Once the seventh-highest market capitalization company in America, Houston’s energy giant Enron Corp. stumbled from a stock-market valuation of $62 billion in January 2001 to penny stock status and Chapter 11 bankruptcy protection in less than a year. A similar fate befell Troy, Michigan–based discount retailer Kmart Corp., which on January 22, 2002, became the largest retailer to ever seek bankruptcy protection. With 275,000 employees and more than 2,100 stores, Kmart is trying to restructure and avoid becoming road kill for retail juggernaut Wal-Mart Stores, Inc.

The demise of corporate titans did not begin with Enron and end with Kmart. The creative destruction of capitalism is ongoing and unforgiving. From 1928–1996, Bethlehem Steel Corp. was a fixture in the Dow Jones Industrial Average. In 1972, imaging company Polaroid Corp. was the most revered member of the Nifty 50, a group of stock-market favorites. Both filed for federal bankruptcy protection in 2001. Xerox Corp., another Nifty 50 favorite, was once so dominant in the copy business that it became a verb, as in “Xerox this.” Xerox hangs on, but business has dwindled in the face of growing competition from electronic media.

Despite massive financial resources and compelling brand names, corporate behemoths often stumble. Large size can breed deadly complacency. To survive and prosper in the new millennium, many large-scale organizations have cut back and refocused in order to become smaller, more nimble organizations.1 This chapter offers perspective on how the nature of competition is affected by the number and size distribution of buyers and sellers; it examines competition in the partly competitive, partly monopolistic world of monopolistic competition and oligopoly.

---

CONTRAST BETWEEN MONOPOLISTIC COMPETITION AND OLIGOPOLY

Monopolistic competition and oligopoly provide differing perspectives on the nature of competition in imperfectly competitive markets. Attributes of the monopolistic competition and oligopoly market models are outlined in this section and then elaborated on in the rest of the chapter.

Monopolistic Competition

The economic environment faced by many firms cannot be described as perfectly competitive. Likewise, few firms enjoy clear monopoly. Real-world markets commonly embody elements of both perfect competition and monopoly. Firms often introduce valuable new products or process innovations that give rise to above-normal rates of return in the short run. In the long run, however, entry and imitation by new rivals erode the dominant market share enjoyed by early innovators, and profits eventually return to normal. Still, in sharp contrast to perfectly competitive markets, the unique product characteristics of individual firms often remain valued by consumers. Consumers often continue to prefer Campbell’s Soup, Dockers, Oil of Olay, Rubbermaid, Tide, and other favorite brands long after comparable products have been introduced by rivals. The partly competitive, partly monopolistic market structure encountered by firms in the apparel, food, hotel, retailing, and consumer products industries is called monopolistic competition. Given the lack of perfect substitutes, monopolistically competitive firms exercise some discretion in setting prices—they are not price takers. However, given vigorous competition from imitators offering close but not identical substitutes, such firms enjoy only a normal risk-adjusted rate of return on investment in long-run equilibrium.

Monopolistic competition is similar to perfect competition in that it entails vigorous price competition among a large number of firms. The major difference between these two market structure models is that consumers perceive important differences among the products offered by monopolistically competitive firms, whereas the output of perfectly competitive firms is homogeneous. This gives monopolistically competitive firms at least some discretion in setting prices. However, the availability of many close substitutes limits this price-setting ability and drives profits down to a normal risk-adjusted rate of return in the long run. As in the case of perfect competition, above-normal profits are possible only in the short run, before the monopolistically competitive firm’s rivals can take effective countermeasures.

Oligopoly

Oligopoly is the market structure model that describes competition among a handful of competitors sheltered by significant barriers to entry. Oligopolists might produce a homogeneous product, such as aluminum, steel, or semiconductors; or differentiated products such as Cheerios, Coca-Cola, Marlboro, MTV, and Nintendo. Innovative leading firms in the ready-to-eat cereal, beverage, cigarette, entertainment, and computer software industries, among others, have the potential for economic profits even in the long run. With few competitors, economic incentives also exist for such firms to devise illegal agreements to limit competition, fix prices, or otherwise divide markets. The history of antitrust enforcement in the United States provides numerous examples of “competitors” who illegally entered into such agreements. Yet there are also examples of markets in which vigorous competition among a small number of firms generates obvious long-term benefits for consumers. It is therefore erroneous to draw a simple link between the number of competitors and the vigor of competition.

In an industry characterized by oligopoly, only a few large rivals are responsible for the bulk of industry output. As in the case of monopoly, high to very high barriers to entry are typical.
Under oligopoly, the price/output decisions of firms are interrelated in the sense that direct reactions among rivals can be expected. As a result, decisions of individual firms anticipate the likely response of competitors. This competition among the few involves a wide variety of price and nonprice methods of rivalry, as determined by the institutional characteristics of each particular market. Even though limited numbers of competitors give rise to a potential for economic profits, above-normal rates of return are far from guaranteed. Competition among the few can be vigorous.

**Dynamic Nature of Competition**

In characterizing the descriptive relevance of the monopolistic competition and oligopoly models of seller behavior, it is important to recognize the dynamic nature of real-world markets. For example, as late as the mid 1980s it seemed appropriate to regard the automobile and personal computer manufacturing markets as oligopolistic in nature. Today, it seems fairer to regard each industry as monopolistically competitive. In the automobile industry, GM, Ford, and Daimler Chrysler have found Toyota, Honda, Nissan, and a host of specialized competitors to be formidable foes. Aggressive competitors like Dell, Compaq, Hewlett-Packard, and Gateway first weakened, and then obliterated, IBM’s early lead in the PC business. Prices and profit margins for PCs continue to fall as improving technology continues to enhance product quality.

In many formerly oligopolistic markets, the market discipline provided by a competitive fringe of smaller domestic and foreign rivals is sufficient to limit the potential abuse of a few large competitors. In the long-distance telephone service market, for example, AT&T, MCI WorldCom, and Sprint have long dominated the industry. However, emerging competition from the so-called regional Bell operating companies (REBOCs), along with a host of smaller specialized providers, cause long-distance phone service price and service quality competition to be spirited. Similarly, the competitive fringe in wireless communications and cable TV promises to force dramatic change during the years ahead.

It is unfortunate, but public perceptions and government regulatory policy sometimes lag behind economic reality. It is essential that timely and accurate market structure information be available to form the basis for managerial investment decisions that relate to entry or exit from specific lines of business. Similarly, enlightened public policy requires timely information.

**MONOPOLISTIC COMPETITION**

Most firms are subject to rivalry, though perhaps not as vigorous as would exist under perfect competition. Even though most firms face a large number of competitors with similar products, many still have some control over the price of their product. They cannot sell all that they want at a fixed price, nor would they lose all sales if they raised prices slightly. Most firms face downward-sloping demand curves, signifying less-than-perfect competition.

**Characteristics of Monopolistically Competitive Markets**

Monopolistic competition exists when individual producers have moderate influence over product prices, where each product enjoys a degree of uniqueness in the perception of customers. This market structure has some important similarities and dissimilarities with perfectly competitive markets. Monopolistic competition is characterized by

- **Large numbers of buyers and sellers.** Each firm produces a small portion of industry output, and each customer buys only a small part of the total.
- **Product heterogeneity.** The output of each firm is perceived to be essentially different from, though comparable with, the output of other firms in the industry.
• Free entry and exit. Firms are not restricted from entering or leaving the industry.

• Perfect dissemination of information. Cost, price, and product quality information is known by all buyers and all sellers.

These basic conditions are not as restrictive as those for perfect competition and are fairly commonplace in actual markets. Vigorous monopolistic competition is evident in the banking, container and packaging, discount and fashion retail, electronics, food manufacturing, office equipment, paper and forest products, and most personal and professional service industries. Although individual firms are able to maintain some control over pricing policy, their pricing discretion is severely limited by competition from firms offering close but not identical substitutes.

Monopolistic competition is a realistic description of competition in a wide variety of industries. As in perfectly competitive markets, a large number of competitors make independent decisions in monopolistically competitive markets. A price change by any one firm does not cause other firms to change prices. If price reactions did occur, then an oligopoly market structure would be present. The most distinctive characteristic of monopolistic competition is that each competitor offers a unique product that is an imperfect substitute for those offered by rivals. Each firm is able to differentiate its product from those of its adversaries. Nevertheless, each firm’s demand function is significantly affected by the presence of numerous competitors producing goods that consumers view as reasonably close substitutes. Exogenous changes in demand and cost conditions also tend to have a similar effect on all firms and frequently lead to comparable pricing influences.

Product differentiation takes many forms. Quality differentials, packaging, credit terms, or superior maintenance service can all differentiate products, as can advertising that leads to brand-name identification. Not only is a tube of Crest toothpaste different from Colgate toothpaste, but a tube of Crest at a nearby convenience store is different from an identical tube available at a distant discount retailer. Because consumers evaluate products on the basis of their ability to satisfy specific wants, as well as when and where they have them, products involve not only quantity, quality, and price characteristics but time and place attributes as well. The important factor in all of these forms of product differentiation is that some consumers prefer the product of one seller to those of others.

The effect of product differentiation is to create downward-sloping firm demand curves in monopolistically competitive markets. Unlike a price taker facing a perfectly horizontal demand curve, the firm is able to independently determine an optimal price/output combination. The degree of price flexibility enjoyed depends on the strength of product differentiation. The more differentiated a firm’s product, the lower the substitutability of other products for it. Strong differentiation results in greater consumer loyalty and greater control over price. This is illustrated in Figure 11.1, which shows the demand curves of firms A and B. Consumers view firm A’s product as being only slightly differentiated from the bulk of industry output. Because many other firms offer acceptable substitutes, firm A is close to being a price taker. Conversely, firm B has successfully differentiated its product, and consumers are therefore less willing to accept substitutes for B’s output. Firm B’s demand is relatively less sensitive to price changes.

Price/Output Decisions Under Monopolistic Competition

As its name suggests, monopolistic competition embodies elements of both monopoly and perfect competition. The monopoly aspect is most forcefully observed in the short run. For example, consider Figure 11.2. With the demand curve, \( D \), and its related marginal revenue curve, \( MR \), the optimum output, \( Q^* \), is found at the point where \( MR = MC \). Short-run monopoly profits equal to the area \( P_1LMAC_1 \) are earned. Such profits can be derived from new product introductions, product and process improvements, creative packaging and marketing, or other factors such as an unexpected rise in demand.
Over time, short-run monopoly profits attract competition, and other firms enter the industry. This competitive aspect of monopolistic competition is seen most forcefully in the long run. As competitors emerge to offer close but imperfect substitutes, the market share and profits of the initial innovating firm diminish. Firm demand and marginal revenue curves shift to the left as, for example, from $D_1$ to $D_2$ and from $MR_1$ to $MR_2$ in Figure 11.2. Optimal long-run output occurs at $Q_2$, the point where $MR_2 = MC$. Because the optimal price $P_2$ equals $ATC_2$, where cost includes a normal profit just sufficient to maintain capital investment, economic profits are zero.

The price/output combination $(P_2Q_2)$ describes a monopolistically competitive market equilibrium characterized by a high degree of product differentiation. If new entrants offered perfect rather than close substitutes, each firm’s long-run demand curve would become more nearly horizontal, and the perfectly competitive equilibrium, $D_3$ with $P_3$ and $Q_3$, would be approached. Like the $(P_2Q_2)$ high-differentiation equilibrium, the $(P_3Q_3)$ no-differentiation equilibrium is something of an extreme case. In most instances, competitor entry reduces but does not eliminate product differentiation. An intermediate price/output solution, one between $(P_2Q_2)$ and $(P_3Q_3)$, is often achieved in long-run equilibrium. Indeed, it is the retention of at least some degree of product differentiation that distinguishes the monopolistically competitive equilibrium from that achieved in perfectly competitive markets.

A firm will never operate at the minimum point on its average cost curve in monopolistically competitive equilibrium. Each firm’s demand curve is downward sloping and is tangent to the $ATC$ curve at some point above minimum $ATC$. However, this does not mean that a monopolistically competitive industry is inefficient. The very existence of a downward-sloping demand curve implies that consumers value an individual firm’s products more highly than they do products of other producers. The higher prices and costs of monopolistically competitive industries, as opposed to perfectly competitive industries, reflect the economic cost of product variety. If consumers are willing to bear such costs, then such costs must not be excessive. The success of branded products in the face of generic competition, for example, is powerful evidence of consumer preferences for product variety.
Although perfect competition and monopoly are somewhat rare in real-world markets, monopolistic competition is frequently observed. For example, in 1960 a small ($37 million in sales) office-machine company, Haloid Xerox, Inc., revolutionized the copy industry with the introduction of the Xerox 914 copier. Xerography was a tremendous improvement over electrofax and other coated-paper copiers. It permitted the use of untreated paper, which produced clearer and less expensive copies. Invention of the dry copier established what is now Xerox Corporation at the forefront of a rapidly growing office-copier industry and propelled the firm to a position of virtual monopoly by 1970. Between 1970 and 1980, the industry’s market structure changed dramatically because of an influx of competition as many of Xerox’s original patents expired. IBM entered the copier market in April 1970 with its Copier I model and expanded its participation in November 1972 with Copier II. Eastman Kodak made its entry into the market in 1975 with its Ektaprint model. Of course, Minnesota Mining and Manufacturing (3M) had long been a factor in the electrofax copier segment of the market. A more complete list of Xerox’s recent domestic and international competitors would include at least 30 firms. The effect of this entry on Xerox’s market share and profitability was dramatic. Between 1970 and 1978, for example, Xerox’s share of the domestic copier market fell from 98 percent to 56 percent, and its return on stockholders’ equity fell from 23.6 percent to 18.2 percent.

More recently, Xerox’s leadership position has been squandered and its profitability has collapsed in the face of vicious price and product quality competition. Because Canon, Kodak, 3M, Panasonic, Ricoh, Savin, and Sharp copiers are only close rather than perfect substitutes for Xerox machines, the industry is commonly described as monopolistically competitive. Effective (but imperfect) competition for paper copies also comes from low-cost printers tied to PCs and from electronic communications, which obviate the need for paper copies. Make no mistake about it, monopolistic competition can be tough on industry leaders that fail to keep up—just ask Xerox.
The process of price/output adjustment and the concept of equilibrium in monopolistically competitive markets can be further illustrated by the following example. Assume that the Skyhawk Trailer Company, located in Toronto, Ontario, owns patents covering important design features of its Tomahawk II, an ultralight camping trailer that can safely be towed by high-mileage subcompact cars. Skyhawk's patent protection has made it very difficult for competitors to offer similar ultralight trailers. The Tomahawk II is highly successful, and a flood of similar products can be expected within 5 years as Skyhawk's patent protection expires.

Skyhawk has asked its financial planning committee to identify short- and long-run pricing and production strategies for the Tomahawk II. To facilitate the decision-making process, the committee has received the following revenue and cost data from Skyhawk's marketing and production departments:

\[
TR = 20,000Q - 15.6Q^2
\]
\[
MR = \frac{\partial TR}{\partial Q} = 20,000 - 31.2Q
\]
\[
TC = 400,000 + 4,640Q + 10Q^2
\]
\[
MC = \frac{\partial TC}{\partial Q} = 4,640 + 20Q
\]

where \(TR\) is revenue (in dollars), \(Q\) is quantity (in units), \(MR\) is marginal revenue (in dollars), \(TC\) is total cost per month, including a risk-adjusted normal rate of return on investment (in dollars), and \(MC\) is marginal cost (in dollars).

As a first step in the analysis, one might determine the optimal price/output combination if the committee were to decide that Skyhawk should take full advantage of its current monopoly
position and maximize short-run profits. To find the short-run profit-maximizing price/output combination, set Skyhawk’s marginal revenue equal to marginal cost and solve for $Q$:

\[
MR = MC \\
$20,000 - 31.2Q = 4,640 + 20Q \\
51.2Q = 15,360 \\
Q = 300 \text{ units}
\]

and

\[
P = 20,000 - 15.6(300) \\
= 15,320 \\
\pi = TR - TC \\
= -25.6(300^2) + 15,360(300) - 400,000 \\
= 1,904,000
\]

Therefore, the financial planning committee should recommend a $15,320 price and 300-unit output level to Skyhawk management if the firm’s objective is to maximize short-run profit. Such a planning decision results in roughly $1.9 million in profit during those months when Skyhawk’s patent protection effectively deters competitors.

Now assume that Skyhawk can maintain a high level of brand loyalty and product differentiation in the long run, despite competitor offerings of similar trailers, but that such competition eliminates any potential for economic profits. This is consistent with a market in monopolistically competitive equilibrium, where $P = AC$ at a point above minimum long-run average costs. Skyhawk’s declining market share is reflected by a leftward shift in its demand curve to a point of tangency with its average cost curve. Although precise identification of the long-run price/output combination is very difficult, the planning committee can identify the bounds within which this price/output combination can be expected to occur.

The high-price/low-output combination is identified by the point of tangency between the firm’s average cost curve and a new demand curve reflecting a parallel leftward shift in demand ($D_2$ in Figure 11.2). This parallel leftward shift assumes that the firm can maintain a high degree of product differentiation in the long run. The low-price/high-output equilibrium combination assumes no residual product differentiation in the long run and it is identified by the point of tangency between the average cost curve and a new horizontal firm demand curve ($D_3$ in Figure 11.2). This is, of course, also the perfectly competitive equilibrium price/output combination.

The equilibrium high-price/low-output combination that follows a parallel leftward shift in Skyhawk’s demand curve can be determined by equating the slopes of the firm’s original demand curve and its long-run average cost curve. Because a parallel leftward shift in firm demand results in a new demand curve with an identical slope, equating the slopes of the firm’s initial demand and average cost curves identifies the monopolistically competitive high-price/low-output equilibrium.

For simplicity, assume that the previous total cost curve for Skyhawk also holds in the long run. To determine the slope of this average cost curve, one must find out how average costs vary with respect to output:

\[
AC = TC/Q = (400,000 + 4,640Q + 10Q^2)/Q \\
= 400,000 + 4,640 + 10Q \\
= 400,000Q^{-1} + 4,640 + 10Q
\]

The slope of this average cost curve is given by the expression...
\( \frac{\partial AC}{\partial Q} = -400,000Q^{-2} + 10 \)

The slope of the new demand curve is given by

\( \frac{\partial P}{\partial Q} = -15.6 \) (same as the original demand curve)

In equilibrium,

\[ \text{Slope of } AC \text{ Curve} = \text{Slope of Demand Curve} \]

\[ -400,000Q^{-2} + 10 = -15.6 \]

\[ Q^2 = \frac{25.6}{400,000} \]

\[ Q^2 = \frac{400,000}{25.6} \]

\[ Q = 125 \text{ Units} \]

\[ P = AC \]

\[ = \frac{$400,000}{125} + \$$4,640 + \$$10(125) \]

\[ = $9,090 \]

and

\[ \pi = P \times Q - TC \]

\[ = $9,090(125) - $400,000 - $4,640(125) - $10(125^2) \]

\[ = $0 \]

This high-price/low-output monopolistically competitive equilibrium results in a decrease in price from $15,320 to $9,090 and a fall in output from 300 to 125 units per year. Only a risk-adjusted normal rate of return will be earned, eliminating Skyhawk’s economic profits. This long-run equilibrium assumes that Skyhawk would enjoy the same low price elasticity of demand that it experienced as a monopolist. This assumption may or may not be appropriate. New entrants often have the effect of both cutting a monopolist’s market share and increasing the price elasticity of demand. It is often reasonable to expect entry to cause both a leftward shift of and some flattening in Skyhawk’s demand curve. To see the extreme limit of the demand curve–flattening process, the case of a perfectly horizontal demand curve can be considered.

