# Chapter 16
# Advertising and Welfare

In the previous chapter, we saw that approximately 2% of GDP is spent on advertising each year. For most of us, it is impossible to escape advertising, as it is found on television and radio, in movie theaters, and on the Internet. Advertising spending is especially prominent in consumer goods industries. The advertising-to-sales ratio exceeds 10% in many consumer goods industries, including liquor, perfume, and cosmetics, but is less than 1% in most producer goods industries, such as cement and industrial materials.

Social critics have debated the merits of advertising for centuries. These are expressed eloquently in the extreme views of Thomas Jefferson and H.G. Wells. In 1819, Jefferson is quoted as saying "Advertisements contain the only truths to be relied on in a newspaper." In 1934, Wells took the opposite viewpoint when he said that "Advertising is legalized lying." Even if all ads were truthful and not socially offensive, many critics would still be concerned that there is too much advertising from society's perspective.[1]

In this chapter, we focus on the effect of advertising on society. As discussed in Chap. 1, welfare analysis is difficult because we want so many things from our political-economic system, and trade offs and value judgments are frequently required. We may all agree that advertisements should be honest and promote socially desirable (not illegal) activities. Yet, distinctions can be subtle, making it difficult to decide which ads cross the line of honesty and acceptability. Efficiency analysis is a cornerstone of economics, and we also want to know if free markets supply too little or too much advertising from an efficiency point of view. Even here, however, we will see that an efficiency analysis is difficult, especially when advertising changes consumer tastes. With these caveats in mind, we take up the welfare issues of advertising in this chapter.

[1] See Jackman and Macmillan (1984) for these and other famous advertising quotes. For a review of the social debate regarding advertising, see Bagwell (2007).

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## 16.1 Advertising and Social Responsibility

The most onerous form of advertising makes false and deceptive claims. Such claims are clearly harmful to consumers and are illegal under the Federal Trade Commission (FTC) Act of 1914.[2] According to the FTC, for an ad to be false or deceptive, three conditions must be met. First, the ad must present or omit information that is likely to mislead consumers. A common example is the use of a "bait and switch" tactic where a seller entices customers with an alluring but insincere offer (e.g., a very low price) that the advertiser has no intention of honoring. Once in the store, customers are told that the advertised product is unavailable and are encouraged to buy a higher priced substitute. Another example is when a firm promotes the merits of a product and fails to disclose a known defect to potential customers.

Second, the ad must be viewed as deceptive from the viewpoint of a "reasonable consumer" or the targeted group, such as children and the terminally ill.[3] This concept is a bit fuzzy; several examples illustrate how the reasonable consumer principle is applied. One distinction of interest is the country-of-origin designation. Consider the examples of a Danish pastry and an American car. To advertise a car as domestic, "all significant parts and processes that go into product must be of US origin" ("Complying with the Made in the USA Standard," at http://www.ftc.gov/). In contrast, even though some consumers may believe that a "Danish pastry" sold at a local bakery is made in Denmark, a reasonable consumer would understand that it is a Danish style pastry baked locally. Thus, representing it as a Danish pastry is not illegal.

The FTC also allows ads that are obvious exaggerations or puffing, as they are not taken seriously by ordinary consumers. Such ads frequently use adjectives such as best, perfect, exceptional, original, and wonderful. Every day we are exposed to ads that exaggerate in this way.

Apple Computers: "The Power to be Your Best"
BMW: "The Ultimate Driving Machine"
Coke: "It's the Real Thing"
Energizer Batteries: "They Keep Going and Going and Going. . ."
Goodyear: "The Best Tires in the World have Goodyear Written all over Them"
McDonald's: "I'm Loving It!"
Minute Rice: "Perfect Rice Every Time"

[2] This discussion derives from the Act and Federal Trade Commission documents that clarify its interpretation. These include "FTC Policy Statement on Deception," "Statement of Policy Regarding Comparative Advertising," "FTC Guides Against Deceptive Pricing," "Guides Against Bait Advertising," "The ABCs at the FTC: Marketing and Advertising to Children," and "Complying with the Made in the USA Standard" which are available at http://www.ftc.gov/.

[3] Regarding ads targeted at children, a higher standard is used because of the "limited ability of children to detect exaggerated or untrue statements" ("The ABCs at the FTC: Marketing and Advertising to Children," at http://www.ftc.gov/).

A classic case where the reasonable consumer principle played an important role in litigation involved Listerine mouthwash.[4] Listerine's marketing stated: "Kills germs by millions on contact" and "For general oral hygiene, bad breath, colds, and resulting sore throats." The FTC effectively argued that these statements would mislead the general population into believing that Listerine could prevent a cold and sore throat, and the company had to delete the "colds, and resultant sore throats" phrase.

The third condition that must be met for an ad to be false or deceptive is "materiality." This means that the deceptive information or sales practice must be important enough to have caused consumers to make a different choice in all likelihood. Material information concerns the purpose, safety, efficacy, or cost of the product. If a deceptive statement is immaterial, it is unlikely to affect consumer behavior and is acceptable.

Posner (1973) claims, however, that it is unnecessary to place any restrictions on advertising. His position is based on the argument that most consumers behave according to the principle of *caveat emptor*, which is Latin for "let the buyer beware." In general, consumers will assess product quality before purchase and when they are deceived, consumers will boycott future sales of dishonest firms. Thus, honest firms succeed and dishonest firms fail in the long run. This provides strong motivation for honesty in the marketplace.

Contributions from behavioral economics challenge Posner's viewpoint. For example, Nagler (1993) shows that deception can be profitable because it frequently takes time for a fraudulent claim to become apparent in a world where products have become increasing more complex, and once apparent some consumers are unwilling to admit to themselves and others that they were fooled.[5] In this case, deceptive marketing tactics are more likely to exist and persist.

