Part VI
Nonprice Competition

So far, most of our analysis has focused on inter-firm competition centered on quantity or price. However, firms compete in many other dimensions, as well. Two such competitive mechanisms are advertising and innovative effort. These are the topics addressed in Part VI.

The economic function of advertising has long been an issue of both academic and popular concern. Initially, economists focused on the use of advertising to build brand loyalty and thereby to soften price competition between different brands. However, subsequent analysis has focused on the informational role of advertising. By helping consumers learn what alternatives are available and at which prices; or by informing consumers about the appropriate uses of a new product and its overall quality; or in numerous other ways, advertising can play a useful role that improves the welfare of both producers and consumers. Our analysis of advertising considers both its potential use as a tactic to suppress competitive pressures as well as its use as an informational tool that may enhance competition. Indeed, we conclude our advertising analysis in Chapter 21 with a description of a recent empirical study that tries to separate the informational role of advertising from its role in conferring prestige and building brand loyalty.

We then turn in Chapters 22 and 23 to an analysis of research and development (R&D). Here we begin with a well-known set of propositions typically referred to jointly as the Schumpeterian hypothesis. This is that large firms and concentrated industries are necessary for technological innovation. Chapter 22 addresses explicitly the nature of R&D competition and precisely the sort of market structure that most encourages technical progress. We also explore the potential gains and losses when firms cooperate on R&D activity. This includes a detailed description of recent evidence on the spillover of benefits from technical research in one area to productivity growth in another.

In Chapter 23, we consider public policy designed to encourage R&D, especially patent policy. Such policy must walk a thin line between granting wide access to available technologies and yet also giving innovators the rights to restrict such access so as to earn a return on their inventions. We discuss recent patent policy developments and illustrate these issues with an empirical study of patent behavior in the semiconductor industry.

20

Advertising, Market Power, and Information

Large retail stores that sell many different kinds of goods and many different brands of each good are a relatively recent phenomenon in the history of commerce. A customer buying say, a pair of shoes in the early twentieth century would have faced a different shopping experience from the one faced today. She would have been restricted to making her purchase in a specialized shoe store carrying only one or at most two brands, or possibly a cobbler's shop that made its own shoes. In addition, the consumer of a hundred years ago would have had to consult with the store proprietor, and would not have been able to examine and compare the merchandise directly.

How different the modern shopping experience is from the practices of the not-so-distant past. Today's consumer can go to a shoe or department store and see a whole range of different brands. Once there, she can personally handle and inspect each different style without any need to deal with a store employee. Only when she decides actually to try a specific pair of shoes on will she require assistance from a store employee—and even that is not always necessary. Consumers now may choose directly from an even wider range of different brands and never deal with a sales representative when they purchase shoes over the web.

What has made this dramatic change in the nature of retailing possible? Our reference to the web provides a clue. The retailing revolution of the twentieth century owes much to the advent of mass media, specifically, radio and television. This technological change made it possible for manufacturers to reach their consumers en masse and promote their products directly to the public. Using wide scale advertising, manufacturers themselves were able to promote the important features of their products to a wide target audience. As a result, the task of selling goods at the retail level required much less specialized expertise, and in turn this greatly facilitated the formation of large-scale retail establishments such as department stores and discount stores, selling several varieties of hundreds of different kinds of goods. As mass communication technology continued to evolve, these retailers were joined by large mail-order businesses and, more recently, by e-tailers. The advent of large-scale advertising by manufacturers has been the source of a major revolution in the way consumers learn about the products that are out there waiting for them to buy.[1]

[1] For a good discussion of this revolutionizing effect of modern advertising and other aspects of advertising and promotional activities see, D. Pope, *The Making of Modern Advertising* (1983).

Yet while it is clear that the emergence of large-scale advertising has played a crucial role in the development of retailing, the full nature of advertising's impact remains a puzzle. We do not know exactly how advertising affects the consumer's decision of whether to buy and if so, what brand to buy. Consider, for example, television ads for Nike shoes. These ads often say little about the nature of the shoes and instead just feature a collage of images accompanied by the Nike Company's famous "swoosh" logo. How does this affect a consumer's decision to buy? In some Nike ads the company expressly points out that it is a corporate sponsor and apparel provider for the U.S. Olympic team. How does this affect our consumer's decision of whether to purchase Nike shoes?

The question as to how ads like those run by Nike actually work is important for many reasons. To begin with, Nike is not alone. Its promotional efforts are typical of many firms marketing consumer products and these efforts are very costly. Advertising on network television for example can cost millions of dollars for a single minute of airtime. For the 2007 Super Bowl the average price of a 30-second spot was a record breaking $2.6 million. Yet Anheuser-Busch, Frito-Lay, Pepsi-Cola, Procter & Gamble and others all bought spots for that game. We would like to understand first how advertising works in order to understand the incentives for these firms to incur such costs. At that point we can examine the decisions of firms to promote their products and why firms in some industries do much more advertising than those in others. Understanding how advertising works allows us to move on to investigate how advertising affects the strategic interaction between firms, and what this means for the consumer.

Our goal in the next two chapters is to understand the role of advertising and the implications that this carries for strategic interaction in the market place and consumer welfare. Advertising is provided by both manufacturers, e.g., Nike, and by retailers, e.g., Target. As a result, the provision of promotional services involves many of the vertical incentive conflicts that we have discussed in the previous two chapters. For the most part, we will suppress this distinction and focus on how advertising affects consumer buying decisions and the strategic interaction among firms competing for the consumer's patronage. We are interested in how advertising works; what information or other feature advertising provides that induces consumers to buy the advertised brand; and what it costs to provide such information.

We also want to understand the effect of advertising on competition in order to evaluate it from a policy perspective. Advertising could be viewed as an integral element of competition among firms that sell different brands of the same good. In this case, high advertising could be considered a sign of good health—a way to increase consumer awareness of different brands and therefore a vital component of healthy competition. In contrast, advertising could be seen as a way to differentiate one manufacturer's brand from another and thereby weaken competition by making it more difficult for a consumer to switch brands. High advertising in this case would be a sign of market power. Our analysis should help us determine which, if either, of these two cases is more likely.

It is important to note that there is a long-standing policy concern that advertising expenditures overall could be socially wasteful—that is, that firms spend far too much on promotional activities that yield little net gain for anyone and too little on more important activities such as product development. Our analysis should help to address this issue. Gaining insight into whether there is too much or too little advertising requires that we learn the underlying economic logic behind advertising. Why do firms do it and how does it work?

20.1 THE EXTENT OF ADVERTISING

The phenomenon of advertising is something of a paradox. Promotional efforts such as TV commercials are often barely tolerated by social critics. More often than not, advertising is disparaged as something that is wrong with contemporary society—something that tricks us into wanting and even buying things we don't need. At the same time, advertising is ubiquitous. It airs on our television sets and radios, accounts for many of the pages in magazines and daily newspapers, dots the landscape and cityscape with billboards, and even shows up on our T-shirts and other apparel. However much one might be critical of advertising, it seems that we can hardly live without it.

The magnitude of the advertising phenomenon as reflected in total dollars of expenditure is staggering. In 2006 the total expenditure on advertising in the U.S. was $285.1 billion dollars or approximately 2.2 percent of the gross domestic product on advertising.[2] This was not unusual. From the 1940s on, advertising expenditures in the U.S. have consistently claimed about two percent of the U.S. national income.

Roughly 58 percent of total advertising expenditure is measured media advertising. This includes spending on nationwide broadcast and cable television networks, radio networks, national magazines, newspapers, yellow pages and the Internet.[3] The other 42 percent is non-measured or only indirectly measured media spending. This category includes expenditures on direct mailings, promotions, coupons, catalogs, business publications, and the sponsorship of special events. Retail advertising is often more heavily concentrated in non-measured media spending.

Firms differ substantially in their advertising behavior. For many years, the number one advertiser in the U.S. was General Motors, a firm that spent $3.3 billion on advertising in 2006. However, that same year witnessed the beginning of a decline in GM's market share with the result that the consumer goods giant, Procter & Gamble, moved into first place, spending $4.9 billion on advertising. In contrast, the much smaller Mattel toy company incurred a 2006 advertising expense of only $391 million in the United States.

In order to compare firms advertising efforts across firms of different sizes we typically compute advertising expenditure as a percentage of sales revenue. Even looking at this fraction—the advertising-to-sales ratio—however, still leaves considerable variation among firms. In 2006, the ratio for GM was about 2.9 percent and this was roughly the same for other U.S. automakers. However, the advertising-to-sales ratio for Volkswagen in 2005 was 3.8 percent and for Mitsubishi, 5.8 percent. Variations in advertising-to-sales ratios across industries are even larger. For example, advertising expenditures claimed over 10 percent of Mattel's domestic sales revenue in 2005, and over 12 percent of Pfizer's revenue in that year.

