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CONSUMER PREFERENCE, ADVERTISING, AND SALES:

ON THE ADVANTAGE FROM EARLY ENTRY

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In his 1956 book, Barriers to New Competition, Joe Bain suggested that a consumer preference for established brands might disadvantage potential entrants (Bain 1956, p. 116). Studying several manufacturing industries, Bain identified several characteristics that might explain such a preference: product reputation, established dealer systems, brand allegiances, customer service, and advertising (Bain 1956, p. 128-129). Although students of the barrier-to-entry hypothesis did not fail to recognize its complexity, empirical tests of the proposition inevitably focused upon advertising as the source of the barrier (Mann, 1974, pp. 138-139). The results have been the subject of continuing debate.

This paper questions the assumption that advertising, per se, is a barrier to entry and focuses instead upon Bain's hypothesized consumer preference for established brands. With a relatively simple profit-maximizing model we demonstrate how a preference for existing brands could lead to a positive correlation between advertising and sales. The model suggests that profit-maximizing promotion and sales will both be greater for early-entrant than for late-entrant brands where brands are qualitatively identical in all ways except order of entry. Although the data required to estimate the parameters of the model would have to be substantially more detailed than any now available, regressions using recently developed brand sales and promotion data for a single prescription drug market suggest that the model at least deserves further exploration.

Background

Empirical tests of the relationship between advertising and market structure have typically followed either of two general methodologies. One approach has utilized cross sectional market data. Although numerous variations exist, advertising as a percentage of sales typically has been related either to the size distribution of firms or to the weighted average profitability of firms in the markets. Where regression analysis has revealed a significantly positive relationship between the advertising-to-sales ratio and either industry concentration or profitability, the evidence typically has been interpreted as confirming the hypothesis that product differentiation or advertising creates a barrier to the entry of new competition (Comanor and Wilson, 1967; Mann, 1974).

The other approach has been to work with time series data covering firms or brands in one or a few markets. Firm or brand sales is regressed upon firm or brand advertising and a significantly positive relationship has been interpreted as a measure of the impact upon sales achievable through advertising campaigns (Telser, 1962; Peles, 1971).

Neither approach has yielded unambiguous results. Critics of cross sectional studies point out that the direction of causality between market advertising and market concentration or profitability is unclear. High concentration or profitability may cause high advertising rather than the reverse. Moreover, other critics have noted that observed relationships could merely reflect accounting phenomena. Failure to treat advertising as a capital expenditure may bias observed relationships, and at least one recent study has shown that the bias could be toward finding a positive relationship between advertising and concentration or profitability. (Bloch, 1974).

Critics of the time series studies have pointed out that most such studies ignore the simultaneity between advertising and sales. Failure to account for such simultaneity is likely to bias estimated coefficients upward. Furthermore, Richard Schmalensee has noted that the market share models estimated with time series data have typically been misspecified: the market shares of competing brands have not been constrained to sum to one. (Schmalensee, 1972).

Notwithstanding the probable validity of the foregoing criticisms, existing studies are subject to an even more basic objection: they focus upon advertising as a basis for success rather than upon Bain's hypothesized consumer preference for the brands of established sellers. Bain treated advertising more as a market performance symptom than as a market structural problem, and he concluded that "we may need in general to look past advertising to other things to get to the heart of the problem" (Bain, 1956, p. 143).

Recent analyses in the marketing literature suggest that Bain's original hypothesis deserves further development. James O. Peckham of the A. C. Nielsen Company has noted that brands of household products first to offer a new or "radically improved" product achieved dominant sales volume while spending relatively less on promotion than their imitative competitors (Peckham, 1975). Furthermore, Bristol Myers' recent entry into the "non-aspirin" (acetaminophen) market suggests that consumers' preferences for existing brands may be both difficult and expensive to overcome. Despite intensive promotional efforts, Bristol Myers' Datril brand of acetaminophen has been able to make only small inroads into the market share of the dominant existing brand, Johnson and Johnson's Tylenol (Wall Street Journal 1976, p. 1). Thus until a distinctly better product comes along, consumer

preferences for established brands might be not only the source of a barrier-to-entry but also an explanation for the distribution of market shares and profitability of existing brands. Most empirical studies have been conducted at a level of aggregation too broad to discern a relationship between the market shares of established brands and the order of their entry into the market.