Two other factors may influence a firm's incentive to engage in false or deceptive advertising. First, a firm that is going out of business will be less interested in its long-run reputation and will be more likely to engage in deceptive tactics. Second, firms that sell experience or credence goods will be more likely to deceive, as consumers will be unable to detect false claims before purchase. This would not be a problem for search goods, however. For example, from 1915 to 1925 the Ford Model T automobile came in just one color, black. The company had no incentive to advertise that it came in multiple colors, because a false claim such as this is readily apparent to consumers before making a purchase. This suggests that deception is more likely for products that are purchased infrequently and for goods with experience/credence characteristics. This is a growing concern in a modern society where products have become increasingly complex. It is for this reason that the sale of products such as these tend to be regulated, a topic that will be discussed in Chap. 20.

[4] Warner-Lambert, 86 F.T.C. 1398, 1415 n.4 (1975), aff'd, 562 F.2d 749 (D.C. Cir. 1977), cert denied, 435 U.S. 950 (1978).

[5] In addition, De Long et al. (1990) and De Long et al. (1991) show that markets may behave inefficiently when not all consumers are fully rational.

Another issue of social concern is that advertising can push the boundaries of social acceptability. Historical examples abound. The current premise in advertising is that sex sells, but this has not always been the case. According to Rooney (2010), a hundred years ago most ads were predominately product-centric. It was not until 1911 that the head of J. Walter Thomson Advertising, Helen Lansdowne, developed the first modern advertising campaign that emphasized sex appeal. The ad was for Woodbury soap and featured elegant young women in the company of dashing young men. The headline said, "Skin You Love to Touch."

To attract attention, advertisements sometimes use stereotypes that promote sexism, racism, and ageism. To appeal to a targeted audience, minority groups have been depicted stereotypically and/or derogatorily. Classic examples include ads for Aunt Jemima pancakes in the 1950s, where the spokesperson for the brand is an African-American woman who is depicted as a servant, and 1960s ads for Frito corn chips, where the spokesperson is a Hispanic cartoon character who is depicted as a criminal, "the Frito Bandito."

Sexism also abounds, with some ads depicting women as technically unskilled or as sex objects. One example is a 1953 magazine ad for Del Monte Ketchup, which shows a surprised women holding a ketchup bottle and asking "You mean a woman can open it?" Another is an advertisement for a VW bug that promotes one advantage of owning a bug: Women are prone to hitting things, and if your wife dents a VW fender, "A new one goes on with just ten bolts for $24.95, plus labor" (*Life Magazine*, August 13, 1964, 15).

The brewing industry provides an excellent case study where firms have sometimes skirted the line of good taste in advertisements. Artistic nudes and pinups have been used to market beer in saloons since the late 1880s. An extreme example is the "Nude Beer" brand, marketed by the Eastern Brewing Company in the 1980s, where each can had a sticker that could be peeled off to reveal a picture of a nude woman. Regarding racial insensitivity, the Heileman Brewing Company introduced "Crazy Horse Malt Liquor" in 1992, a name that offended Native American people because Crazy Horse is another name for Tasunke Witko who is a revered defender of the Lakota Sioux people.[6]

Although the examples presented so far are primarily historical, sexist and racist ads continue to this day. Calvin Klein ads for perfume are notorious for being sexually provocative.[7] Since 2005 Paris Hilton has starred in sexually provocative ads for Carl's Jr.'s spicy BBQ burger, claiming that "It's Hot." Both Microsoft and Sony have had to apologize recently for airing racially insensitive ads. In 2006, Sony promoted a new white PSP (portable game system) to complement its black PSP. To market its new white PSP and contrast it with its black version, Sony developed an ad that featured a white, blond women dominating a subordinate

[6] For a more complete discussion of the politically incorrect marketing actions of US beer companies, see V. Tremblay and C. Tremblay (2005).

[7] Examples of perfume ads that use sex and romance as selling tools can be reviewed at http://www.fragrantica.com, accessed July 20, 2010.

black women with the caption "PlayStation Portable White is Coming." After public criticism, Sony apologized and discontinued the ads. In 2009, Microsoft featured a white male, a black male, and a white female in an ad in the USA. The same ad was used in some European countries, but the black man's face was removed and replaced with that of a white man. Like Sony, Microsoft quickly pulled the ads after public criticism.

Some claim that ads such as these do not promote or reinforce racism and sexism but simply reflect the social norms of our culture. Racism and sexism are undesirable and the advertising messages described above are of greater social concern if advertising is a contributing factor. We will take up this policy issue in Chap. 20.

## 16.2 Advertising and Efficiency

Even if advertisements are truthful and free from using undesirable stereotypes, many critics are concerned that there is too much advertising from society's perspective. As we have seen, about 2% of GDP is devoted to advertising each year, money that could be put to other uses. A related issue is the extent to which advertising is persuasive, informative, or image enhancing. There is obviously less concern with advertising that is purely informative.

At least two problems make it especially difficult to analyze the efficiency of advertising. First, Dixit and Norman (1978) point out that when advertising changes consumer tastes, there is no fixed utility function that can be used as a benchmark to make policy comparisons. For purely persuasive advertising that changes tastes in favor of the advertised brand, pre-advertising preferences appropriately reflect a consumer's "true" (unadulterated) preferences. In contrast, for informative advertising that makes a consumer aware of an important and useful product characteristic, post-advertising preferences better represent a consumer's true (unboundedly rational) preferences. When advertising changes tastes, the resulting change in traditional consumer surplus provides an inaccurate measure of the change in consumer welfare.