What explains the variation we see in advertising expenditures across firms and industries? There is some evidence that the profitability of a consumer goods industry appears to be positively correlated with the advertising intensity in that same industry.[4] Consumer goods such as cereals, perfumes, soaps, and pharmaceutical drugs have traditionally been

[2] Data on advertising expenditures are from Advertising Age Data Center, adage.com.

[3] Expenditures on measured media is tracked by TNS Media Intelligence.

[4] This is one of Schmalensee's (1989) nine stylized facts on U.S. industry profitability. It is based on the studies by Comanor and Wilson (1967, 1974). Their findings have been replicated by other studies done on U.S. data as well as on data from other countries.

characterized by their relatively high profit rates and also by high advertising expenditures relative to sales. In contrast, other consumer goods such as hats, carpets, and jewelry have both lower profit rates and lower advertising expenditures. We also know that consumer goods industries tend to advertise more than those selling producer or intermediate goods. The issue is how to interpret this empirical evidence. Does advertising make firms more profitable or do more profitable firms advertise more? What is it about consumer goods that makes it profitable for a firm to make extensive use of advertising? To answer these questions we develop an analytical framework that permits us to identify the role that advertising plays.

20.2 ADVERTISING, PRODUCT DIFFERENTIATION, AND MONOPOLY POWER

Economists have long been interested in understanding the role of advertising in the marketplace. Some of the earliest writings on advertising came in the 1950s and 1960s. Much of this work drew a fairly negative assessment that advertising is a socially wasteful way for firms to compete (Kaldor 1950; Galbraith 1958; Solow 1967). Essentially, these studies view advertising as an effort by the firm to alter consumer tastes and to persuade consumers that there are few if any substitutes for the firm's products. To the extent that this effort is successful with at least some consumers, the firm will then enjoy a degree of monopoly power because it will not lose its customers to a rival should the firm raise its price. Yet while beneficial for the firm, these efforts in persuasion are bad for consumers not only because of the monopoly power and resultant deadweight loss, but also because these advertising efforts are costly in themselves. Since the differentiation achieved by advertising is not considered to be "real" but instead an artificial distinction created in the consumer's mind, the resources expended in creating that differentiation were seen as wasted. Accordingly, they would be better used to produce real goods and services.[5]

The advent of widescale advertising in the second half of the twentieth century followed closely the advent of mass production technology or economies of scale in production. Advertising enabled manufacturing firms to expand their markets and sell more, and hence exploit economies of scale in production. This led naturally to the fear that there would inevitably be a much more concentrated industrial structure. Even worse, if advertising were simply persuasive it could deter potential competition and new entry even when there was no real product differentiation.

The well-known early industrial organization economist, Joe Bain, explicitly considered the advertising-to-sales ratio of an industry as a proxy for barriers to entry. Many other economists—particularly those working in the structure–conduct–performance framework—shared this view. The fear was that established firms with a history of advertising would possess a market identity for their products that any new entrant would find difficult to overcome. As a result, the incumbent firm would be more immune to competitive entry.

It is worth noting that the fear that advertising would confer monopoly power was not without empirical support. There is both anecdotal and formal evidence to support the hypothesis that widescale advertising enhances a firm's market power and its ability to raise price above cost. The casual evidence is readily obtainable from a trip to the local drug store or supermarket. Anyone who compares the price of a nationally advertised brand of pain reliever

[5] Viewed in this light, advertising is much like rent-seeking behavior. See, for example, Posner (1975).

with that of its generic substitute will find that the national brand sells at a noticeable premium. The same is true for cola drinks, shampoos, laundry bleaches, and a host of other products. In these cases and others, there are substitutes available that are chemically identical or nearly identical to the nationally advertised brand. Hence, production costs should be roughly the same. In turn, this suggests that the higher price commanded by the national brand reflects an increase in the markup over cost that monopoly power makes possible.

Evidence along these lines has been provided by the many statistical studies that find a significant positive relationship between advertising and industry profitability across a wide range of consumer goods industries. The pioneering work in this regard is that of Comanor and Wilson (1967). Their basic finding that industries with high profitability are associated with high advertising to sales ratio has been replicated many times since both for different time periods and different countries.[6] Another early but very well-known study is that by Nichols (1951) of the American cigarette market. Nichols provides statistical evidence that the major brands relied heavily on advertising to differentiate their products and thereby insulate them from price competition, especially that of "penny cigarettes."

There are however reasons to be wary of the view that advertising strengthens market power and inhibits competition. To begin with, there is a fine line between persuasion and information. After all, persuasion doesn't work in a vacuum. Persuading the consumer often requires that some information be given. To the extent that advertising provides information it will play a useful role, and one that could promote competition. Telser (1964) was one of the earliest studies to challenge the idea that advertising fostered monopoly. He studied the relationship between firms' advertising expenditures and market shares in three consumer good industries: food, soap, and cosmetics. Telser found that market shares are less stable, i.e., more likely to change, the greater is the advertising in that industry. This finding contradicts the persuasive view. In that view, advertising would make consumers less likely to switch brands and so should promote market share stability. Instead, Telser's (1964) findings suggest advertising makes consumers less loyal or makes competition fiercer.

Second, in examining any link between advertising and market power we should try to identify what causes that relationship. It may be that monopoly power leads a firm to advertise more rather than that advertising leads a firm to have monopoly power. Finally, if advertising does change consumer tastes then calculating its effects requires that we think carefully about how it changes consumer tastes and what this implies for the benefits that consumers derive from the product.

20.3 THE MONOPOLY FIRM'S PROFIT-MAXIMIZING LEVEL OF ADVERTISING

Rational firms will only expend considerable resources on advertising if it is profitable to do so. Since advertising is costly, this means that it must generate revenue to cover those costs. In other words, advertising must affect demand. It is useful in this respect to recall that any firm with market power faces a downward sloping demand curve. The firm is interested in pushing its demand curve out and selling more at the same price rather than selling more by lowering its price and moving down along the existing demand curve. So, one

[6] See, for example, Lambin (1976), Geroski (1982), and Round (1983).

way of thinking of how advertising works is that advertising shifts the firm's demand curve. In other words, demand depends not only upon the price the firm sets but also upon the amount of advertising that the firm chooses. This can be described by the demand function $Q^D(P, \alpha)$ where P is the product price and α is the amount of advertising messages sent, measured for example as seconds of television or radio time, or perhaps as page space in newspapers or magazines per period. For a given level of advertising, the firm's demand is decreasing in price and for a given price the amount demanded is increasing in advertising. Alternatively we can write the firm's inverse demand function as $P(Q, \alpha)$ where, for a given level of advertising, the price consumers are willing to pay falls as quantity is increased and, for a given quantity, the price consumers are willing to pay increases with a given level of advertising.

The ability of advertising to increase demand is the "good news" of advertising. The "bad news" is that advertising is costly. Suppose that every unit of advertising or advertising message costs the firm T dollars.[7] Let us also assume that every unit of output costs c dollars to produce and that there are no economies of scale in either production or in advertising. We can now characterize decision problem confronting a monopoly firm. It must pick a level of advertising α, and a level of production Q, (or price P), that together maximize profit. In particular this means that the firm needs to quantify the good news and bad news aspects of advertising and work out whether the benefit of sending out one more ad is greater than the incremental cost incurred T.

Let us first work out the profit-maximizing quantity of output to produce for a given number of advertising messages, α. Holding α constant, the firm's marginal revenue curve is:

$$MR(Q, \alpha) = P(Q, \alpha) + \frac{\partial P(Q, \alpha)}{\partial Q} Q. \tag{20.1}$$

Profit maximization implies choosing Q^* such that marginal revenue is equal to marginal cost or:

$$MR(Q^*, \alpha) = P(Q^*, \alpha) + \frac{\partial P(Q^*, \alpha)}{\partial Q} Q^* = c \tag{20.2}$$

We can rewrite the profit-maximizing condition (20.2) and express it in terms of the Lerner Index, which is the firm's price cost margin as a percentage of price, or $\frac{P^* - c}{P^*}$, where $P^* = P(Q^*, \alpha)$.[8] If, for a given level of advertising α, the firm chooses to sell the profit-maximizing quantity Q^* at a price P^* the Lerner Index will satisfy:

$$\frac{P^* - c}{P^*} = \frac{1}{\eta_P} \tag{20.3}$$

[7] This assumption may not always hold. Often there is considerable quantity discounting when air time, network time, or magazine space is purchased by a firm for advertising.

