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ADVERTISING AS A BARRIER TO ENTRY?

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I. Introduction: The Importance of Entry Barriers

Economists are becoming increasingly aware of the importance of the conditions of entry into a market in determining the performance of that market. It is fast becoming conventional wisdom that a firm with a large market share may have quite limited market power if there are no <u>barriers to entry</u> into its market. The absence of barriers to entry implies that any attempt by the dominant firm (or firms) to raise prices and earn monopoly profits will be met (rapidly) by new entry and the erosion of market share. Therefore an analysis of entry conditions is a crucial part of any industry study, and certainly a prerequisite for informed antitrust actions. Indeed, much of the current antitrust debate has shifted from an emphasis on concentration ratios and market shares to the study of entry barriers.

This report studies the relationship between advertising and entry barriers and entry conditions in general. <u>The fundamental question is whether adverising can serve as an entry barrier</u>, and if so how and under what circumstances. This question is important both with regard to the F.T.C.'s position on advertising in particular and with regard to its broader antitrust duties.

If advertising is used as a vehicle to erect entry barriers, then policy decisions in the advertising area must always consider their impact on market structure. When advertising discourages entry, it can have a socially undesireable impact even if it is not deceptive or unfair. This is so for at least three reasons. First, if heavy advertising expenditures promote market power they will lead to allocative inefficiencies known to arise due to such power, namely high prices and restricted output. Second, such monopoly power may tend to increase inequity by diverting resources from consumers towards monopoly profits. Finally, the resources spent on the advertising itself will be to some extent wasted from a public interest

viewpoint.[*] So a finding that advertising is being or can be used to erect entry barriers would warrant a much more aggressive policy towards advertising than currently adopted.

Such a finding would also have implications for the Commission's antitrust activities. Basically the question is whether advertising levels, as measured, say, by advertising to sales ratios, are an important piece of information in an antitrust investigation. If advertising can discourage entry, more careful scrutiny of pricing behavior and profits would be called for in industries which are heavy advertisers. This follows directly from a policy of studying entry barriers carefully in antitrust cases.

· The preceding discussion was intended to bring into focus the importance of the advertising/barriers to entry question. In seeking an answer to this question of whether advertising can be, or is likely to be, an entry barrier, this paper begins with a summary (Section II) and a critique (Section III) of Advertising and Market Power by William Comanor and Thomas Wilson. Comanor and Wilson (C-W) argue that advertising is a significant source of entry barriers in some markets in which it is heavily used. This conclusion is questioned on both theoretical and empirical grounds in the critique below.

Although advertising can theoretically promote market power, as explained in Sections IV and V, it is also a major factor in facilitating entry. Conditions are identified under which advertising is likely to increase or decrease entry barriers. We conclude that a general policy of attacking advertising as an entry barrier, or concentrating antitrust attention on industries with high levels of advertising, is unwarranted.

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[*] Just as resources spent by a monopolist or by oligopolists lobbying for legal entry barriers, e.g. through regulation, are socially unproductive.

II. A Summary of the Comanor-Wilson Position

In their widely quoted book, <u>Advertising and Market Power</u>, Comanor and Wilson (C-W) make both theoretical and empirical arguments in support of the "advertising as a entry barrier" position. The theoretical position is presented primarily in Chapter 3, "Advertising and Consumer Choice," and Chapter 4, "Advertising as a Barrier to Entry," while the strongest empirical support comes in Chapter 6, "Advertising and Profit Rates." A quick summary of their main arguments is now presented; a critique follows in Section III.

The starting point for any story of how advertising influences market structure is at the level of individual consumer response to advertising. C-W assume that consumers have imperfect information about the attributes or performance of each brand. Advertising, along with experience, provides information about product attributes and hence influences demand. C-W assume that advertising tends to both raise the mean and reduce the variance of expected performance, thereby stimulating demand. Assuming that all consumers are identical they then compute the minimum advertising level necessary for one firm (an entrant) to attract customers from another firm (an established brand). A fundamental asymmetry exists between these two firms in that consumers have experience only with the established firm. C-W emphasize that this "head start" may necessitate higher advertising expenditures by the entrant than by the incumbant; this constitutes a barrier to entry. Further-more, increases in advertising by the established firm may necessitate <u>even</u> <u>larger</u> increases by the entrant (in order to remain competitive); this could make advertising a potent entry-deterring weapon.