A second problem associated with evaluating the merits of advertising is that it frequently produces externalities. For example, advertising generates a positive externality when it pays for television and radio broadcasting. It can also produce a negative externality when it increases demand for commodities that themselves have negative externalities associated with them. One example is alcohol advertising, which could lead to greater alcohol consumption, alcohol abuse, and accidents attributable to drunk driving.

### *16.2.1 Advertising and Efficiency: A Graphical Approach*

To illustrate the difficulties associated with identifying the socially efficient level of advertising, we consider a simple monopoly example with no externalities. We set marginal cost of production to zero for simplicity. Advertising is profitable, and to

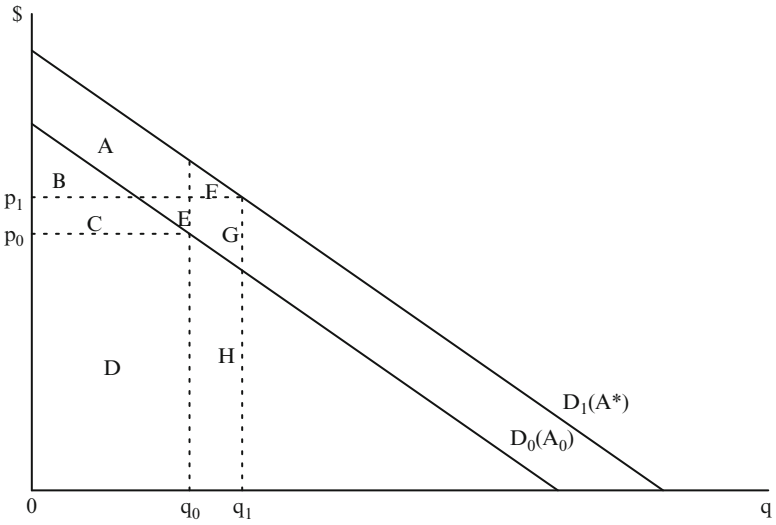


**Fig. 16.1** Consumer and producer surplus when advertising equals $A_0$ and $A^*$ ($A^* > A_0$)

make the effect more apparent, we first consider a discrete change in advertising expenditures from zero ($A_0$) to the firm's profit-maximizing level ($A^*$). This produces a parallel increase in demand, as illustrated in Fig. 16.1, and the optimal price and output pairs correspond to $p_0$–$q_0$ and $p_1$–$q_1$. In this case, advertising is assumed to lead to a higher equilibrium price.[8]

Recall that a market is efficient when it maximizes total (consumer plus producer) surplus. To illustrate the efficiency effect of advertising, we begin with the case where advertising is treated much like a quality improvement (as discussed in Chap. 13), where advertising does not change tastes but produces a product image that society deems beneficial. From Fig. 16.1, an increase in this type of advertising from $A_0$ to $A^*$ has the following effect on consumer surplus (CS), producer surplus (PS), and total surplus (TS):

- At $A_0$, $CS_0 = B + C$; $PS_0 = D$; $TS_0 = B + C + D$.
- At $A^*$, $CS_1 = A + B + F$; $PS_1 = C + D + E + G + H - A^*$; $TS_1 = A + B + C + D + E + F + G + H - A^*$.
- $\Delta TS = TS_1 - TS_0 = CS_1 - CS_0 = A - C + F$.

We derive the change in total surplus as follows. For a profit-maximizing monopolist, the change in producer surplus or profit associated with a small change

[8] When advertising rotates demand, the welfare effect of advertising is more complex. You are asked to address this issue in a review question. For further discussion, see Comanor (1985) and V. Tremblay et al. (forthcoming-b).

in advertising equals zero. In other words, at the margin the change in PS (ΔPS) equals zero: $\Delta PS \equiv PS_1 - PS_0 = C + E + G + H - A^* = 0$. This is true whether advertising creates a desirable image, is persuasive, or is informative. Therefore, the change in TS (ΔTS) equals $CS_1 - CS_0 = A - C + F$, which is positive as long as area $C$ is not too large.[9] In this case, total surplus rises with advertising ($\Delta TS > 0$), implying that the firm is supplying too little advertising from society's perspective. The reason for this is that the TS function is strictly concave in advertising,[10] so that the socially optimal level of advertising is reached when $\Delta TS = 0$; the firm undersupplies (oversupplies) advertising from society's perspective when $\Delta TS > 0$ ($\Delta TS < 0$).

Next, we consider the more difficult case where advertising changes consumer tastes. We continue to use Fig. 16.1 to facilitate a comparison with the previous case. When advertising is persuasive and changes tastes, pre-advertising preferences are the accurate benchmark when making welfare comparisons. In this case,

- At $A_0$, $CS_0 = B + C$; $PS_0 = D$; $TS_0 = B + C + D$.
- At $A^*$, $CS_1 = B$; $PS_1 = C + D + E + G + H - A^*$; $TS_1 = B + C + D + E + G + H - A^*$.
- $\Delta TS = TS_1 - TS_0 = CS_1 - CS_0 = -C < 0$.

Notice that areas $A$ and $F$ are not part of consumer surplus at the optimal level of advertising, $A^*$. This is because pre-advertising tastes represent true preferences (i.e., at $D_0$), and the increase in consumer willingness to pay, represented by areas $A$ and $F$, is the result of pure persuasion or deception. Thus, they do not count as a true social benefit. Under these conditions, TS falls with advertising, implying that the firm supplies an excessive amount of advertising from society's perspective.

A weaker but similar result holds when informative advertising changes tastes by revealing to consumers that the product is more desirable than they previously believed. In this case, post-advertising preferences are the accurate benchmark, and the following conditions hold:

- At $A_0$, $CS_0 = A + B + C + E$; $PS_0 = D$; $TS_0 = A + B + C + D + E$.
- At $A^*$, $CS_1 = A + B + F$; $PS_1 = C + D + E + G + H - A^*$; $TS_1 = A + B + C + D + E + F + G + H - A^*$.
- $\Delta TS = TS_1 - TS_0 = CS_1 - CS_0 = F - C - E$.