The low-price/high-output (perfectly competitive) equilibrium combination occurs at the point where \( P = MR = MC = AC \). This reflects that the firm’s demand curve is perfectly horizontal, and average costs are minimized. To find the output level of minimum average costs, set \( MC = AC \) and solve for \( Q \):

\[ $4,640 + $20Q = $400,000Q^{-1} + $4,640 + $10Q \]

\[ $10Q = $400,000Q^{-1} \]

\[ Q^2 = 40,000 \]

\[ Q^2 = \sqrt{40,000} \]

\[ = 200 \text{ units} \]

\[ P = AC \]

\[ = \frac{$400,000}{200} + $4,640 + $10(200) \]

\[ = $8,640 \]
Under this low-price equilibrium scenario, Skyhawk’s monopoly price falls in the long run from an original $15,320 to $8,640, and output falls from the monopoly level of 300 units to the competitive equilibrium level of 200 units per month. The company would earn only a risk-adjusted normal rate of return, and economic profits would equal zero.

Following expiration of its patent protection, management can expect that competitor entry will reduce Skyhawk’s volume from 300 units per month to a level between $Q = 125$ and $Q = 200$ units per month. The short-run profit-maximizing price of $15,320 will fall to a monopolistically competitive equilibrium price between $P = 9,090$, the high-price/low-output equilibrium, and $P = 8,640$, the low-price/high-output equilibrium. In deciding on an optimal short-run price/output strategy, Skyhawk must weigh the benefits of high near-term profitability against the long-run cost of lost market share resulting from competitor entry. Such a decision involves consideration of current interest rates, the speed of competitor imitation, and the future pace of innovation in the industry, among other factors.

**OLIGOPOLY**

The theory of monopolistic competition recognizes that firms often have some control over price but that their price flexibility is limited by a large number of close substitutes. This theory assumes that in making decisions firms do not consider competitor reactions. Such a behavioral assumption is appropriate for some industries but not others. When individual firm actions cause competitors to react, oligopoly exists.

**Characteristics of Oligopoly Markets**

Oligopoly is present when a handful of competitors dominate the market for a good or service and each firm makes pricing and marketing decisions in light of the expected response by rivals. Individual firms have the ability to set pricing and production strategy, and they enjoy the potential for economic profits in both the short run and the long run. Oligopoly describes markets that can be characterized as follows:

- **Few sellers.** A handful of firms produces the bulk of industry output.
- **Homogeneous or unique product.** Oligopoly output can be homogeneous (e.g., aluminum) or distinctive (e.g., ready-to-eat cereal).
- **Blockaded entry and exit.** Firms are heavily restricted from entering or leaving the industry.
- **Imperfect dissemination of information.** Cost, price, and product quality information is withheld from uninformed buyers.

In the United States, aluminum, cigarettes, electrical equipment, filmed entertainment production and distribution, glass, long-distance telecommunications, and ready-to-eat cereals are all produced and sold under conditions of oligopoly. In each of these industries, a small number of firms produces a dominant percentage of all industry output. In the ready-to-eat breakfast cereal industry, for example, Kellogg, Kraft (Post cereals), General Mills, Nabisco, and Quaker Oats are responsible for almost all domestic production in the United States. Durable customer loyalty gives rise to fat profit margins and rates of return on assets that are two to three times food industry norms. Corn Flakes, Sugar Frosted Flakes, Cheerios, Raisin...
Bran, Wheaties, and a handful of other brands continue to dominate the industry year after year and make successful entry extremely difficult. Even multinational food giant Nestlé sought and obtained a joint venture agreement with General Mills rather than enter the potentially lucrative European breakfast cereal market by itself. Long-distance telephone service is also highly concentrated, with AT&T, Sprint, and WorldCom providing almost all domestic wire-line service to residential customers.

Oligopoly also is present in a number of local markets. In many retail markets for gasoline and food, for example, only a few service stations and grocery stores compete within a small geographic area. Drycleaning services are also sometimes provided by a relative handful of firms in small to medium-size cities and towns.

**Price/Output Decisions Under Oligopoly**

Demand curves relate quantity demanded to price, holding constant the effect of all other variables. One variable that is typically assumed to remain fixed is the price charged by competing firms. In oligopoly, however, if one firm changes its price, other firms react by changing their prices. The demand curve for the initial firm shifts position so that instead of moving along a single demand curve as it changes price, the firm moves to an entirely new demand curve.

The phenomenon of shifting demand curves is illustrated in Figure 11.3(a). Firm $A$ is initially producing $Q_1$ units of output and selling them at a price of $P_1$. Demand curve $D_1$ applies here, assuming that prices charged by other firms remain fixed. Under this assumption, a price cut from $P_1$ to $P_2$ would increase demand to $Q_2$. Assume, however, that only a few firms operate in the market and that each has a fairly large share of total sales. If one firm cuts its price and obtains a substantial increase in volume, other firms lose a large part of their business. Furthermore, they know exactly why their sales have fallen and react by cutting their own prices. This action shifts firm $A$ down to the second demand curve, $D_2$, reducing its demand at $P_2$ from $Q_2$ to $Q_3$ units. The new curve is just as unstable as the old one, so knowledge of its shape is useless to firm $A$; if it tries to move along $D_2$, competitors will react, forcing the company to yet another demand curve.

Shifting demand curves presents no real difficulty in making price/output decisions if each firm knows how rivals will react to price changes. The reactions would just be built into the price/demand relation, and a new demand curve could be constructed to include interactions among firms. Curve $D_3$ in Figure 11.3(b) represents such a reaction-based demand curve; it shows how price reductions affect quantity demanded after competitive reactions have been taken into account. The problem with this approach is that different interfirm behavior leads to different pricing decision rules.

**Cartel Arrangements**

All firms in an oligopoly market benefit if they get together and set prices to maximize industry profits. A group of competitors operating under such a formal overt agreement is called a cartel. If an informal covert agreement is reached, the firms are said to be operating in collusion. Both practices are illegal in the United States. However, cartels are legal in some parts of the world, and U.S. multinational corporations sometimes become involved with them in foreign markets. Several important domestic markets are also dominated by producer associations that operate like cartels and appear to flourish without interference from the government. Agricultural commodities such as milk are prime examples of products marketed under cartel-like arrangements.

A cartel that has absolute control over all firms in an industry can operate as a monopoly. To illustrate, consider the situation shown in Figure 11.4. The marginal cost curves of each firm are summed horizontally to arrive at an industry marginal cost curve. Equating the cartel’s total marginal cost with the industry marginal revenue curve determines the profit-maximizing output and the price, $P^*$, to be charged. Once this profit-maximizing price/output level has been
determined, each individual firm finds its optimal output by equating its own marginal cost curve to the previously determined profit-maximizing marginal cost level for the industry.

Profits are often divided among firms on the basis of their individual level of production, but other allocation techniques can be employed. Market share, production capacity, and a bargained solution based on economic power have all been used in the past. For a number of reasons, cartels are typically rather short-lived. In addition to the long-run problems of changing products and of entry into the market by new producers, cartels are subject to disagreements among members. Although firms usually agree that maximizing joint profits is mutually benefi-
cial, they seldom agree on the equity of various profit-allocation schemes. This problem can lead to attempts to subvert the cartel agreement.

Cartel subversion can be extremely profitable. Consider a two-firm cartel in which each member serves 50 percent of the market. Cheating by either firm is very difficult, because any loss in profits or market share is readily detected. The offending party also can easily be identified and punished. Moreover, the potential profit and market share gain to successful cheating is exactly balanced by the potential profit and market share cost of detection and retribution. Conversely, a 20-member cartel promises substantial profits and market share gains to successful cheaters. At the same time, detecting the source of secret price concessions can be extremely difficult. History shows that cartels including more than a very few members have difficulty policing and maintaining member compliance. With respect to cartels, there is little honor among thieves.

Price Leadership

An informal but sometimes effective means for reducing oligopolistic uncertainty is through price leadership. Price leadership results when one firm establishes itself as the industry leader and other firms follow its pricing policy. This leadership may result from the size and strength of the leading firm, from cost efficiency, or as a result of the ability of the leader to establish prices that produce satisfactory profits throughout the industry.

A typical case is price leadership by a dominant firm, usually the largest firm in the industry. The leader faces a price/output problem similar to monopoly; other firms are price takers and face a competitive price/output problem. This is illustrated in Figure 11.5, where the total market demand curve is $D_T$, the marginal cost curve of the leader is $MC_L$, and the horizontal summation of the marginal cost curves for all of the price followers is labeled $MC_f$. Because price followers take prices as given, they choose to operate at the output level at which their individual marginal costs equal price, just as they would in a perfectly competitive market. Accordingly, the $MC_f$ curve represents the supply curve for following firms. At price $P_2$, followers would supply the entire market, leaving nothing for the dominant firm. At all prices below $P_2$, the horizontal distance between the summed $MC_f$ curve and the market demand curve represents the price leader’s demand. At a price of $P_1$, for example, price followers provide $Q_2$. 

**Figure 11.4**

**Price/Output Determination for a Cartel**

Horizontal summation of the MC curves for each firm gives the cartel’s MC curve. Output for each firm is found by equating its own MC to the industry profit-maximizing MC level.
units of output, leaving demand of $Q_5 - Q_2$ for the price leader. Plotting all of the residual demand quantities for prices below $P_3$ produces the demand curve for the price leader, $D_L$, in Figure 11.5, and the related marginal revenue curve, $MR_L$.

More generally, the leader faces a demand curve of the following form:

\[(11.1) \quad D_L = D_T - S_f\]

where $D_L$ is the leader’s demand, $D_T$ is total demand, and $S_f$ is the followers’ supply curve found by setting $P = MC_f$ and solving for $Q_f$, the quantity that will be supplied by the price followers. Because $D_T$ and $S_f$ are both functions of price, $D_L$ is likewise determined by price.

Because the price leader faces the demand curve $D_L$ as a monopolist, it maximizes profit by operating at the point where marginal revenue equals marginal cost, $MR_L = MC_L$. At this optimal output level for the leader, $Q_1$, market price is established at $P_2$. Price followers supply a combined output of $Q_4 - Q_1$ units. A stable short-run equilibrium is reached if no one challenges the price leader.

A second type of price leadership is **barometric price leadership**. In this case, one firm in an industry announces a price change in response to what it perceives as a change in industry supply and demand conditions. This change could stem from cost increases that result from a new industry labor agreement, higher energy or material costs, higher taxes, or a substantial shift in industry demand. With barometric price leadership, the price leader is not necessarily the largest or the dominant firm in the industry. The price-leader role might even pass from one firm to another over time. To be effective, the price leader must only be accurate in reading the prevailing industry view of the need for price adjustment. If the price leader makes a mistake, other firms may not follow its price move, and the price leader may have to rescind or modify the announced price change to retain its leadership position.
Kinked Demand Curve

An often-noted characteristic of oligopoly markets is “sticky” prices. Once a general price level has been established, whether through cartel agreement or some less formal arrangement, it tends to remain fixed for an extended period. Such rigid prices are sometimes explained by what is referred to as the **kinked demand curve** theory of oligopoly prices. A kinked demand curve is a firm demand curve that has different slopes for price increases as compared with price decreases. The kinked demand curve describes a behavior pattern in which rival firms follow any decrease in price to maintain their respective market shares but refrain from following price increases, allowing their market shares to grow at the expense of the competitor increasing its price. The demand curve facing individual firms is kinked at the current price/output combination, as illustrated in Figure 11.6. The firm is producing $Q$ units of output and selling them at a price of $P$ per unit. If the firm lowers its price, competitors retaliate by lowering their prices. The result of a price cut is a relatively small increase in sales. Price increases, on the other hand, result in significant reductions in the quantity demanded and in total revenue, because customers shift to competing firms that do not follow the price increase.

Associated with the kink in the demand curve is a point of discontinuity in the marginal revenue curve. As a result, the firm’s marginal revenue curve has a gap at the current price/output level, which results in price rigidity. To see why, recall that profit-maximizing firms operate at the point where marginal cost equals marginal revenue. Typically, any change in marginal cost leads to a new point of equality between marginal costs and marginal revenues and to a new optimal price. However, with a gap in the marginal revenue curve, the price/output combination at the kink can remain optimal despite fluctuations in marginal costs. As illustrated in Figure 11.6, the firm’s marginal cost curve can vacillate between $MC_1$ and $MC_2$ without causing any change in the profit-maximizing price/output combination. Small changes in marginal costs have no effect; only large changes in marginal cost lead to price changes. In perfectly competitive grain markets, prices change every day. In the oligopolistic ready-to-eat cereals market, prices change less frequently.

**FIGURE 11.6**

Kinked Demand Curve

When price cuts are followed but price increases are not, a kink develops in the firm’s demand curve. At the kink, the optimal price remains stable despite moderate changes in marginal costs.
"Meet it or beat it" is a pricing challenge that often results in quick competitor price reductions, and price wars always favor the deep pockets of established incumbents. As a result, many successful entrants find nonprice methods of competition an effective means for growing market share and profitability in the face of entrenched rivals.

Advantages of Nonprice Competition

Because rival firms are likely to retaliate against price cuts, oligopolists often emphasize nonprice competition to boost demand. To illustrate, assume that a firm demand function is given by Equation 11.2:

\[ Q_A = f(P_A, P_X, Ad_A, Ad_X, SQ_A, SQ_X, I, Pop, \ldots) \]

\[ = a - bP_A + cP_X + dAd_A - eAd_X + fSQ_A \]

\[ - gSQ_X + hI + iPop + \ldots \]

where \( Q_A \) is the quantity of output demanded from firm \( A \), \( P_A \) is \( A \)'s price, \( P_X \) is the average price charged by other firms in the industry, \( Ad \) is advertising expenditures, \( SQ \) denotes an index of styling and quality, \( I \) represents income, and \( Pop \) is population. The firm can control three variables in Equation 11.2: \( P_A, Ad_A \), and \( SQ_A \). If it reduces \( P_A \) in an effort to stimulate demand, it will probably cause a reduction in \( P_X \), offsetting the hoped-for effects of the initial price cut. Rather than boosting sales, firm \( A \) may have simply started a price war.

Now consider the effects of changing \( Ad_A \) and \( SQ_A \). Effective advertising shifts the firm’s demand curve to the right, thus enabling the firm to increase sales at a given price or to sell the much lower interest costs on borrowed funds than the amount paid by their purely private-sector competitors.

Both Fannie and Freddie make a profit by selling packages of home loans to investors at an interest rate that is roughly 1 percent per year lower than that on the underlying pool of mortgages. In so doing, they earn an annual rate of return on stockholders’ equity in excess of 25 percent per year, or nearly double the profit rate earned by the average financial institution. These extraordinary profit rates are also remarkably stable. As a result, their stock-price performance has been sensational. Long-term investors saw their initial investments in Fannie and Freddie multiply more than ten-fold over the past decade and look forward to continued gains of 12 percent to 15 percent per year.

Obviously, there are tangible rewards to government-guaranteed oligopoly!
same quantity at a higher price. Any improvement in styling or quality would have a comparable effect, as would easier credit terms, better service, and more convenient retail locations. Although competitors react to nonprice competition, their reaction is often slower and less direct than that for price changes. Nonprice changes are generally less obvious to rivals, and the design of an effective response is often time-consuming and difficult. Advertising campaigns have to be designed; media time and space must be purchased. Styling and quality changes frequently require long lead times, as do fundamental improvements in customer service. Furthermore, nonprice competition can alter customer buying habits, and regaining lost customers can prove to be difficult. Although it may take longer to establish a reputation through nonprice competition, its advantageous effects are likely to be more persistent than the fleeting benefits of a price cut.

The optimal level of nonprice competition is defined by resulting marginal benefits and marginal costs. Any form of nonprice competition should be pursued as long as marginal benefits exceed marginal costs. For example, suppose that a product has a market price of $10 per unit and a variable cost per unit of $8. If sales can be increased at an additional cost of less than $2 per unit, these additional expenditures will increase profits and should be made.

### Optimal Level of Advertising

Advertising is one of the most common methods of nonprice competition. Others include personal selling, improvements in product quality, expansions in customer service, research and development, and so on. The profit-maximizing amount of nonprice competition is found by setting the marginal cost of the activity involved equal to the marginal revenue or marginal benefit derived from it. For example, the optimal level of advertising occurs at that point where the marginal revenues derived from advertising just offset the marginal cost of advertising.

The marginal revenue derived from advertising is measured by the marginal profit contribution generated. This is the difference between marginal revenue, $MR$, and the marginal cost of production and distribution, $MC_Q$, before advertising costs:

\[
MR_A = MR - MC_Q
\]

The marginal cost of advertising, again expressed in terms of the marginal cost of selling one additional unit of output, can be written:

\[
MC_A = \frac{\partial \text{Advertising Expenditures}}{\partial \text{Demand}} = \frac{\partial \text{Ad}}{\partial Q}
\]

The optimal level of advertising is found where

\[
MR - MC_Q = \frac{\partial \text{Advertising Expenditures}}{\partial \text{Demand}}
\]

\[
MR_A = MC_A
\]

In general, it will pay to expand advertising expenditures so long as $MR_A > MC_A$. Because the marginal profit derived from advertising is
(11.5) \[ M\pi_A = MR_A - MC_A \]

the optimal level of advertising occurs at the point where

\[ M\pi_A = 0 \]

This relation is illustrated in Figure 11.7. As long as \( MR_A > MC_A \), \( M\pi_A > 0 \), and it will pay to expand the level of advertising. Conversely, if \( MR_A < MC_A \), then \( M\pi_A < 0 \), and it will pay to reduce the level of advertising expenditures. The optimal level of advertising is achieved when \( MR_A = MC_A \), and \( M\pi_A = 0 \).

**Example of Optimal Advertising**

The effect of advertising on the optimal price/output combination can be further illustrated with a more detailed example. Suppose that Consumer Products, Inc., has a new prescription ointment called Regain that can be used to restore hair loss due to male pattern baldness in some patients. Currently, Regain is marketed through doctors without any consumer advertising. Given the newness of the product, demand for Regain is expected to increase rapidly following the initiation of consumer advertising. Samantha Stevens, an ad executive with the McMann & Tate Advertising Agency, projects that demand would double following the start of a $500,000 per month media advertising campaign developed by the agency.

To illustrate the profit impact of the proposed television advertising campaign, it is necessary to identify the projected effect on demand and revenue relations.

