industrial and commercial machinery and computer equipment) are four-digit categories 3523 (farm machinery and equipment) and 3534 (elevators and moving stairways). Within 3534 are six-digit categories for automobile lifts, dumbwaiters, and so forth. One should use caution when using SIC codes to identify competitors. Although products with the same SIC code may often be classified as competitors, this is not always so. For example, category 2834 includes all pharmaceuticals, but not all drugs substitute for each other. Conversely, some four-digit categories are too narrow. Firms in the four-digit categories for variety stores (5331), department stores (5311), and general merchandise stores (5399) may all compete against each other.

Geographic Competitor Identification

The government census provides a good starting point for identifying geographic competitors. For example, one could limit the geographic scope of competition to cities or states. Without knowledge of actual product or consumer flows, however, this can lead to gross errors. For example, it is unlikely that all the grocery stores in Chicago compete with one another. Were all the grocers on the south side to merge, they could surely raise their prices by 5 percent without losing much business to stores in other parts of Chicago.

---

[2]Capps, Dranove, Greenstein, and Satterthwaite (2001) use this approach to identify a hospital's substitutes. "The Silent Majority Fallacy of the Elzinge Hogarty Criteria" NBER Working Paper 8216.

Rather than rely on *ad hoc* market boundaries, it is preferable to identify competitors by directly examining the flow of goods and services across geographic regions. To illustrate this approach, consider how a hypothetical sporting goods store in the Sunset section of San Francisco—Bay City Sports—might try to identify its competitors. Bay City Sports might assume that its competitors include all sporting goods stores in the Sunset. This is mere guesswork and is probably wrong. Bay City Sports might instead survey its customers to find out where else they shop. This would certainly identify some direct competitors. But it might fail to identify other direct competitors, and would likely miss indirect competitors.

To identify all of its direct and indirect competitors, Bay City Sports should adopt a two-stage approach. First, it should ask its customers where they live. The store can then identify the contiguous area from which it draws most of its customers, sometimes called the *catchment area*. Perhaps Bay City was partly correct, in that most of its customers do live in the Sunset. It should definitely consider other sporting goods stores in the Sunset to be direct competitors. But some residents of the Sunset, especially those who live on its fringes, may prefer to travel elsewhere to buy their sporting goods. To identify these distant direct competitors, Bay City Sports should perform a second survey of Sunset residents (not just its own customers) to find out whether and where they shop outside the area. Bay City may identify competitors that lie outside its catchment area.

While flow analysis is a good starting point for identifying geographic competitors, it is not foolproof. It may turn out that few customers currently leave the Sunset, but this does not imply that they would not leave if stores in the Sunset were to raise their prices. Or it may be that many customers currently shop outside the Sunset. But they may have idiosyncratic reasons for leaving—perhaps they are avid hockey players and stores in the Sunset do not sell hockey gear. In this case, the Sunset stores might be able to achieve a SSNIP for the merchandise they do carry. Stores outside the Sunset may not be competitors after all.

◆ ◆ ◆ ◆ ◆ Measuring Market Structure

Markets are often described as being concentrated (having just a few sellers) or unconcentrated. As we will see, such characterizations often permit a quick and reasonably accurate assessment of the likely nature of competition in a market. These characterizations are aided by having measures of *market structure*.

Market structure refers to the number and distribution of firms in a market. A common measure of market structure is the N-firm concentration ratio. This gives the combined market share of the N largest firms in the market. For example, the four-firm concentration ratio in the soft drink industry is about .90, which indicates that the combined market share of the four largest soft drink manufacturers is about 90 percent. When calculating market share, one usually uses sales revenue, although concentration ratios based on other measures, such as production capacity, may also be used. Table 6.1 shows four-firm and eight-firm concentration ratios for selected U.S. manufacturing industries in 1992.

Another commonly used measure of market structure is the Herfindahl index.[3] The Herfindahl index equals the sum of the squared market shares of all the firms in

[3]The index is named for Orris Herfindahl, who developed it while writing a Ph.D dissertation at Columbia University on concentration in the steel industry. The index is sometimes referred to as the Herfindahl-Hirschman index and is often abbreviated HHI.