[8] For a derivation of the Lerner Index see, section 3.2, Chapter 3.

where $\eta_p = \frac{dQ/Q}{dP/P} = \frac{P}{Q}\frac{\partial Q}{\partial P}$ is the price elasticity of demand evaluated at the firm's choice of output Q^* and corresponding price P^*.[9]

Now consider the monopoly firm's optimal amount of advertising, or α^*. At any output level Q the firm's corresponding price $P(Q, \alpha)$ will increase in the amount of advertising α. To maximize profit the firm should choose an amount of advertising α^* such that the marginal revenue from an additional unit of advertising is equal to its marginal cost T. In other words the firm should choose α^* such that:

$$\frac{\partial P(Q, \alpha^*)}{\partial \alpha} Q = T \tag{20.4}$$

We can rewrite condition (20.4) by multiplying each side by α and dividing each side by PQ so that we have:

$$\frac{\alpha^*}{P^*}\frac{\partial P(Q^*, \alpha^*)}{\partial \alpha} = \frac{\alpha^* T}{P^* Q^*} \tag{20.5}$$

Observe that the right-hand side of (20.5) is the optimal or profit-maximizing advertising expenditure-to-sales ratio for the firm. We can rewrite the left hand side of (20.5) by defining a new elasticity measure, the elasticity of demand with respect to advertising, or $\eta_\alpha = \frac{dQ/Q}{d\alpha/\alpha} = \frac{\alpha}{Q}\frac{\partial Q}{\partial \alpha}$. Now again recall the price elasticity of demand $\eta_p = \frac{dQ/Q}{dP/P} = \frac{P}{Q}\frac{\partial Q}{\partial P}$. Observe that the ratio of these two elasticities η_α/η_p is equal to the left-hand-side of (20.5). We now have a key result. The firm with market power maximizes profits by choosing a level of output (or price) and a level of advertising such that the ratio of advertising expenditure to sales is just equal to the ratio of the advertising elasticity of demand to the price elasticity of demand. That is, profits are maximized when:

$$\frac{\textit{Advertising Expenditure}}{\textit{Sales Revenue}} = \frac{\alpha^* T}{P^* Q^*} = \frac{\eta_\alpha}{\eta_P} \tag{20.6}$$

The condition in equation (20.6) is usually referred to as the Dorfman-Steiner condition after the pioneering paper on advertising written by Dorfman and Steiner in (1954).[10] It states that the monopoly firm maximizes profit by choosing to spend a proportion of its revenue on advertising that is just equal to the ratio of the advertising elasticity of demand to the price elasticity of demand. That is, the firm will advertise until the ratio of dollar advertising to dollar sales equals the ratio of the advertising elasticity of demand to the price elasticity of demand. The *less price elastic* is demand, or the smaller is η_P, the *more* the firm should spend on advertising, and the *more advertising elastic i*s demand, or the greater η_α the *more* the firm should spend on advertising.

[9] Actually, η_P is the negative of the elasticity of demand as the actual elasticity is formally a negative value.

[10] Dorfman, R. and P. Steiner, "Optimal Advertising and Optimal Quality," *American Economic Review*, 44, pp. 826–36.

20.1 Practice Problem

Suppose that a monopoly firm faces an inverse demand curve described by $P(Q, \alpha) = 100 - \frac{1}{\sqrt{\alpha}}Q$. The firm has a constant marginal production cost equal to 60. Each advertising message costs the firm \$1.

a. What is the slope of the demand curve when $\alpha = 100$? When $\alpha = 1{,}000$? Illustrate your answers.
b. Suppose that firm decides to send $\alpha = 2{,}500$ advertising messages.
   (i) What is the monopolist's marginal revenue curve?
   (ii) What will be the monopolist's profit-maximizing price and output values?
   (iii) What is the price elasticity of demand at this price and output combination?
c. The demand function is such that the advertising elasticity of demand is constant at 1/2. Does the price and output combination derived in part b), satisfy the Dorfman-Steiner condition?

The Dorfman–Steiner condition is an extremely useful reference point in the analysis of advertising behavior. The condition helps us see the positive relationship observed between the firm's profit margin and the extent of advertising in a different light. This relationship has often been used as evidence to support the argument that advertising is a way for a firm to differentiate its product in the eyes of the consumer, and thereby achieve some market power, that is, advertising makes the firm's customers less likely to switch brands.

The Dorfman–Steiner condition in equation (20.6) does makes it clear that advertising will be greater in a market where the demand elasticity is low. The profit margin, as measured by the Lerner Index, is inversely proportional to the elasticity of demand. In other words, the Dorfman-Steiner condition says that, all else equal, advertising will be more intense the more market power there is in the industry. But the causality here is different. Rather than the heavy advertising causing the market power, it is in fact the market power, or really the low price elasticity of demand, that induces the heavy advertising.

Think about it for a minute. A perfectly competitive firm faces an infinitely elastic demand curve. As a result, it has a price-cost margin of zero. Clearly, such a firm has little incentive to advertise. It can sell all it wants to at the current price without any additional promotional effort. Moreover, because its price just equals its cost, selling extra units does not bring in any additional profit. In contrast, a firm with market power has a smaller elasticity of demand and, accordingly, a positive price-cost margin. If such a firm can shift out its demand curve it can earn its margin on every additional unit sold. It clearly has an incentive to do this. If not, the firm can only make additional sales by cutting its price. In short, the Dorfman–Steiner condition makes clear that the frequent statement that high advertising and low price elasticity go together cannot be used to vindicate the view that advertising is used by firms to increase their market power. It is rather the market power already there that gives the firm a strong incentive to advertise.

A second insight of the Dorfman–Steiner condition is what it says about how the firm's advertising-to-sales ratio changes in response to changes in the cost of advertising. The condition in equation (20.6) shows that unless the change in cost alters the ratio of the two elasticities—the price elasticity of demand, and the advertising elasticity of demand—the profit maximizing advertising-to-sales ratio will be constant. Thus, even if the cost of advertising

Table 20.1 Estimated industry advertising-to-sales ratios, 2006

Industry	*NAICS*	$\frac{\alpha T}{PQ}$	*Industry*	*NAICS*	$\frac{\alpha T}{PQ}$
Amusement parks/arcades	713,110	10.5	Mobile homes (mfg.)	321,991	1.9
Soft drink beverages	312,111	10.2	Motor vehicles (mfg.)	336,111	3.5
Preserves (tin, jar, frozen)	311,421	5.4	Cosmetics (mfg.)	325,620	11.1
Radio and TV stores	443,112	3.2	Bedroom furniture (mfg.)	337,122	4.0
Passenger airlines	481,111	3.3	Tires (mfg.)	326,211	3.0
Hotels and motels	721,110	3.6	Legal services	541,110	6.4
Non-discount dept. stores	452,111	5.4	Tobacco products (mfg.)	312,229	5.7

Source: *Advertising Age* and *Outburst Advertising*

increases, the firm's advertising-to-sales ratio will not change if these elasticities are unaffected. This result suggests that the ratio of advertising expenditure to sales across industries will not be greatly affected by changes in the cost of advertising.

In Table 20.1 we report the advertising to sales ratio for a sample of industries products for the year 2006. The advertising to sales ratio for this small sample of industries range from 1.9 percent for motor homes to 11.1 percent for cosmetics. The Dorfman–Steiner condition suggests that the differences in advertising to sales ratios could be explained by differences in the both the advertising and price elasticity of demand. A firm's price elasticity of demand is of course affected by the availability of substitute products, which in turn is affected by the number of rivals and the degree of product differentiation. Yet what determines a firm's advertising elasticity of demand? The magnitude of this elasticity reflects just how responsive is consumer demand is to an increase in advertising. This begs the larger question to which we now turn. Why do consumers respond to advertising?

20.4 ADVERTISING AS CONSUMER INFORMATION

The traditional textbook model of consumer choice assumes that consumers are perfectly informed about the kinds of goods and services available and their prices. However, consumers typically do not know which brands of products are available, or how quality varies across brands, and which stores sell which brands at the lowest prices.

Certain consumer goods and services, such as cars, furniture and legal services are relatively expensive items in the consumer's budget and they are products that tend to be rather infrequently purchased. These goods are called *shop* goods because consumers find it worthwhile to "shop around" and become informed about what is available before deciding which brand of good or service to buy. The time and effort spent by the consumer to become informed makes sense for goods that are costly for the consumer and that are bought infrequently.