Recognition of the existence of consumer preferences for early brands could substantially alter current interpretations of structure-performance relationships, at least for consumer goods markets. Variations in the intensity of consumer preference for early brands could independently account for variation in observed pricecost margins, concentration, and advertising-to-sales ratios. A strong preference for early brands could lead to the domination of one or a few brands and hence to high concentration. Moreover, an intense preference for early brands might induce late brands to devote a higher percentage of their sales dollars to promotion. Finally, whether because they incur relatively lower advertising costs or charge somewhat higher prices, early brands might maintain pricecost margins higher than those of their competitors. Hence, observed pairwise correlations between advertising-to-sales ratios, concentration, and price-cost margins could reflect essentially noncausal associations stemming from each variable's functional relationship with consumer preference.

Preference, Promotion, and Sales

Implicit in much of the literature discussing advertising as a barrier to entry is the notion that promotion creates consumer preferences which in turn determine sales. Thus, in the argument's simplest form, a large scale promotional campaign for any brand could create an overwhelming preference

for that brand and ensure its dominant market share. If there were increasing returns to promotion, large scale promotion might then create a barrier to entry in much the same fashion as would large scale production in an industry with increasing returns to production capital. Such an approach assumes that although the potential entrant could in fact achieve substantial sales through intensive promotion, he is deterred from doing so because of his fear of the existing firm's reaction to large scale entry (Comanor and Wilson 1967, p. 283).

The foregoing analysis incorporates a causal chain running from promotion to preference to sales. But a reconsideration of the Bain hypothesis suggests that such a view may be overly simplified. If consumers do prefer the brands of existing sellers to those of potential entrants, such a preference could imply that consumers respond more favorably to the promotion of early-to-enter brands than to the promotion to late-to-enter brands. Thus, sellers who entered the market at different points in time would face different advertising-sales response functions. Both profit maximizing sales and promotion could be determined exogenously by consumers' preferences for early brands.

That late entrants may face circumstances different from those faced by early entrants was recently recognized by Comanor and Wilson (1974). They suggest that consumers' experiences with existing brands create a reservoir of consumer information about the qualities of those brands. Consumers have little or no information about new brands, and entrant firms must advertise intensively to create a stock of such information. Comanor and Wilson further argue that firms entering an existing market may have to advertise more intensively than established firms did when they entered the market:

> . . . the effectiveness of advertising in a new product area may be greater than where products are well established and consumers have come to rely on specific brands. Consumer attachments are often originally weak or absent, so that advertising messages encounter relatively little resistance. [For firms entering an already established market] consumer resistance may be encountered that requires a proportionately larger volume of advertising if a substantial market share is to be gained (Comanor and Wilson 1974, p. 46).

If consumers do "resist" the messages of new entrants, thereby requiring entrants to send proportionately more messages, then more formal treatment of the effect of such resistance requires that we distinguish between the number of advertising messages delivered and consumer reaction to the messages.

A Model of the Advantage From Early Entry

Let us suppose that the probability of consumer purchase is conditional upon the receipt of an advertising message. Quantity sold for any given brand will then be given by the product of the number of messages delivered to potential buyers and the probability of purchase given message receipt.

The Number of Messages:

Promotion dollars are spent to deliver messages to potential buyers. By spending more dollars the seller can deliver messages to more potential buyers. But a doubling of dollars spent will probably not result in a doubling of messages received by the audience the seller wishes to reach. Beyond small scales the cost of informing additional potential buyers is likely to be increasing. To reach more and more potential buyers the seller is likely to "waste" more and more of his messages on nonpotential buyers and on unwanted duplication. Using prescription drugs for an example, if 50 percent of the cardiologists read the Journal of Cardiology, the seller of a cardiovascular drug might find that journal to be the most productive

vehicle for distributing messages. Yet if the seller wishes to present his message to more than 50 percent of the potential buyers, he may have to resort to a journal that is less specialized. In so doing, the seller will waste messages upon specialists such as ophthalmologists and duplicate messages among those cardiologists who read both the Journal of Cardiology and the less specialized journal. Hence, for all but the smallest sellers, diseconomies of scale are likely to dominate. Since most empirical work does not focus upon the brands of very small sellers, virtually all observations commonly observed should fall within the range of declining returns of scale. If "M" represents the number of messages a seller wishes potential buyers to receive, and if "a" represents the real dollars spent, then the general relationship between messages delivered to potential buyers and dollar advertising will be given by:

(1) $M = M(a)$ where $M_a = \frac{\partial M}{\partial a} > 0$, and $M_{aa} = \frac{\partial^2 M}{\partial a^2} < 0$;

a mathematically convenient specific functional form would be:

(2) $M = \delta + \lambda \ln a$

Probability of Purchase Given Message Receipt:

Consider two alternative market situations: one in which a new and better brand is introduced in competition with "n" identical brands; the other in which a new identical brand is introduced in competition with "n" other identical brands. Now, within each market, potential buyers are comprised of two subsets: those who might try a brand for the first time and those who might repeat purchase the brand. Even if the conditional probabilities of trial purchase were the same for the two entering brands in the first time period, the probabilities of repeat purchase in subsequent periods should differ. Because repeat purchase probabilities will be conditioned by

consumers' evaluations of the brands during the trial purchase period, it is plausible to assume that a higher percentage of consumers would repeat purchase a brand that is better than its competitors' than would repeat purchase a brand just like its competitors'. Thus, because of differing repeat purchase probabilities, a given investment in advertising will result in differential sales and profitability. There will be at least a temporary advantage to innovating with a new and better brand.

With free entry, however, a new and better brand will soon be imitated. And if the conditional probability of trial purchase is the same for all new brands—is independent of the novelty of a new brand—the market would over time become nearly equally divided among the first, the second, and subsequent better brands. But the conditional probability of trial purchase is probably not independent of novelty.

Again consider the two market situations posed above. If the sellers' information is factual, the content of the messages delivered by the seller of the new better brand would differ radically from the content of the messages delivered by the seller of the new identical brand.[1] The seller of the better brand might state the ways in which his brand is better than those of existing sellers. The seller of the identical brand might state only that, in fact, the brand has characteristics the same as the "n" existing brands. Since consumers do incur opportunity costs when they consume sellers' messages, messages promising greater utility for the same price are likely to be more completely consumed by more consumers than messages promising the same

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[1] Since consumers can evaluate brands during the trial purchase period, sellers' messages must be, if not factual, at least not refutable, upon experience with the brand.

old thing. It seems legitimate, then, to assume that the probability of trial is a function of the novelty of the brand. Given that a message has reached a household, the probability that the message will generate a trial purchase is greater for a better than for an identical brand. Accordingly, if the probability of trial is allowed to vary as novelty varies, we have a potentially long lived advantage to being first or early in the market with a better brand. Even the first imitator of a better brand cannot claim to be superior to the first better brand.

Dropping the distinction between trial and repeat purchase, we may define a variable, the conditional probability of purchase. Focusing upon a set of brands qualitatively identical in all ways except order of entry, we assume the conditional probability of purchase to be higher for early-to-enter than for late-to-enter brands. Of course, the probability of purchase will also depend upon price. Hence, we also assume that the probability of purchase declines as price increases. If "S" is the conditional probability of purchase, "r" is a measure of the rank order of a brand's entry into the market (or some other measure of "firstness"), and "p" is the brand's price, then assume the probability of purchase will be given by:

$$(3)\quad S = S(r, p) \quad \text{where } S_r = \frac{\partial S}{\partial r} < 0,\ S_p = \frac{\partial S}{\partial p} < 0, \text{ and}$$

$$0 < S < 1$$

Specific probability of purchase functions might take any of several forms common to demand functions:

$$(4)\quad S = \alpha r^{-\gamma} p^{-\beta}; \qquad \text{or}$$

$$(5)\quad S = \alpha - \gamma r - \beta p; \qquad \text{or}$$

$$(6)\quad S = \frac{\alpha - \beta p}{\gamma r}.$$

If Q is the quantity sold, then:

(7) $Q = SM = S(r, p)\ M(a)$

If the cost of production (k) is constant across brands, then total sales and total profits will be given by:

(8) $pQ = pS(r, p)M(a)$

(9) $\pi = (p-k)S(r, p)M(a)-a$

Each firm takes the rank order of it's brand's entry into the market as given and manipulates price and advertising so as to maximize profits. The first order conditions require that the partial derivative of profit with respect to advertising (π_a) and the partial derivative of profit with respect to price (π_p) each be equal to zero:

(10) $\pi_a = M_a S(p-k)-1 = 0$

(11) $\pi_p = S_p M(p-k) + SM = 0$

The second-order conditions for profit maximization require that π_{aa} and π_{pp} each be less than zero.