Current monthly demand for the product is described by the following expressions:

\[ Q = 25,000 - 100P \]
or

\[ P = 250 - 0.01Q \]

This market demand implies total and marginal revenue functions of

\[ TR = P \times Q = 250Q - 0.01Q^2 \]
\[ MR = \frac{\partial TR}{\partial Q} = 250 - 0.02Q \]

Assume total and marginal costs before advertising expenses are given by the expressions

\[ TC = 250,000 + 50Q \]
\[ MC = \frac{\partial TC}{\partial Q} = 50 \]

The optimal price/output combination is found by setting \( MR = MC \) and solving for \( Q \). Because marginal costs are constant at $50 per unit, the pre-advertising optimal activity level for Regain is

\[ MR = MC \]
\[ 250 - 0.02Q = 50 \]
\[ 0.02Q = 200 \]
\[ Q = 10,000 \]

and

\[ P = 250 - 0.01 \]
\[ = 250 - 0.01(10,000) \]
\[ = 150 \]
\[ \pi = TR - TC \]
\[ = 250(10,000) - 0.01(10,000^2) - 250,000 - 50(10,000) \]
\[ = 750,000 \text{ per month} \]

Following a 100 percent advertising-inspired increase in demand, the new monthly demand relations for Regain are

\[ Q = 2(25,000 - 100P) \]
\[ = 50,000 - 200P \]

or

\[ P = 250 - 0.005Q \]

This new advertising-induced market demand implies new total and marginal revenue functions of

\[ TR = 250Q - 0.005Q^2 \]
\[ MR = 250 - 0.01Q \]

The new optimal price/output combination is found by setting the new \( MR = MC \) and solving for \( Q \). Because marginal costs remain constant at $50 per unit, the new optimal activity level for Regain is
\[ MR = MC \\ \$250 - \$0.01Q = \$50 \\ 0.01Q = 200 \\ Q = 20,000 \]

and

\[ P = \$250 - \$0.005Q \\ = \$250 - \$0.005(20,000) \\ = \$150 \]

\[ \pi = TR - TC \\ = \$250(20,000) - \$0.005(20,000^2) - \$250,000 - \$50(20,000) - \$500,000 \\ = \$1,250,000 \text{ per month} \]

Notice that sales have doubled from 10,000 to 20,000 at the $150 price. The effect on profits is dramatic, rising from $750,000 to $1.25 million, even after accounting for the additional $500,000 in media expenditures. Therefore, the new advertising campaign appears fully warranted. In fact, given the $1.25 million in profits that are generated by a doubling in unit sales at a price of $150, Consumer Products would be willing to pay up to that full amount to double sales. From this perspective, the $500,000 price charge for the advertising campaign represents a relative bargain. The profit implications of other forms of advertising, or other types of nonprice competition, can be measured in a similar fashion.

**GAME THEORY**

**Game theory** concepts are used to develop effective competitive strategies for setting prices, the level of product quality, research and development, advertising, and other forms of nonprice competition in oligopoly markets. Game theory concepts have also been used to set public policy for currency market intervention in emerging markets and auction strategies for broadcast spectrum in the telecommunications industry. This brief introduction shows how managers can use a simple understanding of game theory concepts to make better managerial decisions.

**Prisoner’s Dilemma**

Game theory is a general framework to help decision making when firm payoffs depend on actions taken by other firms. Because decision interdependence is a prime characteristic of oligopoly markets, game theory concepts have a wide variety of applications in the study of oligopoly. In a **simultaneous-move game**, each decision maker makes choices without specific knowledge of competitor counter moves. In a **sequential-move game**, decision makers make their move after observing competitor moves. If two firms set prices without knowledge of each other’s decisions, it is a simultaneous-move game. If one firm sets its price only after observing its rival’s price, the firm is said to be involved in a sequential-move game. In a **one-shot game**, the underlying interaction between competitors occurs only once; in a **repeat game**, there is an ongoing interaction between competitors.

A game theory strategy is a decision rule that describes the action taken by a decision maker at any point in time. A simple introduction to game theory strategy is provided by perhaps the
most famous of all simultaneous-move one-shot games: The so-called **Prisoner’s Dilemma**. Suppose two suspects, Bonnie and Clyde, are jointly accused of committing a specific crime, say inside trading. Furthermore, assume that the conviction of either suspect cannot be secured without a signed confession by one or both suspects. As shown in Table 11.1, if neither Bonnie nor Clyde confesses, the prosecutor will be unable to obtain a conviction, and both will be set free. If only one suspect confesses, turns state’s evidence and implicates the other, then the one confessing will get the relatively light penalty of a having to pay a fine and serving probation, and the implicated party will receive the harsh sentence of 5 years in prison. If both suspects confess, then each will receive a stiff 2-year sentence. If both suspects are held in isolation, neither knows what the other will do, and a classic conflict-of-interest situation is created.

Although each suspect can control the range of sentencing outcomes, neither can control the ultimate outcome. In this situation, there is no **dominant strategy** that results in the best result for either suspect regardless of the action taken by the other. Both would be better off if they could be assured that the other would not confess, because if neither confesses both are set free. However, in failing to confess, each is exposed to the risk that the other will confess. By not confessing, they would then receive the harsh sentence of 5 years in prison. This uncertainty creates the Prisoner’s Dilemma. To confess, or not to confess—that is the question.

A **secure strategy**, sometimes called the maximin strategy, guarantees the best possible outcome given the worst possible scenario. In this case, the worst possible scenario for each suspect is that the other chooses to confess. Each suspect can avoid the worst possible outcome of receiving a harsh 5 years in prison sentence only by choosing to confess. For each suspect, the secure strategy is to confess, thereby becoming a prisoner, because neither could solve the riddle posed by the Prisoner’s Dilemma.

Though the Prisoner’s Dilemma is posed within the scope of a bargaining problem between two suspects, it has obvious practical applications in business. Competitors like Coca-Cola and Pepsi-Cola confront similar bargaining problems on a regular basis. Suppose each has to decide whether or not to offer a special discount to a large grocery store retailer. Table 11.2 shows that if neither offers discount pricing, a weekly profit of $12,500 will be earned by Coca-Cola, and $9,000 per week will be earned by its smaller competitor, Pepsi-Cola. This is the best possible scenario for both. However, if Coca-Cola is the only one to offer a discount, it will earn $10,000 per week, while Pepsi-Cola profits fall to $1,000 per week. If Pepsi-Cola offers a discount and Coca-Cola continues to charge the regular price, Pepsi-Cola profits will total $6,500 per week while Coca-Cola weekly profits fall to $1,500. The only secure means Coca-Cola has for avoiding the possibility of a meager $1,500 per week profit is to grant a discount price to the retailer, thereby assuring itself of a weekly profit of at least $4,000. Similarly, the only means Pepsi-Cola has of avoiding the possibility of meager profits of $1,000 per week is to also grant a discount price to the grocery retailer, thereby assuring

<table>
<thead>
<tr>
<th>TABLE 11.1</th>
<th>The Prisoner’s Dilemma Payoff Matrix</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Suspect #1: Bonnie</strong></td>
<td><strong>Confession Strategy</strong></td>
</tr>
<tr>
<td>Not Confess</td>
<td>Freedom,</td>
</tr>
<tr>
<td>Confess</td>
<td>Fine and probation,</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
itself of at least $2,000 in weekly profits. For both Coca-Cola and Pepsi-Cola, the only secure strategy is to offer discount prices, thereby assuring consumers of bargain prices and themselves of modest profits of $4,000 and $2,000 per week, respectively.

**Nash Equilibrium**

In Table 11.2, each firm’s secure strategy is to offer a discount price regardless of the other firm’s actions. The outcome is that both firms offer discount prices and earn relatively modest profits. This outcome is also called a **Nash equilibrium** because, given the strategy of its competitor, neither firm can improve its own payoff by unilaterally changing its own strategy. In the case of Coca-Cola, given that Pepsi-Cola has chosen a discount pricing strategy, it too would decide to offer discount prices. When Pepsi-Cola offers discount prices, Coca-Cola can earn profits of $4,000 rather than $1,500 per week by also offering a discount. Similarly, when Coca-Cola offers discount prices, Pepsi-Cola can earn maximum profits of $2,000 per week, versus $1,000 per week, by also offering a discount.

Clearly, profits are less than if they colluded and both charged regular prices. As seen in Table 11.2, Coca-Cola would earn $12,500 per week and Pepsi-Cola would earn $9,000 per week if both charged regular prices. This is a business manifestation of the Prisoner’s Dilemma because the dual discount pricing Nash equilibrium is inferior from the firms’ viewpoint to a collusive outcome where both competitors agree to charge regular prices.

Of course, if firms collude and agree to charge high prices, consumers are made worse off. This is why price collusion among competitors is illegal in the United States, as discussed in Chapter 13.

**Nash Bargaining**

A **Nash bargaining** game is another application of the simultaneous-move, one-shot game. In Nash bargaining, two competitors or players “bargain” over some item of value. In a simultaneous-move, one-shot game, the players have only one chance to reach an agreement.

For example, suppose the board of directors specifies a $1 million profit-sharing pool provided that both management and workers can come to agreement concerning how such profits are to be distributed. For simplicity, assume that this pool can only be distributed in amounts of $0, $500,000, and $1 million. If the sum of the amounts requested by each party totals more than $1 million, neither party receives anything. If the sum of the amounts requested by each party totals no more than $1 million, each party receives the amount requested.

Table 11.3 shows the nine possible outcomes from such a profit-sharing bargaining game. If the workers request $1 million, the only way that they would get any money at all is if management requests nothing. Similarly, if management requests $1 million, the only way they get money is if workers request nothing. If either party requests nothing, Nash equilibrium solutions are achieved when the other party requests the full $1 million. Thus, the ($1 million, $0) and ($0, $1 million) solutions are both Nash equilibriums. However, suppose the workers

<table>
<thead>
<tr>
<th>Coca-Cola</th>
<th>Pepsi-Cola</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discount Price</td>
<td>Discount Price</td>
</tr>
<tr>
<td>$4,000, $2,000</td>
<td>$10,000, $1,000</td>
</tr>
<tr>
<td>Regular Price</td>
<td>Regular Price</td>
</tr>
<tr>
<td>$1,500, $6,500</td>
<td>$12,500, $9,000</td>
</tr>
</tbody>
</table>

**TABLE 11.2**

A Hypothetical Prisoner’s Dilemma Faced by Coca-Cola and Pepsi-Cola
request $500,000; then the Nash equilibrium response from management would be to also request $500,000. If management requests $500,000, then the Nash equilibrium response from workers would be to also request $500,000. Thus, the ($500,000, $500,000) payoff is also a Nash equilibrium. This game involves three Nash equilibriums out of nine possible solutions. In each Nash equilibrium, the entire profit-sharing pool is paid out. In the six remaining outcomes, some of the profit-sharing pool would not be distributed. Such suboptimal outcomes can and do occur in real-life situations.

However, in contemplating the bargaining process, workers are apt to note that a request for $0 is dominated by asking for either $500,000 or $1 million. If you do not ask for anything, you are sure of getting nothing. Similarly, management will never do worse, and may do better, if it asks for something. As a result, the $0 request strategy is dominated for both parties and will tend not to be followed. In addition, a request for the entire $1 million by either party will not be successful unless the other party requests nothing. Because a $0 request by either party is not likely, neither party is likely to request the full $1 million. In this case, the logical and rational request from each party is $500,000, or an equal 50/50 sharing of the profit pool.

**Repeat Games**

The study of one-shot pricing and product quality games might lead one to conclude that even tacit collusion is impossible. This is not true because competitors often interact on a continuous basis. In such circumstances, firms are said to be involved in repeat games.

When a competitive game is repeated over and over, firms receive sequential payoffs that shape current and future strategies. For example, in Table 11.2, both Coca-Cola and Pepsi-Cola might tacitly or secretly agree to charge regular prices so long as the other party continues to do so. If neither firm cheats on such a collusive agreement, discounts will never be offered, and maximum profits will be earned. Although there is an obvious risk involved with charging regular prices, there is also an obvious cost if either or both firms offer discount pricing. If each firm is convinced that the other will maintain regular prices, both will enjoy high profits. This resolve is increased if each firm is convinced that the other will quickly match any discount pricing strategy. In fact, it is rational for colluding firms to quickly and severely punish colluding competitors who “cheat” by lowering prices.

However, although it is important to recognize that the repeat nature of competitor interactions can sometimes harm consumers, it is equally important to recognize that repetitive interactions in the marketplace provide necessary incentives for firms to produce high-quality goods. In any one-shot game, it would pay firms with high-quality reputations to produce low-cost or shoddy goods. In the real world, the ongoing interaction between firms and their customers provides incentives for firms to maintain product consistency. For example, both

**TABLE 11.3**

<table>
<thead>
<tr>
<th>Request Strategy</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>$0</td>
<td>$0, $500,000, $1,000,000</td>
</tr>
<tr>
<td>$500,000</td>
<td>$500,000, $0, $1,000,000</td>
</tr>
<tr>
<td>$1,000,000</td>
<td>$1,000,000, $0, $0, $0,</td>
</tr>
</tbody>
</table>
Coca-Cola and Pepsi-Cola have well-deserved reputations for providing uniformly high-quality soft drinks. They have both invested millions of dollars in product development and quality control to ensure that consumers can depend upon the taste, smell, and feel of Coca-Cola and Pepsi-Cola products. Moreover, because the value of millions of dollars spent on brand-name advertising would be lost if product quality were to deteriorate, that brand-name advertising is itself a type of quality assurance provided to customers of Coca-Cola and Pepsi-Cola. At Wal-Mart, *Satisfaction Guaranteed, or your money back* is more than just a slogan. It is their business; it is what separates Wal-Mart from fly-by-night operators or low-quality discount stores. Similarly, customers of DaimlerChrysler depend upon that company’s well-deserved reputation for producing high-quality cars, trucks, and minivans. Like any written guarantee or insurance policy, repeat transactions in the marketplace give consumers confidence that they will get what they pay for.

**MARKET STRUCTURE MEASUREMENT**

To formulate an effective competitive strategy, managers must accurately assess the current competitive environment for actual and potential products. Data gathered by the federal government, private market research firms, and trade associations are often useful for this purpose. This section shows the types of market structure data available from public sources and explains why they are important for decision-making purposes.

**How Are Economic Markets Measured?**

An economic market consists of all individuals and firms willing and able to buy or sell competing products during a given period. The key criterion in identifying competing products is

---

**MANAGERIAL APPLICATION 11.3**

**Dot.com**

With all the hoopla, it is tough to sort out what’s real and what’s Internet hype. For companies, building a publishing-only Web site is the first step to becoming an e-business. Most businesses have already done this. That’s fine as far as it goes; it’s an extremely cost-efficient way to distribute basic information. However, the payoff for business starts with “self-service” Web sites where customers can do things like check the status of an account or trace a package online (like at FedEx). The real payoff begins with transaction-based Web sites that go beyond just buying and selling to create a dynamic and interactive flow of information.

An e-business is created when companies put their core processes online to improve service, cut costs, or boost revenue. For example, IBM helped Charles Schwab Web-enable their brokerage systems for online trading and customer service. Since opening, Schwab’s Web service has generated over 1 million online accounts totaling over $50 billion in assets. E-business economics are compelling. According to management consultants, traditional bank transactions cost more than a dollar; the same transaction over the Web costs about 1¢. Issuing a paper airline ticket costs about $8; an e-ticket costs just $1. Customers love the convenience; management loves the lower costs.

Although a number of companies use the Web to further exploit long-standing competitive advantages, it is not clear that companies can use the Web to create durable competitive advantages. Hoping to stand out from the crowd, some Internet merchants devote as much as 70 percent of total revenues to advertising. “Get ahead and stay ahead” is the mantra at Amazon.com, a company trying to create a durable online marketing presence in books, electronics, computers, toys and games, health and beauty aids, DVDs, and much more. To date, Amazon.com has proven adept at quickly growing online revenues. It’s a widely recognized online leader. However, even for Amazon.com, building online profits has proven elusive.

---

similarity in use. Precise determination of whether a specific good is a distinct economic product involves an evaluation of cross-price elasticities for broad classes of goods. When cross-price elasticities are large and positive, goods are substitutes for each other and can be thought of as competing products in a single market. Conversely, large negative cross-price elasticities indicate complementary products. Complementary products produced by a single firm must be evaluated as a single product line serving the same market. If complementary products are produced by other companies, evaluating the potential of a given product line involves incorporating exogenous influences beyond the firm’s control. When cross-price elasticities are near zero, goods are in separate economic markets and can be separately analyzed as serving distinct consumer needs. Therefore, using cross-price elasticity criteria to desegregate the firm’s overall product line into its distinct economic markets is an important task confronting managers.

To identify relevant economic markets and define their characteristics, firms in the United States make extensive use of economic data collected by the Bureau of the Census of the U.S. Department of Commerce. Because these data provide valuable information on economic activity across the broad spectrum of U.S. industry, it is worthwhile to briefly consider the method and scope of the economic censuses.

**Economic Census**

Once every 5 years, the economic census provides a comprehensive statistical profile of the economy, from the national, to the state, to the local level. Censuses are taken at 5-year intervals during years ending with the digits 2 and 7—for example, 1992, 1997, 2002, 2007, and so on. As shown in Figure 11.8, the economic census covers economic activity in important sectors such as manufacturing, retail and wholesale trade, services, minerals, and construction. Sectors covered account for roughly three-quarters of total economic activity originating in the private sector. Principal industry groups with incomplete coverage are agriculture, education, financial services, forestry, professional services, and transportation.

The economic census is the primary source of detailed public facts about the nation’s economy. As such, census data are essential inputs for decisions made by managers in government, business, and the not-for-profit sector. Economic census data allows businesses to compare company sales to census totals for specific industries or areas, calculate market share, evaluate performance, and make plans for expansion or asset redeployment. Companies can use census data to lay out territories, allocate advertising, and locate new stores or offices. Firms supplying goods and services to other businesses also use census data to target industries for business-to-business marketing. Manufacturers look at statistics on materials consumed to learn more about industries that use their products and to gain insight concerning industry growth potential. All firms compare operating ratios to census averages to see how they stack up against competitive norms. Consultants, government researchers, and job seekers use census data to analyze changes in industrial structure, location, and the pace of growth in job opportunities. Both state and federal regulators use census data to monitor business activity as captured by fluctuations in monthly retail sales, gross domestic product (GDP), and other such measures. Industry trade associations and news media study census data to learn key business facts and to project trends. Legislators use census data in the preparation and evaluation of new legislation designed to spur economic development. State and local government agencies monitor census information to better understand their regional economic base and to help them better focus efforts to attract new businesses and/or retain existing firms.

The economic census covers nearly all of the U.S. economy in its establishment statistics. There also are several related programs, including the collection and publication of statistics on minority- and women-owned businesses. Separate censuses of agriculture and government are also conducted at the same time as the economic census. Results from this most recent economic census were issued on CD-ROM and on the Internet in a series of continuing reports over a period of more than 2 years, starting in early 1999. Only summary reports are issued in print.
How Economic Census Data Are Collected and Published

The 1997 economic census measured economic activity during calendar year 1997. Census forms were mailed to more than 5 million companies in December 1997, with a due date of February 12, 1998. There were over 500 versions of the census form, each customized to particular industries. Some very small companies did not receive a census form. The economic census is authorized by law; compliance is mandatory. The law requires firms to respond and specifies penalties for firms that fail to report. The law also requires the Census Bureau to maintain confidentiality. Individual responses may be seen only by sworn Census Bureau employees. Moreover, precautions are taken to insure that no data are published that could reveal the identity or activity of any individual business.

Economic census statistics are collected and published primarily at the “establishment” level of aggregation. An establishment is a business or industrial unit at a single physical location that produces or distributes goods or performs services. For example, a single store or factory constitutes a single establishment under the census system. Of course, many companies own or control more than one establishment, and those establishments may be located in different geographic areas. They are often also engaged in different kinds of business activity. By collecting separate information for each establishment, the economic census is able to include detailed data for each industry group and geographic area.