In Chapter 4 C-W seek to specify the theoretical reasons they believe advertising can be an entry barrier. They correctly point out that for barriers to entry to exist it is not sufficient to show that established

firms have an advantage over entrants. "Entry restrictions depend on the presence of differential advantages of existing firms over new entrants, and not merely on the cost of entry, which may have been required of established firms in the past." (p.42)

An important part of the C-W argument is that advertising is subject to substantial economies of scale, and that these scale economies constitute a barrier to entry. The conventional reason why scale economies raise entry barriers is that later entrants may find the market "full" in that their (large scale) entry would depress prices (while small scale entry is inefficient). C-W claim that economies of scale in advertising can come from two separate sources: (1) Quantity discounts offered by the media, and (2) Increasing effectiveness of advertising messages as the scale of advertising increases.

A second argument is that advertising erects barriers by increasing brand loyalty i.e. by decreasing the cross-price elasticity of demand between the two brands. This type of barrier exists if it is more difficult for the later entrant to attract customers than it was for the first-entrant. C-W claim that "in many circumstances, the effectiveness of advertising in a new product area may be greater than where products are well established ..." (p.46), The idea is that advertising creates product differentiation (rather than the other way around).

Comanor and Wilson support these theoretical points with empirical evidence drawn from a handful of consumer goods industries. The key empirical finding is that advertising levels and profits are correlated in the cross-section, even after correcting for the asset value of the advertising itself.

III. A Critique of Comanor and Wilson

While C-W identify a number of arguments which make the entry -
deterring role of advertising possible, they do so only under very special
and restrictive assumptions, many of which are inappropriate for studying
this problem. In addition, they omit some critical considerations which
lend substantial doubt to their theoretical claims.

Consumer Behavior

In their treatment of consumer behavior in response to advertising
they assume all consumers are identical. This is a very strange assumption
when one is studying product differentiation; the reason products are
differentiated is due to differences in tastes. This is not a minor point;
the prevalent entry strategy in heavily advertised markets is to find a
niche in the market and capture it. (Selective advertising is in fact
a critical part of such an entry strategy.) So to restrict viable entry
to those strategies which compete for the whole market is to make entry
difficult indeed, and hence entry barriers easy to erect.

Another serious problem arises from the assumption (p. 28 equation (10))
that consumers' uncertainty about an entrant's product constitutes a dis-
advantage to the entrant. In fact quite the opposite is true, at least
for products which are frequently purchased. A "mystery" product is well
worth a try in case it happens to suit your taste very well. If it is a
poor product you can always return to the established brand. So long as
as consumers believe there to be a reasonable probability that the new product
is superior to existing brands, there is a large "information value" to sampl-
ing the new brand. This is an inducement, rather than a barrier, to entry.
The proof that C-W's assumption is generally false is given in an appendix to
this report. Basically, the argument that entrants are penalized because of sub-
jective uncertainty about their products is wrong, although they are peanlized if

their products are on average expected to be worse than esablished brands. [In fact, C-W also assume (p.34. equation (20) that the established brand is actually better than expected. Why this should be the case is far from clear, yet it is essential to the. results, especially when consumers are risk neutral.]

Advertising and Consumer Experience

C-W correctly identify brand loyalty (i.e. experience with the established brand) as the critical issue and basic source of entry barriers in markets of the type they are looking at, i.e. where advertising is important. The problem arises when they try to attribute brand loyalty to advertising expenditures alone. A very different conclusion emerges if brand loyalty is attributed instead to product quality and consumer experience, with advertising being a method of overcoming brand loyalty. Advertising serves as an entry barrier when it is a complement to experience in creating brand loyalty, while it promotes entry when it substitutes for experience in the production of brand loyalty. A short mathematical derivation of this claim is presented in an appendix to this report. C-W allude to this (p.48-9) but do not properly qualify their claim that advertising serves as a barrier.