Notice that areas $A$ and $E$ are included in consumer surplus at advertising level $A_0$. This is because post-advertising tastes represent true preferences, which are characterized by demand function $D_1$. For example, advertising might inform consumers of the health benefits of eating broccoli. Even though a consumer who eats broccoli may not realize the health benefits without advertising, the consumer still

[9] Notice that area $C$ will be small if the increase in price is small, an issue that will become apparent shortly.

[10] To illustrate, consider the following inverse demand and total cost functions: $p = 12 - q + A$ and $TC = cq - A^2$, where $c = 0$ for simplicity. In this case, $p^* = q^* = 6 + A/2$. $TS = 54 + 6A - 7A^2/8$, which is strictly concave, and TS reaches a maximum at $A^* = 3.43$.

receives those benefits nevertheless. So, the social gain of consuming $q_0$ (without advertising) includes area $A + E$. Under these conditions, TS still falls as long as advertising leads to a substantially higher price. When this occurs, the firm will advertise too much from society's perspective. Later in the chapter we will see that informative advertising of a different type can benefit both producers and consumers by lowering consumer search costs, implying that it is undersupplied in the marketplace.

### 16.2.2 Advertising and Efficiency: A More General Approach Using Calculus

To better understand how the price effect is important when analyzing the efficiency of advertising, we consider a more general model. We assume an oligopoly industry with homogeneous goods where advertising can have external effects. As noted above, there are positive externalities when advertising subsidizes television and radio programming and negative externalities when advertising leads to greater social ills. In this case, the total surplus function (TS) for this industry can be written as

$$\mathrm{TS} = \mathrm{CS}(A, p) + \mathrm{PS}(A, p) + E(A, p), \tag{16.1}$$

where CS is the dollar value of consumer surplus, $A$ is now the industry level of advertising expenditures, PS is producer surplus or industry profit, and $E$ is the dollar value of the externality; $E > 0$ for a positive externality and $E < 0$ for a negative externality. TS is assumed to be strictly concave and twice continuously differentiable. The efficiency effect of advertising is determined by totally differentiating (16.1) with respect to $A$[11]:

$$\frac{\mathrm{dTS}}{\mathrm{d}A} = \frac{\partial \mathrm{CS}}{\partial A} + \frac{\partial \mathrm{CS}}{\partial p}\frac{\partial p}{\partial A} + \frac{\partial \mathrm{PS}}{\partial A} + \frac{\partial \mathrm{PS}}{\partial p}\frac{\partial p}{\partial A} + \frac{\mathrm{d}E}{\mathrm{d}A}. \tag{16.2}$$

Given that TS is strictly concave, from society's perspective advertising is insufficient when $\mathrm{dTS}/\mathrm{d}A > 0$, is optimal when $\mathrm{dTS}/\mathrm{d}A = 0$, and is excessive when $\mathrm{dTS}/\mathrm{d}A < 0$.

In order to better understand the overall effect of advertising, we consider different market structures and types of advertising. First, we consider a monopoly or cartel setting where there are no externalities and advertising changes tastes, as in Dixit and Norman (1978).[12] In this case,

- $\partial \mathrm{PS}/\partial A = 0$ and $\partial \mathrm{PS}/\partial p = 0$ from the first-order conditions of profit maximization

[11] This derivative involves the use of the chain rule, which is discussed in the Mathematics and Econometrics Appendix at the end of the book. According to the chain rule, if $y = f(x_1)$ and $x_1 = f(x_2)$, then a change in $x_2$ causes a change in $x_1$ which causes $y$ to change. That is, $\mathrm{d}y/\mathrm{d}x_2 = (\mathrm{d}y/\mathrm{d}x_1)(\mathrm{d}x_1/\mathrm{d}x_2)$. In this case, because $\mathrm{CS} = \mathrm{CS}(p)$ and $p = p(A)$, $\partial \mathrm{CS}/\partial A = (\partial \mathrm{CS}/\partial p)(\partial p/\partial A)$.

[12] For a similar viewpoint, see Braithwaite (1928).

- $dE/dA = 0$ given no externalities
- $\partial CS/\partial A = 0$ given that advertising changes tastes and is, therefore, of no social value

Thus, (16.2) becomes

$$\frac{dTS}{dA} = \frac{\partial CS}{\partial p}\frac{\partial p}{\partial A}. \tag{16.3}$$

Because consumer surplus falls with a price increase ($\partial CS/\partial p < 0$), the sign of $dTS/dA$ is opposite the sign of $dp/dA$. That is, advertising is excessive when it leads to a higher price, is undersupplied when it leads to a lower price, and is optimal when advertising has no effect on price. When the assumptions of this example hold, (16.3) provides a simple test to determine whether an industry provides too much advertising from society's perspective: advertising is excessive when it leads to a higher price. This explains why Dixit and Norman found that advertising was excessive, as their model assumed that advertising leads to a higher price.