Industry statistics contained in the economic census are largely classified using the North American Industry Classification System (NAICS). To a lesser extent, the classification of some industries is based upon the old Standard Industrial Classification (SIC) system that was used in previous censuses. Both NAICS and SIC systems categorize establishments by the principal activity in which they are engaged. The NAICS, developed in cooperation with Canada and Mexico, classifies North America’s economic activities at 2-, 3-, 4-, and 5-digit levels of aggregation.
The U.S. version of NAICS further defines some industries to a more precise sixth digit of detail. The NAICS represents 96 sectors (3-digit codes), 313 industry groups (4-digit codes), and, as implemented in the United States, 1,170 industries (5- and 6-digit codes).

The NAICS example in Table 11.4 illustrates the makeup of the broadcasting and telecommunications sector in the state of Colorado during 1997. Notice the logical progression as one moves from the 3-digit broadcasting and telecommunications sector (513), to the 4-digit telecommunications industry group (5133), to 5-digit wireless telecommunications carriers (except satellite) industry (51332), to the very narrow 6-digit paging industry (513321). Economists generally agree that 5-digit or 6-digit classifications correspond quite closely with the economic definition of a market. Establishments grouped at the 5-digit or 6-digit levels produce products that are ready substitutes for one another and thus function as competitors. Managers who analyze census data to learn about the number and size distribution of actual and potential competitors focus their attention primarily on data provided at the 5-digit or 6-digit levels. The Census Bureau also classifies products. In the case of manufacturing and mining industries, products are classified in a manner consistent with the NAICS structure. The first 6 digits of the 10-digit product code are normally the same as the NAICS code for the industry with which the product is most frequently associated. Broad product or service lines also are provided for retail and wholesale trade and other service industries.

The most detailed economic census data are provided for the United States as a whole. Key statistics, albeit progressively fewer, are available for states, metropolitan areas (MAs), counties,

### TABLE 11.4

**NAICS Data Is Available at the U.S., State, and Local Levels of Detail**

The North American Industry Classification System (NAICS) represents 96 sectors (3-digit codes), 313 industry groups (4-digit codes), and, as implemented in the United States, 1,170 industries (5- and 6-digit codes). This example shows the makeup of the broadcasting and telecommunications sector in the state of Colorado during 1997.

<table>
<thead>
<tr>
<th>NAICS Code</th>
<th>Description</th>
<th>Establishments</th>
<th>Revenue ($1,000)</th>
<th>Annual Payroll ($1,000)</th>
<th>Paid Employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>513</td>
<td>Broadcasting and telecommunications</td>
<td>960</td>
<td>8,392,739</td>
<td>2,062,393</td>
<td>43,139</td>
</tr>
<tr>
<td>5131</td>
<td>Radio and television broadcasting</td>
<td>160</td>
<td>508,221</td>
<td>140,940</td>
<td>4,287</td>
</tr>
<tr>
<td>51311</td>
<td>Radio broadcasting</td>
<td>119</td>
<td>191,315</td>
<td>62,803</td>
<td>2,666</td>
</tr>
<tr>
<td>513111</td>
<td>Radio networks</td>
<td>9</td>
<td>25,432</td>
<td>5,974</td>
<td>245</td>
</tr>
<tr>
<td>513112</td>
<td>Radio stations</td>
<td>110</td>
<td>165,883</td>
<td>56,829</td>
<td>2,421</td>
</tr>
<tr>
<td>51312</td>
<td>Television broadcasting</td>
<td>41</td>
<td>316,906</td>
<td>78,137</td>
<td>1,621</td>
</tr>
<tr>
<td>5132</td>
<td>Cable networks and program distribution</td>
<td>137</td>
<td>1,318,198</td>
<td>200,056</td>
<td>6,145</td>
</tr>
<tr>
<td>51321</td>
<td>Cable networks</td>
<td>21</td>
<td>140,427</td>
<td>22,229</td>
<td>424</td>
</tr>
<tr>
<td>51322</td>
<td>Cable and other program distribution</td>
<td>116</td>
<td>1,177,771</td>
<td>177,827</td>
<td>5,721</td>
</tr>
<tr>
<td>5133</td>
<td>Telecommunications</td>
<td>663</td>
<td>6,566,320</td>
<td>1,721,397</td>
<td>32,707</td>
</tr>
<tr>
<td>51331</td>
<td>Wired telecommunications carriers</td>
<td>438</td>
<td>5,522,088</td>
<td>1,430,795</td>
<td>26,698</td>
</tr>
<tr>
<td>51332</td>
<td>Wireless telecommunications carriers (except satellite)</td>
<td>138</td>
<td>589,492</td>
<td>78,891</td>
<td>1,837</td>
</tr>
<tr>
<td>513321</td>
<td>Paging</td>
<td>59</td>
<td>264,559</td>
<td>26,529</td>
<td>773</td>
</tr>
<tr>
<td>513322</td>
<td>Cellular and other wireless telecommunications</td>
<td>79</td>
<td>324,933</td>
<td>52,362</td>
<td>1,064</td>
</tr>
<tr>
<td>51333</td>
<td>Telecommunications resellers</td>
<td>55</td>
<td>391,664</td>
<td>192,891</td>
<td>3,653</td>
</tr>
<tr>
<td>51334</td>
<td>Satellite telecommunications</td>
<td>12</td>
<td>14,397</td>
<td>5,455</td>
<td>134</td>
</tr>
<tr>
<td>51339</td>
<td>Other telecommunications</td>
<td>20</td>
<td>48,679</td>
<td>13,365</td>
<td>385</td>
</tr>
</tbody>
</table>

Data source: U.S. Census Bureau (http://www.census.gov).
Statistics for smaller areas are typically withheld to avoid disclosing information about individual firms. The level of geographic detail varies widely for major data items. Basic census content includes several key statistics such as the number of establishments (or companies), number of employees, payroll, and measures of output like sales revenue, which the economic census refers to as the value of shipments.

Because the economic census is now based on the NAICS, only limited information is published according to the old SIC system. However, a detailed “bridge table” showing the relationships between NAICS and SIC categories makes for an easier comparison between current and previous statistics. Although still very slow by private-sector standards, 2002 economic census results will become available on the Internet much faster than the results from prior censuses, which were largely distributed in printed form. Although only highlights of recent economic censuses are available in printed form, software on both CD-ROM and the Internet allows companies to print detailed data. Given a faster publication cycle, industry reports for manufacturing, mining, and construction, previously issued in both preliminary and final form, are now issued only once. In another recent change, all reports are now titled simply as economic census reports. They are no longer treated as if each sector had a separate census, e.g., the census of manufacturers.

Detailed data are issued, sector by sector, on CD-ROM and on the Internet. Geographic area series (published for all sectors) provide detail for establishments with employees, for the nation, states, and substate areas. ZIP code statistics are also published for most sectors. Industry series reports for manufacturing, mining, and construction provide national totals on groups of related industries and their products. Limited data are available for individual states. Subject series (all sectors) provide national and limited local data on special topics including merchandise line sales, concentration ratios, and both establishment and firm sizes. Summary reports by sector provide highlights of the data in print. They feature primarily national data and general statistics by state, and include illustrations of some of the more detailed data available in electronic media. Table 11.4 shows a typical example of the level of detail available in the geographic area series. This example shows the makeup of the broadcasting and telecommunications sector in the state of Colorado during 1997.

CENSUS MEASURES OF MARKET CONCENTRATION

Pricing strategies and profit rates tend to be heavily influenced by the vigor of competition. As a result, information from the economic census on the number and size distribution of competitors is a vital input into the managerial decision-making process.

Concentration Ratios

In addition to those directly engaged in business, both government and the public share an interest in the number and size distribution of competitors. A small number of competitors can sometimes have direct implications for regulation and antitrust policy. Thus, considerable public resources are devoted to monitoring both the size distribution and economic performance of firms in several important sectors of the economy. Among those sectors covered by the economic census, manufacturing is clearly the largest, accounting for approximately 20 percent of aggregate economic activity in the United States. Firm sizes in manufacturing are also much larger than in other major sectors such as retail and wholesale trade, construction, legal and medical services, and so on. Among the more than 16 million business enterprises in the United States, manufacturing is the domain of the large corporation. Thus, the manufacturing sector provides an interesting basis for considering data that are available on the size distribution of firms.
Table 11.5 shows census information on the number of competitors, industry sales, and leading-firm market share data for a small sample of industries. Industries that contain a large number of firms of roughly equal sizes are generally regarded as vigorously competitive. Questions about the intensity of competition sometimes arise when only a limited number of competitors are present, or when only a handful of large firms dominate the industry.

As shown in Table 11.5, the economic census uses two different methods to describe the degree of competitor size inequality within an industry. The most commonly used group measures of leading-firm market share data are calculated from sales information for various

<table>
<thead>
<tr>
<th>Industry</th>
<th>NACIS Code</th>
<th>Number of Firms</th>
<th>Industry Sales ($ millions)</th>
<th>Herfindahl Hirschmann Index (HHI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breakfast cereal</td>
<td>31123</td>
<td>48</td>
<td>9,099</td>
<td>2,445.9</td>
</tr>
<tr>
<td>Dairy products (except frozen)</td>
<td>31151</td>
<td>948</td>
<td>52,812</td>
<td>169.8</td>
</tr>
<tr>
<td>Bread and bakery products</td>
<td>31181</td>
<td>9,489</td>
<td>25,953</td>
<td>423.4</td>
</tr>
<tr>
<td>Coffee and tea</td>
<td>31192</td>
<td>215</td>
<td>3,645</td>
<td>1,187.2</td>
</tr>
<tr>
<td>Soft drinks</td>
<td>31211</td>
<td>1,008</td>
<td>13,131</td>
<td>663.4</td>
</tr>
<tr>
<td>Carpet and rug mills</td>
<td>31411</td>
<td>413</td>
<td>11,493</td>
<td>922.5</td>
</tr>
<tr>
<td>Footwear</td>
<td>31621</td>
<td>366</td>
<td>4,211</td>
<td>317.0</td>
</tr>
<tr>
<td>Luggage</td>
<td>31691</td>
<td>270</td>
<td>4,126</td>
<td>1,418.6</td>
</tr>
<tr>
<td>Printing</td>
<td>32311</td>
<td>36,617</td>
<td>90,565</td>
<td>43.3</td>
</tr>
<tr>
<td>Petroleum refineries</td>
<td>32411</td>
<td>122</td>
<td>158,668</td>
<td>422.1</td>
</tr>
<tr>
<td>Petrochemicals</td>
<td>32511</td>
<td>42</td>
<td>19,469</td>
<td>1,187.0</td>
</tr>
<tr>
<td>Soap and cleaning compounds</td>
<td>32561</td>
<td>1,583</td>
<td>30,928</td>
<td>625.9</td>
</tr>
<tr>
<td>Cement</td>
<td>32731</td>
<td>176</td>
<td>6,532</td>
<td>466.6</td>
</tr>
<tr>
<td>Primary aluminum production</td>
<td>331312</td>
<td>13</td>
<td>6,225</td>
<td>1,230.6</td>
</tr>
<tr>
<td>Ferrous metal foundries</td>
<td>33151</td>
<td>986</td>
<td>17,428</td>
<td>176.4</td>
</tr>
<tr>
<td>Hardware</td>
<td>33251</td>
<td>906</td>
<td>11,062</td>
<td>154.6</td>
</tr>
<tr>
<td>Construction machinery</td>
<td>33312</td>
<td>723</td>
<td>22,117</td>
<td>1,020.3</td>
</tr>
<tr>
<td>Computer and peripheral equipment</td>
<td>33411</td>
<td>1,870</td>
<td>110,055</td>
<td>464.9</td>
</tr>
<tr>
<td>Telephones</td>
<td>33421</td>
<td>548</td>
<td>38,376</td>
<td>999.4</td>
</tr>
<tr>
<td>Semiconductors</td>
<td>33441</td>
<td>5,652</td>
<td>139,084</td>
<td>413.7</td>
</tr>
<tr>
<td>Lighting fixtures</td>
<td>33512</td>
<td>1,160</td>
<td>9,404</td>
<td>272.8</td>
</tr>
<tr>
<td>Automobiles</td>
<td>33611</td>
<td>253</td>
<td>205,544</td>
<td>2,862.8</td>
</tr>
<tr>
<td>Guided missiles and space vehicles</td>
<td>336414</td>
<td>15</td>
<td>16,247</td>
<td>n.a.</td>
</tr>
<tr>
<td>Medical equipment</td>
<td>3911</td>
<td>12,123</td>
<td>44,894</td>
<td>137.5</td>
</tr>
<tr>
<td>Jewelry and silverware</td>
<td>33991</td>
<td>3,737</td>
<td>8,304</td>
<td>65.2</td>
</tr>
</tbody>
</table>

Note: n.a. means not available. Data withheld to avoid disclosing information for individual companies.

concentration ratios

Data that show the percentage market share held by a group of leading firms.

Clusters of top firms. These group market share data are called concentration ratios because they measure the percentage market share concentrated in (or held by) an industry’s top four (CR₄), eight (CR₈), 20 (CR₂₀), or 50 (CR₅₀) firms. Thus, the concentration ratio for a group of \( n \) leading firms is defined in percentage terms as:

\[
CR_n = \frac{\sum_{i=1}^{n} \text{Firm Sales}_i}{\text{Industry Sales}} \times 100
\]

where \( i \) refers to an individual firm.

Theoretically, concentration ratios can range between \( CR_n = 0 \) for an industry with a massive number of small competitors, to \( CR_n = 100 \) for an industry represented by a single monopolist. In the manufacturing sector where concentration tends to be highest, four-firm concentration ratios tend to fall in a broad range between \( CR_4 = 20 \) and \( CR_4 = 60 \); eight-firm concentration ratios often lie in a range between \( CR_8 = 30 \) and \( CR_8 = 70 \). When concentration ratios are low, industries tend to include many firms, and competition tends to be vigorous. Industries in which the four leading firms are responsible for less than 20 percent of total industry sales (i.e., \( CR_4 < 20 \)) are highly competitive and approximate the perfect competition model. On the other hand, when concentration ratios are high, leading firms dominate following firms in terms of size, and leading firms may have more potential for pricing flexibility and economic profits. Industries in which the four leading firms control more than 80 percent of total industry sales (i.e., \( CR_4 > 80 \)) are often described as highly concentrated. Industries with a \( CR_4 < 20 \) or \( CR_4 > 80 \), however, are quite rare. Three-quarters of all manufacturing activity takes place in industries with concentration ratios falling in the range \( 20 \leq CR_4 \leq 80 \). In terms of relative importance, market structures that can be described as monopolistically competitive are much more common than perfect competition or monopoly.

**Herfindahl Hirschmann Index**

By definition, concentration ratios rise with greater competitor size inequality within a given industry. Concentration ratios, however, are unaffected by the degree of size inequality within each respective group of leading firms. This can create problems because competition within industries featuring a handful of large competitors can be much more vigorous than in those where a single dominant firm faces no large adversaries. For example, although \( CR_4 = 100 \) would signal monopoly in the case of a single dominant firm, it might describe a vigorously competitive industry if each of the leading four firms enjoy roughly equal market shares of 25 percent. The Herfindahl Hirschmann Index (HHI), named after the economists who invented it, is a popular measure of competitor size inequality that reflects size differences among large and small firms. Calculated in percentage terms, the HHI is the sum of the squared market shares for all \( n \) industry competitors:

\[
HHI = \sum_{i=1}^{n} \left( \frac{\text{Firm Sales}_i}{\text{Industry Sales}} \times 100 \right)^2
\]

For example, a monopoly industry with a single dominant firm is described by a \( CR_4 = 100 \) and an HHI = 100² = 10,000. A vigorously competitive industry where each of the leading four firms enjoys market shares of 25 percent is also described by a \( CR_4 = 100 \), but features an HHI = 25² +25² +25² +25² = 2,500. Like concentration ratios, the HHI approaches zero for industries characterized by a large number of very small competitors.
Limitations of Concentration Ratios and HHI Information

Despite the obvious attraction of census concentration ratios and HHI data as useful information on the number and size distribution of current competitors, it is prudent to remain cautious in their use and interpretation. Important limitations must be recognized. By not appreciating these limitations, one might make fundamental errors in judging the vigor of competition within industries.

A major drawback of concentration ratio and HHI information is that they take a long time to collect and publish. Data for 1997 were not generally available on the Internet until 2000 and 2001; data for 2002 will be collected in 2003 and published in 2004 and 2005. In many fast-moving markets, these data are obsolete before they are published. Even in less dynamic markets, they provide only an imperfect guide to managerial decision making. As a result, many managers supplement census information with current data available on the Internet from market research firms.

A further important weakness of census concentration ratio and HHI information is that they ignore domestic sales by foreign competitors (imports) as well as exports by domestic firms. Only data on domestic sales from domestic production, not total domestic sales, are reported. This means, for example, that if foreign imports have a market share of 25 percent, the four leading domestic automobile manufacturers account for 66.2 percent (= 88.3 percent of 75 percent) of total U.S. foreign plus domestic car sales (NAICS 33611), rather than the 88.3 percent, as Table 11.5 suggests. For industries with significant import competition, concentration ratios and HHI data significantly overstate the relative importance of leading domestic firms. Concentration ratios and HHI information also overstate market power for several industries in which increasing foreign competition has been responsible for the liquidation or merger of many smaller domestic firms with older, less efficient production facilities. Despite reduced numbers of domestic firms and the consequent rise in concentration, an increase in foreign competition often makes affected industries more efficient and more competitive rather than less so. The impact of foreign competition is important in many industries, but it is particularly so in manufacturing industries such as apparel, steel, automobiles, cameras, copiers, motorcycles, and television sets.

Another limitation of concentration ratio data is that they are national totals, whereas a relevant economic market may be national, regional, or local in scope. If high transportation costs or other product characteristics keep markets regional or local rather than national in scope, concentration ratios can significantly understate the relative importance of leading firms. For example, the leading firm in many metropolitan newspaper markets often approaches 100 percent of classified advertising and subscription revenues. Thus, a national CR₄ for newspapers would significantly understated local market power. Although national four-firm concentration ratios of less than 25 percent usually suggest a highly competitive market, the local or regional character of some markets can make national concentration figures meaningless. Examples of other products with local or regional rather than national markets include milk, bread and bakery products, commercial printing, and ready-mix concrete.

Additional problems occur because concentration ratios and HHI information provide an imperfect view of market structure by including only firms that are currently active in a particular industry. Recall that an economic market includes all firms willing and able to sell an identifiable product. Besides firms currently active in an industry, this includes those that can be regarded as likely potential entrants. Often the mere presence of one or more potential entrants constitutes a sufficient threat to force competitive market behavior in industries with only a handful of established competitors. Major retailers such as Wal-Mart, Target, and Sears, for example, use their positions as potential entrants into manufacturing to obtain attractive prices on a wide range of private-label merchandise such as clothing, lawn mowers, washing machines, and so on.
Finally, considering concentration ratio and HHI data in isolation can lead to deceptive conclusions regarding the vigor of competition because they measure only part of market structure; other components include barriers to entry or exit, nonprice competition, vertical integration, and so on. Under certain circumstances, even a very few large competitors can compete vigorously. *Competition among the few can be spirited.* For example, the market for large commercial and military aircraft is viciously competitive despite being dominated by only two global competitors: Boeing, from the United States, and Airbus Industrie, the European multinational consortium. In addition to considering the number and size distribution of competi-

---

### Managerial Application 11.4

**Characteristics of Wonderful Businesses**

Interesting perspectives on the characteristics of “wonderful businesses” are given by legendary Wall Street investors T. Rowe Price and Warren E. Buffett. The late T. Rowe Price was founder of Baltimore-based T. Rowe Price and Associates, Inc., one of the largest no-load mutual fund organizations in the United States, and the father of the “growth stock” theory of investing. According to Price, attractive growth stocks have low labor costs, superior research to develop products and new markets, a high rate of return on stockholders’ equity (ROE), elevated profit margins, rapid earnings per share (EPS) growth, lack cutthroat competition, and are comparatively immune from regulation. Omaha’s Warren E. Buffett, the billionaire head of Berkshire Hathaway, Inc., also looks for companies that have strong franchises and enjoy pricing flexibility, high ROE, high cash flow, owner-oriented management, and predictable earnings that are not natural targets of regulation. Like Price, Buffett has profited enormously through his investments.