On the other hand there are many other consumer goods such as cosmetics, beverages, and perhaps tobacco products that are that are purchased with some frequency—perhaps once a month and certainly once a year. These goods are called *convenience* goods. For these goods, consumers might be expected to expend less time doing research on what is available and where.

We might expect advertising to be a more influential factor in the purchase of a convenience good than in the purchase of *shop good*. Because consumers consider the buying decision for a shop good carefully they will want to seek out reliable information on their own. Advertising sent out by the party interested in selling is likely to be less influential than a trusted friend's endorsement. The opposite holds in the case of convenience *goods*. For these products, consumers simply want to know such things as what the product does—is Old Spice a deodorant or a food seasoning?—and where it can be bought. Advertising can provide this information quickly and cheaply. Hence, we would expect the advertising elasticity of demand to be greater for convenience good*s* than for *shop goods*. To the extent that advertising plays this informational role it serves an economically useful function for the consumer.

We can also take another step and distinguish within the categories of shop and convenience goods those products whose quality or performance cannot be known by consumers before being tried or consumed. For certain goods, it is relatively easy to ascertain the quality of any one brand relative to others. This may be because of widely available ratings guides or simply reflect any consumer's judgment ability. It may also be because there is little quality variation from one store to another. These goods are called *search* goods, indicating that the primary information issue confronting the consumer is one of searching out where the best deals on such goods are to be found. There are other goods, however, such as cars and cosmetic brands where the actual quality is difficult to know without consumers actually purchasing them and actually trying them out. Often this reflects the fact that quality is a matter of personal taste, as is the case with cosmetics, so that the consumer cannot be sure what she feels about the product until she has tried it. Sometimes, it will reflect the fact that quality can only be judged over an extended period of use, as in automobiles. Whatever the reason, we call these kinds of goods *experience* goods as it takes first-hand experience to know how good they are.

Of course, some shop goods will also be search goods while others will be experience goods. A similar division may be made for convenience goods. We might expect that consumers would be more responsive to advertising for convenience goods that are also experience goods. The ad is an inexpensive way for the consumer to learn whether she is likely to enjoy this relatively inexpensive experience good. In other words we might expect the advertising elasticity of demand to be greatest for goods that are both convenience and experience goods. Following the Dorfman-Steiner logic and for the moment, holding all else equal, this logic implies that we should expect a higher advertising expenditure to sales ratio for convenience goods that are also experience goods.

In Table 20.2 we have attempted to classify the sample of industries in Table 20.1 according to each of the four product categories just identified. Our grouping is admittedly somewhat arbitrary. Nevertheless, we think that it is roughly accurate. These data tend to support our conjecture that products that are both convenience goods and experience goods ought to

Table 20.2 Advertising expenditures as a % of sales by different categories of products

Convenience, search		*Convenience, experience*		*Shop, search*		*Shop, experience*	
Radio and TV stores	3.2	Soft drink beverages	10.2	Tires	3.0	Amusement parks	10.5
Passenger airlines	3.3	Cosmetics	11.1	Mobile homes	1.9	Motor vehicles	3.5
Hotels and motels	3.6	Preserves	5.4	Bedroom furniture	4.0	Legal services	6.4
Tobacco products	5.7	Department stores	5.4				

be among those most heavily advertised. The convenience good industries in our sample tend to have higher advertising to sales ratios, and these ratios are highest for the experience category. Of course other factors such as the degree of competition in the market—because it affects the price elasticity of demand—are also important. Overall though, these data support the view that advertising plays, at least in part, a useful role of informing consumers about the function and availability of various goods.

To the extent advertising provides consumers with information on price, quality, and retail location advertising should strengthen competition rather than weaken it. Such ads make it difficult for a seller to sell a product at a high price when consumers are aware that a perfect or at least a good substitute is available nearby at a lower price. When viewed in this light, advertising or brand awareness is a highly useful and pro-competitive force that works to reduce the type of product differentiation that results because each consumer knows only a local store's offerings but lacks *information* about what products and prices are available elsewhere.

There is sound empirical evidence to support the view that advertising prices and retail locations intensifies price competition. The classic study is that of Benham (1972) who showed that the average price of eyeglasses was significantly higher in states where advertising the prices and retail locations of opticians' services was prohibited. Similar price effects when advertising is restricted were found by Cady (1976) in the market for prescription drugs. The view that advertising promotes price competition may also explain why many professional associations, such as those of lawyers, doctors, and dentists, have long argued for legislation to restrict such price advertising in their professions.

We will consider in greater depth the role of advertising in promoting price competition in the next chapter. For now, we focus on the informational role of advertising in a setting in which firm rivalry is not important, i.e., a setting of monopoly power. A major point of contention concerns precisely what informational role advertising plays. Often the explicit information content seems surprisingly little. What information is provided by an ad in which Tony the Tiger says that sugar-frosted flakes are great? What do consumers learn from a Nissan auto commercial that simply focuses on the figure of a scantily clad woman as she rides in a car? If no useful information is provided by advertising, how then does it affect consumer purchases?

20.5 PERSUASIVE ADVERTISING

The Tony the Tiger and Nissan advertisements appear devoid of any useful information. Instead they aim at somehow persuading consumers that their corn flakes or cars, respectively, are special. Thus this kind of advertising raises the same issue as those raised in early analyses of advertising. These ads appear largely persuasive, and aimed at differentiating the firm's products so as to soften price competition. Yet, even if this view is true some important questions remain. In particular, we need to examine more carefully what it means to say that advertising convinces some consumers that a particular brand of good is superior and a bargain, even at a relatively high price.

If advertising messages devoid of any true information can persuade consumers to buy a product then advertising appears to be effectively *changing* consumer preferences. This presents a new and important twist in how we model consumer behavior. Typically, we assume that the consumer preferences that underlie consumer demand are given or exogenous. The utility function is a formal way to represent the consumer's set of tastes. The conventional

textbook model of consumer decision-making describes how the consumer chooses a set of goods that reflect her tastes, i.e., that maximize her utility given her budget constraint.

If advertising does change consumer tastes and hence the consumer's utility function then we must take that into account when we evaluate the role of advertising. For example, suppose that without any advertising, consumers regard one unit of Good X to be worth about $10 at the margin and that firm X finds that it maximizes profit at a price of $10 per box. Now suppose that if the firm advertises it raises consumers' valuation of Good X from $10 to $20 per box and that the firm now finds it profitable to raise its price from $10 to $15 per box. In this scenario, advertising is purely persuasive but is it harmful? Consumer surplus on the marginal box sold rises from 0 to $5 even as the firm has become more profitable as well.[11]

Consumer tastes do change over time. In some sense, every taste is an acquired one developed in response to what we might call persuasive efforts. The training and experience to appreciate fully a classical symphony or an abstract painting or, for that matter, a baseball game can also be thought of as persuasive efforts. Similarly, children have to be taught or persuaded of the value of a healthy diet and adults often have to learn the value of regular exercise. We do not generally complain about efforts to persuade or encourage individuals to enjoy such activities, even though such efforts are an attempt to change an individual's tastes. Why then should we be concerned about promotional efforts to change consumer preferences among competing brands? But perhaps the real question here is *how* the cereal or Nissan ads change consumer tastes. How does the image of a friendly cartoon tiger or a scantily clad young woman on a car persuade a consumer to buy these products?

20.6 ADVERTISING AND SIGNALING

Persuasive advertising is viewed by many as a challenge to the basic tenet of "the invisible hand." According to the persuasive view of advertising it is not the invisible hand but rather visible advertising that convinces consumers what it is that they want and what they should buy. Perhaps not surprisingly, it was the Chicago School with its long intellectual heritage of defending free markets that took up this challenge to the invisible hand.[12] The very important contribution of these economists was to recognize that image advertising may be more informative than first meets the eye. But what sort of information can be inferred from the typical sort of commercials aired on television that seem almost entirely devoted to building a brand image? This was the question raised by the Chicago School economist Philip Nelson (1970, 1974) in two seminal articles written in the 1970s. Nelson began answering the question by first posing another. "What do consumers *know* about a product *before* they

[11] Dixit and Norman (1978) proposed a way to evaluate welfare effects by using both pre-advertising demand and post-advertising consumer tastes. If on the basis of both sets of tastes one gets the same welfare effects then conclusions can be drawn about the effect of persuasive advertising on welfare. This approach was subsequently criticized in Fisher and McGowan (1979) because Dixit and Norman compare welfare before and after advertising using either one set of preferences or the other for both equilibrium outcomes. The comparison that should be made is a comparison of the pre-advertising equilibrium using pre-advertising tastes to the post-advertising equilibrium using post-advertising tastes. But this raises the familiar problem of interpersonal comparison of utility levels.

