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Advertising Content When Brand Choice Is a Signal*

This article gives a formal rationale for image advertising and branding of homogeneous products that are consumed in public. The idea is that consumers can use brand choice to coordinate behavior and send meaningful social signals. The article distinguishes between variety signals and quality signals and analyzes the competitive implications.

I. Introduction

The economic theory of branding is very limited. The only widely accepted explanation is that a firm can send a credible signal of product quality by "burning" enough money advertising a brand name. Milgrom and Roberts (1986) is the most satisfactory formalization of this story. Not much more is known about advertising content. The main argument is still Nelson's (1970) view of advertising as information. More recently, it has been shown that umbrella branding can signal either location (Sullivan 1986; Sappington and Wernerfelt 1985) or quality (Wernerfelt 1988).

I here propose another function of branding and advertising content, namely, that consumers can use brand choice as a way of signaling to each other. Briefly, the argument is as follows. Much social interaction is based on signs whose meanings derive from convention (use). When a product is consumed in public, then brand choice could be used to send a signal. If consumers value communicating their types, an equilibrium exists in which some brands signal one type, while others signal other types. In principle, the meaning of the types could be anything, but it seems fair to conjecture that the content of advertising helps establish a focal point. We there-

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fore have a rationale for image advertising and branding of (perhaps even homogeneous) products that are consumed in public.

This idea is already known in the marketing literature as "symbolic consumer behavior" (Levy 1959; Hirschman and Holbrook 1981), and the article is, to a large extent, an idealization and formalization of that literature. I will here look at brand choice as a signal, but the idea also applies at the product level where quasi monopolists (such as DeBeers in diamonds) may boost primary demand by endowing their products with symbolic value.

II. Variety Model

Consider a large group of consumers who value signaling their type $t \in \{1, 2, \ldots, n\}$ where $1/n$ of the consumers are of each type and the types refer to anything (outdoorsy or indoorsy; interested in aerobics, running, or gardening; left wing or right wing, etc.). In particular, suppose that if a type t sends a signal that makes others ascribe the probability q to his being type t, he experiences utility $q\bar{u} + (1 - q)\underline{u} > \underline{u}$. Assume further that all these consumers buy a publicly consumed, homogeneous product supplied by an industry with free entry.

The simplest equilibrium is one in which the types are indifferent between suppliers. There are, however, many other equilibria. Suppose that it became known that more than $1/n$ of the customers of firm f were of type t, while types otherwise bought randomly. In this case, t types would prefer f, provided that its product was identifiable, and others would prefer any other firm. So there is another equilibrium in which t types buy from f, while all others randomize among the other firms. Similarly, there are equilibria where subsets of firms signal subsets of types. For example, buying brand 1 or 2 may identify you as type 1, 2, or 3, while buying brand 3 identifies you as a type 4, and so on.

The question is, How can this happen? Language and other social signals have developed over long time periods and it does not seem likely that consumers spontaneously would identify "outdoorsiness" with something as unhealthy as a brand of cigarettes. I will here suggest that "cheap talk" (Farrell 1987) can coordinate the signaling equilibria. Let a firm make an unverifiable, nonbinding statement: "People who buy brand f are of type t." Even if somebody knows that the firm has no data to back it up and that it is costless for the firm to lie, this could still be used as a focal point for purchasing patterns. If it is, it becomes true and the signal works. In principle, consumers could, of course, equally well decide that those who buy f are of all types but type t—but that seems less "natural"—especially if consumers are many and have a difficult time getting aggregate information.

The firm has to pay to name (brand) its product and to advertise the suggested meaning of the signal. But since the consumer, by assumption, values sending the signal, these costs can be recovered through higher prices. In principle, the product itself may have very low or even negative utility were it not for the signal (as when a teenager wears a particular dark coat in 90-degree weather). A firm's decision to suggest a signaling equilibrium will depend on the perceived likelihood that consumers will respond and their willingness to pay for the signal.

I still need to specify what happens if two brands vie for endowment with the same meaning. Analysis of this phenomenon depends on the way in which the signaling equilibrium is reached. If it happens instantaneously, any number of brands could claim and take on the same meaning. However, if it takes time for the equilibrium to "form," then it seems reasonable that only one brand can come to signal each type. The argument goes informally like this: look at an m-brand, n-type market. If consumers select brands based on the signals these brands conferred in the last period, then the only stable equilibria are those where each brand is sold to, at most, one type. Further, at any time "on the way to" such an equilibrium, it will be true that a brand that is not first (or in a tie for first) in terms of signaling a type will end up with no sales to that type. So generically we would expect a fully separating equilibrium where each type is signaled by exactly one brand.