Unfortunately, the problem is more complex when we consider more realistic scenarios. Becker and Murphy (1993) showed that this result does not hold when we add externalities. If advertising generates a positive externality (by paying for television and radio programming), (16.3) becomes

$$\frac{dTS}{dA} = \frac{\partial CS}{\partial p}\frac{\partial p}{\partial A} + \frac{dE}{dA}, \tag{16.4}$$

where $dE/dA$ is positive. In this case, it is clear that advertising is undersupplied if it leads to a lower price. If it leads to a higher price, however, the social welfare implications are not clear.[13]

The problem is complicated further when we assume an oligopolistic industry and the equilibrium is static Nash instead of cartel. In this case, $\partial PS/\partial p > 0$ because the Nash equilibrium price will be less than the cartel or monopoly price. The sign of $\partial PS/\partial A$ will depend on whether advertising is combative or constructive. If combative, we saw in Sect. 15.3.3 that $\partial PS/\partial A < 0$ because the Nash equilibrium level of advertising will be greater than the cartel level of advertising. If constructive, the reverse holds true. Thus, (16.2) becomes

$$\frac{dTS}{dA} = \underbrace{\left(\frac{\partial CS}{\partial p} + \frac{\partial PS}{\partial p}\right)}_{(-)}\underbrace{\frac{\partial p}{\partial A}}_{(?)} + \underbrace{\frac{\partial PS}{\partial A}}_{(?)} + \underbrace{\frac{dE}{dA}}_{(?)}, \tag{16.5}$$

[13] Of course, if the externality is negative, then all we can say is that advertising is excessive if it leads to a higher price. If it leads to a lower price, it may or may not be undersupplied.

with the expected signs listed below each term. Taken together, the first two terms in (16.5) will be negative because a higher price leads to a deadweight loss in a market with market power (i.e., it lowers consumer plus producer surplus), *ceteris paribus*. In this case, to argue that advertising is unambiguously excessive when it leads to higher prices, it must also be true that the last two terms on the right-hand side of the equality in (16.5) are not too great. This will certainly occur when advertising is both combative ($\partial \mathrm{PS}/\partial A < 0$) and does not produce a positive externality.

Finally, we consider the case where advertising does not change consumer tastes. For example, let advertising create a product image that is valuable to consumers and society, as discussed graphically above, except that advertising need not cause the equilibrium price to increase. Under these conditions, $\partial \mathrm{CS}/\partial A > 0$, and

$$\underset{(+)}{\frac{\mathrm{dTS}}{\mathrm{d}A}} = \underset{(+)}{\frac{\partial \mathrm{CS}}{\partial A}} + \underset{(-)\quad(?)}{\left(\frac{\partial \mathrm{CS}}{\partial p} + \frac{\partial \mathrm{PS}}{\partial p}\right)\frac{\partial p}{\partial A}} + \underset{(?)}{\frac{\partial \mathrm{PS}}{\partial A}} + \underset{(?)}{\frac{\mathrm{d}E}{\partial A}} \tag{16.6}$$

Thus, to determine the efficiency effect of advertising requires one to estimate the effect that advertising has on industry price, consumer welfare, industry profits, and externalities. This demonstrates how particular assumptions about the type and influence of advertising affect the efficiency implications of advertising.

### *16.2.3 Advertising and Efficiency When Advertising Lowers Consumer Search Costs*

The sensitivity of the welfare implications of advertising to different assumptions can also be seen when we consider a different type of informative advertising. In this case, consider the Stivers and V. Tremblay (2005) model that we discussed in the previous chapter in which advertising lowers consumer search costs and does not change consumer tastes. They show that the welfare implications are similar in monopoly and oligopoly markets, so we analyze only the monopoly case here. As before, production costs are zero for simplicity.

The basic idea behind the Stivers and V. Tremblay model can be seen in Fig. 16.2. Ignoring advertising for the moment, in the presence of search costs consumer demand is a function of the full price ($p_\mathrm{f}$) and is identified as $\mathrm{D_f}$. Recall from our discussion of this model in the previous chapter that the full price is the market price ($p$) plus a search cost ($s$): $p_\mathrm{f} = p + s$. Producers only receive the market price, $p = p_\mathrm{f} - s$. This means that the firm's effective demand function is D, which is lower than $\mathrm{D_f}$ by the amount $s$.

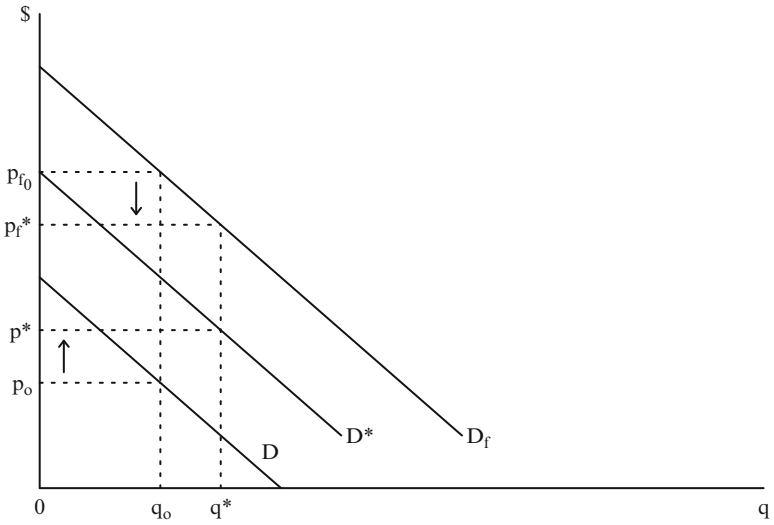


**Fig. 16.2** The monopoly outcome when advertising lowers search costs

To understand the welfare effect of advertising, we compare total surplus with and without advertising. With no advertising, the firm's profit-maximizing output is $q_0$, price is $p_0$, and full price is $p_{f0}$ in Fig. 16.2. When the firm does invest in advertising, this lowers consumer search costs and raises the firm's effective demand function to $D^*$. The new optimum values are $q^*$, $p^*$, $p_f^*$. This has three chief effects:

1. Output increases from $q_0$ to $q^*$.
2. The consumer price falls from $p_{f0}$ to $p_f^*$.
3. The producer price increases from $p_0$ to $p^*$.