The table shows Berkshire’s major common stock holdings in large and highly profitable growth companies in late 2001. The Coca-Cola Company, Berkshire’s biggest and most successful holding, typifies the concept of a wonderful business. Coca-Cola enjoys perhaps the world’s strongest franchise, owner-oriented management, and growing profits. From the standpoint of being a wonderful business, Coca-Cola is clearly the “real thing.” Berkshire also holds a large stake in The American Express Company, a premier travel and financial services firm strategically positioned to benefit from aging baby boomers. Gillette, a global leader in toiletries and a wide variety of consumer products, is another top holding.

Above-normal returns from investing in wonderful businesses are only possible if their virtues are not fully recognized by other investors. Buffett has profited by taking major positions in wonderful companies that suffer from some significant, but curable, malady. Once he buys them, Buffett is very reluctant to sell. It’s a simple, but very successful, investment philosophy.

<table>
<thead>
<tr>
<th>Company</th>
<th>Ticker</th>
<th>Return on Equity (%)</th>
<th>Expected Earnings Growth (%)</th>
<th>Market Cap. ($ billions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Express</td>
<td>AXP</td>
<td>14.4</td>
<td>13</td>
<td>43.5</td>
</tr>
<tr>
<td>Coca-Cola</td>
<td>KO</td>
<td>32.6</td>
<td>12</td>
<td>115.0</td>
</tr>
<tr>
<td>Gillette</td>
<td>G</td>
<td>29.1</td>
<td>10</td>
<td>34.9</td>
</tr>
<tr>
<td>First Data</td>
<td>FDC</td>
<td>22.8</td>
<td>15</td>
<td>28.4</td>
</tr>
<tr>
<td>H&amp;R Block</td>
<td>HRB</td>
<td>33.1</td>
<td>14</td>
<td>7.5</td>
</tr>
<tr>
<td>Moody’s</td>
<td>MCO</td>
<td>47.7</td>
<td>15</td>
<td>5.3</td>
</tr>
<tr>
<td>Washington Post</td>
<td>WPO</td>
<td>16.0</td>
<td>10</td>
<td>4.8</td>
</tr>
<tr>
<td>Wells Fargo</td>
<td>WFC</td>
<td>12.6</td>
<td>12</td>
<td>72.4</td>
</tr>
<tr>
<td>Wesco Financial</td>
<td>WSC</td>
<td>5.0</td>
<td>15</td>
<td>2.2</td>
</tr>
</tbody>
</table>


tors, firms must judge the competitive environment in light of foreign competition, transportation costs, regional product differences, likely potential entrants, advertising, customer loyalty, research and development, demand growth, and economies of scale in production, among other factors, to make accurate pricing and output decisions. All of these features constitute important elements of market structure.

COMPETITIVE STRATEGY IN MONOPOLISTIC COMPETITION AND OLIGOPOLY MARKETS

Developing and implementing an effective competitive strategy in imperfectly competitive markets involves a never-ending search for uniquely attractive products. Not all industries offer the same potential for sustained profitability; not all firms are equally capable of exploiting the profit potential that is available.

Competitive Strategy in Imperfectly Competitive Markets

It is always helpful to consider the number and size distribution of competitors, degree of product differentiation, level of information available in the marketplace, and conditions of entry when attempting to define market structure. Unfortunately, these and other readily obtained data are seldom definitive. Conditions of entry and exit are subtle and dynamic, as is the role of unseen potential entrants. All of this contributes to the difficulty of correctly assessing the profit potential of current products or prospective lines of business.

Rather than simply consider what is, effective managers must contemplate what might be. This is especially true when seeking to develop an effective competitive strategy. An effective competitive strategy in imperfectly competitive markets must be founded on the firm’s competitive advantage. A competitive advantage is a unique or rare ability to create, distribute, or service products valued by customers. It is the business-world analog to what economists call comparative advantage, or when one nation or region of the country is better suited to the production of one product than to the production of some other product. For example, when compared with the United States and Canada, Mexico enjoys a relative abundance of raw materials and cheap labor. As such, Mexico is in a relatively good position to export agricultural products, oil, and finished goods that require unskilled labor to the U.S. and Canadian market. At the same time, the United States and Canada enjoy a relative abundance of highly educated people, capital goods, and investment resources. Therefore, the United States and Canada are in a relatively good position to export machine tools, computer equipment, education, and professional services to Mexico.

An effective competitive strategy in imperfectly competitive markets grows out of a sophisticated understanding of the rules of competition in a given line of business or industry. The ultimate aim of this strategy is to cope with or, better still, change those rules in the company’s favor. To do so, managers must understand and contend with the rivalry among existing competitors, entry of new rivals, threat of substitutes, bargaining power of suppliers, and the bargaining power of buyers. Just as all industries are not alike in terms of their inherent profit potential, all firms are not alike in terms of their capacity to exploit available opportunities. In the business world, long-lasting above-normal rates of return require a sustainable competitive advantage that, by definition, cannot be easily duplicated.

Nike’s use of basketball superstar Michael Jordan as the focal point of its extensive media advertising and product development campaign is an interesting case in point. Like other highly successful and innovative advertising campaigns, the Nike promotion captured the imagination of consumers and put competitors like Reebok at a distinct disadvantage. After all, there is only one Michael Jordan. Nike sales surged as consumers got caught up in the enthusiasm of Jordan’s amazing basketball prowess and the excitement generated as the
Jordan-led Chicago Bulls marched to NBA championships. However, Jordan’s popularity and Nike sales plummeted following Jordan’s two surprise retirements from basketball, only to surge once again upon his triumphant returns. Meanwhile, Reebok, the second largest basketball shoe manufacturer in America, seeks to capture consumers’ interest with the “Shaq Attack,” an extensive media promotion and product development strategy built around NBA star Shaquille O’Neal.

The risks of star-based advertising as an effective form of nonprice competition in the nondurable consumer products industries became even more readily apparent following the well-documented failure of Pepsi’s sponsorship of musical legend Michael Jackson during the mid 1990s. Pepsi not only lost the millions of dollars it spent on an obviously ineffective Michael Jackson–based advertising campaign, but it also lost valuable market share to rival Coca-Cola.

This is not to suggest that advertising and other nonprice methods of competition have not been used to great advantage by many successful firms in imperfectly competitive markets. In fact, these techniques are often a primary force in developing a strong basis for product differentiation. Table 11.6 summarizes major characteristics typical of the monopolistic competition and oligopoly market structures. To develop an effective competitive strategy, it is necessary to assess the degree to which an individual industry or line of business embodies elements of each of these market structures. Although the probability of successful entry is higher in monopolis-

<table>
<thead>
<tr>
<th>TABLE 11.6</th>
<th>Summary of Monopolistic Competition and Oligopoly (Oligopsony) Market-Structure Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Monopolistic Competition</strong></td>
<td><strong>Oligopoly</strong></td>
</tr>
<tr>
<td>Number of actual or potential competitors</td>
<td>Many sellers</td>
</tr>
<tr>
<td>Product differentiation</td>
<td>Consumers perceive differences among the products of various competitors</td>
</tr>
<tr>
<td>Information</td>
<td>Low-cost information on price and product quality</td>
</tr>
<tr>
<td>Conditions of entry and exit</td>
<td>Easy entry and exit</td>
</tr>
<tr>
<td>Profit potential</td>
<td>Economic (above-normal) profits in short run only; normal profit in long run</td>
</tr>
<tr>
<td>Examples</td>
<td>Clothing, consumer financial services, professional services, restaurants</td>
</tr>
</tbody>
</table>
tically competitive markets, only difficult-to-enter oligopoly markets hold the potential for long-lasting above-normal returns.

In sum, firms in imperfectly competitive markets have the potential to earn economic profits in the long run only to the extent that they impart a valuable degree of uniqueness to the goods or services provided. Success, measured in terms of above-normal rates of return, requires a comparative advantage in production, distribution, or marketing that cannot easily be copied. That such success is difficult to achieve and is often rather fleeting is obvious when one considers the most profitable companies in America.

The Most Profitable Companies in America

Table 11.7 shows business profit rates for a sample of top-performing large firms from the United States. Profitability is measured by the rate of return on equity, thereby including the effects of both operating and financing decisions. These data demonstrate that market leaders earn truly extraordinary profits. In industries that produce distinctive goods and services, and in others that offer fairly mundane products, the most profitable firms in America earn an average rate of return on equity (ROE) that is a whopping 310.4 percent of all-industry norms. This means that the most profitable firm in a typical industry earns roughly 42.09 percent on capital, or far in excess of the average return on capital of 14.12 percent per year for large and highly successful U.S. companies. Notice that this average profit rate is only slightly above the 12 percent long-term average ROE typical for all companies.

It is obvious that the most profitable companies in America are able to outpace industry norms by a significant margin. Some of this variation in business profits represents the influence of risk premiums necessary to compensate investors if one business is inherently riskier than another. In the prescription pharmaceuticals industry, for example, hoped-for discoveries of effective therapies for important diseases are often a long-shot at best. However, apart from such risks, the observed intraindustry variation in profitability makes it clear that many firms earn significant economic profits or experience meaningful economic losses at any given point in time. Some above-normal returns in monopolistically competitive and oligopoly markets also reflect temporary good fortune due to unexpected changes in industry demand or cost conditions and/or profits due to uniquely productive inputs. However, most superior performers clearly are doing something faster, better, or cheaper than the competition.

When Large Size Is a Disadvantage

If economies of scale are substantial, larger firms are able to achieve lower costs of production or distribution than their smaller rivals. These cost advantages can translate into higher and more stable profits, and a significant competitive advantage for larger firms. Diseconomies of large-scale organizations work in the opposite direction. When diseconomies of scale are operative, larger firms suffer a cost disadvantage when compared to smaller rivals. Smaller firms are then able to translate the benefits of small size into a distinct competitive advantage. Rather than losing profits and sales opportunities to larger rivals, smaller firms can enjoy higher profit rates and gain market share over time.

Industries dominated by large firms tend to be those in which there are significant economies of scale, important advantages to vertical integration, and a prevalence of mass marketing. As a result, large organizations with sprawling plants emphasize large quantities of output at low production costs. Use of national media, especially TV advertising, is common. Industries in which “small is beautiful” tend to be characterized by diseconomies of scale, “just in time” assembly and manufacturing, and niche marketing that emphasizes the use of highly skilled individuals adept at personal selling. Small factories with flexible production schedules are common. Rather than emphasize long production runs, many smaller companies focus on product quality. Instead of the sometimes slow-to-respond hierarchical organizations of large
### TABLE 11.7
The Relative Profitability of Top-Performing Companies

In both dynamic and mundane industries, top-performers earn profit rates that are more than three times industry norms.

<table>
<thead>
<tr>
<th>Top-Performing Company</th>
<th>Industry</th>
<th>Top-Performer ROE</th>
<th>Industry ROE</th>
<th>Relative Profitability</th>
</tr>
</thead>
<tbody>
<tr>
<td>True North</td>
<td>Advertising</td>
<td>23.49</td>
<td>17.78</td>
<td>132.2%</td>
</tr>
<tr>
<td>Alliant Techsystems</td>
<td>Aerospace/defense</td>
<td>56.07</td>
<td>14.78</td>
<td>379.4%</td>
</tr>
<tr>
<td>Northwest Airlines</td>
<td>Air transport</td>
<td>32.14</td>
<td>14.18</td>
<td>226.7%</td>
</tr>
<tr>
<td>Oshkosh B’Gosh</td>
<td>Apparel</td>
<td>138.43</td>
<td>17.50</td>
<td>791.0%</td>
</tr>
<tr>
<td>Navistar Int’l</td>
<td>Auto and truck</td>
<td>28.35</td>
<td>14.24</td>
<td>199.1%</td>
</tr>
<tr>
<td>Delphi Automotive</td>
<td>Auto parts (OEM)</td>
<td>33.84</td>
<td>17.54</td>
<td>192.9%</td>
</tr>
<tr>
<td>Tenneco Automotive</td>
<td>Auto parts (replacement)</td>
<td>19.43</td>
<td>15.39</td>
<td>126.3%</td>
</tr>
<tr>
<td>North Fork Bancorp</td>
<td>Bank</td>
<td>35.61</td>
<td>18.09</td>
<td>196.8%</td>
</tr>
<tr>
<td>Royal Bank of Canada</td>
<td>Bank (Canadian)</td>
<td>14.72</td>
<td>14.72</td>
<td>100.0%</td>
</tr>
<tr>
<td>National City Corp.</td>
<td>Bank (Midwest)</td>
<td>24.51</td>
<td>19.35</td>
<td>126.7%</td>
</tr>
<tr>
<td>Anheuser-Busch</td>
<td>Beverage (alcoholic)</td>
<td>35.75</td>
<td>13.56</td>
<td>263.7%</td>
</tr>
<tr>
<td>Coca-Cola</td>
<td>Beverage (soft drink)</td>
<td>33.98</td>
<td>9.72</td>
<td>349.6%</td>
</tr>
<tr>
<td>USG Corp.</td>
<td>Building materials</td>
<td>50.17</td>
<td>16.96</td>
<td>295.8%</td>
</tr>
<tr>
<td>Cablevision Sys.</td>
<td>Cable TV</td>
<td>20.86</td>
<td>2.55</td>
<td>818.0%</td>
</tr>
<tr>
<td>Numac Energy</td>
<td>Canadian energy</td>
<td>13.83</td>
<td>7.19</td>
<td>192.4%</td>
</tr>
<tr>
<td>Centex Construction</td>
<td>Cement and aggregates</td>
<td>31.78</td>
<td>16.12</td>
<td>197.2%</td>
</tr>
<tr>
<td>Georgia Gulf</td>
<td>Chemical (basic)</td>
<td>75.43</td>
<td>13.47</td>
<td>560.0%</td>
</tr>
<tr>
<td>Millipore Corp.</td>
<td>Chemical (diversified)</td>
<td>34.45</td>
<td>15.28</td>
<td>225.5%</td>
</tr>
<tr>
<td>WD-40 Co.</td>
<td>Chemical (specialty)</td>
<td>38.94</td>
<td>15.05</td>
<td>258.7%</td>
</tr>
<tr>
<td>Dell Computer</td>
<td>Computer and peripherals</td>
<td>35.04</td>
<td>9.90</td>
<td>353.9%</td>
</tr>
<tr>
<td>Adobe Systems</td>
<td>Computer software and svcs</td>
<td>38.16</td>
<td>16.96</td>
<td>225.0%</td>
</tr>
<tr>
<td>Sepracor, Inc.</td>
<td>Drug</td>
<td>117.34</td>
<td>14.05</td>
<td>835.2%</td>
</tr>
<tr>
<td>IPALCO Enterprises</td>
<td>Electric util. (Central)</td>
<td>17.93</td>
<td>11.60</td>
<td>154.6%</td>
</tr>
<tr>
<td>Allegheny Energy</td>
<td>Electric utility (East)</td>
<td>17.77</td>
<td>11.31</td>
<td>157.1%</td>
</tr>
<tr>
<td>Black Hills</td>
<td>Electric utility (West)</td>
<td>16.83</td>
<td>10.78</td>
<td>156.2%</td>
</tr>
<tr>
<td>Gen’l Cable</td>
<td>Electrical equipment</td>
<td>28.26</td>
<td>17.03</td>
<td>165.9%</td>
</tr>
<tr>
<td>Plantronics Inc.</td>
<td>Electronics</td>
<td>61.22</td>
<td>12.80</td>
<td>478.3%</td>
</tr>
<tr>
<td>Imax Corp.</td>
<td>Entertainment</td>
<td>22.71</td>
<td>5.57</td>
<td>407.7%</td>
</tr>
<tr>
<td>Waste Management</td>
<td>Environmental</td>
<td>25.20</td>
<td>12.03</td>
<td>209.5%</td>
</tr>
<tr>
<td>Alliance Capital Mgmt.</td>
<td>Financial svcs. (div.)</td>
<td>83.53</td>
<td>20.11</td>
<td>415.4%</td>
</tr>
<tr>
<td>Sara Lee Corp.</td>
<td>Food processing</td>
<td>91.97</td>
<td>16.55</td>
<td>555.7%</td>
</tr>
<tr>
<td>Sysco Corp.</td>
<td>Food wholesalers</td>
<td>25.75</td>
<td>11.21</td>
<td>229.7%</td>
</tr>
<tr>
<td>Nokia Corp. ADR</td>
<td>Foreign telecom.</td>
<td>34.41</td>
<td>11.02</td>
<td>312.3%</td>
</tr>
<tr>
<td>Miller (Herman)</td>
<td>Furn./home furnishings</td>
<td>47.43</td>
<td>18.73</td>
<td>253.2%</td>
</tr>
<tr>
<td>Barrick Gold</td>
<td>Gold/silver mining</td>
<td>7.96</td>
<td>3.72</td>
<td>214.0%</td>
</tr>
<tr>
<td>Kroger Co.</td>
<td>Grocery</td>
<td>35.99</td>
<td>10.78</td>
<td>333.9%</td>
</tr>
<tr>
<td>IMS HEALTH</td>
<td>Healthcare info systems</td>
<td>48.91</td>
<td>12.49</td>
<td>391.6%</td>
</tr>
<tr>
<td>Black &amp; Decker</td>
<td>Home appliance</td>
<td>37.48</td>
<td>18.13</td>
<td>206.8%</td>
</tr>
<tr>
<td>Newhall Land &amp; Farming</td>
<td>Homebuilding</td>
<td>64.69</td>
<td>17.47</td>
<td>370.3%</td>
</tr>
<tr>
<td>Int’l Game Tech.</td>
<td>Hotel/gaming</td>
<td>56.02</td>
<td>12.72</td>
<td>440.4%</td>
</tr>
<tr>
<td>Ralston Purina Group</td>
<td>Household products</td>
<td>69.40</td>
<td>30.47</td>
<td>227.8%</td>
</tr>
<tr>
<td>Equifax, Inc.</td>
<td>Industrial services</td>
<td>100.11</td>
<td>13.99</td>
<td>715.6%</td>
</tr>
<tr>
<td>Protective Life</td>
<td>Insurance (life)</td>
<td>17.69</td>
<td>13.38</td>
<td>132.2%</td>
</tr>
<tr>
<td>PMI Group</td>
<td>Insurance (prop/casualty)</td>
<td>15.53</td>
<td>10.73</td>
<td>144.7%</td>
</tr>
<tr>
<td>Briggs &amp; Stratton</td>
<td>Machinery</td>
<td>30.79</td>
<td>14.44</td>
<td>213.2%</td>
</tr>
<tr>
<td>Winnebago</td>
<td>Manuf. housing/rec veh</td>
<td>27.67</td>
<td>14.27</td>
<td>193.9%</td>
</tr>
<tr>
<td>Sea Containers Ltd.</td>
<td>Maritime</td>
<td>12.69</td>
<td>2.76</td>
<td>459.8%</td>
</tr>
<tr>
<td>Apria Healthcare</td>
<td>Medical services</td>
<td>96.46</td>
<td>12.37</td>
<td>779.8%</td>
</tr>
</tbody>
</table>
companies, smaller companies feature “flat” organizations with quick, decentralized decision making and authority.