To keep the analysis simple I will abstract from the dynamics of the problem and assume that separating equilibria form immediately after firms make once-and-for-all advertising decisions. So we consider a simple model in which identical firms compete for segment monopolies. There are n segments and monopoly profits are given by $\pi_1, \pi_2, \ldots, \pi_n$, reflecting different sizes and valuations of products and signals. There are m ($> n$) firms who decide to compete. Firms can only advertise to one segment—that is, if a firm claims to signal more than one segment, it might as well not advertise. The segmental monopolies are awarded to the firms that spend the most money on these segments. If no firm advertises to a segment, it is given to a randomly chosen firm among those who did not win a segment. For simplicity, we abstract from production costs.

This game has a symmetric mixed strategy equilibrium characterized by an $n - 1$ vector and n probability distributions. Firms can be thought of as acting in two steps. First, they use an appropriate mixed strategy $(p_1, p_2, \ldots, p_n = 1 - \Sigma_{i=1}^{n-1} p_i)$ to select a segment. Second, they use a probability distribution $F_i(a)$ to select a level of advertising, a_i, in that segment. (I assume that the second step is taken without knowledge of which segments competitors selected in the first step.)

To understand this better, note first that the postulated "winner-takes-all" payoff function endows the game with properties analogous

to price games with homogeneous consumers as analyzed by, for example, Varian (1980). This implies that the equilibrium F can have no mass points. If it did, a firm could advertise infinitesimally above it and do discretely better (in expectation) than the firms at the mass point. So we do not have to worry about ties, and F is differentiable. The expected profits per firm are

$$\sum_{j=1}^{n} p_j \Bigg[\sum_{\nu=0}^{m-1} \binom{m-1}{\nu} p_j^{\nu}(1-p_j)^{m-1-\nu} \Bigg(\pi_j \int_0^{\infty} F_j^{\nu} dF_j + \sum_{i \neq j}^{n} (1-p_i)^{m-1} \pi_i (m-n)^{-1} \times \int_0^{\infty} (1-F_j^{\nu}(a)) dF_j \Bigg) - \int_0^{\infty} a dF_j \Bigg].$$

To interpret this, recall that p_j is the probability of pursuing segment j. The first line gives the expected profits if the firm wins the segment it advertises to: given that $\nu + 1$ firms pursue j, the probability of winning with advertising a is $F_j^{\nu}(a)$. Similarly, the second line gives the expected profits if the firm loses its segment but is allocated another segment. Here $(1 - p_i)^{m-1}$ is the probability that no other firm pursues segment i, and $1 - F_j^{\nu}(a)$ is the probability that our firm loses segment j. In this case, it gets π_i with probability $(m - n)^{-1}$.

In free-entry equilibrium, profits are zero at any a in any segment. We can therefore find $F_j^*(a)$ from $dF_j^*/da \geq 0$, $F_j^*(0) = 0$, $\int_0^{\infty} dF_j^* = 1$ and

$$\sum_{\nu=0}^{m-1} \binom{m-1}{\nu} p_j^{\nu}(1-p_j)^{m-1-\nu} \Big(\pi_j F_j^{*\nu}(a) + \sum_{i \neq j}^{n} (1-p_i)^{m-1} \pi_i (m-n)^{-1} (1 - F_j^{*\nu}(a)) \Big) = a,$$

$$j = 1, 2, \ldots, n.$$

We can then, in principle, substitute the F^*'s into the expected profits and use the first-order conditions to find $p_1, p_2, \ldots, p_{n-1}$.

I admit that this one-shot game is not a good description of reality. However, it captures the essence of what goes on in the following sense: in the more realistic case where firms compete over time with fixed advertising budgets, we get an equilibrium with similar qualitative properties (this equilibrium will be of the war-of-attrition type with firms dropping out at random times).

This competition is obviously wasteful, although the suggestions sent to consumers are not. As in Posner (1975), the competition for monopoly results in the monopoly profits being dissipated.