Thus, consumer, producer, and total surplus increase with advertising. This implies that from society's perspective, the market provides too little informative advertising that lowers consumer search costs.[14] This is because the firm will ignore the added benefit that its advertising generates for consumers, as it maximizes only producer surplus.

This may seem like a strange result in a society where advertising is everywhere, but it only applies to advertising that lowers consumer search costs. Government agencies are well aware of the problem. For example, decades ago billboard

[14] We can see this more formally by analyzing the effect of advertising on total surplus, $TS = CS(p_f) + PS(A, p)$. Totally differentiating this function with respect to $A$ produces $\frac{dTS}{dA} = \frac{\partial CS}{\partial p_f}\frac{\partial p_f}{\partial s}\frac{ds}{dA} + \frac{\partial PS}{\partial A} + \frac{\partial PS}{\partial p}\frac{\partial p}{\partial A}$. In this setting, $\partial CS/\partial p_f < 0$, $\partial p_f/\partial s = 1$, $ds/dA < 0$. Assuming that advertising does not lower producer surplus, $dTS/dA > 0$. This implies that the firm produces too little advertising from society's perspective.

advertising was the only source of information available to rural interstate travelers regarding upcoming roadside facilities (gas, restaurant, and lodging). Due to the free rider problem, too little information of this kind is provided by the marketplace. In response, the federal government in the USA and Japan post signs on freeways indicating exits with nearby gas, food, and lodging facilities. In addition, many states require gas stations to post their prices so that they are visible from the highway. Finally, some states require restaurants to post their health inspection rating in the front window.[15] These types of regulations suggest that the free market supplies too little advertising that lowers consumer search costs.

In summary, the theoretical literature explains why debate continues regarding the welfare effect of advertising in real markets. The most we can say is that unregulated markets tend to produce too much advertising from society's perspective when advertising is deceptive or changes consumer tastes and does not generate positive externalities. However, advertising that lowers search costs and does not produce negative externalities is likely to be undersupplied. Ultimately, the efficiency effect of advertising is an empirical question that must be studied case by case.

### *16.2.4 Advertising and Efficiency: Empirical Evidence*

We divide our discussion of the empirical evidence into three parts. First, we investigate the extent to which advertising is informative, persuasive, and image enhancing. Then we summarize the evidence on the advertising–price relationship. Finally, we discuss the effect of advertising on externalities.

Survey evidence indicates that most people believe that advertising is more persuasive than informative. In a survey of 2,700 subscribers to the *Harvard Business Review*, 85% believed that advertising "persuades people to buy things they do not need" (Greyser and Reece 1971, 158). After reviewing 20 national surveys from 1930 to 1992, Calfee and Ringold (1994) found that surveys consistently indicate that about 70% of consumers believe that advertising persuades consumers to buy things they do not want. If true, this is a problem because there is greater social concern with advertising that is persuasive.

One hypothesis is that persuasive advertising creates brand loyalty. This is supported by blind taste test studies, which show that advertising induces many consumers to prefer the advertised brand. For example, Allison and Uhl (1964) found that in blind taste tests most consumers cannot distinguish one brand of regular domestic beer from another. Similar to the findings of Lee et al. (2006), they also found that when comparing the same beer in two different bottles, one labeled and the other unlabeled, consumers generally favored the labeled product.

[15] Not only does this regulation provide consumers with better information, Jin and Leslie (2003) found that forced disclosure of ratings in the Los Angeles area led to an increase in the hygiene scores by over 5%.

Equivalent results have been reported for wine and soft drinks. As we discussed in Chap. 4, in blind taste tests Plassman et al. (2008) found that subjects gave a higher quality rating to wines that they thought to be of higher price, even though all samples came from the same bottle. Brain scans by McClure et al. (2004a, b) confirm that consumers who are given a Coke receive greater utility when they know that they are drinking Coke than when they are uninformed about the brand of cola that they are drinking. The combined evidence shows that consumers receive utility from both the product and from the product's image that is created by advertising. Unfortunately, these results are consistent with two different points of view: (1) that advertising enhances brand loyalty by persuasive means and (2) that advertising enhances brand loyalty by creating a desirable product image.

Ackerberg (2001) developed a clever way of distinguishing between the informative and other (image, prestige, and persuasive) effects of advertising for a new brand of low calorie yogurt, Yoplait 150. Ackerberg compared the demand effect of advertising on experienced households, those that had purchased the brand previously, with inexperienced households, those that had not purchased the brand before. If advertising is primarily informative, it should influence only inexperienced household demand. If it is primarily persuasive or image enhancing, however, then both experienced and inexperienced households should respond to advertising, as all consumers are influenced by persuasion and all benefit from the enhanced image created by advertising. Ackerberg finds strong empirical support for the hypothesis that advertising for Yoplait 150 increases the demand from inexperienced consumers but not experienced consumers. This supports the informative view of advertising.

The evidence is also consistent with the hypothesis that when advertising lowers consumer search costs, it is undersupplied and requires government intervention. As we discussed in the previous section, society gains when government posts signs with information about service availability at upcoming freeway exits, requires gas stations to post prices on signs that are visible from the highway, and requires restaurants to post health inspection signs in storefront windows.

It is clear from the evidence that advertising can have informative, persuasive, and image-enhancing effects, depending on the market. As discussed above, advertising is more likely to have a persuasive component for experience and credence goods. Informative advertising is more likely to be found in printed materials and for new products. Finally, advertising that creates subjective differentiation is more likely for consumer goods, such as perfume, beer, and soft drinks. One can conclude that the extent to which advertising is beneficial to consumers depends upon the mix of the informative, persuasive, and image-enhancing components of advertising.