This approach forces one to think carefully about what we mean when we say that advertising serves as an entry barrier. Should we compare the unfettered private market outcome to one in which there is no advertising? Or should we consider the effect on entry conditions of marginal reductions in advertising - by both established firms and entrants. (It is neither feasible nor relevant from a policy perspective to consider reductions in advertising by established brands alone; today's entrant is tommorrow's established brand). These two approaches are discussed in the appendix. The basic conclusion is that brand loyalty constitutes an entry barrier, but advertising may either strengthen or weaken this barrier. Some conditions under which it strengthens the barrier are dscribed below. But the fundamental

source of the entry barrier is an information one: consumers have better information about established brands than about new ones.

Recognizing that information is the basic barrier to be overcome by a new product, we must consider the size of this barrier as faced by the pioneering brand in comparison with the barrier facing later entrants. Economists generally agree that such an entry hurdle is anticompetitive only if the obstacles facing later entrants are greater than these facing earlier entrants. Is this the case for informational hurdles? This is an empirical question (which C-W do not address), but it seems likely that pioneering brands face greater consumer resistance to their products than later imitators do. First entrants perform a useful function of consumer education, through both experience and advertising, which later entrants can to some degree appropriate for themselves. Indeed, consumers are often more receptive to advertising by new brands in a product class with which they are familiar than they are to advertising by an entirely new product type. It is easier to induce brand switching from one brand of personal computer to another than to convince a buyer to switch from mainframe to personal computers. In such circumstances advertising promotes rather than deters entry. Indeed, these situations are characterized by second – rather than first – mover advantages.

The argument that advertising can promote entry is further bolstered by looking at the typical life cycle advertising patterns for consumer goods products. A new brand is accompanied by a substantial promotional campaign, while an established brand typically undertakes mainly "maintenance advertising" to keep its repeat purchasing rate up. These patterns strongly suggest that reductions in advertising levels at both firms would benefit the established brand relative to the entrant. Advertising plays a relatively large role for new brands relative to established brands.

In summary, a finding that advertising enhances brand loyalty and lowers cross-price elasticities between competing brands does not prove or even suggest that advertising is an entry barrier. What matters is the relation between advertising and experience (i.e. are they substitutes or complements), for entry barriers are based on _differential_ advantages of established brands. Certainly advertising by the established brand decreases sales by the entrant, but the key issue is which brand finds advertising _more_ effective in attracting customers.

Advertising and Profit Rates

The key empirical support for C-W's claim that advertising is a barrier to entry rests on the finding that industries with high advertising to sales ratios tend to earn supernormal profits. While the existence of a correlation between advertising and profits in the cross section is disputed (see Demsetz, and Goldschmidt, Mann and Weston; a key issue is how to properly treat advertising as an asset rather than simply an expense) the objections below center on how to interpret such a correlation assuming it does indeed exist.

The finding that industries which rely heavily on advertising tend to earn excess profits probably reflects the role of product differentiation and brand loyalty, rather than advertising, as barriers to entry. It is agreed that advertising is important in industries where consumers have imperfect information about product characteristics. These tend to be exactly those industries where products are relatively differentiated and brand loyalty plays an important role. Entry costs tend to be large in these markets because it takes time to establish a new product. Therefore we expect established firms to earn a flow of profits for a least two reasons: (1) These "profits" are really a return on the initial large entry expenses

they previously incurred. These include new product development costs.
This explanation is consistent with free entry into these markets; over the
firm's life cycle profits are not excessive. (2) These profits do indeed
reflect entry barriers, but the barriers are due to the information struture
of the market (as discussed above) rather than advertising per se. The
cross-section correlation between advertising and profits may arise because
both advertising and profits are correlated with the true explanatory vari-
able, high information costs faced by consumers.