The villain sometimes encountered by large-scale firms is not any diseconomy of scale in the production process itself, but rather the burden that size places on effective management. Big often means complex, and complexity results in inefficiencies and bureaucratic snarls that can strangle effective communication. In the former Soviet Union, a huge, highly centralized, run-from-the-top system came crashing down as a result of its own gigantic weight. Hoping to avoid a similar fate, many large organizations are now splitting assets into smaller independent operating units that can react quickly to customer needs without the typically long delays of large organizations. IBM, for example, has split into independent operating units

<table>
<thead>
<tr>
<th>Top-Performing Company</th>
<th>Industry</th>
<th>Top-Performer ROE</th>
<th>Industry ROE</th>
<th>Relative Profitability</th>
</tr>
</thead>
<tbody>
<tr>
<td>AmeriSource Health</td>
<td>Medical supplies</td>
<td>49.96</td>
<td>15.01</td>
<td>332.8%</td>
</tr>
<tr>
<td>Illinois Tool Works</td>
<td>Metal fabricating</td>
<td>18.93</td>
<td>13.95</td>
<td>135.7%</td>
</tr>
<tr>
<td>Freeport-McMoRan C&amp;G</td>
<td>Metals and mining (div.)</td>
<td>19.94</td>
<td>6.50</td>
<td>307.0%</td>
</tr>
<tr>
<td>UGI Corp.</td>
<td>Natural gas (distrib.)</td>
<td>16.84</td>
<td>10.05</td>
<td>167.6%</td>
</tr>
<tr>
<td>Mitchell Energy</td>
<td>Natural gas (diversified)</td>
<td>20.21</td>
<td>9.87</td>
<td>204.8%</td>
</tr>
<tr>
<td>Dow Jones &amp; Co.</td>
<td>Newspaper</td>
<td>40.16</td>
<td>12.29</td>
<td>326.8%</td>
</tr>
<tr>
<td>Lexmark Int’l `A’</td>
<td>Office equip and supplies</td>
<td>48.32</td>
<td>17.13</td>
<td>282.1%</td>
</tr>
<tr>
<td>Diamond Offshore</td>
<td>Oilfield services/equip.</td>
<td>8.84</td>
<td>2.37</td>
<td>373.0%</td>
</tr>
<tr>
<td>Sealed Air</td>
<td>Packaging and container</td>
<td>9.15</td>
<td>21.30</td>
<td>43.0%</td>
</tr>
<tr>
<td>Georgia-Pacific Group</td>
<td>Paper and forest products</td>
<td>19.09</td>
<td>9.30</td>
<td>205.4%</td>
</tr>
<tr>
<td>Conoco Inc.</td>
<td>Petroleum (integrated)</td>
<td>17.16</td>
<td>9.81</td>
<td>174.9%</td>
</tr>
<tr>
<td>Berry Petroleum</td>
<td>Petroleum (producing)</td>
<td>15.49</td>
<td>5.42</td>
<td>286.1%</td>
</tr>
<tr>
<td>Mettler-Toledo Int’l</td>
<td>Precision instrument</td>
<td>51.71</td>
<td>13.13</td>
<td>394.0%</td>
</tr>
<tr>
<td>Deluxe Corp.</td>
<td>Publishing</td>
<td>48.65</td>
<td>21.30</td>
<td>228.4%</td>
</tr>
<tr>
<td>Burlington Northern</td>
<td>Railroad</td>
<td>13.86</td>
<td>9.54</td>
<td>145.4%</td>
</tr>
<tr>
<td>Topps Co.</td>
<td>Recreation</td>
<td>45.84</td>
<td>14.23</td>
<td>322.2%</td>
</tr>
<tr>
<td>Jack in the Box</td>
<td>Restaurant</td>
<td>35.09</td>
<td>14.68</td>
<td>239.0%</td>
</tr>
<tr>
<td>Intimate Brands</td>
<td>Retail (special lines)</td>
<td>84.24</td>
<td>15.44</td>
<td>545.6%</td>
</tr>
<tr>
<td>Fastenal Co.</td>
<td>Retail building supply</td>
<td>23.21</td>
<td>14.69</td>
<td>158.0%</td>
</tr>
<tr>
<td>Dollar General Corp.</td>
<td>Retail store</td>
<td>23.69</td>
<td>15.31</td>
<td>154.7%</td>
</tr>
<tr>
<td>Morgan S. Dean Witter</td>
<td>Securities brokerage</td>
<td>28.15</td>
<td>18.95</td>
<td>148.5%</td>
</tr>
<tr>
<td>PMC-Sierra</td>
<td>Semiconductor</td>
<td>31.04</td>
<td>13.66</td>
<td>227.2%</td>
</tr>
<tr>
<td>Lam Research</td>
<td>Semiconductor cap equip</td>
<td>27.35</td>
<td>17.07</td>
<td>160.2%</td>
</tr>
<tr>
<td>Timberland Co.</td>
<td>Shoe</td>
<td>27.62</td>
<td>14.06</td>
<td>196.4%</td>
</tr>
<tr>
<td>Worthington Inds.</td>
<td>Steel (general)</td>
<td>14.77</td>
<td>10.81</td>
<td>136.6%</td>
</tr>
<tr>
<td>Pohang Iron ADR</td>
<td>Steel (integrated)</td>
<td>15.96</td>
<td>12.99</td>
<td>122.9%</td>
</tr>
<tr>
<td>Tellabs, Inc.</td>
<td>Telecom. equipment</td>
<td>26.29</td>
<td>2.32</td>
<td>1133.2%</td>
</tr>
<tr>
<td>Polymer Group</td>
<td>Textile</td>
<td>13.80</td>
<td>6.05</td>
<td>228.1%</td>
</tr>
<tr>
<td>N.Y. Community Bancorp</td>
<td>Thrift</td>
<td>21.99</td>
<td>15.97</td>
<td>137.7%</td>
</tr>
<tr>
<td>Carlisle Cos.</td>
<td>Tire and rubber</td>
<td>19.94</td>
<td>13.21</td>
<td>150.9%</td>
</tr>
<tr>
<td>Philip Morris</td>
<td>Tobacco</td>
<td>50.14</td>
<td>17.62</td>
<td>284.6%</td>
</tr>
<tr>
<td>Chattem Inc.</td>
<td>Toiletries/cosmetics</td>
<td>46.28</td>
<td>18.76</td>
<td>246.7%</td>
</tr>
<tr>
<td>Forward Air</td>
<td>Trucking/transp. leasing</td>
<td>29.19</td>
<td>15.65</td>
<td>186.6%</td>
</tr>
<tr>
<td>Sawtek Inc.</td>
<td>Wireless networking</td>
<td>23.08</td>
<td>2.35</td>
<td>982.1%</td>
</tr>
<tr>
<td><strong>Averages</strong></td>
<td><strong>42.09</strong></td>
<td><strong>14.12</strong></td>
<td><strong>310.4%</strong></td>
<td></td>
</tr>
</tbody>
</table>

that compete directly with each other to provide customers with the latest in computer equipment and software. GM, seeking to become more lean and agile like Japanese competitors, established Saturn as an independent operating unit. Exxon is selling domestic exploration and production operations to smaller independents that chop overhead and earn significant profits despite low volume and depressed oil prices. These examples suggest that many large corporations are going through a metamorphosis that will favor organizations that are especially adept at reallocating capital among nimble, entrepreneurial operating units.

In the past, when foreign visitors wanted to experience firsthand the latest innovations in U.S. business and administrative practice, they found it mandatory to visit major corporations in Chicago, Detroit, New York, and Pittsburgh. Today, it is more likely that they would make stops at Boston’s Route 128, California’s Silicon Valley, or North Carolina’s Research Triangle. From electronics instrumentation to specialized steel, smaller companies have replaced larger companies in positions of industry leadership. The trend towards a higher level of efficiency for smaller companies has become so widespread that larger companies are now finding that meeting the needs of the customer sometimes requires a dramatic downsizing of the large-scale organization.

**Threat of Potential Competition**

The potential for above-normal rates of return is a powerful inducement to the entry of new competitors and to the rapid growth of nonleading firms. Imitation may be the sincerest form of flattery, but it is also the most effective enemy of above-normal rates of return. Regression to the mean is the rule rather than the exception for above-normal corporate profit rates over time. During recent years, after-tax rates of return on stockholders’ equity have usually been in the range of 9 percent to 10 percent per year. Just as in the stock market where investors rarely earn excess returns, individual companies rarely earn in excess of 15 percent to 20 percent for more than a decade. A consistent ROE $\geq 20$ percent is simply unheard of for an entire industry with several competitors over a sustained period. Therefore, it seems reasonable to conclude that price and nonprice methods of competition are often vigorous, even in imperfectly competitive industries with few active or potential competitors.

**SUMMARY**

This chapter extends the study of market structure to monopolistic competition and oligopoly. These models describe the behavior of competitors in imperfectly competitive markets across a broad spectrum of our economy in which both price competition and a wide variety of methods of nonprice competition are observed.

- **Monopolistic competition** is similar to perfect competition in that it entails vigorous price competition among a large number of firms and individuals. The major difference is that consumers perceive important differences among the products offered by monopolistically competitive firms, whereas the output of perfectly competitive firms is homogeneous.
- In an industry characterized by oligopoly, only a few large rivals are responsible for the bulk of industry output. High to very high barriers to entry are typical, and the price/output decisions of firms are interrelated in the sense that direct reactions from rivals can be expected. This “competition among the few” involves a wide variety of price and nonprice methods of rivalry.
- A group of competitors operating under a formal overt agreement is called a cartel. If an informal covert agreement is reached, the firms are said to be operating in collusion. Both practices are generally illegal in the United States. However, cartels are legal in many parts of the world, and multinational corporations often become involved with them in foreign markets.
• **Price leadership** results when one firm establishes itself as the industry leader and all other firms accept its pricing policy. This leadership may result from the size and strength of the leading firm, from cost efficiency, or as a result of the recognized ability of the leader to forecast market conditions accurately and to establish prices that produce satisfactory profits for all firms in the industry. Under a second type of price leadership, **barometric price leadership**, the price leader is not necessarily the largest or dominant firm in the industry. The price leader must only be accurate in reading the prevailing industry view of the need for price adjustment.

• An often-noted characteristic of oligopoly markets is “sticky” prices. Once a general price level has been established, whether through cartel agreement or some less formal arrangement, it tends to remain fixed for an extended period. Such rigid prices are often explained by what is referred to as the **kinked demand curve** theory of oligopoly prices. A kinked demand curve is a firm demand curve that has different slopes for price increases versus price decreases.

• **Game theory** is a general framework to help decision making when firm payoffs depend on actions taken by other firms. In a **simultaneous-move game**, each decision maker makes choices without specific knowledge of competitor counter moves. In a **sequential-move game**, decision makers make their move after observing competitor moves. In a **one-shot game**, the underlying interaction between competitors occurs only once; in a **repeat game**, there is an ongoing interaction between competitors.

• The so-called **Prisoner's Dilemma** is a classic conflict-of-interest situation. A **dominant strategy** gives the best result for either party regardless of the action taken by the other. A **secure strategy** guarantees the best possible outcome given the worst possible scenario. In a **Nash equilibrium**, neither player can improve its own payoff by unilaterally changing its own strategy. In a **Nash bargaining** game, two competitors or players “bargain” over some item of value. When competitors interact on a continuous basis, they are said to be involved in **repeat games**. Like any written guarantee or insurance policy, repeat transactions in the marketplace give consumers confidence that they’ll get what they pay for.

• The **economic census** provides a comprehensive statistical profile of the national economy. They are taken at 5-year intervals during years ending with the digits 2 and 7—for example, 1992, 1997, 2002, and so on. The **North American Industry Classification System (NAICS)** categorizes establishments by the principal economic activity in which they are engaged. Below the 2-digit major group or sector level, the NAICS system proceeds to desegregated levels of increasingly narrowly defined activity.

• **Concentration ratios** measure the percentage market share held by (concentrated in) a group of top firms. When concentration ratios are low, industries tend to be made up of many firms, and competition tends to be vigorous. When concentration ratios are high, leading firms dominate and sometimes have the potential for pricing flexibility and economic profits. The **Herfindahl Hirschmann Index (HHI)** is a measure of competitor size inequality that reflects size differences among both large and small firms. Calculated in percentage terms, the HHI is the sum of the squared market shares for all \( n \) industry competitors:

\[
\text{HHI} = \sum_{i=1}^{n} \left( \frac{\text{Market Share}_i}{100} \right)^2
\]

• An effective competitive strategy in imperfectly competitive markets must be founded on the firm’s **competitive advantage**. A competitive advantage is a unique or rare ability to create, distribute, or service products valued by customers. It is the business-world analog to what economists call **comparative advantage**, or when one nation or region of the country is better suited to the production of one product than to the production of some other product.

Public and private sources offer valuable service through their regular collection and publication of market structure data on the number and size distribution of competitors, market size, growth, capital intensity, investment, and so on. All of this information is useful to the process
of managerial decision making and provides a useful starting point for the development of successful competitive strategy.

**QUESTIONS**

**Q11.1** Describe the monopolistically competitive market structure and provide some examples.

**Q11.2** Describe the oligopolistic market structure and provide some examples.

**Q11.3** Explain the process by which economic profits are eliminated in a monopolistically competitive industry as compared to a perfectly competitive industry.

**Q11.4** Would you expect the demand curve for a firm in a monopolistically competitive industry to be more or less elastic after economic profits have been eliminated?

**Q11.5** “One might expect firms in a monopolistically competitive industry to experience greater swings in the price of their products over the business cycle than those in an oligopolistic industry. However, fluctuations in profits do not necessarily follow the same pattern.” Discuss this statement.

**Q11.6** Will revenue-maximizing firms have short-run profits as large as or larger than profit-maximizing firms? If so, when? If not, why not?

**Q11.7** Is short-run revenue maximization necessarily inconsistent with the more traditional long-run profit-maximizing model of firm behavior? Why or why not?

**Q11.8** Why is the four-firm concentration ratio only an imperfect measure of market power?

**Q11.9** The statement “You get what you pay for” reflects the common perception that high prices indicate high product quality and low prices indicate low quality. Irrespective of market structure considerations, is this statement always correct?

**Q11.10** “Economic profits result whenever only a few large competitors are active in a given market.” Discuss this statement.

**SELF-TEST PROBLEMS AND SOLUTIONS**

**ST11.1 Game Theory.** One of the most dynamic changes taking place in our economy is the evolution of the personal computer from a document preparation and computing device to a communicating device. What we used to view as stand-alone personal computers, televisions, VCRs, telephones, fax and copy machines are all converging toward nimble communications devices with the ability to fulfill a number of tasks simultaneously. Nowhere is the influence of this trend more obvious than in the communications equipment industries. This is the sector within which manufacturers produce household audio and video equipment, prerecorded records and tapes, telephone and telegraph apparatus, and radio and television communications equipment. Because many commercial users have unique needs, equipment suppliers sometimes have significant ability to influence the price charged for what is often a bundle of specialized goods and services. As a result, game theory concepts prove useful to both buyers and sellers of communications devices.

To illustrate, suppose two local suppliers are seeking to win the right to upgrade the communications capability of the internal “intranets” that link a number of customers with their suppliers. The system quality decision facing each competitor, and potential profit payoffs, are illustrated in the table. The first number listed in each cell is the profit earned by U.S. Equipment Supply; the second number indicates the profit earned by Business Systems, Inc. For example, if both competitors, U.S. Equipment Supply and Business Systems, Inc., pursue a high-quality strategy, U.S. Equipment Supply will earn $25,000 and Business Systems, Inc., will earn $50,000. If U.S. Equipment Supply pursues a high-quality strategy while Business Systems, Inc., offers

<table>
<thead>
<tr>
<th>Quality Strategy</th>
<th>High Quality</th>
<th>Low Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. Equipment Supply</td>
<td>$25,000, $50,000</td>
<td>$40,000, $22,000</td>
</tr>
<tr>
<td>Low Quality</td>
<td>–$25,000, $20,000</td>
<td>$25,000, $25,000</td>
</tr>
</tbody>
</table>

A. Does U.S. Equipment Supply and/or Business Systems, Inc., have a dominant strategy? If so, what is it?
B. Does U.S. Equipment Supply and/or Business Systems, Inc., have a secure strategy? If so, what is it?
C. What is the Nash equilibrium concept, and why is it useful? What is the Nash equilibrium for this problem?

**ST11.1 Solution**

A. The dominant strategy for U.S. Equipment Supply is to provide high-quality goods. Irrespective of the quality strategy chosen by Business Systems, Inc., U.S. Equipment Supply can do no better than to choose a high-quality strategy. To see this, note that if Business Systems, Inc., chooses to produce high-quality goods, the best choice for U.S. Equipment Supply is to also provide high-quality goods because the $25,000 profit then earned is better than the $25,000 loss that would be incurred if U.S. Equipment Supply chose a low-quality strategy. If Business Systems, Inc., chose a low-quality strategy, the best choice by U.S. Equipment Supply would again be to produce high-quality goods. U.S. Equipment Supply’s high-quality strategy profit of $40,000 dominates the low-quality payoff for U.S. Equipment Supply of $25,000.

Business Systems, Inc., does not have a dominant strategy. To see this, note that if U.S. Equipment Supply chooses to produce high-quality goods, the best choice for Business Systems, Inc., is to also provide high-quality goods because the $50,000 profit then earned is better than the $22,000 profit if Business Systems, Inc., chose a low-quality strategy. If U.S. Equipment Supply chose a low-quality strategy, the best choice by Business Systems, Inc., would be to produce low-quality goods and earn $25,000 versus $20,000.

B. The secure strategy for U.S. Equipment Supply is to provide high-quality goods. By choosing to provide high-quality goods, U.S. Equipment Supply can be guaranteed a profit payoff of at least $25,000. By pursuing a high-quality strategy, U.S. Equipment Supply can eliminate the chance of losing $25,000, as would happen if U.S. Equipment Supply chose a low-quality strategy while Business Systems, Inc., chose to produce high-quality goods.

The secure strategy for Business Systems, Inc., is to provide low-quality goods. By choosing to provide high-quality goods, Business Systems, Inc., can guarantee a profit payoff of only $20,000. Business Systems, Inc., can be assured of earning at least $22,000 with a low-quality strategy. Thus, the secure strategy for Business Systems, Inc., is to provide low-quality goods.

C. A set of strategies constitutes a Nash equilibrium if, given the strategies of other players, no player can improve its payoff through a unilateral change in strategy. The concept of Nash
equilibrium is very important because it represents a situation where every player is doing the best possible in light of what other players are doing.

Although useful, the notion of a secure strategy suffers from a serious shortcoming. In the present example, suppose Business Systems, Inc., reasoned as follows: “U.S. Equipment Supply will surely choose its high-quality dominant strategy. Therefore, I should not choose my secure low-quality strategy and earn $22,000. I should instead choose a high-quality strategy and earn $50,000.” A natural way of formalizing the “end result” of such a thought process is captured in the definition of Nash equilibrium.