A welfare assessment of advertising also requires an analysis of the price effect of advertising. Research on this topic has produced two clear results. First, a complete ban on advertising leads to higher market prices. This line of research began with the seminal study by Benham (1972), who compared the retail price of eyeglasses in states with and without advertising restrictions. Benham found that

the price was over twice as high in states that prohibited advertising ($37.48 compared to $17.98). Subsequent studies for prescription drugs, gasoline, toys, optometric services, and legal services confirm that advertising restrictions increase the average price paid by consumers.[16] In a related line of research, Milyo and Waldfogel (1999) found that legalizing price advertising for liquor in Rhode Island led to lower prices on advertised brands. These results are consistent with the informative view of advertising in which advertising promotes price competition.

The second result regarding the advertising–price relationship is that advertised brands are priced higher than their generic or unadvertised counterparts. The data in Table 15.7 confirm this conclusion for a *Consumer Reports* sample of 23 food items. It shows that the average national brand received a 40% price premium over generic store brands. In addition, the empirical results of C. Tremblay and V. Tremblay (1995) and Iwasaki et al. (2008) support the hypothesis that a marginal increase in advertising leads to higher prices in the US brewing and cigarette markets. This evidence is consistent with the persuasive view of advertising.

One concern with this interpretation of the evidence is that advertised brands may command a higher price because they are of higher quality. The evidence does not always support this argument, however. For example, experts at *Consumer Reports* conducted blind taste tests and found that national and store brands for most food items are of like quality. As reported in Table 15.7, for 57% of these food items the experts felt that national and store brands were of similar quality. Only 26% of national brands were viewed as being of higher quality, and 17% of store brands were viewed as being of higher quality. This is consistent with the evidence from the other studies discussed above that used blind taste tests. If price reflects quality, one would also expect national brands to command a higher price premium in the six categories where the national brands were evaluated to be of higher quality than in the four product categories where store brands were evaluated to be of higher quality. Yet, the opposite is true: the price premium for the national brands when they are of higher quality is 19%, and the price premium for national brands when store brands are of higher quality is 37%. Furthermore, Iwasaki et al. (2008) attempt to control for product quality in their regression analysis of the US brewing industry and still found that advertising has a positive effect on price.

Other concerns remain. Even though advertised brands are higher priced than generic brands, the prices of both types might be higher if all advertising were banned, as the work of Benham (1972) and others suggests. It is also possible that a marginal increase in advertising leads to higher prices on average, while a complete ban on advertising also leads to higher prices. If the price effect were all that mattered in our welfare calculation, this would suggest that the market produces too much advertising but that a complete ban is too restrictive from society's perspective.

[16] See Bagwell (2007) for a review of this extensive literature.

**Table 16.1** The effect of relaxing the broadcast advertising ban on externalities ($E$), producer surplus (PS), consumer surplus (CS), and total surplus (TS)

| Variable | Estimated effect[a] |
|---|---|
| $\Delta E_{\text{TV-Radio}}$ | 630 |
| $\Delta E_{\text{Health}}$ | −1,460 |
| $\Delta$PS | −1,920 |
| $\Delta \text{CS}_{\text{Persuasion}}$ | 2,490 |
| $\Delta \text{CS}_{\text{Information}}$ | 2,920 |
| $\Delta \text{CS}_{\text{Image}}$ | 7,710 |
| $\Delta \text{TS}_{\text{Persuasion}}$ | −250 |
| $\Delta \text{TS}_{\text{Information}}$ | 170 |
| $\Delta \text{TS}_{\text{Image}}$ | 4,970 |

[a]Measured in millions of dollars. Total surplus may not add up due to rounding errors.
*Source*: Farr et al. (2001).

In any case, even if the above factors were understood, a complete welfare analysis would still require us to investigate the effect that advertising has on externalities. Becker and Murphy (1993) point out that advertising produces positive externalities when it helps pay for broadcast television and radio programming. On the other hand, advertising generates negative externalities when it causes consumers to increase consumption of commodities that themselves produce negative externalities. This has been a policy concern in the markets for alcohol and tobacco. Sloan et al. (2004) estimate that cigarette smoking produces $104 billion in annual social costs, $35 billion of which are external to the smoker.[17] For beer, the annual external cost is estimated to be between $18 and $37 billion, which amounts to between $1.74 and $3.49 per six-pack of beer.[18] Thus, negative externalities are substantial in these industries.

Farr et al. (2001) estimated all of these factors when assessing the efficiency of the advertising restrictions in the US cigarette industry. Their welfare estimates are reproduced in Table 16.1. Because cigarette advertising has had elements of information, persuasion, and image creation, they estimated the change in consumer surplus under three different scenarios: advertising is purely persuasive ($\Delta \text{CS}_{\text{Persuasive}}$), advertising is purely informative ($\Delta \text{CS}_{\text{Informative}}$), and advertising is purely image enhancing ($\Delta \text{CS}_{\text{Image}}$). This provides three different estimates of the change in total surplus due to the elimination of advertising restrictions.

The Farr et al. findings are consistent with the implications of this chapter. Estimates from a market model show that the elimination of restrictions on cigarette advertising would lead to a lower average price and an increase in cigarette

[17] This is due to the external costs of second-hand smoke and the resulting health care expenditures. According to Levit et al. (1994), 44% of all US health care costs are paid for by the public.