An alternative explanation of the advertising/profits correlation
claimed to exist by C-W is that such profits are in fact a normal rate of
return on a relatively risky investment. A key characteristic of advertising
is that it is entirely a sunk cost. If new brand is a failure there is no
resale value to the advertising capital invested in the product.* Consequently
advertising is inherently a risky type of investment and the "market" rate
of return on heavily advertised goods should be the rate on other equally
risky investments.

Another important bias in C-W's advertising/profits analysis is
introduced with their ommission of the firm's reputation or customer good-
will as an asset. In markets where consumers have imperfect information
about product attributes, a firm will typically sustain losses, at least
for a while, when it introduces a product and builds up its reputation.
These losses are later recouped with a flow of (quasi-) profits which can be
viewed as rents to the reputation asset. This analysis, which is carefully
and fully presented in my paper, "Premiums to High Quality Products as
Rents to Reputation," applies when there are no entry barriers at all. The
observed profit flow constitutes a normal rate of return on the reputation

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* In contrast, the physical capital used to produce the product is not
  nearly so sunk: production facilities can usually be transferred to the
  production of other products.

asset. If that asset is not included in firm's set of assets, however pro-
fits would appear to be supernormal. Since the importance of reputation, and
therefore its asset value, is highest in exactly those industries where
advertising is extensively used, a correlation between advertising and profit
rates will be found if the reputation or goodwill asset is ignored. It is
quite incorrect to infer from this correlation that advertising causes entry
barriers, however, or even that entry barriers or excess profits in fact
exist.

Yet another theoretical problem with the Comanor and Wilson analysis is
that it fails to take into account the role of profits as a return to
innovation. Both patent and trademark protections attempt, quite properly,
to provide adequate returns for private parties who engage in experimentation,
research, and new product development. The private firm which "innovates"
by developing a new product which consumers value is expected to earn an
above normal rate of return. Such a return is often tied to a trademark
in consumer goods markets, and trademarks tend to be important in exactly
those industries in which advertising is. Therefore the cross-section
data may well show a correlation between advertising and rates of return
simply because they are both correlated with the use of trademarks and
patents, and not because of any entry deterring effect of advertising. In
such cases profits are the return to a good idea, just as profits can be
the fair return to a seller's reputation, as described above. It is
important to keep in mind that "innovation" here refers not so much to sub-
stantial technological breakthroughs as to the more common commericaliza-
tion process whereby some manufacturers find superior product designs
to bring to the market. Indeed, advertising may be an important

method by which such pioneering firms appropriate enough of the benefits of such product improvements in order to finance the necessary development efforts.

Finally, C-W's interpretation of a positive correlation between advertising and profit rates is questionable on econometric grounds. Beasically, they have no structural, simultaneous equation model of advertising, market structure, and profits. They never actually test the hypothesis that entry barriers are higher in heavily advertised industries, because they have no model designed to test that hypothesis. They did not use the theoretical chapters to build a model with testable hypotheses.

IV. Advertising and Economies of Scale

While the role of advertising in creating and maintaining brand loyalty leaves open the possibility that advertising can either increase or decrease entry barriers, there are some other aspects of advertising which suggest that advertising will indeed have an entry deterring impact. One of these, the role of advertising in increasing scale economies, is treated quite well by Comanor and Wilson. These scale economies are the subject of this section. In Section V the role of advertising as a sunk cost, and therefore as a strategic commitment, is analyzed.

It is generally accepted that substantial economies of scale can lead to entry barriers. One reason for this is that there may be imperfections in the capital market which make it impossible for potential

entrants to borrow the necessary capital to start up business. This is quite a weak argument, however, for two reasons: a) many companies can finance operations out of retained earnings, and b) U.S. capital markets work very well in attracting capital for new ventures.

A stronger argument for the entry deterring effect of economies of scale is that they lead to a "lumpiness" of entry possibilities. If entry must be either large or not at all, it may be possible for existing firms to earn positive profits and yet rational potential entrants to choose not to enter. This would occur if the addition of a single firm at minimum efficient scale would cause profits to be driven to zero or below. This effect is well understood, yet it can only be empirically significant when the minimum efficient scale of operation is large relative to the market as a whole.