In the present example, if U.S. Equipment Supply chooses a high-quality strategy, the Nash equilibrium strategy is for Business Systems, Inc., to also choose a high-quality strategy. Similarly, if Business Systems, Inc., chooses a high-quality strategy, the Nash equilibrium strategy is for U.S. Equipment Supply to also choose a high-quality strategy. Thus, a Nash equilibrium is reached when both firms adopt high-quality strategies.

Although some problems have multiple Nash equilibriums, that is not true in this case. A combination of high-quality strategies for both firms is the only set of strategies where no player can improve its payoff through a unilateral change in strategy.

Columbia Drugstores, Inc., based in Seattle, Washington, operates a chain of 30 drugstores in the Pacific Northwest. During recent years, the company has become increasingly concerned with the long-run implications of competition from a new type of competitor, the so-called superstore.

To measure the effects of superstore competition on current profitability, Columbia asked management consultant Mindy McConnell to conduct a statistical analysis of the company’s profitability in its various markets. To net out size-related influences, profitability was measured by Columbia’s gross profit margin, or earnings before interest and taxes divided by sales. Columbia provided proprietary company profit, advertising, and sales data covering the last year for all 30 outlets, along with public trade association and Census Bureau data concerning the number and relative size distribution of competitors in each market, among other market characteristics.

As a first step in the study, McConnell decided to conduct a regression-based analysis of the various factors thought to affect Columbia’s profitability. The first is the relative size of leading competitors in the relevant market, measured at the Standard Metropolitan Statistical Area (SMSA) level. Columbia’s market share, MS, in each market area is expected to have a positive effect on profitability given the pricing, marketing, and average-cost advantages that accompany large relative size. The market concentration ratio, CR, measured as the combined market share of the four largest competitors in any given market, is expected to have a negative effect on Columbia profitability given the stiff competition from large, well-financed rivals. Of course, the expected negative effect of high concentration on Columbia profitability contrasts with the positive influence of high concentration on industry profits that is sometimes observed.

Both capital intensity, K/S, measured by the ratio of the book value of assets to sales, and advertising intensity, A/S, measured by the advertising-to-sales ratio, are expected to exert positive influences on profitability. Given that profitability is measured by Columbia’s gross profit margin, the coefficient on capital intensity measured Columbia’s return on tangible investment. Similarly, the coefficient on the advertising variable measures the profit effects of advertising. Growth, GR, measured by the geometric mean rate of change in total disposable income in each market, is expected to have a positive influence on Columbia’s profitability, because some disequilibrium in industry demand and supply conditions is often observed in rapidly growing areas.
Finally, to gauge the profit implications of superstore competition, McConnell used a “dummy” (or binary) variable where $S = 1$ in each market in which Columbia faced superstore competition and $S = 0$ otherwise. The coefficient on this variable measures the average profit rate effect of superstore competition. Given the vigorous nature of superstore price competition, McConnell expects the superstore coefficient to be both negative and statistically significant, indicating a profit-limiting influence. The Columbia profit-margin data and related information used in McConnell’s statistical analysis are given in the preceding table. Regression model estimates for the determinants of Columbia’s profitability are as follows:

### Determinants of Profitability for Columbia Drugstores, Inc.

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Coefficient (1)</th>
<th>Standard Error of Coefficient (2)</th>
<th>$t$ Statistic $(3) = (1) ÷ (1)$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>7.846</td>
<td>3.154</td>
<td>2.49</td>
</tr>
<tr>
<td>Market share</td>
<td>0.214</td>
<td>0.033</td>
<td>6.50</td>
</tr>
<tr>
<td>Concentration</td>
<td>-0.203</td>
<td>0.038</td>
<td>-5.30</td>
</tr>
</tbody>
</table>

### Profit-Margin and Market-Structure Data for Columbia Drugstores, Inc.

<table>
<thead>
<tr>
<th>Store No.</th>
<th>Profit Margin</th>
<th>Market Share</th>
<th>Concentration</th>
<th>Capital Intensity</th>
<th>Advertising Intensity</th>
<th>Growth</th>
<th>Superstore (S=1 if superstore present)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>15.0</td>
<td>25.0</td>
<td>75.0</td>
<td>10.0</td>
<td>10.0</td>
<td>7.5</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>10.0</td>
<td>20.0</td>
<td>60.0</td>
<td>7.5</td>
<td>10.0</td>
<td>2.5</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>15.0</td>
<td>40.0</td>
<td>70.0</td>
<td>7.5</td>
<td>10.0</td>
<td>5.0</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>15.0</td>
<td>30.0</td>
<td>75.0</td>
<td>15.0</td>
<td>12.5</td>
<td>5.0</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>15.0</td>
<td>50.0</td>
<td>75.0</td>
<td>10.0</td>
<td>12.5</td>
<td>0.0</td>
<td>0</td>
</tr>
<tr>
<td>6</td>
<td>20.0</td>
<td>50.0</td>
<td>70.0</td>
<td>10.0</td>
<td>12.5</td>
<td>7.5</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>15.0</td>
<td>50.0</td>
<td>70.0</td>
<td>7.5</td>
<td>10.0</td>
<td>0.0</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>25.0</td>
<td>40.0</td>
<td>60.0</td>
<td>12.5</td>
<td>15.0</td>
<td>5.0</td>
<td>0</td>
</tr>
<tr>
<td>9</td>
<td>20.0</td>
<td>10.0</td>
<td>40.0</td>
<td>10.0</td>
<td>12.5</td>
<td>5.0</td>
<td>0</td>
</tr>
<tr>
<td>10</td>
<td>10.0</td>
<td>30.0</td>
<td>60.0</td>
<td>10.0</td>
<td>12.5</td>
<td>0.0</td>
<td>0</td>
</tr>
<tr>
<td>11</td>
<td>15.0</td>
<td>20.0</td>
<td>60.0</td>
<td>12.5</td>
<td>12.5</td>
<td>7.5</td>
<td>1</td>
</tr>
<tr>
<td>12</td>
<td>10.0</td>
<td>30.0</td>
<td>75.0</td>
<td>12.5</td>
<td>10.0</td>
<td>2.5</td>
<td>0</td>
</tr>
<tr>
<td>13</td>
<td>15.0</td>
<td>50.0</td>
<td>75.0</td>
<td>7.5</td>
<td>10.0</td>
<td>5.0</td>
<td>0</td>
</tr>
<tr>
<td>14</td>
<td>10.0</td>
<td>20.0</td>
<td>75.0</td>
<td>7.5</td>
<td>12.5</td>
<td>2.5</td>
<td>0</td>
</tr>
<tr>
<td>15</td>
<td>10.0</td>
<td>10.0</td>
<td>50.0</td>
<td>7.5</td>
<td>10.0</td>
<td>2.5</td>
<td>0</td>
</tr>
<tr>
<td>16</td>
<td>20.0</td>
<td>30.0</td>
<td>60.0</td>
<td>15.0</td>
<td>12.5</td>
<td>2.5</td>
<td>0</td>
</tr>
<tr>
<td>17</td>
<td>15.0</td>
<td>30.0</td>
<td>50.0</td>
<td>7.5</td>
<td>12.5</td>
<td>5.0</td>
<td>1</td>
</tr>
<tr>
<td>18</td>
<td>20.0</td>
<td>40.0</td>
<td>70.0</td>
<td>7.5</td>
<td>12.5</td>
<td>5.0</td>
<td>0</td>
</tr>
<tr>
<td>19</td>
<td>10.0</td>
<td>10.0</td>
<td>60.0</td>
<td>12.5</td>
<td>10.0</td>
<td>2.5</td>
<td>0</td>
</tr>
<tr>
<td>20</td>
<td>15.0</td>
<td>20.0</td>
<td>70.0</td>
<td>5.0</td>
<td>12.5</td>
<td>7.5</td>
<td>0</td>
</tr>
<tr>
<td>21</td>
<td>20.0</td>
<td>20.0</td>
<td>40.0</td>
<td>7.5</td>
<td>10.0</td>
<td>7.5</td>
<td>0</td>
</tr>
<tr>
<td>22</td>
<td>15.0</td>
<td>10.0</td>
<td>50.0</td>
<td>15.0</td>
<td>10.0</td>
<td>5.0</td>
<td>1</td>
</tr>
<tr>
<td>23</td>
<td>15.0</td>
<td>40.0</td>
<td>40.0</td>
<td>7.5</td>
<td>12.5</td>
<td>5.0</td>
<td>1</td>
</tr>
<tr>
<td>24</td>
<td>10.0</td>
<td>30.0</td>
<td>50.0</td>
<td>5.0</td>
<td>7.5</td>
<td>0.0</td>
<td>0</td>
</tr>
<tr>
<td>25</td>
<td>20.0</td>
<td>40.0</td>
<td>70.0</td>
<td>15.0</td>
<td>12.5</td>
<td>5.0</td>
<td>0</td>
</tr>
<tr>
<td>26</td>
<td>15.0</td>
<td>40.0</td>
<td>70.0</td>
<td>12.5</td>
<td>10.0</td>
<td>5.0</td>
<td>1</td>
</tr>
<tr>
<td>27</td>
<td>10.0</td>
<td>20.0</td>
<td>75.0</td>
<td>7.5</td>
<td>10.5</td>
<td>2.5</td>
<td>0</td>
</tr>
<tr>
<td>28</td>
<td>15.0</td>
<td>10.0</td>
<td>60.0</td>
<td>12.5</td>
<td>12.5</td>
<td>5.0</td>
<td>0</td>
</tr>
<tr>
<td>29</td>
<td>10.0</td>
<td>30.0</td>
<td>75.0</td>
<td>5.0</td>
<td>7.5</td>
<td>2.5</td>
<td>0</td>
</tr>
<tr>
<td>30</td>
<td>10.0</td>
<td>20.0</td>
<td>75.0</td>
<td>12.5</td>
<td>12.5</td>
<td>0.0</td>
<td>0</td>
</tr>
</tbody>
</table>
A. Describe the overall explanatory power of this regression model, as well as the relative
importance of each continuous variable.

B. Based on the importance of the binary or dummy variable that indicates superstore com-
petition, do superstores pose a serious threat to Columbia’s profitability?

C. What factors might Columbia consider in developing an effective competitive strategy to
combat the superstore influence?

**ST11.2 Solution**

**A.** The coefficient of determination $R^2 = 84\%$ means that 84% of the total variation in Columbia’s
profit-rate variability is explained by the regression model. This is a relatively high level of
explanation for a cross-section study such as this, suggesting that the model provides useful
insight concerning the determinants of profitability. The intercept coefficient of 7.846 has no
economic meaning because it lies far outside the relevant range of observed data. The 0.214
coefficient for the market-share variable means that, on average, a 1% (unit) rise in
Columbia’s market share leads to a 0.214% (unit) rise in Columbia’s profit margin. Similarly,
as expected, Columbia’s profit margin is positively related to capital intensity, advertising
intensity, and the rate of growth in the market area. Conversely, high concentration has the
expected limiting influence. Because of the effects of leading-firm rivalry, a 1% rise in industry
concentration will lead to a 0.203% decrease in Columbia’s profit margin. This means that
relatively large firms compete effectively with Columbia.

**B.** Yes, the regression model indicates that superstore competition in one of Columbia’s mar-
ket areas reduces Columbia’s profit margin on average by 2.102%. Given that Columbia’s
rate of return on sales routinely falls in the 10% to 15% range, the profit-limiting effect of
superstore competition is substantial. Looking more closely at the data, it appears that
Columbia faces superstore competition in only one of the seven lucrative markets in which
the company earns a 20% to 25% rate of return on sales. Both observations suggest that cur-
rent and potential superstore competition constitutes a considerable threat to the company
and one that must be addressed in an effective competitive strategy.

**C.** Development of an effective competitive strategy to combat the influence of superstores
involves the careful consideration of a wide range of factors related to Columbia’s busi-
ness. It might prove fruitful to begin this analysis by more carefully considering market
characteristics for Store No. 6, the one Columbia outlet able to earn a substantial 20% profit margin despite superstore competition. For example, this analysis might suggest that Columbia, like Store No. 6, should specialize in service (e.g., prescription drug delivery) or in a slightly different mix of merchandise. On the other hand, perhaps Columbia should follow the example set by Wal-Mart in its early development and focus its plans for expansion on small to medium-size markets. In the meantime, Columbia’s still-profitable stores in major metropolitan areas could help fund future growth.

Although obviously only a first step, a regression-based study of market structure such as that described here can provide a very useful beginning to the development of an effective competitive strategy.
PROBLEMS

P11.1 Market Structure Concepts. Indicate whether each of the following statements is true or false and explain why.

A. Equilibrium in monopolistically competitive markets requires that firms be operating at the minimum point on the long-run average cost curve.
B. A high ratio of distribution cost to total cost tends to increase competition by widening the geographic area over which any individual producer can compete.
C. The price elasticity of demand tends to fall as new competitors introduce substitute products.
D. An efficiently functioning cartel achieves a monopoly price/output combination.
E. An increase in product differentiation tends to increase the slope of firm demand curves.

P11.2 Monopolistically Competitive Demand. Would the following factors increase or decrease the ability of domestic auto manufacturers to raise prices and profit margins? Why?

A. Decreased import quotas
B. Elimination of uniform emission standards
C. Increased automobile price advertising
D. Increased import tariffs (taxes)
E. A rising value of the dollar, which has the effect of lowering import car prices

P11.3 Monopolistically Competitive Equilibrium. Soft Lens, Inc., has enjoyed rapid growth in sales and high operating profits on its innovative extended-wear soft contact lenses. However, the company faces potentially fierce competition from a host of new competitors as some important basic patents expire during the coming year. Unless the company is able to thwart such competition, severe downward pressure on prices and profit margins is anticipated.

A. Use Soft Lens’s current price, output, and total cost data to complete the table:

<table>
<thead>
<tr>
<th>Price ($)</th>
<th>Monthly Output (million)</th>
<th>Total Revenue ($million)</th>
<th>Marginal Revenue ($million)</th>
<th>Total Cost ($million)</th>
<th>Marginal Cost ($million)</th>
<th>Average Cost ($million)</th>
<th>Total Profit ($million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>0</td>
<td>$0</td>
<td></td>
<td>$0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>1</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>2</td>
<td>27</td>
<td>27</td>
<td>27</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>3</td>
<td>42</td>
<td>42</td>
<td>42</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>4</td>
<td>58</td>
<td>58</td>
<td>58</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>5</td>
<td>75</td>
<td>75</td>
<td>75</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>6</td>
<td>84</td>
<td>84</td>
<td>84</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>7</td>
<td>92</td>
<td>92</td>
<td>92</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>8</td>
<td>96</td>
<td>96</td>
<td>96</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>9</td>
<td>99</td>
<td>99</td>
<td>99</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>105</td>
<td>105</td>
<td>105</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Note: Total costs include a risk-adjusted normal rate of return.)

B. If cost conditions remain constant, what is the monopolistically competitive high-price/low-output long-run equilibrium in this industry? What are industry profits?
C. Under these same cost conditions, what is the monopolistically competitive low-price/high-output equilibrium in this industry? What are industry profits?
D. Now assume that Soft Lens is able to enter into restrictive licensing agreements with potential competitors and create an effective cartel in the industry. If demand and cost conditions remain constant, what is the cartel price/output and profit equilibrium?

P11.4 Competitive Strategy. Gray Computer, Inc., located in Colorado Springs, Colorado, is a privately held producer of high-speed electronic computers with immense storage capacity and computing capability. Although Gray’s market is restricted to industrial users and a few large government agencies (e.g., Department of Health, NASA, National Weather Service), the company has profitably exploited its market niche.

Glen Gray, founder and research director, has recently announced his retirement, the timing of which will unfortunately coincide with the expiration of several patents covering key aspects of the Gray computer. Your company, a potential entrant into the market for supercomputers, has asked you to evaluate the short- and long-run potential of this market. Based on data gathered from your company’s engineering department, user surveys, trade associations, and other sources, the following market demand and cost information has been developed:

\[
P = 54 - 1.5Q
\]
\[
MR = \frac{\partial TR}{\partial Q} = 54 - 3Q
\]
\[
TC = 200 + 6Q + 0.5Q^2
\]
\[
MC = \frac{\partial TC}{\partial Q} = 6 + 1Q
\]

where \(P\) is price, \(Q\) is units measured by the number of supercomputers, \(MR\) is marginal revenue, \(TC\) is total costs including a normal rate of return, \(MC\) is marginal cost, and all figures are in millions of dollars.

A. Assume that these demand and cost data are descriptive of Gray’s historical experience. Calculate output, price, and economic profits earned by the Gray company as a monopolist. What is the point price elasticity of demand at this output level?

B. Calculate the range within which a long-run equilibrium price/output combination would be found for individual firms if entry eliminated Gray’s economic profits. (Note: Assume that the cost function is unchanged and that the high-price/low-output solution results from a parallel shift in the demand curve while the low-price/high-output solution results from a competitive equilibrium.)

C. Assume that the point price elasticity of demand calculated in part A is a good estimate of the relevant arc price elasticity. What is the potential overall market size for supercomputers?

D. If no other near-term entrants are anticipated, should your company enter the market for supercomputers? Why or why not?

P11.5 Game Theory. Assume that IBM and Dell Computer have an inventory of personal computers that they would like to sell before a new generation of faster, cheaper machines is introduced. The question facing each competitor is whether or not they should widely advertise a “close out” sale on these discontinued items or instead let excess inventory work itself off over the next few months. If both aggressively promote their products with a nationwide advertising campaign, each will earn profits of $5 million. If one advertises while the other does not, the firm that advertises will earn $20 million, while the one that does not advertise will earn $2 million. If neither advertises, both will earn $10 million. Assume this is a one-shot game and both firms seek to maximize profits.

<table>
<thead>
<tr>
<th>Promotion Strategy</th>
<th>Advertise</th>
<th>Do Not Advertise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dell Computer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advertise</td>
<td>$5, $5</td>
<td>$20, $2</td>
</tr>
<tr>
<td>Do Not Advertise</td>
<td>$2, $20</td>
<td>$10, $10</td>
</tr>
</tbody>
</table>
A. What is the dominant strategy for each firm? Are these also secure strategies?
B. What is the Nash equilibrium?
C. Would collusion work in this case?

P11.6 Cartel Equilibrium. The Hand Tool Manufacturing Industry Trade Association recently published the following estimates of demand and supply relations for hammers:

\[ Q_D = 60,000 - 10,000P \]  
\[ Q_S = 20,000P \]

A. Calculate the perfectly competitive industry equilibrium price/output combination.
B. Now assume that the industry output is organized into a cartel. Calculate the industry price/output combination that will maximize profits for cartel members. (Hint: As a cartel, industry \( MR = $6 - $0.0002Q \).)
C. Compare your answers to parts A and B. Calculate the price/output effects of the cartel.

P11.7 Kinked Demand Curves. Safety Service Products (SSP) faces the following segmented demand and marginal revenue curves for its new infant safety seat:

1. Over the range from 0 to 10,000 units of output,
   \[ P_1 = $60 - Q \]
   \[ MR_1 = \frac{\partial TR_1}{\partial Q} = $60 - $2Q \]

2. When output exceeds 10,000 units,
   \[ P_2 = $80 - $3Q \]
   \[ MR_2 = \frac{\partial TR_2}{\partial Q} = $80 - $6Q \]

The company’s total and marginal cost functions are as follows:

\[ TC = $100 + $20Q + $0.5Q^2 \]
\[ MC = \frac{\partial TC}{\partial Q} = $20 + $1Q \]

where \( P \) is price (in dollars), \( Q \) is output (in thousands), \( MR \) is marginal revenue, \( TC \) is total cost, and \( MC \) is marginal cost, all in thousands of dollars.