[12] It is also important to point out the Chicago School's belief in the stability of consumer preferences. Since this assumption is the starting point of most economic models, there is a lot at stake in taking up this challenge.

purchase it?" Specifically, can consumers identify the quality or other characteristics of the product before they try it?

For certain goods, specifically the ones such as salt or dishes, that we defined as search goods Nelson argued that the answer is surely, yes. Consumers can more or less ascertain the quality of these goods before they decide to buy them. Nelson reasoned that it was in the other category goods, experience *goods*, such as cars, electrical appliances, wine, and health care products where there was a potential role for image based advertising to play.

Nelson's argument is quite straightforward. The manufacturer of an experience good knows whether it is a high quality or a low quality product. The producer knows whether or not the consumer will be satisfied with the product after purchasing it. The problem is that the consumer does not have this information and can only acquire it by perhaps painful experience. How can the producer—particularly one who knows that he is selling a high-quality product—get this information across to potential customers? Advertising is the key.

The manufacturer of say, an analgesic, does not want the customer's business only once but also hopes to gain that patronage on a repeated basis. If the good is of high quality and works well then, once a consumer tries it, she will probably buy the product again. As long as experience with the pain reliever is satisfactory, the typical consumer will very likely continue to purchase that same product repeatedly rather than start all over searching for an alternative brand. This is not the case, though, for an ineffective pain relief product. The consumer who buys a low-quality product will, in all probability, switch to an alternative brand the next time she goes shopping. Accordingly, only makers of high quality analgesics have any hope of earning repeat purchases.

Nelson's model combines the above intuition with the concept of discounting and present value of future profits that we discussed in section 2.2 in Chapter 2. Nelson argues that a firm's advertising expenditures are incurred up front. They can only be justified if the discounted value of the future stream of revenues generated by the advertising is sufficient to cover this sunk cost. Nelson's idea is that if a consumer tries an experience good and finds it to be a "good deal" then the consumer is likely to continue to buy it. Indeed, the "better the deal" the producer offers, the higher the probability of repeat purchase, and therefore the greater the present value of the profits that the firm can expect from an ad that induces or persuades the consumer to try the good in the first place.

Only the maker of a good quality product can be confident that an additional customer lured to the store by an additional successful ad will come back for a second and third purchase. Hence, only the maker of a high-quality product can be sure that an advertisement will generate the extra income necessary to cover the initial expense. The better the quality of its product, the more customers will return in the future and the higher the price they will pay. Accordingly, the better the quality of its product, the more advertising the firm will wish to do to get that first purchase. Moreover, Nelson argued that consumers can recognize this logic, too. They will rationally conclude that if a firm does a lot of advertising it must be because the firm is offering a high quality product at a reasonable price. This is true even though the explicit content of the advertising may simply be an image and little else. It is the fact of advertising and not its content that signals to the consumer the "good deal" that the firm is offering.

Nelson's dual insight was that in a world in which firms know the quality of their products, but consumers do not, the makers of good quality products would look for some technique to signal that quality, and advertising could be precisely that signaling device. Since the argument applies explicitly to experience goods, a natural test of Nelson's idea would be to examine whether or not the manufacturers of experience goods do more advertising

than manufacturers of search goods. In fact, we saw that this seems to be the case with the data shown in Table 20.2. Nelson provided further statistical evidence that this relationship holds.

For the next fifteen years Nelson's insight into advertising and signaling set the agenda for most of the theoretical work on advertising. An important early paper in this regard is Schmalensee (1978). That paper raises the point that Nelson's argument that a firm offering a "good deal" has a stronger incentive to advertise than a firm offering a "bad deal" depends quite a bit on the price–cost margin of a "good deal" relative to that of a "bad deal." Suppose, for example, that a high quality pain reliever can be produced at a cost of ten cents per dosage while a worthless pain reliever, made from a commonly available extract of carrot roots, costs only a penny per dose to make. Then a firm offering the carrot root painkiller may find that it can earn a very high markup on each bottle sold. Even if no repeat purchases occur, the firm may earn enough on every first-time purchase to justify considerable advertising expense. Quite possibly, this expense will exceed the amount the maker of the high quality pain reliever will spend.

Yet despite Schmalensee's cautionary point, the signaling possibility raised by Nelson remained the subject of investigation and much additional work was done.[13] Among the more important papers in the signaling literature are those by Kihlstrom and Riordan (1984) and Milgrom and Roberts (1986). Kihlstrom and Riordan (1984) develop a two period model in which a firm's advertising alone in the first period determines whether consumers believe the good to be a high- or low-quality product. Given consumer beliefs about quality, prices are then determined in a traditional demand and supply manner. The important result of the Kihlstrom and Riordan (1984) study is that they too find a strong incentive for high quality producers to lure "repeat buyers" by advertising heavily in the first period, just as Nelson (1970 and 1974) found in his earlier and much simpler analysis. The contribution of Milgrom and Roberts (1986) is to show that pricing can serve as a quality signal as well as can advertising. Because both advertising and pricing can indicate product quality, the extent to which either is used is very complicated. Using a high price to signal quality is a cheaper alternative for the firm than advertising, with the result that the Milgrom and Roberts (1986) paper weakens the theoretical link between advertising and product quality. The Milgrom and Roberts signaling model is, however, a monopoly or single firm model. Fluet and Garella (2002) show instead that when the firm competes in price with other firms it may be necessary to use advertising, and not price, to signal quality.[14]

The large volume of papers on the signaling theory of advertising and prices has generated empirical research as well. In general, this research has tried to provide evidence on the extent to which the quality of a good is linked with the manufacturer's advertising-to-sales ratio, or price. Of course, one obvious issue is that the task of empirically measuring quality is far from easy. The truth is that quality has many dimensions and it is not clear how to combine the many dimensions into a single index. Nevertheless, broad rankings of product quality are regularly published by Consumers Union. An important early study using this data was done by Reisz (1978) on over 10,000 brands of 685 products. He found, however, only a weak correlation between price and product quality.

If high prices do not necessarily signal high quality, what about advertising? Kotowitz and Mathewson (1986) examined this relationship for both automobiles and whole-life

[13] The interested reader can refer to Bagwell and Riordan (1991) and Schwartz and Wilde (1985).

[14] Remember, we are assuming again that firms care about repeat business. If not, and if consumers always inferred that high quality meant high price, every producer would raise its price whether it made a high-quality or a low-quality product.

Table 20.3 Price and quality in the upright vacuum cleaner market

Brand/model	*Model quality rating (0–100)*	*Price*
Kenmore Progressive	74	$300
Hoover Wind Tunnel	69	$250
Eureka Boss	68	$150
Electrolux Oxygens	67	$400
Kirby Sentria	67	$1,350
Riccar Superlite	66	$350
Bissell Healthy	64	$300
Oreck XL21	63	$750
Panasonic MV-V7720	63	$200
Dyson DC 14	62	$550

insurance. They did not, however, find evidence that the higher the advertising the better the deal. Similarly, Archibald, Haulman, and Moody (1983) examined running shoes and again found that neither price nor advertising levels for 187 brands were strongly correlated with the quality rankings, which were published in the magazine *Runner's World*. However, these authors did find that the magazine's quality ratings, once publicized and circulated, were very positively correlated with the extent of advertising done *after* those rankings were published. Firms with a high ranking were anxious to let consumers know this fact, while those with a low ranking were less interested in displaying their product's deficiencies.[15]

A study of 196 different industries by Caves and Green (1996) finds few discernible tendencies in the relation between advertising and brand quality. For many industries, these authors find that the quality-advertising expenditure correlation approaches a negative one—the exact opposite of Nelson's prediction. They do, however, find a positive relationship between advertising and quality in the case of new or innovative goods. They also find a weaker but still positive correlation between advertising and the quality of those goods in their sample that might be called "experience goods." The Caves and Green evidence on Nelson's hypothesis may then be best described as mixed.

As a final but less formal bit of evidence on this issue we offer in Table 20.3 recent analysis of upright vacuum cleaners recently reported by *Consumer Reports*.[16] The table lists the top ten models and their prices. It is quite clear that the correlation between price and quality is very weak. One of the lowest ranked brands, the Oreck XL21, sells for nearly $300 above the average of $460. A medium quality model, the Kirby Sentria, sells for nearly three times the average and four times the most highly ranked model. Moreover, while Kenmore and Hoover both advertise extensively, it is not clear that they advertise more than Eureka, Bissall, or Oreck.