The analysis therefore shifts to two more specific questions: (1) Does advertising tend to increase the minimum efficient scale of operation?, and (2) Are these economies of scale significant in comparison with the relevant markets in which they arise? These are now treated in turn.

When discussing scale economies in the context of advertising one must exercise care, for the traditional notion of scale economies refers only to the conversion of physical inputs into outputs. The normal cost function does not incorporate advertising expenditures at all; it is purely a supply side construct. A satisfactory analytical approach to this problem has been given only recently by Spence [1981]. Instead of looking at the cost of producing a given number of units of <u>output</u>, he allows for expenditures which influence the demand curve by looking at the <u>cost of generating a given amount of revenue</u>. Since advertising operates on the demand side, this modification of the cost function concept is necessary for measuring

the joint economies of scale of production and marketing.

Including advertising as a revenue generating aspect of a firm's operations generally alters the minimum efficient scale of operations. In order for advertising to increase overall economies of scale, there must be some scale economies in the way in which advertising effects demand

It is generally difficult to estimate the extent of economies of scale in advertising. After all, the outputs of the advertising process are impossible to observe. Comanor and Wilson adopt an approach which looks at the relationship between firm size and profits, but this cannot plausibly be used to measure such economies. Size may be correlated with profits for any number of other reasons including concentration.

Comanor and Wilson fruitfully distinguish two potential sources of scale economies in advertising: (a) Quantity discounts to large purchasers of advertising messages, and (b) Increasing "effectiveness" per message as the number of messages increases.

The first of these advantages to large firms is relatively simple to identify empirically. C-W present some evidence to support their claim that quantity discounts are important (especially for those firms advertising heavily on a single TV program (p.59)). This question seems highly researchable; a study of quantity discounts for advertising would be desireable if the F.T.C. elects to pursue the economies of scale issue further and use it as a theory on which to base an entry deterrence case. (Such a study could be interesting as a test of Robinson-Patman act violations as well.) Previous work in this area by John Peterman suggests that quantity discounts are not an important source of scale economies in advertising.

Even if quantity discounts _are_ available from a given medium, however,

economies of scale in advertising are not necessarily present. This is because the effectiveness of advertising expenditures may fall off as those expenditures rise (see (b) above). One reason this is so is that a given medium tends to run into substantial duplication in its viewing audience as it is used repeatedly. For example if demand is determined only by the number of people who are exposed to at least one ad, and each advertising spot reaches 40% of the target population, then 2 spots reach 64% of the population, while 4 spots reach only 87%.* This duplication is a source of diseconomies of scale which must be compared with the quantity discounts where they exist.

A second source of diseconomies of scale in advertising is the existence of a scarce number of preferred media for a given seller. Typically an advertiser will have a few media which target particularly well towards the audience he judges likely to purchase his product. After these preferred media (which play the role of fixed factors in the production of revenues) are exhausted, the advertiser must move on to less well-suited media if he wishes to reach more customers. By definition this means that it becomes increasingly costly to shift the demand curve further out.**

On net these arguments suggest that advertising displays an initial region of increasing returns to scale (small campaigns are inefficient, partly due to the fixed costs of designing advertising content) followed by

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* This makes the favorable assumption that there is no correlation between viewers of one spot and viewers of another. In general if each spot reaches a fraction p, $0 < p < 1$ of the population, under this assumption n reach a fraction $P_n = 1 - (1 - p)^n$. It is easy to check that this process displays decreasing returns to scale i.e. $d^2 P_n/dn^2 < 0$.

** This "production of revenues" problem is formally identical to standard production with a fixed factor such as land which comes in varying qualities. To expand production becomes expensive as less and less productive land is brought into use.

a region of decreasing return to scale. Empirical work is needed to
determine where the efficient scale is for advertising, but there is
no a priori reason to believe it is higher than the minimum efficient
scale for production or distribution. (In fact, for consumer goods
industries the distribution network is usually the factor which generates
the greates scale economies.)