TABLE
CONCE

SIC code
2024
2033
2037
2041
2043
2046
2047
2273
2411
2448
2511
2731
2771
2812
2841
2911
3221
3274
3312
3334
3411
3491
3511
3562
3565
3571
3581
3632
3711
3823
3931
3995

Sourc
Depa

the
$\Sigma_i(S_i$
Her
equ
inde
ahl i
suff
squ

On

The ensuing discussion of these competitive conditions highlights some intuitive issues for managers. We begin with brief discussions of perfect competition and monopoly. (More detailed discussions may be found in the Economics Primer and in microeconomics textbooks.) We then provide lengthier discussions of monopolistic competition and oligopoly. Because the theory of oligopoly is especially rich, we will elaborate on it in Chapters 7 and 8.

Perfect Competition

In the theory of perfect competition, there are many sellers of a homogeneous good and many well-informed consumers who can costlessly shop around for the best price. Under these conditions, there is a single market price that is determined by the interaction of all sellers and buyers, but is beyond the control of any one of them. This implies that if a firm charges even one penny more than the market price it will sell nothing, and if it sets a price below the market price, it will needlessly sacrifice revenue. In other words, the firm faces infinitely elastic demand. Its only decision, then, is how much output to produce and sell.

Recall from the Economics Primer that a firm maximizes profit by producing a volume of output at which marginal revenue equals marginal cost. Recall, too, that the percentage contribution margin (PCM) equals $(P - MC)/P$, where P = price and MC = marginal cost. The condition for profit maximization can then be written $PCM = 1/\eta$.[5] In perfect competition, $\eta = \infty$, so the optimal PCM is 0.

Many markets approximate perfect competition, including those for many metals and agricultural commodities. As the model predicts, price competition in these markets is fierce. Sellers set identical prices, and prices are generally driven down to marginal costs. Many other markets, including those for most consumer goods and professional services, do not fit the literal conditions of the model of perfect competition. Even so, some of these markets may experience fierce price competition. Chapter 8 provides a rigorous explanation of why prices in some markets are driven down toward marginal costs. Below, we present some informal explanations.

Market conditions will tend to drive down prices when two or more of the following conditions are met:

1. There are many sellers.
2. Consumers perceive the product to be homogeneous.
3. There is excess capacity.

We discuss how each of these features may contribute to fierce pressure to reduce prices.

Many Sellers

A top airline executive once said that "the industry is led by its dumbest competitor."[6] He made this statement in conjunction with a round of price cutting by two competitors. He probably meant that the airlines could increase their profits if they would stop cutting prices in vain attempts to increase market share. Of course, if the members of an industry could collude to maintain high prices, consumers would suffer. To

[5]See the Economics Primer.

[6]*Fortune*, October 20, 1980, p. 27.

prevent this, the DOJ and Federal Trade Commission (FTC) and their counterparts in the European community, Canada, and Australia, vigorously enforce antitrust laws designed to prevent collusive pricing. In enforcing these laws, the antitrust authorities are seldom concerned about markets with more than a few sellers. Experience, coupled with economic theory, has taught them that it is unusual for more than a handful of sellers to raise prices much above costs for a sustained period. This is true for a number of reasons.

First, when there are many sellers, there is likely to be a diversity of pricing preferences. Even if the industry PCM is high, a particular seller may prefer a low price, for example, if it has low costs. In the airline industry, for example, a low-cost airline, such as Southwest, will often underprice higher-cost competitors, such as Delta and United, on routes in which they directly compete.