III. Quality Model

This refers to the "Veblenesque" case where all consumers want to send the same signal (i.e., that they are sophisticated, intelligent, rich, following fashion, etc.). Suppose that consumers differ in their willingness to pay for the signal such that $(1 - \alpha)L$ consumers will pay $\bar{b}$ for it, while αL will pay at most $\underline{b} < \bar{b}$. All products have the same actual quality and average costs $c(v)$ are U-shaped such that the volume $\underline{v}$ gives minimum average costs $\underline{c}$, which we take to be less than the valuation of the product itself.

With free entry, the one-shot game has an equilibrium where $\alpha L/\underline{v}$ firms charge $\underline{c}$ and sell to the low-valuation consumers, while $(1 - \alpha)$ $L/\bar{v}$ firms charge $\underline{c} + \underline{b}$ and sell to the higher valuation consumers, where $\bar{v}$ is the volume below $\underline{v}$ at which average costs are $\underline{c} + \underline{b}$. To see this, note that the low-valuation consumers will pay for the signal and thus destroy it, unless the price difference is at least $\underline{b}$. Now think of any other price pair $p_h \geq \underline{c} + \underline{b}$, $p_\ell \geq \underline{c}$. Free entry and price competition will drive p_ℓ down to $\underline{c}$ and the volume of these firms to $\underline{v}$. Similarly, p_h will be driven to $\underline{c} + \underline{b}$ and volume for these firms will go to $\bar{v}$, but not below that.

The assumed information structure of the one-shot game is, however, critical in this model. If the game is repeated, it seems reasonable to assume that a firm which earlier charged the high price could make money by lowering its price a little and selling the "afterglow" of the signal to the low-valuation consumers. In this case, where signals take meaning from last period's trades, such firms can make one-period cheating profits of $\max_v[\underline{c} + \underline{b} - c(v)]v \equiv \pi^0$. To prevent this, the net present value of profits to the high price firms have to be sufficiently high. Following the logic of Klein and Leffler (1981), this can be accomplished by letting each high price firm sell a larger volume v^* given by $\pi^0 = [\underline{c} + \underline{b} - c(v^*)]v^*/r$. If the price is $\underline{c} + \underline{b}$, these firms make insufficient profits at lower volumes and thus find themselves tempted to cheat. Said differently, unless they sell at least v^*, they are unable to credibly commit against cheating.[1] These equilibria are illustrated in figure 1.

In such an equilibrium, only $(1 - \alpha)L/v^*$ firms can charge high prices. If more firms do it, their volume will fall below v^* and the equilibrium will collapse. Since these firms make positive profits, there will be competition for these positions. To sustain this equilibrium against free entry, we need to endow consumers with enough information so that they will not buy from a firm at $\underline{c} + \underline{b}$, unless that firm has

1. Of course, there exists a continuum of price, volume pairs $\hat{p}$, $\hat{v}$, such that $[\hat{p} - c(\hat{v})]\hat{v}/r = 0$. However, no $\hat{p} > \underline{c} + \underline{b}$ can be an equilibrium of the price game.

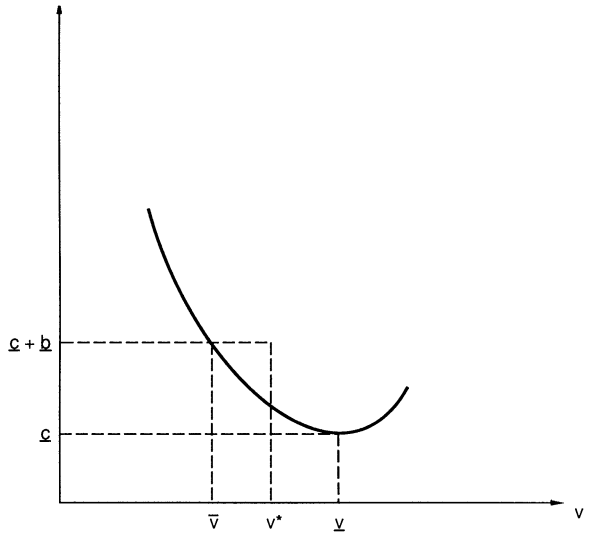

FIG. 1.—Equilibria in the quality model

paid its dues on conspicuous spending (e.g., advertising). This characterization of beliefs is not completely satisfactory, but it is reasonable.