The effectiveness of advertising depends not only on how many potential
consumers are reached, but how many messages each one receives. If an
individual's response to advertising (as measured, say, by the probability
of trying the product) displays increasing returns in the number of messages
received (or in the total time of exposure to messages), then the overall
response to advertising may be subject to scale economies despite the
elements of decreasing returns described above. Again, however, individual
behavior suggests that while there may be an initial region of increasing
return to scale, e.g. a threshold effect as hypothesized by C-W, eventually
a viewer becomes dulled to the message and the marginal effectiveness
of additional repetitions of that message declines (or becomes negative
in some cases). A study of the substantial existing empirical work on
the response function of consumers as they receive more messages would be
useful here.

This analysis strongly suggests that advertising as an input into the
production of revenues is subject to an initial region of increasing returns
followed by decreasing returns of scale. From the viewpoint of entry barriers,
what must ultimately be compared are the minimum efficient scale including
advertising, and the extent of the market. As with any economies of scale
as a barrier to entry argument, the potential welfare losses due to the
barrier are likely to be small when minimum efficient scale is small

relative to the market. If we see six firms in the market and they are earning profits but a seventh would not, the welfare losses are likely to be quite small as a fraction of the market's sales revenues. This is not the case for an industry with just one or two active firms, however. In summary, the economies of scale argument is theoretically correct to the extent scale economies are enhanced by advertising, but is unlikely to be empirically important in most consumers goods industries since these industries typically have at least a handful of active rivals.

V. Advertising as a Strategic Commitment

Another aspect of advertising which makes it a potential tool of entry deterrence is its high degree of sunkness. By this we mean that advertising expenditures are irreversible and hence constitute a commitment to the market. Such a commitment may enable an established brand to enjoy excess profits and simultaneously deter entry. Such successful deterrence will not be in the public interest.

The basic theory of capital commitment as an entry barrier (see Spence [1979] and Dixit [1980]) has been worked out in the industrial organization literature only since the appearance of the Comanor and Wilson book. The basic idea runs as follows (Investment in physical capital is used as an example.) One firm for some reason (such as an ability to anticipate demand) has the first opportunity to enter a new market. By rapidly expanding its capacity this first entrant makes a credible and viable commitment to the market. Capital investment constitutes a credible commitment in a way which pricing policy, for example, cannot because prices can be changed rapidly and virtually costlessly in the event of entry.

The key to understanding this entry deterring strategy is to think about the decision facing a potential entrant. He must form expectations about the response of the established firm to his entry in order to decide whether such entry is attractive or not. In order to deter entry, the established firm (or firms) must credibly convince potential entrants that the post-entry conditions will not permit them to earn profits. The word "credibly" here emphasizes that it is not sufficient for the established brands to claim that they will engage in a self-destructive price war (for example) in response to entry. A naive potential entrant might be deterred by such an announcement, but not a rational or calculating entrant.

Entry can be credibly deterred if existing firms can take actions which will make their own self-interested response to entry aggressive enough so as to lead to losses for the entrant. The now-classic example of this is the use of investment as a barrier to entry. In this scenerio an incumbant firm builds a large plant (which has low resale value and hence constitutes a commitment to the market). The large capacity makes it easy and attractive for the firm to supply a relatively large quantity to the market.* Prospective entrants realize therefore that they will face an aggressive response if they do enter. The net result is deterrence.

It is critical here that the investment constitute a sunk cost. If the established firm can profitably sell off the plant when faced with entry, entrants, will foresee this accomodating response and enter. Advertising can operate in exactly this entry deterring manner because it is fully sunk, i.e. it has no "resale value". Therefore the Spence - Dixit deterrence theory can apply to advertising as an entry barrier.

The welfare properties of such a deterrence equilibrium are quite poor. Not only is monopoly power protected, but resources are wasted in building the entry barriers. It is worth noting that profits will not be as high in

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*This is so because a large capacity leads to lower average variable and marginal costs, thereby shifting out the post-entry supply response. See Dixit.

such a setting as they would be absent the entry threat; this is because
some profits are dissipated in the entry - deterring advertising investment.