(12) $\pi_{aa} = M_{aa} S(p-k) < 0$

(13) $\pi_{pp} = S_{pp} M(p-k) + 2S_p M < 0$

and further that $\pi_{aa}\pi_{pp} > (\pi_{ap})^2$:

(14) $\pi_{aa}\pi_{pp} > M_a S_p(p-k) + M_a S$

Substituting equilibrium values into equations (10) and (11), we obtain the pair of equilibrium identities, $\bar{\pi}_a$ and $\bar{\pi}_p$:

(15) $\bar{\pi}_a \equiv 0$

(16) $\bar{\pi}_p \equiv 0$

Differentiating (15) and (16) totally with respect to "r" results in the following pair of simultaneous equations:

$$(17)\quad \bar{\pi}_{aa}\frac{d\bar{a}}{dr} + \bar{\pi}_{ap}\frac{d\bar{p}}{dr} = -\bar{\pi}_{ar}$$

$$(18)\quad \bar{\pi}_{pa}\frac{d\bar{a}}{dr} + \bar{\pi}_{pp}\frac{d\bar{p}}{dr} = -\bar{\pi}_{pr}$$

Solving (17) and (18) by Cramer's rule yields:

$$(19)\quad \frac{d\bar{a}}{dr} = \frac{\bar{\pi}_{ap}\bar{\pi}_{pr} - \bar{\pi}_{ar}\bar{\pi}_{pp}}{\bar{\pi}_{aa}\bar{\pi}_{pp} - (\bar{\pi}_{ap})^2}$$

$$(20)\quad \frac{d\bar{p}_i}{dr_i} = \frac{\bar{\pi}_{pa}\bar{\pi}_{ar} - \bar{\pi}_{aa}\bar{\pi}_{pr}}{\bar{\pi}_{aa}\bar{\pi}_{pp} - (\bar{\pi}_{ap})^2}$$

For maximum profit (11) reveals that

$$(21)\quad \bar{S}_p = \frac{-\bar{S}}{\bar{p}-k} \text{ and}$$

$$(22)\quad \bar{M}_a = \frac{1}{\bar{S}(\bar{p}-K)}$$

Substituting (21) into π_{ap} yields

$$(23)\quad -\bar{M}_a\bar{S} + \bar{M}_a\bar{S} = 0$$

Hence the equilibrium value of π_{ap} is zero and

$$(24)\quad \frac{d\bar{a}}{dr} = \frac{-\bar{\pi}_{ar}}{\bar{\pi}_{aa}}$$

π_{aa} must be negative by the second order conditions and

$$(25)\quad \bar{\pi}_{ar} = \bar{M}_a\bar{S}_r(p-k) < 0$$

Hence $\frac{d\bar{a}}{dr}$ must be negative.

Since π_{ap} must equal zero in equilibrium, it also follows that:

$$(26)\quad \frac{d\bar{p}}{dr} = \frac{\bar{\pi}_{pr}}{\bar{\pi}_{pp}}$$

Again second order conditions require that $\bar{\pi}_{pp}$ be negative and

$$(27)\quad \bar{\pi}_{pr} = \bar{M}[\bar{S}_{pr}(\bar{p}-k) + \bar{S}_r].$$

Thus $\frac{d\bar{p}}{dr}$ can be positive only if

$$(28)\quad \bar{S}_{pr} > 0 \text{ and } |\bar{S}_{pr}(\bar{p}-k)| > |\bar{S}_r| .$$

It would seem most plausible for late entrants to charge prices no higher than those of existing brands. In fact, the common functional forms given in (2) and (4) through (6) all yields $\frac{d\bar{p}}{dr} < 0$.