[18] See V. Tremblay and C. Tremblay (2005) for a review of this evidence.

smoking. This generates an estimated $630 million in positive externalities associated with the subsidy of broadcast television and radio programming ($\Delta E_{\text{TV-Radio}}$) and $1,460 million in negative externalities associated with increased health problems ($\Delta E_{\text{Health}}$). Due to lower prices, producer surplus falls by $1,920 million ($\Delta$PS). Eliminating all restrictions leads to greater demand and greater consumer surplus (ignoring the adverse health effects) for all three types of advertising. Consistent with our discussion above, the increase in consumer surplus resulting from the increase in advertising is smallest when advertising is purely persuasive and greatest when it is image enhancing. Finally, their evidence shows that eliminating advertising restrictions lowers total surplus by $250 million if advertising is purely persuasive but increases total surplus otherwise.

Because most cigarette ads had persuasive, informative, and image enhancing effects, we would need to add appropriate weights for them to complete the analysis. Although it is difficult to come up with precise estimates of the appropriate mix, if we use the survey estimate that 70% of advertising is persuasive (Calfee and Ringold 1994) and assume that the remainder is informative, then the change in total surplus is negative, implying that cigarette advertising restrictions are efficient.

### *16.2.5 Advertising, Strategic Effects, and Cost Efficiency*

In this section our goal is to characterize a firm's technology when both production and marketing are important to the firm's survival. After all, in many consumer goods industries the success of a new product depends on a successful marketing campaign almost as much as it does on the attractiveness of the product itself.

When both output and advertising are important strategic variables, Färe et al. (2004) argue that a firm's cost function can be decomposed into two parts. The first involves the use of production inputs to manufacture output, and the second involves the use of marketing inputs to sell that output. Assuming that these components are separable,[19] then we can write a firm's total cost function (TC) as

$$\text{TC}(w, q) = \text{TC}_{\text{p}}\left(w_{\text{p}}, q\right) + \text{TC}_{\text{A}}(w_{\text{A}}, q), \tag{16.7}$$

where $\text{TC}_{\text{p}}$ is the total cost of production, $\text{TC}_{\text{A}}$ is the total cost of marketing or advertising, $w$ is a vector of both production input prices ($w_{\text{p}}$) and advertising input prices ($w_{\text{A}}$), and $q$ is output. To be economically efficient, the firm will want to choose those inputs that minimize the cost of manufacturing output and the cost of advertising. At the firm level, profit maximization guarantees cost minimization.

[19] This may be reasonable, given that most manufacturing firms produce and market output at separate locations and the production and marketing divisions are supervised by separate management teams.

At the industry level, however, strategic effects may prevent the industry from producing the productively efficient level of advertising.[20] That is, firms may advertise more than is needed to produce a given level of industry sales. As we saw in Chap. 15, this can occur when advertising is combative, which forces firms into a prisoners' dilemma in advertising. This is productively inefficient because much of each firm's advertising is designed to steal customers from its competitors rather than attract new customers to the industry.[21] As we saw in Chap. 15, the evidence shows that this is the case for the US brewing and cigarette industries. Nelson (1999) and V. Tremblay and C. Tremblay (2005) found that advertising in the brewing industry is combative. In addition, Iwasaki and V. Tremblay (2009) found that before the 1971 ban on television and radio advertising, the productively efficient level of broadcast (television and radio) advertising was zero. This was an era when most of the cigarette marketing dollars were spent on broadcast media. This demonstrates that free markets need not produce the productively efficient level of advertising.

## 16.3 Summary

1. As a society, we want advertising to be socially responsible and efficient. Responsible advertising is honest and refrains from stereotyping and promoting sexism, racism, and ageism, for example. Not all ads in the USA meet this criterion.
2. Whether free markets produce the socially efficient level of advertising depends upon the effect of advertising on consumer utility, producer surplus, and externalities. Assessing the efficiency effect of advertising both theoretically and empirically is a difficult task, because advertising may generate externalities and can affect prices and consumers in so many different ways.
3. In general, advertising that is deceptive, changes tastes, leads to higher prices, and produces negative externalities will be oversupplied from society's perspective. Advertising that is honest, lowers search costs, and does not produce negative externalities is undersupplied.
4. Advertising bans tend to raise market prices. At the same time, heavily advertised brands tend to be higher priced than generic or unadvertised brands.

[20] For a more complete discussion of the effect that marketing externalities can have on a firm's cost efficiency, see Vardanyan and V. Tremblay (2006).

[21] Of course, if advertising is constructive, firms will invest too little in advertising from the industry's perspective. This need not imply that the market produces too little advertising from society's perspective, because it may be persuasive or taste changing, for example.

5. When firms compete in both output (or price) and advertising, a firm's cost function can be decomposed into a manufacturing component and a marketing or advertising component. Even though a firm may use its production and marketing inputs so as to minimize costs, firms will invest too much money in advertising from the industry's perspective when advertising is combative.

## 16.4 Review Questions

1. Explain why a firm is more likely to use false advertising when it sells experience goods (as opposed to search goods) and plans to exit the industry in the near future. Would you be more or less reluctant to eat at a restaurant that you knew was going out of business in the near future? Explain.
2. Explain the key factors that determine whether or not advertising is excessive from society's perspective.
3. Assume that a monopolist uses informative advertising to change consumer tastes as in Dixit and Norman (1978). In this case, advertising causes demand to rotate in one of two possible ways.

   A. Advertising causes demand to rotate around the quantity intercept of demand. That is, the $q$-intercept on the horizontal axis remains the same.
   B. Advertising causes demand to rotate around the price intercept of demand. That is, the $p$-intercept on the vertical axis remains the same.

   Use discrete analysis as in Fig. 16.1 to determine the effect of advertising on efficiency (i.e., total surplus) for each type of demand rotation.

4. Use two behavioral concepts to explain how advertising might change consumer beliefs in ways that benefit the advertiser. If advertising can change beliefs, what are the policy implications? Discuss Ackerberg's (2001) evidence on this issue.
5. Discuss the policy implications of advertising that creates images that are valued by consumers but not by society as a whole.