While Nelson's insight that costly advertising might serve as signal for high product quality remains a valuable one, the theory has not held up well in empirical testing. There are as well other problems with the signaling theory of advertising. First, the basic idea that the

[15] It is worthwhile noting as well that the magazine *Runner's World* does allow manufacturers to quote their rankings in advertisements whereas the magazine *Consumer's Report* does not.

[16] Consumer Reports.org, Upright Vacuum Ratings, May, 2007.

more advertising the higher is the quality suggests that the firm has a clear incentive to let consumers know just how costly that ad campaign is. However, firms do not announce to consumers how much they spend on advertising.

Further difficulties with the view that advertising signals quality come from the assumption that the goods are experience goods. Some experience goods are sold to consumers while others are sold to businesses. The signaling approach would suggest that the type of buyer should not matter and hence, that the extent of advertising should not differ across these two type of experience goods. However, advertising expenditure to sales ratios are markedly higher for experience goods that are marketed to consumers than for those that are marketed instead to other firms, i.e., intermediate or producer goods. And even within the consumer goods category advertising expenditures are also relatively high for search goods as well as experience goods. For example, a Ralph Lauren Polo shirt or a pair of Calvin Klein jeans can be tried on and inspected before purchase. So, these are search goods. Yet Ralph Lauren, Calvin Klein, and the manufacturers of clothing apparel in general do a great deal of advertising. Here again, it is not clear how the signaling approach can explain this observation.

Finally, it should be noted that the signaling theory is only relevant for untried products. After many or most consumers have tried the good and experienced its quality, the underlying logic of the signaling approach suggests that there is little further role for advertising. Yet if this is the case, that approach cannot tell us why firms who market established and well-known brands, such as Coca-Cola, Miller-Lite, Chevrolet, and Rice Krispies, each continue to launch expensive advertising campaigns.

20.7 SUPPRESSED ADVERTISING CONTENT

An even-handed reading of the evidence to date is that while the signaling approach to advertising pioneered by Nelson (1970 and 1974) is insightful, it cannot provide a complete explanation for all the advertising we observe. In trying to understand the low information content of many ads, we are left with the view that these ads are mostly efforts to manipulate consumer preferences or that the information or quality signals they convey cannot be easily deciphered. A somewhat related explanation is that these ads do contain information but there is a conscious attempt to limit that information. There may be a reason for a firm to offer some information about its products but not "too much." This is the approach taken by Anderson and Renault (2006). We explore their argument briefly, here.

The Anderson and Renault (2006) model begins with the recognition that once the consumer has traveled to the store that travel cost is sunk. This can lead to a so-called "hold-up" problem for consumers. You may remember the 1990s fad of Beanie Babies. Suppose consumers value the Beanie Babies differently. Some are willing to pay $25 for Crunch the Shark whereas others do not value Crunch at all. Instead, they prefer Chilly the Polar Bear. If there are any transport costs, a retailer that advertises that she has Crunch the Shark for sale will only attract the first group. The retailer may prefer simply to advertise that she has Beanie Babies in general and suppress the information that her inventory is Crunch in particular. The retailer also knows that anyone that does come to the store and asks for Crunch values Crunch at $25. Since the transport cost is sunk at that point, the retailer will have a strong incentive to "hold up" the consumer and charge them the full $25.

Somewhat more formally, let there be three consumer types, 1, 2, and 3, and three kinds of widgets, red, blue, and yellow. Consumer type-1 values red widgets at $40, yellow widgets at $20, and blue widgets at $15. Type-2 values red widgets at $15, yellow widgets

at $40, and blue widgets at $20. For type 3, the respective valuations are $20, $15, and $40. These willingness to pay values for each consumer are shown in the following table.

		Consumer type		
		Consumer 1	Consumer 2	Consumer 3
	Red	$40	$15	$20
Widget type	Yellow	$20	$40	$15
	Blue	$15	$20	$40

Each consumer also incurs a transport cost of $5.01 to visit the store. Once a consumer actually visits a store, the transport cost is sunk. A store is equally likely to have either red, yellow, or blue widgets. If consumers know only that a store has widgets, they infer a probability of one third that the store has widgets of any specific color. The store incurs zero cost per widget.

Consider two advertising strategies for a store that has only red widgets. The store can advertise that it has red widgets or the store can advertise simply that it has widgets. Which strategy will the store prefer? First observe that the store will never set a widget price below $15, the minimum valuation of any consumer. Now consider the first strategy of advertising that the store has only red widgets. If the retailer does this, consumer types 2 and 3 will not come to the store. The $5.01 in transport cost will mean that the effective price for them will never be less than $20.01. So, it is not worthwhile for either of these two types to come. Of course, the store knows this, too. So, if it advertises its "Red Widgets" alone, it knows that the only buyers who show up are Type-1 consumers. Since, for these consumers, the $5.01 in transport cost is a sunk cost once they are at the store, the owner can then charge them their full willingness-to-pay of $40 for the widgets. Foreseeing this outcome, type-1 consumers will not respond to a red widget advertisement either. Advertising that the store only has red widgets will not attract customers.

However, if the shop announces that it simply has widgets in general, consumers can reason as follows. Faced with a crowd of all consumer types but not knowing who is who, the shopkeeper will set a price of $15 per widget. This will permit the store to sell one (red) widget to each type and earn profit of $45 from each threesome rather than set a price of $40 and sell only to one type or a price of $20 and sell to types 1 and 3 (each of which yields profit of $40 per threesome). Moreover, since consumers infer that the probability associated with each color is one-third, all three types will in fact respond to the ad by showing up at the store knowing that, in fact, when this happens, the store owner will keep the price at $15. Consumer i will work out that for a price of $15 and a transport cost of $5.01, she will receive either a red, yellow, or blue widget (each with probability 0.3333) whose value therefore is: $0.3333(\$40 + \$20 + 15) = \$25$, implying a net value of $5 regardless of what consumer i's most preferred type is.

There are a number of features of the foregoing outcome worth noting. First, the store suppresses some information in its advertising. Specifically, it does not reveal that its inventory is just red widgets. The store does not need to mention the price in its ads. Consumers can work out that the profit-maximizing price to set is $15. It is the presence of a variety of consumer types—due to precisely the vagueness of the advertisement—that supports this outcome. Because some of the consumers attracted to the store do not value red widgets very highly, the store-owner is motivated to keep the price low. We have a market outcome in which advertising deliberately does not mention either the specific attributes of the product for sale or its price.

Perhaps most surprising of all, the suppression of this informational content can raise welfare. To see this, observe that advertising red widgets led to a complete breakdown

of the market whereas advertising widgets in general leads to trades from which everyone potentially can gain.[17] In other words, a law requiring full disclosure by the firm would make things worse.

Ellison and Ellison (2005) present a somewhat related argument regarding search engines on the web. In principle, search engines increase the competitive pressure on Internet firms. Moreover, the search engine can claim for itself some of the profit that would have gone to the firm in return for providing consumers with the relevant price information. Thus, an e-commerce company has some reason to thwart the search engine even though it may like the fact that the search engine or shopbot brings customers to its site. It can do this in a variety of ways. For example, it can list a low product price that the search engine sees but charge a very high transport price that the search engine does not see or similarly offer only very slow delivery. Again, once the consumer has invested in the search cost and arrived at the firm's website, the firm may find that it can charge the consumer a very high price for the product that she really wants, e.g., one with quick delivery. Here again, e-tailers are happy to list some information to entice the search engine but simultaneously to keep too much information from being revealed.

20.8 TRUTH VERSUS FRAUD IN ADVERTISING

Suppression of information borders closely on misrepresentation. We therefore conclude this chapter by considering briefly the issue of false advertising. Fraudulent or misleading product claims are a problem that is at least as old as alchemy. Sometimes, the harm in such activities is relatively minor, such as a claim that a particular toothpaste will leave one's teeth 30 percent whiter. Sometimes, however, fraudulent advertising claims have turned trusting consumers into unwilling victims. Often the main wounds suffered in these episodes are financial ones as individuals have parted with large sums of money to pursue "get rich quick" schemes or have fallen for other phony promises. However, in the case of health products and health care services, the victims of fraudulent claims of both ancient and modern "snake oil" salesmen have suffered pain, physical harm, and even death in addition to any monetary loss. It was in part such events that led Congress to include in the Federal Trade Commission Act a prohibition of methods of competition deemed unfair, including the practice of false or deceptive advertising.