The major difference between physical capital and advertising as
entry barriers is the rate at which the two assets depreciate. Implicit
in both Spence and Dixit is the assumption that the commitment capital
never depreciates. So long as physical capital lasts a long time this will
be a good approximation. If advertising capital depreciates very rapidly
however, as has been estimated, it cannot constitute much of a commitment.
Again it seems likely that it is brand loyalty, rather than advertising,
which constitutes the entry barrier; brand loyalty deteriorates much less
rapidly than advertising capital.

Under the strategic commitment theory outlined in this section,
advertising can erect entry barriers only if it is a long-lived asset
i.e. only if it depreciates slowly.* Therefore an estimate of advertising
depreciation rates would be an important element in a case which was brought
under this theory. Exisiting empirical work suggests, however, that advertis-
ing itself depreciates quite rapidly, absent actual use of the product.
Therefore the development of brand loyalty through experience is the natural
candidate as the source of the entry barrier. If this is true however, we
know (the reader is again referred to the appendix) that advertising itself
may or may not strengthen such a barrier, depending on whether it is a
substitute or complement for experience.

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* Even assuming that advertising depreciates very slowly, it is unclear
  theoretically if advertising can work in the same way as, say, capacity,
  as a commitment which deters entry. See Schmalensee, 1982b.

VI. Summary and Conclusions

The role of advertising as a potential barrier to entry in industries where it is heavily used has been carefully examined. While advertising may strengthen entry barriers by increasing the minimum efficient scale of operation or by constituting a strategic commitment to the market, it appears that brand loyalty itself is the major entry barrier in differentiated product consumer goods industries. This being the case, advertising will strengthen entry barriers if it is a complement with consumer experience in consumers brand choice decisions. In the case where advertising and experience are substitutes, however, advertising actually helps facilitate entry.

There is little a priori reason to expect advertising to play an entry deterring role as a rule. Indeed, advertising appears more important to the process of establishing a new brand than to the process of maintaining an old one. Therefore antitrust attention should not be directed specifically at industries with high advertising to sales ratios for that reason alone. In specific antitrust cases involving industries which rely heavily on advertising, the theory outlined above can be used to help determine whether substantial barriers to entry are present.

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Appendix: Rational Brand Switching

We show here that uncertainty about the quality or performance of a new brand should promote the sales of the entrant's brand. This assumes only that consumers are rational in their purchase plans, given their expectations.

Suppose the established brand provides a known consumer surplus of $S_0 > 0$. The new brand provides an expected surplus of $\bar{S} = pS_H + (1 - p)S_L$, where $S_H > S_0 > S_L$ and $0 < p < 1$. The idea is that there is some probability, p, that the new brand is a success, providing surplus $S_H > S_0$. With probability $1 - p$, however, it is a failure, giving surplus $S_L < S_0$.

Assuming that the consumer purchases the product every period and the one-period interest rate is $r > 0$, the consumer can achieve a liftetime surplus of $V_0 = S_0(1 + \frac{1}{1 + r} + \ldots) = \frac{S_0(1 + r)}{r}$ with certainty by sticking with the established brand.

If he tries the new brand the lifetime expected surplus is

$$V = \bar{S} + p\,\frac{S_H}{r} + (1 - p)\,\frac{S_0}{r} \ .$$

The first term is expected surplus the first period. The second term represents the surplus when the brand is a success, while the final term represents surplus when the new brand is a failure and the consumer returns to the established brand.

The (rational) consumer will use the new brand if and only if $V \geq V_0$ i.e. if

$$\bar{S} + \frac{pS_H}{r} + (1 - p)\,\frac{S_0}{r} \geq S_0 + \frac{S_0}{r} \ .$$

This can be rewritten as

$$(*) \qquad p(S_H - S_0) \geq (S_0 - \bar{S})r \ .$$

Now consider what happens when uncertainty about the new brand increases, but its expected quality, $\bar{S}$, remains fixed. Such an increase in uncertainty is most easily represented by an increase in S_H with a corresponding decline in S_L (so that $\bar{S} = pS_H + (1 - p)S_L$ remains constant). We can see that such an increase in uncertainty will increase the left hand side of (*) without changing the right hand side. Therefore increases in uncertanity will only make the new brand _more_ attractive. The reason is that a consumer of the new brand faces no "down side risk." If it is a failure he simply returns to the old brand. For infrequent purchases r is large so (*) is less likely to be satisfied if $S_0 > \bar{S}$.