A. Graph the demand, marginal revenue, and marginal cost curves.
B. How would you describe the market structure of the industry in which SSP operates? Explain why the demand curve takes the shape indicated previously.
C. Calculate price, output, and profits at the profit-maximizing activity level.
D. How much could marginal costs rise before the optimal price would increase? How much could they fall before the optimal price would decrease?

P11.8 Supply Reactions. Anaheim Industries, Inc., and Binghampton Electronics, Ltd., are the only suppliers to the National Weather Service of an important electronic instrument. The Weather Service has established a fixed-price procurement policy, however, so \( P = MR \) in this market. Total and marginal cost relations for each firm are as follows:

\[ TC_A = $7,000 + $250Q_A + $0.5Q_A^2 \]  
\[ MC_A = \frac{\partial TC_A}{\partial Q_A} = $250 + $1Q_A \]
\[ TC_B = $8,000 + $200Q_B + $1Q_B^2 \]
\[ MC_B = \frac{\partial TC_B}{\partial Q_B} = $200 + $2Q_B \]

(Anaheim)

(Binghampton)
where \( Q \) is output in units, and \( MC > AVC \) for each firm.

A. What is the minimum price necessary for each firm to supply output?

B. Determine the supply curve for each firm.

C. Based on the assumption that \( P = P_A = P_B \), determine industry supply curves when \( P < 200 \), \( 200 < P < 250 \), and \( P > 250 \).

P11.9 Nonprice Competition. General Cereals, Inc. (GCI), produces and markets Sweeties!, a popular ready-to-eat breakfast cereal. In an effort to expand sales in the Secaucus, New Jersey, market, the company is considering a 1-month promotion whereby GCI would distribute a coupon for a free daily pass to a local amusement park in exchange for three box tops, as sent in by retail customers. A 25% boost in demand is anticipated, even though only 15% of all eligible customers are expected to redeem their coupons. Each redeemed coupon costs GCI $6, so the expected cost of this promotion is 30¢ (= 0.15 × $6 ÷ 3) per unit sold. Other marginal costs for cereal production and distribution are constant at $1 per unit.

Current demand and marginal revenue relations for Sweeties! are

\[
Q = 16,000 - 2,000P \\
MR = \frac{\partial TR}{\partial Q} = 8 - 0.001Q
\]

Demand and marginal revenue relations that reflect the expected 25% boost in demand for Sweeties! are the following:

\[
Q = 20,000 - 2,500P \\
MR = \frac{\partial TR}{\partial Q} = 8 - 0.0008Q
\]

A. Calculate the profit-maximizing price/output and profit levels for Sweeties! prior to the coupon promotion.

B. Calculate these same values subsequent to the Sweeties! coupon promotion and following the expected 25% boost in demand.

P11.10 Price Leadership. Louisville Communications, Inc., offers 24-hour telephone answering service for individuals and small businesses in southeastern states. Louisville is a dominant, price-leading firm in many of its markets. Recently, Memphis Answering Service, Inc., and Nashville Recording, Ltd., have begun to offer services with the same essential characteristics as Louisville’s service. Total and marginal cost functions for Memphis (\( M \)) and Nashville (\( N \)) services are as follows:

\[
TC_M = 75,000 - 7Q_M + 0.0025Q_M^2 \\
MC_M = \frac{\partial TC_M}{\partial Q_M} = -7 + 0.005Q_M \\
TC_N = 50,000 + 3Q_N + 0.0025Q_N^2 \\
MC_N = \frac{\partial TC_N}{\partial Q_N} = 3 + 0.005Q_N
\]

Louisville’s total and marginal cost relations are as follows:

\[
TC_L = 300,000 + 5Q_L + 0.0002Q_L^2 \\
MC_L = \frac{\partial TC_L}{\partial Q_L} = 5 + 0.0004Q_L
\]

The industry demand curve for telephone answering service is

\[
Q = 500,800 - 19,600P
\]

Assume throughout this problem that the Memphis and Nashville services are perfect substitutes for Louisville’s service.
A. Determine the supply curves for the Memphis and Nashville services, assuming that the firms operate as price takers.

B. What is the demand curve faced by Louisville?

C. Calculate Louisville’s profit-maximizing price and output levels. (Hint: Louisville’s total and marginal revenue relations are $TR_L = 25Q_L - 0.00005Q_L^2$, and $MR_L = 25 - 0.0001Q_L$.)

D. Calculate profit-maximizing output levels for the Memphis and Nashville services.

E. Is the market for service from these three firms in short-run equilibrium?

---

**CASE STUDY**

**The Profitability of Multinational Operations**

Like market power in domestic markets, market power in foreign markets will have positive effects on the market value of the firm when it is an important determinant of future above-normal returns. In fact, greater valuation effects may be associated with market power in foreign as opposed to domestic operations. Although substantial numbers of efficiently sized competitors are available in an overwhelming share of U.S. markets, generally smaller foreign markets tend to be dominated by few large competitors. Entry barriers due to economies of scale tend to be more onerous, and the advantages to established leading firms greater, in foreign as opposed to U.S. markets. Antitrust and other policies limiting monopoly power also tend to be more vigorously pursued in the United States than in many foreign countries. In fact, some foreign governments encourage monopoly to gain a comparative advantages in foreign trade. Thus, the valuation effects of market power in foreign operations can be interesting in isolation, as well as in contrast with perhaps smaller effects due to market power in domestic operations.

Although the effects of market power are often indirectly measured using concentration ratios in studies conducted at the industry level of aggregation, studies using firm-level data often consider profit rate data directly. Generally speaking, concentration ratios for a firm’s primary product industry are only a poor measure of market power for widely diversified firms. Even weighted average concentration ratios reflecting firm involvement in a number of industries can fail to capture market power influences because the possibility of a critical concentration ratio is neglected. Both reasons help explain why concentration ratios seldom have any discernible influence on the market value of the firm.

High profit rates can show the influences of relatively higher prices, lower costs, or both. By themselves, it is impossible to determine if high profit rates reflect the exercise of market power or superior efficiency. As such, profit rate data are an imperfect proxy for market power. They remain, however, a useful index of the relative attractiveness of one line of business or industry. If profit rates for foreign operations consistently exceed profit rates for U.S. operations, one might conclude that foreign markets are generally more attractive because they entail relatively less product market competition than U.S. markets. If profit rates for foreign operations have market value effects that invariably exceed the valuation effects of profit rates for U.S. operations, one might conclude that profit rates from foreign markets tend to be both higher and more long-lasting than profit rates earned in U.S. markets.

To estimate the effects of profit rates on the market value of the firm, it is necessary to build a simple economic model. To illustrate, consider the simple accounting identity that total assets equal the value of stockholders’ equity plus total liabilities:

\[
\text{Total Assets} = \text{Stockholders' Equity} + \text{Total Liabilities}
\]

This means that the total assets of any corporation are financed either through the sale of common stock and retained earnings or through debt financing. When the market value of
common stock is used as an economic measure of the value of stockholder equity, then Equation 11.6 implies:

\[
\text{Market Value of Common Stock} = \frac{\text{Total Assets}}{\text{Total Liabilities}} + \epsilon
\]

The error term \(\epsilon\) (epsilon) allows for the fact that the market value of common stock seldom exactly equals the difference between assets and liabilities, which is defined as the book value of stockholders’ equity. As such, \(\epsilon\) reflects the combined influence of accounting errors and bias. For example, because the accounting profession does not typically assign a value to intangible assets like advertising and R&D, the market price of common stock is often much greater than the accountant’s book value of stockholders’ equity.

The effects of profit rates on the market value of the firm can be estimated by expanding the number of independent \(X\) variables in Equation 11.9 to include profit rates on domestic and foreign operations. If current profit rates are a useful indicator of the multinational firm’s future profit-making potential, an impact on the current market value of the firm can be anticipated. If profit rates on foreign operations are higher and/or more stable than profit rates on domestic operations, a somewhat greater influence of foreign profit rates on the market value of the firm can also be anticipated.

To properly isolate the market value effects of profit rates in both foreign and domestic markets, it is important to control for the risk implications of multinational involvement. In many instances, multinational involvement not only allows firms to expand product markets, but also provides a “portfolio” of regulatory environments, economic conditions, and trade currencies. Although exchange risk can be limited at minimal cost through participation in highly developed currency markets, limiting risks associated with political intervention (increased taxation, expropriation) and localized economic fluctuations can be costly. Thus, a firm’s degree of “multinationalism” may have important implications for its overall risk level. To the extent that conventional measures fail to reflect the greater risks associated with multinational activity, the degree of multinational involvement can convey additional risk information. If multinationals face greater than typical levels of risk, or involve substantial hedging expenses, a firm’s degree of multinational involvement can have negative valuation effects. In addition, one might expect positive valuation effects to accompany high expected growth because a firm’s options for future investment are largely determined by expected growth in demand.

Based on these considerations, a regression model that can be used to learn the relative market-value impacts of domestic versus foreign profit rates can be written

\[
\text{Market Value/Assets} = b_0 + b_1 \frac{1}{\text{Assets}} + b_2 \frac{\text{Debt/Assets}}{\text{Assets}} + b_3 \text{ROA}_1 + b_4 \text{Growth} + b_5 \frac{\text{Foreign/Domestic}}{\text{Assets}} + u
\]

In this equation, notice that each size-related variable has been deflated, or normalized, by the book value of total assets. Without deflation of size-related variables, the link between market value and profits could be dominated by size effects: By definition, large firms have high market values and profits. The deflation of all size-related variables makes it possible to focus on the valuation effects of profit rate differences between foreign and domestic operations. In this model, the profit rate of interest is called the return on total assets, or ROA, and defined as net income (profits) divided by the book value of total assets. Like ROE, ROA is a basic measure of the firm’s rate of return on investment; unlike ROE, the ROA measure does not directly reflect the firm’s use of financial leverage.

For exploratory purposes, the simple economic model described in Equation 11.10 is estimated over an \(n = 25\) sample of the largest U.S. multinationals. In an annual survey, Forbes shows foreign sales, foreign profits, and foreign assets for top U.S. multinationals. To estimate
Equation 11.8, it is necessary to supplement Forbes data with market value, leverage, and estimated earnings per share growth information from the Value Line/Value Screen database. Table 11.8 shows the actual data used in the regression analysis.

Over this sample of large multinationals, the average ROA = 7.55% is comprised of an average profit rate for domestic operation of $\text{ROA}_D = 6.72\%$, and an average profit rate for foreign operations of $\text{ROA}_F = 9.45\%$.

A. A multiple regression analysis based upon the data contained in Table 11.8 revealed the following ($t$ statistics in parentheses):

\[
\text{Market Value/Assets} = -0.215 + 6,860 \frac{1}{\text{Assets}} + 0.242 \frac{\text{Debt}}{\text{Assets}}
\]

\[
(\text{–0.25}) \quad (7,956) \quad (0.22)
\]

\[
+28.109 \text{ROA} -0.043 \text{Growth}
\]

\[
(6.52) \quad (–0.85)
\]

Based on the statistical importance of the ROA variable, is it reasonable to conclude that stock-market investors believe that current rates of return will persist into future periods?

**TABLE 11.8**

<p>| Market Value and the Profitability of Foreign Operations for 25 Top U.S. Multinationals |</p>
<table>
<thead>
<tr>
<th>Company</th>
<th>Industry</th>
<th>Market Value of Common</th>
<th>Total Debt</th>
<th>Foreign Profit</th>
<th>Total Profit</th>
<th>Foreign Assets</th>
<th>Total Assets</th>
<th>EPS Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>American International Group</td>
<td>Insurance</td>
<td>52,397</td>
<td>41,582</td>
<td>1,746</td>
<td>2,897</td>
<td>56,343</td>
<td>148,431</td>
<td>13.5</td>
</tr>
<tr>
<td>Chevron</td>
<td>Petroleum</td>
<td>42,727</td>
<td>8,239</td>
<td>1,560</td>
<td>2,607</td>
<td>17,420</td>
<td>38,378</td>
<td>10.0</td>
</tr>
<tr>
<td>Citicorp</td>
<td>Bank</td>
<td>44,972</td>
<td>125,858</td>
<td>2,146</td>
<td>3,788</td>
<td>161,000</td>
<td>270,000</td>
<td>13.0</td>
</tr>
<tr>
<td>Coca-Cola</td>
<td>Soft drinks</td>
<td>133,057</td>
<td>2,355</td>
<td>2,366</td>
<td>3,492</td>
<td>6,090</td>
<td>16,161</td>
<td>16.5</td>
</tr>
<tr>
<td>Compaq Computer</td>
<td>Computer</td>
<td>19,958</td>
<td>469</td>
<td>679</td>
<td>1,313</td>
<td>3,306</td>
<td>10,526</td>
<td>17.5</td>
</tr>
<tr>
<td>Digital Equipment</td>
<td>Computer</td>
<td>5,870</td>
<td>2,217</td>
<td>147</td>
<td>112</td>
<td>5,178</td>
<td>10,075</td>
<td>0.0</td>
</tr>
<tr>
<td>Dow Chemical</td>
<td>Chemical</td>
<td>19,974</td>
<td>8,961</td>
<td>777</td>
<td>2,101</td>
<td>14,047</td>
<td>24,673</td>
<td>13.5</td>
</tr>
<tr>
<td>du Pont (E.I.)</td>
<td>Chemical</td>
<td>53,189</td>
<td>14,925</td>
<td>1,051</td>
<td>3,636</td>
<td>15,435</td>
<td>37,987</td>
<td>11.5</td>
</tr>
<tr>
<td>Eastman Kodak</td>
<td>Precision instruments</td>
<td>27,974</td>
<td>1,592</td>
<td>236</td>
<td>1,011</td>
<td>5,740</td>
<td>14,438</td>
<td>12.0</td>
</tr>
<tr>
<td>Exxon</td>
<td>Petroleum</td>
<td>124,511</td>
<td>14,607</td>
<td>5,153</td>
<td>7,510</td>
<td>55,589</td>
<td>95,527</td>
<td>8.0</td>
</tr>
<tr>
<td>Ford</td>
<td>Auto</td>
<td>35,272</td>
<td>180,029</td>
<td>223</td>
<td>4,446</td>
<td>79,196</td>
<td>262,867</td>
<td>9.0</td>
</tr>
<tr>
<td>General Electric</td>
<td>Electrical equipment</td>
<td>169,984</td>
<td>3,900</td>
<td>1,596</td>
<td>7,280</td>
<td>82,976</td>
<td>272,402</td>
<td>14.5</td>
</tr>
<tr>
<td>General Motors</td>
<td>Auto</td>
<td>41,604</td>
<td>132,445</td>
<td>3,365</td>
<td>4,953</td>
<td>58,785</td>
<td>222,142</td>
<td>17.0</td>
</tr>
<tr>
<td>Hewlett-Packard</td>
<td>Computer</td>
<td>52,143</td>
<td>1,221</td>
<td>1,612</td>
<td>2,586</td>
<td>15,121</td>
<td>27,699</td>
<td>20.0</td>
</tr>
<tr>
<td>IBM</td>
<td>Computer</td>
<td>85,230</td>
<td>24,891</td>
<td>3,541</td>
<td>5,429</td>
<td>42,007</td>
<td>81,132</td>
<td>21.5</td>
</tr>
<tr>
<td>Intel</td>
<td>Semiconductor</td>
<td>111,246</td>
<td>525</td>
<td>1,982</td>
<td>5,157</td>
<td>4,784</td>
<td>23,735</td>
<td>19.0</td>
</tr>
<tr>
<td>Johnson &amp; Johnson</td>
<td>Medical supplies</td>
<td>64,678</td>
<td>3,966</td>
<td>1,332</td>
<td>2,287</td>
<td>9,147</td>
<td>20,010</td>
<td>14.0</td>
</tr>
<tr>
<td>Mobil</td>
<td>Petroleum</td>
<td>49,320</td>
<td>8,489</td>
<td>2,035</td>
<td>3,328</td>
<td>31,330</td>
<td>46,408</td>
<td>11.5</td>
</tr>
<tr>
<td>Motorola</td>
<td>Semiconductor</td>
<td>35,706</td>
<td>3,420</td>
<td>1,066</td>
<td>1,154</td>
<td>8,604</td>
<td>24,076</td>
<td>12.5</td>
</tr>
<tr>
<td>PepsiCo</td>
<td>Soft drinks</td>
<td>46,098</td>
<td>13,733</td>
<td>757</td>
<td>1,199</td>
<td>7,802</td>
<td>24,512</td>
<td>13.5</td>
</tr>
<tr>
<td>Philip Morris Co</td>
<td>Tobacco</td>
<td>95,169</td>
<td>25,291</td>
<td>1,608</td>
<td>6,303</td>
<td>20,558</td>
<td>54,871</td>
<td>18.0</td>
</tr>
<tr>
<td>Procter &amp; Gamble</td>
<td>Household products</td>
<td>74,816</td>
<td>7,764</td>
<td>1,125</td>
<td>3,046</td>
<td>11,222</td>
<td>27,730</td>
<td>13.0</td>
</tr>
<tr>
<td>Texaco</td>
<td>Petroleum</td>
<td>25,959</td>
<td>9,227</td>
<td>931</td>
<td>2,274</td>
<td>14,312</td>
<td>31,443</td>
<td>11.0</td>
</tr>
<tr>
<td>United Technologies</td>
<td>Diversified</td>
<td>16,541</td>
<td>4,309</td>
<td>714</td>
<td>1,037</td>
<td>6,374</td>
<td>16,745</td>
<td>16.5</td>
</tr>
<tr>
<td>Xerox</td>
<td>Office equipment</td>
<td>16,671</td>
<td>16,360</td>
<td>792</td>
<td>1,206</td>
<td>14,541</td>
<td>28,120</td>
<td>14.5</td>
</tr>
<tr>
<td><strong>Averages</strong></td>
<td></td>
<td><strong>57,793</strong></td>
<td><strong>26,255</strong></td>
<td><strong>1,493</strong></td>
<td><strong>3,195</strong></td>
<td><strong>29,873</strong></td>
<td><strong>73,204</strong></td>
<td><strong>13.6</strong></td>
</tr>
</tbody>
</table>

CASE STUDY (continued)

B. A second multiple regression analysis based upon the data contained in Table 11.8 revealed the following (t statistics in parentheses):

\[
\text{Market Value/Assets} = -0.016 + 7,145 \frac{1}{\text{Assets}} + 0.660 \frac{\text{Debt}}{\text{Assets}}
\]

\[
\begin{array}{ccc}
(-0.01) & (0.82) & (0.52) \\
+13.018 \text{ROA}_F + 6.885 \text{ROA}_D - 0.040 \text{Growth} + 0.150 \frac{\text{Foreign}}{\text{Domestic}}
\end{array}
\]

\[
(4.52) \quad (1.30) \quad (-0.72) \quad (0.94)
\]

Based on the importance of the ROA variables for foreign versus domestic operations, is it reasonable to conclude that foreign markets may be more or less competitive than the U.S. market?

SELECTED REFERENCES