Advertising is considered false by the FTC when it includes actual or implied claims about a product that are verifiably untrue. In addition, these claims must have affected the decision of a substantial number of consumers to buy the product before the FTC will take enforcement action. Omitting information about a product does not constitute false advertising unless the product is one for which the advertising is regulated by the Food and Drug Administration. Subjective claims, such as "this product can change your life," are almost nonverifiable by definition and so are not considered false advertising under current law. Illegal advertising consists of claims that are demonstrably false and that induce a large number of consumers to buy the product. Firms found guilty of such conduct are frequently required to compensate the customers who were deceived by the false advertisement.

[17] Not counting (sunk) transport costs, all consumers and the seller are better off in the limited information equilibrium. Including sunk costs, type-2 consumers are (trivially) worse off but the gains for all other participants are enough that these consumers could be compensated while others would still be better off.

Popular culture is filled with images of dishonest promoters. The used car salesman tirelessly pushing his stock that he knows to be filled with "lemons," the real estate dealer selling the Brooklyn Bridge or some other phony property claim, and the "quack" medical expert promoting the latest miracle cure are all common, even stereotypical images. The widespread currency of such images, coupled with a general suspicion that Madison Avenue can manipulate consumer tastes at will, has focused the attention of both the public and the regulatory agencies on fraudulent or deceptive claims as perhaps the major issue in connection with advertising.

When we review the FTC case files regarding charges of illegal advertising over the past several years, what do we find? Broadly speaking, we find that most cases involve situations in which customers have little ability to pursue any compensation from the firm engaged in such advertising for either or both of two reasons. One is that the substance of the advertised claim—while verifiable in a laboratory or by individuals with specialized knowledge—is one that most consumers are ill equipped to monitor and verify. Thus, for example, Pizzeria Uno was asked to stop making the claim that its Thinzetta pizza line is low fat not because it is misleading but because it is virtually impossible for the consumer to evaluate. Similarly, the FTC stopped the frequent claim of weight-loss company Jenny Craig that nine out of ten clients would recommend Jenny Craig to a friend. This claim reflects a statement that can only be judged for accuracy by a formal statistical survey and not by most potential customers of Jenny Craig.

The second and perhaps more important reason the victims of false advertising may have difficulty pursuing their claims is that often the guilty firms are "fly-by-night" operations that disappear into thin air whenever an irate customer tries to track them down. Fly-by-night firms have little concern for repeat business. These firms know that the product or service they sell will fail, but only after the customer has paid up front. The "snake oil" medical quacks of the American Old West quickly left town after selling their wares. A more modern example of a fly-by-night firm using false advertising might be the New York City-based firm Student Aid Incorporated, which guaranteed each of its customers that in return for a fee of $97 the company would obtain for them a minimum of $1,000 in college scholarship funds. These examples effectively make the cautionary point first raised by Schmalensee (1978) regarding the signaling approach to advertising.

In light of the foregoing, we expect fraudulent advertising to be most prevalent in markets in which two conditions are satisfied. The first is that the firm is selling a product for which an actual purchase is necessary in order to evaluate the product's efficacy, or what we call experience goods. The second is that a customer who is dissatisfied with the product's performance cannot easily claim compensation from the firm. While the latter condition is most easily met by "fly-by-night" firms, we should recognize that it may be difficult for consumers to verify how well many modern products, such as medications, software, and automobile repair parts are working and to obtain compensation if they are not performing. More generally, different products will satisfy these two criteria to a greater or lesser extent.

This has implications well beyond the narrow issue of fraudulent advertising because consumers are smart too. Because they understand the settings in which advertising will be less honest, consumers' response to advertising will be equally strategic. Consumers will accept such promotional efforts as truthful only to the extent that they can verify the product's quality prior to purchase and even that criterion will be moderated by whether the consumer will be back in this product market for additional purchases later. Here again the way in which advertising affects consumers' decision to buy will vary across product markets. As a result, there will be no single role that advertising plays in consumer decision-making.

Reality Checkpoint

Taken for A Ride on the Internet Superhighway

The advent of mass media and the associated mass advertising made possible has greatly altered the selling of goods to final consumers. The advent of the Internet and worldwiide web is certainly part of this information revolution. At the same time, because it is easy for anyone to advertise on the web but difficult for the recipients of those ads to trace down the location of the advertisers in real space, this medium has also prompted a wave of fraudulent claims. These deceptive practices have included promotions for products falsely alleged to help one lose weight without exercise or dieting; products to increase the size of sexual organs; and, perhaps most commonly, get-rich-quick schemes.

For example, Michael J. Gardner and Rebecca Dahl Gardner, operated several businesses that offered buyers the chance to make as much as $900 per week just working at home and using the specialized software that the Gardner's would provide to operate a billing service for a healthcare firm whose name would also be provided by the Gardners. In return, the customer had to pay the Gardner's an upfront fee ranging from $59 to $150. However, after paying the fee consumers found that they either never received the software or that if they did, it did not work properly. Nor were the customers ever given any healthcare firms as clients. Similarly, Gregory P. Roth and Peter W. Stolz, operated a company known as 30 Minute Mortgage that promised consumers incredibly low interest rate mortgages. Potential customers were asked for all kinds of sensitive private information such as names, addresses, phone numbers, social security numbers, employment information, income, first and second mortgage payments, and bank account balances. However, no mortgages were ever actually offered. Instead, the firm just sold this sensitive information to other firms who could then better target their own promotions.

Snake oil remedies also still sell. David L. Walker maintained a website and conducted seminars and personal consultations promoting his purported cancer cure, the "CWAT Treatment: BioResonance Therapy and Molecular Enhancer." The website claimed his treatments, for which he charged between $2,400 and $5,200, make surgery, chemotherapy, and other conventional cancer treatments unnecessary. However, there was no real evidence that Walker's BioResonance Therapy had any therapeutic effects.

All the firms mentioned above and others were caught and prosecuted by the Federal Trade Commission. Yet many other fraudulent promotions undoubtedly persist. As Schmalensee (1978) noted, when advertising is cheap and the gains from one sale are large, it matters little if dissatisfied customers make no repeat purchases and Nelson's (1970 and 1974) hypotheses that advertising itself is a signal of quality breaks down.

Sources: Federal Trade Commission, various news releases, www.ftc.gov.

Summary

Large-scale advertising has played a pivotal role in shaping the modern shopping experience. The development of large retail outlets offering numerous brands of products is largely a result of the rise of mass media and the promotional efforts that have accompanied this rise. Yet from the beginning, advertising has had its critics. In particular, early economic analyses viewed advertising as a way to increase and protect monopoly power. The evidence that firms with relatively high profit and in relatively concentrated industries tended to do relatively more advertising lent support to this view.

The view that advertising strengthens market power and weakens price competition is based, in part, on the empirical finding that advertising is most intense in industries where firms have considerable market power and in part on the belief

that advertising is persuasive and changes consumer tastes in favor of the advertised brand. Yet from a purely economics perspective, such arguments must be viewed as, at best, incomplete. To begin with, the observed empirical correlation of market power and advertising may well result from the fact that the more inelastic is a firm's demand curve, the more it will find it worthwhile to use advertising to push that demand curve out rather than to try to sell more units by dropping the price. Firms with market power have a greater incentive to advertise than perfectly competitive firms.

Moreover, if consumers are rational, they are not likely to be duped by any artificial distinctions advertising tries to create. Alternatively, the preference for an advertised good may in fact reflect some real information that the advertising conveys. The most obvious kind of information that advertising could provide is about product characteristics and prices. Several empirical studies have documented cases where laws permitting various professional occupations and stores to advertise have led to lower prices and increased consumer welfare.

Many advertisements however, do not seem to include much explicit information. Following the work of Nelson (1970, 1974), many economists have explored the possibility that important information is being conveyed just by the fact that the firm is advertising, regardless of whether that advertising mentions price or all the salient characteristics of its products. This literature focuses on the fact that a consumer can learn the true value of many goods only by a process of trial and error so that when a particular brand of a good is found to be satisfactory, the consumer will likely continue to purchase that brand in the future. If good products enjoy a high likelihood of repeat business then the firms marketing good products have a strong incentive to advertise in order to get consumers to make an initial purchase. Rational consumers will recognize this and therefore infer that a product that is widely advertised must be of high quality—regardless of the content of the advertising message. Yet despite the theoretical appeal of this argument there does not seem to be a close connection in reality between product quality and advertising expense.

It may be the case that firms have an incentive to advertise but to do so in a way that in fact limits the amount of information transmitted. Offering some but not all information may be a means for a firm to commit to a low price since it means that the typical set of customers that it faces will include some who are not really willing to pay very much for the good. Suppressing information may also be a way to suppress price competition and to thwart the ability of a search engine or other mechanism to claim profits for itself at the expense of the firm.