Profit-maximizing profit, $\bar{\pi}$, will be equal to $(\bar{p}-k)\overline{SM} - \bar{a}$. Differentiating totally with respect to r, we obtain:

$$(29)\quad \frac{d\bar{\pi}}{dr} = \frac{d\bar{a}}{dr}\ [\bar{M}_a(\bar{p}-k)\bar{S} - 1]\ + \frac{d\bar{p}}{dr}\ [\overline{SM} + (\bar{p}-k)\overline{MS}_p]\ + \overline{MS}_r(\bar{p}-k)$$

Substituting (21) and (22) into (29), the first two terms become zero, and we are left with:

$$(30)\quad \frac{d\bar{\pi}}{dr} = \overline{MS}_r(\bar{p}-k)$$

Since $\bar{M}$ and $(\bar{p}-k)$ are both positive and $\bar{S}_r$ is negative, total profits must be lower for late than for early entrants.

Two dynamic implications of the foregoing static model deserve elaboration. First, the model is meant to explain the promotion and sales of brands that are qualitatively identical. But if there were a disadvantage to late entry with an identical brand, potential entrants would have an incentive to enter, if not with a better, at least with a different brand. Second, the model does not explore the variability over time in the conditional probability of purchase: the model is assumed to apply at any given point in time to distinguish early-entrant from late-entrant brands. The conditional probability of purchase is invariant for a given brand, but variable across brands depending upon their novelty at the time of introduction.

Some Limited Empirical Evidence

In this section we turn to the problem of testing empirically the predictions of the model presented above.

The Data:

The data base is a compilation of annual brand sales and promotion for diuretic and combination diuretic antihypertensive prescription drug products.[1] The data base also includes the year in which a brand entered the market as well as a Food and Drug Administration (FDA) appraisal of the therapeutic gain embodied in the brand at the time it was introduced.

Collected in 1974 as part of a study of prescription drug markets by the Bureau of Economics of the Federal Trade Commission (Bond and Lean 1977), the data have the advantage of being unusually detailed. Moreover, the data date back to the year of introduction of a "breakthrough" chemical and span 14 years during which time numerous substitute brands were introduced. Data were gathered from all firms that had marketed orally effective diuretic and combination diuretic antihypertensive drugs at any time during the period between 1956 and 1971.

Of course, the data are confined to a single market and accordingly generalization can be undertaken only at considerable risk. Moreover, the institutions surrounding the distribution of prescription drugs are quite different from those in other consumer goods markets. Although the physician

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[1] Diuretic drugs are used to reduce edema, an abnormal accumulation of fluids in the body, as well as to reduce the blood pressure of hypertensive patients. Combination diuretic antihypertensive drugs combine a diuretic with one or more agents and are used to reduce the blood pressure of patients not adequately treated by a diuretic agent alone. The drugs first to appear were members of the benzothiadiazine chemical group, commonly known as thiazides. Other chemicals such as furosemide, spironolactone, chlorthalidone, and ethacrynic acid were found to be effective and were introduced in later years.

selects the brand, it is the consumer who pays for it. Hence, the effect of price upon the selection decision is probably less direct than in most markets.

Limitations notwithstanding, the data do offer a unique opportunity to observe the distribution across brands of sales and promotion over a considerable period of time.

The Variables:

The sales and promotion of each brand were summed over all years during which the brand was marketed, the totals being then divided by the number of years on the market. Such long-run averages have the advantage of abstracting from variation over time in firm strategies and from firm miscalculations. The use of such averages, however, requires that the results be viewed as descriptive rather than predictive. Estimated sales and promotion will not be indicative of actual sales and promotion for any particular year.[1]

Two somewhat different measures of "firstness" and order of entry were incorporated. First the FDA therapeutic gain ratings were used to identify brands that were first to incorporate new therapeutic advantages. The FDA ratings, published in 1973, distinguish between important, modest, and no gain

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[1] The averages also have a disadvantage in that neither the sales nor the promotional dollars were adjusted for trends in the general price level. Since promotional costs have probably followed the upward movement of the general price level, average annual promotional expenditures measured in nominal dollars probably understate the real promotion of early entrants relative to later entrants. Thus, our use of nominal dollars mitigates against finding significantly higher promotional expenditures for early entrants. Similarly, although the prices of many, if not most, drug brands in the data base remained relatively constant, the unit costs of manufacturing as well as promoting the drugs have probably risen over time. Hence, although the sales comparisons using nominal dollars are probably little different from comparisons using real dollars, the use of nominal dollar sales probably understates the profitability advantage from early entry.

drugs. Among the 63 oral diuretic brands incorporated in the overall sample, 7 were rated as important gain, 4 as modest gain, and 52 as no-gain products.

