Do Consumers Buy Advertising?

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Introduction

Advertising has become one of the most interesting topics in the area of consumer economics. It is ubiquitous, yet it raises controversy of whether it is needed or not. That is, whether it is overly-, under-, or optimally supplied. Galbraith once attacked the practice of advertising as "it molds consumer tastes". However, Stigler and Becker countered him with "it is neither necessary nor useful to attribute to advertising the function of changing tastes" (Stigler and Becker, 1977).

Other critics to advertising argue that the advertising expense is borne by the consumers, who pay higher prices for the advertised goods. Moreover, buyers have more advertising foisted off on them than they would be willing to purchase in a separate market for advertising services. And even, advertising wastes resources, since advertising and physical commodity are in joint supply and consumers cannot buy the advertising separately.

Telser responded to these criticisms by arguing that some of the price differential is due to the advertising for which consumers are willing to pay as revealed by their foregoing the alternative of finding and purchasing cheaper, less advertised goods. In addition, many goods are joint products the parts of which are seldom sold separately to consumers. However, a consumer might want to buy a complete, assembled good, for example, instead of the parts that she could assemble herself. Other consumer might have to compromise his preference because of the tastes of people in his surrounding. When there is a separate market for components, it is true that minority tastes can be gratified, but this may be so costly that at the prices that suppliers would require, the minority would be unwilling to pay (Telser, 1966).

Advertising can also be supported using Lancaster's idea of "characteristics" (Lancaster, 1966). He argued that good, *per se*, does not give utility to the consumer. It possesses characteristics, and these characteristics give rise to utility. In general, a good will possess more than one characteristic, and many characteristics will be shared by more than one good. Relating this idea to the case of advertising, we infer that preferences are ordered over characteristics, not over

goods. Advertising can lower the shadow price of a characteristic by increasing the ability of the purchased good to produce the desired characteristic. This is accomplished by providing the consumer with different information or beliefs about the product than previously held. As pointed out by Nelson, information is crucial for consumers and they are willing to get it through either search, experience, or simply through the help of advertising (Nelson, 1974).

This paper is intended to explore the discourse on advertising. We will first discuss the simple supply of and demand for advertising, based on the classic work of Telser, and then move to analyze the welfare implication of advertising. The latter will be based on the seminal paper by Stigler and Becker (1977), using the interpretation framework developed by Nichols (1985) and Hochman and Luski (1988).

Supply of and Demand for Advertising

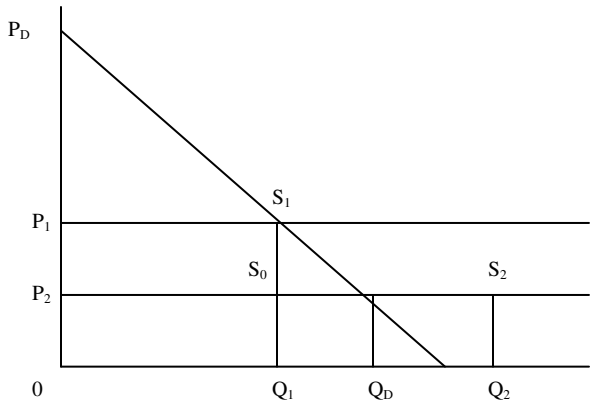
One may hardly doubt that there is a demand for some kinds of advertising. Newspapers, for example, would not likely to survive without advertising. Conventional demand theory says that there are given consumer tastes, incomes, a set of goods, and prices at which unlimited purchases can be made by individual consumers. This model is useful for many purposes. However, it does not go far toward explaining the role of advertising. Buying decisions depend partly on the awareness of available goods and services. There will be no demand unless buyers know who are the sellers, what they are selling, and the terms of sale. Advertising is therefore one way to create a demand for products.

Nelson (1974) explained that information is generated by advertising because of consumer power in product market. If the advertised properties of a product differ from its actual properties, in case of *search qualities*[1], the consumer will know about the difference before purchasing it. As a consequence, the incentives for producer to produce misleading advertisement is reduced, otherwise he will suffer a decline in his credibility for future advertisements and pay the costs of processing non-buying customers. While in the case of *experience qualities*[2] the major control that the consumer has over the market is whether she repeats the purchase of the brand or not.