In sum, advertising is a complex phenomenon. We need to be clear about the way advertising works to influence consumer demand in order to evaluate its impact and design appropriate public policy. Moreover, as our discussion of search engines suggests, a crucial aspect of the advertising issue is its impact on the strategic interaction among firms. In the next chapter, we examine advertising when firms compete with each other for customers.

Problems

1. You have been hired to market a new music recording that is expected to have target sales of $20 million for the coming year. The marketing department has estimated that a 1 percent increase in advertising the recording would increase the recordings sold by about 0.5 percent, and that a 1 percent increase in the price of the recording would reduce the number sold by about 2 percent. How much money should you commit to advertising the recording in the coming year?

2. Suppose that the demand for a new wrinkle cream is described by a nonlinear demand function $Q(P, A) = P^{-1/2}A^{1/4}$, and so $\partial Q(P, A)/\partial P = -P^{-3/2}A^{1/4}/2$ and $\partial Q(P, A)/\partial A = P^{-1/2}A^{-3/4}/4$. Show that the price elasticity of demand is $\eta_P = 1/2$, and that the advertising elasticity of demand is $\eta_A = 1/4$.
   a. What do you predict the advertising-to-sales ratio would be in this industry?
   b. Does it depend on how costly it is to advertise for this product?

3. A firm has developed a new product for which it has a registered trademark. The firm's market research department has estimated that the demand for this product is

$Q(P, A) = 11{,}600 - 1{,}000P + 20A^{1/2}$, where Q is annual output, P is the price, and S the annual expenditure for advertising. The total cost of producing the new good is $C(Q) = .001Q^2 + 4Q$. This implies that the marginal cost of production is $MC(Q) = .002Q + 4$. The unit cost of advertising is constant and equal to one, or $T = 1$.

a. Find the inverse demand function $P(Q, A)$, and show that the marginal revenue from an additional dollar of advertising is $MR_A = QA^{-1/2}/100$.
b. Calculate the optimal output level Q^*, price P^*, and advertising level A^* for the firm.
c. What is firm profit if it follows this optimal strategy?
d. What is consumer surplus if the firm adopts this strategy?

4. Consider again the firm in question 3. Work out the firm's profit-maximizing output, price, and profit if the firm did not advertise. By how much does the use of advertising in this market change the firm's profit and consumer surplus for the customers of the firm?
5. How could you explain the different advertising-to-sales ratios of the following firms:

Firm	*Main products*	$S\tau/PQ(\%)$
Philip Morris	Tobacco, food, beer	7.3
Procter & Gamble	Soaps, paper, food	5.3
General Motors	Autos	3.5
Kodak	Photo supplies	9.3
Johnson & Johnson	Pharmaceuticals	11.3
Pepsico	Soft drinks, snacks	5.2
Sears, Roebuck	Retailing	3.4
American Home Products	Pharmaceuticals	17.3

6. Imagine that there are 1,000 consumers. For each consumer, the willingness to pay for a widget is distributed uniformly over the interval [0, 1] depending on the style of the widget. A retailer with a particular style of the good knows this distribution. Her costs are zero. Consumers do not know the style that the retailer has and incur a transport or search cost of $c = 0.125$. Once this cost is incurred it is sunk. At that point, a consumer in the retailer's store will purchase the product so long as her valuation is greater than or equal to the price charged by the retailer.
   a. Show that faced with a random selection of customers, the retailer's profit maximizing price is $p = 0.5$
   b. Show that with $c = 0.125$, all consumers will come to shop expecting and getting a price of 0.5. What would happen if $c = 0.15$?
7. Suppose that the retailer in question 6 could communicate in some way to those customers with valuations less than 0.5 of the style that she has in stock and tell them that it is not worthwhile coming. If the retailer keeps the price at 0.5, how large can the transport cost c now be before the market collapses? Will the retailer keep the price at $p = 0.5$?

References

Anderson, S. and R. Renault. 2006. "Advertising Content." *American Economic Review* 96 (March): 93–113.

Archibald, R., C. A. Haulman, and C. E. Moody. 1983. "Quality, Price, Advertising, Published Quality Ratings." *Journal of Consumer Research* 9 (March): 347–53.

Bagwell, K. and M. Riordan. 1991. "High and Declining Prices Signal Product Quality." *American Economic Review* 81 (March): 224–39.

Benham, L. 1972. "The Effects of Advertising on the Price of Eyeglasses." *Journal of Law and Economics* 15 (October): 337–52.

Cady, J. F. 1976. "An Estimate of the Price Effects of Restrictions on Drug Price Advertising." *Economic Inquiry* 14 (July): 493–510.

Caves, R. E. and D. P. Green. 1996. "Brands' Quality Levels, Prices, and Advertising Outlays: Empirical Evidence on Signals and Information Costs." *International Journal of Industrial Organization* 14 (February): 29–52.

Comanor, W. S. and T. A. Wilson. 1967. "Advertising Market Structure and Performance." *Review of Economics and Statistics* 49 (November): 423–40.

——. 1974. *Advertising and Market Power*. Cambridge, MA: Harvard University Press.

Dixit, A. and V. Norman. 1978. "Advertising and Welfare." *Bell Journal of Economics* 9 (Spring): 1–17.

Dorfman, R. and P. O. Steiner. 1954. "Optimal Advertising and Optimal Quality." *American Economic Review* 44 (December): 826–36.

Ellison, G. and S. Fisher Ellison. 2005. "Search, Obfuscation, and Price Elasticities on the Internet." Working Paper, MIT Department of Economics.

Fluet, C. and P. Garella. 2002. "Advertising and Prices as Signals of Quality in a Regime of Price Rivalry." *International Journal of Industrial Organization* 20 (September): 907–30.

Fisher, F. and J. J. McGowan. 1979. "Advertising and Welfare: Comment." *Bell Journal of Economics* 10 (Autumn): 726–7.

Galbraith, J. K. 1958. *The Affluent Society*. Boston: Houghton-Mifflin.

Geroski, P. 1982. "Simultaneous Equations Models of the Structure-Performance Paradigm." *European Economic Review* 19 (September): 145–58.

Kaldor, N. V. 1950. "The Economic Aspects of Advertising." *Review of Economic Studies* 18 (February): 1–27.

Kihlstrom, R. and M. Riordan. 1984. "Advertising as a Signal." *Journal of Political Economy* 92 (June): 427–50.

Kotowitz, Y. and G. F. Mathewson. 1986. "Advertising and Consumer Learning." In P. M. Ippolito and D. T. Schefman, eds., *Empirical Approaches to Consumer Protection Economics*. Washington, DC: Federal Trade Commission, U.S. Government Printing Office.

Lambin, J. J. 1976. *Advertising, Competition, and Market Conduct in Oligopoly over Time*. Amsterdam: North-Holland.

Milgrom, P. and J. Roberts. 1986. "Price and Advertising Signals of Product Quality." *Journal of Political Economy* 94 (August): 796–821.

Nelson, P. 1970. "Information and Consumer Behavior." *Journal of Political Economy* 78 (May): 311–29.

——. 1974. "Advertising as Information." *Journal of Political Economy* 82 (August): 729–54.

Nichols, W. H. 1951. *Price Policy in the Cigarette Industry*. Nashville: Vanderbilt University Press.

Pope, D. 1983. *The Making of Modern Advertising*. New York: Basic Books.

Posner, R. 1975. "The Social Cost of Monopoly and Regulation." *Journal of Political Economy* 83 (June): 807–38.

Reisz, P. 1978. "Price versus Quality in the Marketplace." *Journal of Retailing* 54 (Winter): 15–28.

Round, D. K. 1983. "Intertemporal Profit Margin Variability and Market Structure in Australian Manufacturing." *International Journal of Industrial Organization* 1 (June): 189–209.

Schmalensee, R. 1978. "A Model of Advertising and Product Quality." *Journal of Political Economy* 86 (June): 485–503.

——. 1989. "Inter-industry Studies of Structure and Performance." In R. Schmalensee and R. D. Willig, eds., *Handbook of Industrial Organization, Vol. 2*. Amsterdam: North-Holland.

Schwartz, A. and L. Wilde. 1985. "Product Quality and Imperfect Information." *Review of Economic Studies* 52 (April): 251–62.

Solow, R. M. 1967. "The New Industrial State or Son of Affluence." *Public Interest* 9 (Fall): 100–8.

Telser, L. 1964. "Advertising and Competition." *Journal of Political Economy* 72 (December): 537–62.