In interpreting the results it must be remembered that the gain ratings apply at the time the drug was approved for marketing, and, accordingly, the ratings distinguish brands first to offer a new type of therapy from those that merely duplicate existing therapy. No-gain brands are not qualitatively inferior products; indeed they may be chemically and therapeutically identical to important gain brands. No-gain brands, however, fail to offer any gain over therapy already available from existing brands, while gain brands are similar to first better brands in the foregoing model.

The second measure of firstness is a transformation of a time variable very similar to the actual rank order of brand entry. Since the data base provided only the year of introduction and since several brands were often introduced in the same year, rank order of entry could be only approximated. The time variable was defined as follows: the year in which the first brand entered was assigned the value of 1, successive years being assigned values of 2, 3, 4, etc. A brand appearing in the third year after the year in which the first brand was introduced would, for example, receive a value of 3 for the time variable.

To hold constant possible differences in submarket characteristics, each brand was assigned a dummy variable identifying it as belonging to one of five submarkets: (1) single-entity thiazide diuretics; (2) potassium-supplemented thiazide diuretics; (3) potassium-sparing diuretics; (4) rapid-acting diuretics; and (5) combination diuretic-antihypertensives.

In summary, the endogenous variables, sales and promotion, and the exogenous variables are defined as follows:

SALES——The average annual dollar sales of a brand over the entire time period the brand was marketed between 1956 and 1971.

PROMO——The average annual dollars of promotion spent on a brand over the entire time period the brand was marketed between 1956 and 1971.

IMPGAIN--A dummy variable equal to 1 for brands incorporating chemicals given an important gain rating by the FDA; otherwise equal to zero.

MODGAIN--A dummy variable equal to 1 for brands incorporating chemicals given a modest gain rating by the FDA; otherwise equal to zero.

K SUP——A dummy variable equal to 1 for brands that are potassium-supplemented diuretics; otherwise equal to zero.

POTS——A dummy variable equal to 1 for brands that are potassium-sparing diuretics; otherwise equal to zero.

RAP——A dummy variable equal to 1 for brands that are rapid-acting diuretics; otherwise equal to zero.

COMB——A dummy variable equal to 1 for brands that are combination diuretic-antihypertensives; otherwise equal to zero.

1/TIME--Reciprocal of Time.

We make no attempt to estimate the parameters of the structural equations themselves, choosing instead to work with descriptive reduced-form estimates of average sales and promotion.[1]

The Results:

The results strongly suggest that prescribing physicians do respond more favorably to the promotion of early entrant brands, and particularly to the promotion of first brands, than to the promotion of late entrant brands. Both sales and promotion are significantly higher for first brands than for late brands and rank order of entry appears to be negatively associated with sales.

The estimates from the regression analyses are presented in tables I and II. In the sales equations all of the independent variables have the expected signs and are significant. Being first to enter the market with a gain brand provides a substantial sales advantage. Moreover the consistent significance of the time variable reveals that, apart from being first, early entry results in greater sales than late entry.[2]

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[1] Because of the simultaneous relationship between sales and promotion, ordinary least squares estimates of the impact of promotion upon sales will be biased upward. While simultaneity is hardly a problem new to econometric analysis, variation in annual sales and promotion data is probably insufficient to yield estimates of true relationships.

Analyzing data for cigarette firms, Schmalensee concludes, "The effectiveness of any firm's advertising may vary considerably from year to year. Also, when a brand or product is heavily advertised, the marginal effects of additional spending are apt to be small on average. Since our sample does not contain great fluctuations in any firm's advertising outlays, the effects we are trying to capture are thus likely to be small and variable. When the problem of disentangling advertising's effects on sales from the impact of sales on advertising budgets is also considered, it is perhaps not surprising that we failed to find any persistent advertising effects. . . . Time-series analysis may never be able to shed adequate light on the effects of advertising on demand unless substantial data covering periods shorter than a quarter become available" (Schmalensee 1972, pp. 211-215).