As in the variety model, we have a mixed strategy equilibrium. Assume that m firms compete and define $n \equiv (1 - \alpha)L/v^*$. In this case, the equilibrium spending distribution satisfies for all a, the zero-expected profit condition:

$$\pi^0 \sum_{j=1}^{n} F^{m-j}(a)\,[1 - F(a)]^{j-1} = a.$$

To understand this, note that $F^{m-j}(1 - F)^{j-1}$ is the probability that $m - j$ firms advertise less than a, while $j - 1$ firms advertise more than a.

Of course, irreversible investments in higher quality production could also serve as a vehicle for profit dissipation. In that case, however, the analysis is more involved since both costs and actual (as opposed to symbolic) quality may vary across brands.

For search goods, an alternative and quite natural vehicle for dissipation may be actual excess quality. Suppose $\underline{q}$ is the first-best quality level and let $g(q)$ be the amount a consumer is willing to pay for $q > \underline{q}$. It is then an equilibrium for $\alpha L/\underline{v}$ firms to charge $\underline{c}$ for $\underline{q}$, while $(1 - \alpha)L/\bar{v}$ firms charge $\underline{c} + \underline{b} + g(\bar{q})$ for $\bar{q}$ where $\bar{v}$ is minimum economic scale at $\bar{q}$ and the cost of $\bar{q}$ at $\bar{v}$ equals $\underline{c} + \underline{b} + g(\bar{q})$. In such an equilibrium, high prices reflect the combined effect of high quality and symbolism.

IV. Discussion

I have suggested that advertising can supply "cheap talk" such that brand choice can serve a signaling function. Because the signals may be completely unrelated to the product itself, this possibility places the product in very wide competition in the market for signals. For variety signals particularly, cigarettes compete with beer, haircuts, mannerisms, jargons, and so on. While brand choice signals are expensive, the advertising dollars give an ability to create signals (propose equilibria) which otherwise would not develop (or at best develop slowly). On the other hand, because of wasteful interbrand competition, this advantage may come at too high a price. In the symmetric equilibrium from Section II, all surplus was dissipated as advertising. However, this is an extreme case. Most likely, firms will enter sequentially such that much less advertising is necessary. Furthermore, once developed, a signal can be transferred from one market to another, as when the "Marlboro" name is put on a type of clothing.

Quality signals are different from variety signals. They do not compete with signals from outside the commercial sphere—their meaning derives from the spending of money (or some other utility equivalent—time, for instance). Profit dissipation also plays a different role here. It still comes from competition for monopoly but also from the need to sustain the equilibrium against cheating. So the entry barriers are different and the dissipation of all surplus is a more integral part of market equilibrium.

In order to make the argument transparent I used very stylized models. For example, I assumed that consumers are homogeneous except in their valuation of signals, that firms are homogeneous, that quality is exogenous, and so on. The critical assumption behind this approach is that the model is robust. So I assume that heterogeneity will not render the intuition behind the results wrong. Of course, only more detailed modeling can ultimately satisfy this assumption.

The above has implications for the testability of the theory. For example, a simple dynamic extension of the model suggests that first entrants should be able to capture a market segment. And yet, this does not happen in all instances. Before these counterexamples can be accepted as rejecting the theory, one should control for factors outside the model, such as firm heterogeneity.

The model can be tested at two levels. At the micro level, one can gather data on the social processes through which brand names are endowed with meaning and look at the relationship between these meanings and actual consumption patterns. At the market level, a key implication of the variety models is that the returns to advertising depend on competitor advertising to the chosen segment, rather than absolute expense. If a $2 million budget makes one number two in a

segment, it may give one less than $1 million to a segment which one can dominate. For the quality model, the theory describes the determinants of the amount of advertising necessary to credibly "sell" the signal. This could be looked at in a cross-sectional analysis of advertising levels in different markets.

I end by once again stressing that the whole argument depends on the selection of one of many equilibria. Since the meaning of the signal is payoff irrelevant from the brand name, it will not be possible to develop standard equilibrium selection arguments for this case. Consider, however, the most direct analog, language. It only works by convention and words can and do have different meanings in different cultures. And yet language exists and works. So it is impossible to insist on confining attention to signaling games for which equilibrium selection arguments are possible. The point in this article is that advertising can be seen as a way to propose equilibria in such games.

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