[1] "Search qualities" refers to qualities of a brand that the consumer can determine by inspection before purchasing, e.g. dress-style (Nelson, pg. 730).
[2] "Experience qualities" refers to qualities that are not determined prior to purchase, e.g. the taste of a brand of canned tuna fish (Nelson, pg. 730).

Changes in the stock of knowledge about goods and services creates a demand for advertising messages that will keep consumers informed about changing conditions in the market. The demand for advertising varies by commodity because of differences in market size which makes one or another promotional technique more efficient. One may enjoy the entertainment used to deliver advertising without buying the product being advertised. In response to this, some producers supply their advertising by mailing information about their goods and terms of sale to *potential* customers and sought to collect charges for this service. In this case, the producer should bear the expense of locating such potential customers; including the fact that some would be willing to pay for the information, and some would not, or even feel offended by the content of the messages. To conclude, the advertising can be supplied either by a joint market with the goods being advertised or by a separate market (see Telser, 1966). As a consequence, transaction costs matter (see Fig. 1 below).

Figure 1



In Figure 1 line P_DQ_D represents the demand for advertising. For convenience, supply is assumed to be perfectly elastic. It can be one of two forms: the supply when there is a separate market for advertisement (P_1S_1) and when the advertisement is supplied jointly with the physical good (line P_2S_2). The distance P_1P_2 in the figure represents the transaction costs per message. In the case of separated market, the supply price would include these costs in addition to all other costs, OP_2. Therefore, the price of advertisement is Q_1S_1 and the quantity supplied is OQ_1. The total resources engaged in advertising would be $OQ_1S_1P_1$.

If advertising, on the other hand, were sold jointly with the good, then the supply of advertisement would be P_2S_2, because the seller could save the expense of the transaction costs that are required when markets are separated. So, in the absence of a separate market for advertisement the quantity provided by the seller of the good would lie between Q_D and Q_2. Point Q_2 implies that the total resources engaged is $OQ_2S_2P_2$, which is equal to $OQ_1S_1P_1$. So in the range of Q_DQ_2, the total resources engaged in advertising is less than that under the case when there is a separate market for advertising messages. Q_2S_2 represents the implicit price paid by the consumer of advertised good for the advertisements since it is the amount by which the price of advertised goods exceeds the price of similar but unadvertised goods.

The amount of advertising supplied is excessive relative to the demand because in most cases advertising is provided at a zero price to potential buyers while the cost of advertising is positive to society. However, although more advertising messages would be offered at a zero price than at a positive price, the total resources engaged in the supply of advertising messages would be less than if the advertising messages were sold separately from the physical goods. In the next section we would examine the conditions when the advertising is over-, under-, or optimally supplied.

The Optimal Level of Advertising

As mentioned above, the ultimate objects of choice are characteristics[3] produced by each household with market goods, own time, knowledge, and perhaps other inputs. And knowledge can be produced by advertising.

In the conventional analysis, firms in perfectly competitive markets gain nothing from advertising and thus have no incentive to advertise because they are assumed to be unable to differentiate their products to consumers who have perfect knowledge. Nevertheless, Stigler and Becker in their analysis showed that consumers have imperfect information, including misinformation, and a skilled advertiser might well be able to differentiate his product from other apparently similar products.

[3] Stigler and Becker (1977) calls this "commodities". I would use S-B's "commodities" and Lancaster's "characteristics" interchangeably in this paper. Nichols (1985) chooses to follow Lancaster while Hochman and Luski (1988) maintains S-B terminology.

Stigler and Becker assumed that all households have the same utility function $u(z,y)$, where z is the commodity or characteristic consumed by the household and produced through a household production function; and y is the composite non-advertised good. The inputs to this function are good x that is purchased in the market and advertising A that is provided to all consumers by the producers of x being consumed. So, the production function of the characteristic is:

$$z = g(A)x \qquad (1)$$

The function $g(A)$ implies the consumer's attitudes toward advertising. It is assumed to be increasing and concave. In addition, z is homogeneous of degree one in x. Let P_x and P_z be the market price of x and the derived price of z. Then:

$$P_x x = P_z z = P_z g(A) x \qquad (2)$$

which implies:

$$P_z = P_x / g(A) \qquad (3)$$

The firm's income is:

$$I_p = P_x X - TC(X) - A P_a \qquad (4)$$

where I_p is the firm's income, X is the firm's total output of x and P_a is the unit cost of advertising. Substituting this with (3) and assuming g be the same across consumers, we have:

$$I_p = P_z g(A)X - TC(X) - A P_a \qquad (5)$$

The first-order conditions with respect to X and A are respectively:

$$P_x = P_z g(A) = MC(X) \qquad (6)$$

$$X \frac{\partial P_x}{\partial A} = P_z X g'(A) = P_a \qquad (7)$$

Equation *(6)* implies the maximizing condition for *competitive firms* when there is advertising, while equation *(7)* says that marginal revenue equals marginal costs.