Second, a price increase will result in fewer purchases by consumers, so some sellers will have to reduce production to support the elevated prices. It is difficult to get a lot of sellers to agree on who should cut production. This point is illustrated by the contrast between the historical success of cartels in the potash and nitrogen industries.[7] The potash cartel that existed before World War II was highly concentrated and generally succeeded in restricting production and keeping prices high. The world nitrogen cartel, by contrast, consisted of many firms in the United States, Europe, and South America and was far less successful in its attempts to raise prices above competitive levels.[8] The collapse of world oil prices in 2001 further illustrates this point. OPEC efforts to restrict output were thwarted when nonmember nations including Russia boosted oil production.

Third, even if sellers appear willing to cut production, some may be tempted to "cheat" by lowering price and increasing production. Among the firms most tempted to lower prices are those with small market shares, of which there will be many when the market is relatively unconcentrated. A small firm may view the collusive bargain among bigger rivals as an opportunity to increase market share. Together with increased market share may come learning benefits and economies of scale that will enhance a firm's long-run competitive position. A small firm may also gamble that its larger rivals will be unable to detect its price reductions. Even if they did, they may be reluctant to slash prices further in retaliation, since they would stand to lose more (in absolute terms) from a price war than does the small firm.[9]

Homogeneous Products

When a firm lowers its price, it expects to increase its sales. The sales increase may come from three different sources:

1. Increased sales to customers who were planning to buy a smaller quantity from the firm
2. Sales to customers who were not planning to purchase from the firm or its competitors
3. Sales to customers who were planning to buy from a competitor but switched to take advantage of the lower price

---

[7]Potash (potassium oxide) is a compound used to produce products such as fertilizer and soap.

[8]Chapters 5 and 6 of Markham, J., *The Fertilizer Industry*, Nashville, TN, Vanderbilt University Press, 1958.

[9]This point is developed more fully in Chapter 8.

For many firms that reduce prices, customer switching represents the largest source of sales gain. A good example is automobiles. When Mercedes lowered prices on its luxury sedans, most of the resulting sales increase came from car buyers who might have bought a competitor's car, as opposed to Mercedes owners who decided to buy another Mercedes because of the price reduction, or people who were not planning to buy any car before the price reduction.

Customers are more willing to switch from one seller to another when the product is homogeneous, that is, if the characteristics of the product do not vary across sellers. When products are homogeneous, customers tend to be less loyal, because any seller's product will meet their needs. This intensifies price competition, because firms that lower prices can expect large increases in sales.

Some products are clearly homogeneous. A share of IBM stock sold by one trader provides the same financial rights as a share of IBM stock sold by another. One ounce of 24-karat gold is completely interchangeable with another. Other products, such as DVD players, are slightly differentiated, and many (but not all) consumers will switch to obtain a lower price. Yet other products, such as medical services, are highly differentiated, and most consumers are unwilling to switch just to obtain a lower price.

Excess Capacity

To understand the role of capacity in pricing problems, recall the distinction between average costs and marginal costs that we made in the Economics Primer and in Chapter 2. For production processes that entail high fixed costs, marginal cost can be well below average cost over a wide range of output. Only when production nears capacity—the point at which average cost begins to rise sharply—does marginal cost begin to exceed average cost.

The numerical example in Table 6.3 illustrates the implications of excess capacity for a firm's pricing incentives. The table depicts the situation facing a diesel engine manufacturer, such as Deere & Company, whose plant has a capacity of 50,000 engines per year. Because of a recession, suppose that Deere has confirmed orders for only 10,000 engines during the upcoming year. Deere is confident, however, that it can increase sales by another 10,000 engines by stealing a major customer from one of its competitors, Navistar. To do so, Deere has to offer this customer a price of $300 per engine.[10] Should Deere offer this price?

TABLE 6.3
CAPACITY UTILIZATION AND COSTS

Annual Output	*Total Variable Cost ($millions/year)*	*Total Fixed Cost ($millions/year)*	*Total Cost ($millions/year)*	*Average Cost per Engine*
10,000	$1	$12	$13	$1300
20,000	2	12	14	700
30,000	3	12	15	500
40,000	4	12	16	400
50,000	8	12	20	400

[10]We will assume that this offer does not require Deere to adjust the price at which it sells engines to its other customers.