Appendix: Advertising and Experience

In this appendix it is shown that advertising can only be thought of as an entry barrier when it is a _complement_ to experience in attracting consumers. When it is a substitute, it actually promotes entry in the sense that an equal increase in advertising expenses at the old and new firms would reduce the entrants profits by more than it would the established brand's.

Suppose the number of consumers who purchase brand i (i = 1, 2) is given by $N_i = f(A_i, E_i)$ where A_i represents firm i's advertising expenditures and E_i represents consumers' experience with brand i. By definition let brand 1 be established so $E_1 > E_2$. Assume that each firm has a markup of m per consumer. Then the profits for firm i are

$$\pi_i = mf(A_i, E_i) - A_i \ . \tag{1}$$

Firm i is assumed to set A_i so as to maximize profits. The first-order condition is

$$\frac{d\pi_i}{dA_i} = mf_A(A_i, E_i) - 1 = 0 \ . \tag{2}$$

The second order condition is that advertising display diminishing marginal returns, i.e. $f_{AA} < 0$. By differentiating this first-order condition with respect to E_i we can see which firm advertises more:

$$mf_{AA}(A_i, E_i) \frac{dA_i}{dE_i} + mf_{AE}(A_i, E_i) = 0$$

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Solving for $\dfrac{dA_i}{dE_i}$ we have

$$\frac{dA_i}{dE_i} = \frac{-f_{AE}}{f_{AA}} \ .$$

Since $f_{AA} < 0$ we know that

$$\text{sign}(\frac{dA_i}{dE_i}) = \text{sign}(f_{AE}) \ .$$

When $f_{AE} > 0$, increases in experience increase the effectiveness of advertising, i.e. experience and advertising are <u>complements</u>. When $f_{AE} < 0$ increases in experience decrease the effectiveness of advertising, i.e. they are <u>substitutes</u>. Therefore we find that <u>the entrant will advertise more than the established brand if and only if advertising and experience are substitutes</u>* (in this case $f_{AE} < 0$, so $\dfrac{dA_i}{dE_i} < 0$ and thus $E_1 > E_2$ implies $A_1 < A_2$).

What does this tell us about entry barriers? The relevant policy question is this: What would happen to market shares and entry prospects if advertising policy increased the effective cost per ad to both firms. Formally rewrite firm i's profit from (1) as

$$\pi_i = mf(A_i, \ E_i) - (1 + t)A_i \tag{4}$$

where t measures increased advertising costs. Assuming each firm selects advertising optimally at A_i^* which satisfies (2), the envelope theorem tells us that

$$\frac{d\pi_i}{dt} = -A_i^* \ .$$

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* A dynamic treatment of advertising would involve dynamic versions of the concepts of substitutes and complements.

Then, if A and E are substitutes, $A_1^* < A_2^*$ so $\frac{d\pi_2}{dt} < \frac{d\pi_1}{dt} < 0$ i.e. a tough advertising policy hurts entrants more than established firms.

Changing advertising costs marginally through t is one way of seeing how advertising influences entry barriers. A more extreme test would be to consider the effect on entry of an elimination of advertising. Then the market shares would be $f(0, E_1)$ and $f(0, E_2)$ respectively. Again assuming that $f_{AE} < 0$ i.e. ads substitute for experience this would seriously reduce the market share of entrants. Assuming there are some fixed costs of entry, this reduction of entry scale may make entry impossible. The shares of the two firms with and without advertising are shown in the Figure below, assuming $f_{AE} < 0$. The difference in firm size without advertising, $\bar{N}_1 - \bar{N}_2$, is much larger than that with advertising, $N_1 - N_2$.

Market Shares With and Without Advertising