Since $Z = gX$ and $\partial Z/\partial X = g$, the necessary condition to maximize income is that its derivatives with respect to X and A equal zero:

$$\frac{\partial I}{\partial X} = P_z g + X \frac{\partial P_z}{\partial Z}\frac{\partial Z}{\partial X} g - MC(X) = 0 \qquad (8)$$

$$\frac{\partial I}{\partial A} = X \frac{\partial P_x}{\partial A} - P_a = P_z \frac{\partial Z}{\partial A} + \frac{\partial P_z}{\partial Z}\frac{\partial Z}{\partial A} Z - P_a = 0 \qquad (9)$$

Therefore, the maximizing condition for a *monopolist* when there is advertising is

$$P_z g\left(1+\frac{1}{\eta_{P_z}}\right) = P_x\left(1+\frac{1}{\eta_{P_z}}\right) = MC(X) \qquad (10)$$

where η_{P_z} is the elasticity of the characteristic[4]. The relation between the optimal level of advertising and the characteristic elasticity can be expressed as:

$$X\frac{\partial P_x}{\partial A} = P_z g' X\left(1+\frac{1}{\eta_{P_z}}\right) = P_a \qquad (11)$$

To see the consumer's willingness-to-pay for advertising, suppose that x^*, y^*, and λ^* be the solutions to consumer's utility maximization. This means, her income must be allocated according to[5]:

$$I_c = P_x x^* + P_y y^* \qquad (12)$$

where I_c is the consumer's income; and the utility is attained at:

$$u = u(g(A)x^*, y^*) \qquad (13)$$

Differentiating *(12)* and *(13)* with respect to advertising gives:

$$-x^*\frac{\partial P_x}{\partial A} = P_x\frac{\partial x^*}{\partial A} + P_y\frac{\partial y^*}{\partial A} \qquad (14)$$

$$\frac{du}{dA} = \frac{du}{dz}\left[x^* g'(A) + g(A)\frac{\partial x^*}{\partial A}\right] + \frac{du}{dy}\frac{\partial y^*}{\partial A} \qquad (15)$$

Using first-order condition from utility maximization subject to budget constraint yields[6]:

$$\frac{\partial u}{\partial A} = \lambda\left[P_x\frac{x^* g'(A)}{g(A)} + P_x\frac{\partial x^*}{\partial A} + P_y\frac{\partial y^*}{\partial A}\right] \qquad (16)$$

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[4] That is, $\eta_{P_z} = \dfrac{\partial Z}{\partial P_z}\dfrac{P_z}{Z}$

[5] See Nichols (1985)

[6] $L = u(g(A)x, y) + \lambda(I_c - P_x x - P_y y)$ implies:

$P_x/g(A) = u_z / \lambda$

$P_y = u_y / \lambda$

Substituting with *(14)*:

$$\frac{\partial u/\partial A}{\lambda} = \frac{P_x x^*}{A}\left[A\frac{g'(A)}{g(A)} - \frac{\partial P_x}{\partial A}\frac{A}{P_x}\right] \qquad (17)$$

Since λ is the marginal utility of income, the LHS of *(17)* is the consumer's willingness-to-pay for more advertising at the margin. The first term in bracket is the advertising elasticity of the characteristics and the second term is the advertising elasticity of the price of *x*. Let $\eta_{g,A}$ and $\eta_{P_x,A}$ denote these two terms respectively. Thus we can rewrite *(17)* as:

$$\frac{\partial u/\partial A}{\lambda} = \frac{P_x x^*}{A}\left[\eta_{g,A} - \eta_{P_x,A}\right] \qquad (18)$$

Now we can infer the conditions for advertising to be optimally supplied. That is, optimal supply is attained when the LHS of *(18)* equals zero. If it is greater than zero, the advertising is undersupplied; and if it is less than zero, the advertising is oversupplied. In other words, the advertising is optimally (over-, under-) supplied when $\eta_{g,A}$ = (< , >) $\eta_{P_x,A}$. The terms in bracket is in fact the negative of the advertising elasticity of the price of *z* (denote: $\eta_{P_x,A}$)[7]. Therefore if advertising does not affect P_z, $\eta_{P_x,A}$ equals zero, and the advertising is optimally supplied. This condition defines a perfectly competitive characteristic market. That is, perfect competition in *z* is a sufficient condition for the social optimality of advertising on *x*.

[7] Using *(6)*, we get $\eta_{P_z,A} = \frac{\partial P_z}{\partial A}\frac{A}{P_z} = \eta_{P_x,A} - \eta_{g,A}$

Pareto Efficiency[8]

Suppose that firms produce *A* and *Z* using labor (*L*) input. Differentiating (1) with respect to *L*, while keeping *x* then *A* constant gives:

$$\left.\frac{dz}{dL}\right|_{dx=0} = \frac{\partial A}{\partial L} g'(A) X \qquad (19)$$

$$\left.\frac{dz}{dL}\right|_{dA=0} = \frac{\partial x}{\partial L} g(A) \qquad (20)$$

where $\partial A/\partial L$ and $\partial X/\partial L$ are the marginal productivity (MP) of *L* in the production of *A* and in the production of *Z* through *X*, respectively. From the theory we know that a Pareto efficiency condition is met when the LHS's of *(19)* and *(20)* are equal. This implies

$$MP(X)\, g(A) = MP(A)\, g'(A)\, X \qquad (21)$$

Equation *(21)* is a necessary condition for Pareto optimum.

Using the result from neoclassical theory that *W/MP = MC*, where W is the wage rate, we can substitute *W/MP(X)* for *MC(X)* in (10) and obtain

$$P_x MP(X)\left(1+\frac{1}{\eta_{P_z}}\right) = W \qquad (22)$$

In addition, we can substitute *W/MP(A)* for P_a in (11) and obtain

$$P_z g' X . MP(A).\left(1+\frac{1}{\eta_{P_z}}\right) = W \qquad (23)$$

Equating *(22)* and *(23)* and using $P_z = P_x / g(A)$, we get *(21)*.

We assume that *y* is produced by competitive industry, so that $P_y MP(y) = W$. Substituting this into *(22)* and again using $P_z = P_x / g(A)$ gives us

$$\frac{P_z}{P_y} = \frac{MP(y)}{g(A) MP(x)(1+1/\eta_{P_z})} \qquad (24)$$

[8] Based on Hochman and Luski (1988).

Since utility-maximizing individuals equate marginal rate of substitution (MRS) in consumption to the price ratio, then the following should hold:

$$\frac{\partial u/\partial z}{\partial u/\partial y} = \frac{MP(y)}{g(A)MP(x)(1+1/\eta_{P_z})} \qquad (25)$$

In addition, efficient market requires that the MRS equals marginal rate of transformation (MRT), that is

$$\frac{\partial u/\partial z}{\partial u/\partial y} = \frac{MP(y)}{g(A)MP(x)} \qquad (26)$$

Therefore, the only way for the market to be efficient in terms of *(25)*, is that the elasticity of characteristic equals -∞. This means that the elasticity of the good being advertised also equals -∞ (since S-B proved that $\eta_{P_z} = \eta_{P_x}$). In other words, efficiency is attained only if producers are price takers in both goods markets and characteristic markets.

Conclusion

The criticisms to the use of advertising in luring consumers are not well supported. In contrast, it is shown that advertising as an important means to deliver information is needed by both seller and buyer of the good being advertised. The methods of delivering advertising messages vary. In explaining the difference between them, the transaction costs matter. For example, if advertising were sold jointly with the good, the price per advertising messages would be lower than that if it were sold separately, because the seller could save the expense of the transaction costs that are required when the markets are separated.

Using the framework formulated by Stigler and Becker (1977) with further development by Nichols (1985) and Hochman and Luski (1988) we conclude that the optimal supply of advertising is attained when the consumer's willingness-to-pay for more advertising at the margin equals zero. At this condition advertising does not affect the price of characteristic. Thus, perfect competition in the characteristic market is a sufficient condition for the social optimality of advertising on a particular good. Moreover, a Pareto efficiency is attained when the producers are price takers in *both* goods markets and characteristic markets.

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