[2] In unreported regressions alternative specifications of the time variable gave poorer results. That the reciprocal transformation gives superior performance suggests that sales decline rapidly the later the entry.

TABLE 1

Sales and Promotion Equations: Oral Diuretic Drugs
Regression Coefficients and t Values
Complete Sample

Independent Variables

Dependent Variable	Intercept	IMP Gain	MOD Gain	1/TIME	K SUP	POTS	RAP	COMB	R^2	N
(1) Sales	1.610	7.105[a]	2.383[c]						.373	63
		(3.875)	(1.533)							
(2) Sales	1.565	7.919[a]	4.540[a]		0.401	-4.131[b]	3.443[c]	-0.189	.456	63
		(5.893)	(2.560)		(0.361)	(-2.139)	(1.568)	(-0.244)		
(3) Sales	-0.587	6.325[a]	4.754[a]	8.541[a]	0.227	-3.462[b]	5.491[a]	-0.127	.602	63
		(5.211)	(3.102)	(4.482)	(0.237)	(-2.067)	(2.815)	(-0.190)		
(4) Promo	0.348	1.326[a]	1.518[a]						.370	63
		(4.637)	(4.118)							
(5) Promo	0.289	1.236[a]	1.911[a]		-0.149	-0.713[b]	2.201[a]	0.089	.604	63
		(4.554)	(5.334)		(-0.662)	(-1.827)	(4.964)	(0.569)		
(6) Promo	0.223	1.187[a]	1.917[a]	0.262	-0.154	-0.692[b]	2.264[a]	0.091	.606	63
		(4.157)	(5.319)	(0.584)	(-0.681)	(-1.757)	(4.934)	(0.578)		

t values in parentheses

a = significant at the 1 percent level b = significant at the 5 percent level

c = significant at the 10 percent level

TABLE II

Sales and Promotion Equations: Oral Diuretic Drugs
Regression Coefficients and t Values
Subsample

Independent Variables

Dependent Variable	Intercept	IMP Gain	MOD Gain	1/TIME	K SUP	POTS	RAP	COMB	R^2	N
(7) Sales	2.053	7.658[a]	1.940						.401	50
		(5.58)	(1.18)							
(8) Sales	2.235	9.122[a]	4.625[a]		0.456	-5.445[a]	2.171	-0.580	.511	50
		(6.00)	(2.51)		(0.35)	(-2.68)	(0.95)	(-0.65)		
(9) Sales	-0.121	7.552[a]	4.960[a]	7.065[a]	0.435	-4.269[b]	4.567[b]	-0.104	.588	50
		(4.97)	(2.89)	(2.80)	(0.36)	(-2.21)	(1.99)	(-0.12)		
(10) Promo	0.426	1.151[a]	1.440[a]			-0.679[c]			.312	50
		(3.37)	(3.51)							
(11) Promo	0.416	1.031[a]	1.794[a]		-0.227	-0.679[c]	2.177[a]	-0.020	.578	50
		(3.14)	(4.51)		(-0.80)	(-1.55)	(4.39)	(-0.10)		
(12) Promo	0.379	1.007[a]	1.800[a]	0.110	-0.227	-0.661[c]	2.214[a]	-0.012	.579	50
		(2.82)	(4.46)	(0.18)	(-0.79)	(-1.45)	(4.10)	(-0.06)		

t values in parentheses

a = significant at the 1 percent level b = significant at the 5 percent level

c = significant at the 10 percent level

As the model predicted, gain brands also receive more promotion than non-gain brands. In the promotion equations the gain variables prove to be significant and of the expected sign. Unlike the sales equations, however, the time variable proves to be insignificant.

In both the sales and the promotion equations the submarket dummy variables for rapid-acting and potassium-sparing diuretics are significant. Relative to the single-entities, rapid-acting diuretics have significantly higher promotion and sales, while potassium sparing diuretics have significantly lower promotion and sales.

Conclusions

Beginning with the Bain hypothesis that consumers prefer the brands of existing sellers, we have developed a model in which both profit-maximizing sales and profit-maximizing promotion are determined by rank order of entry. The model predicts that sales, promotion, and profits will be higher for early entrant than for late entrant brands.

Simple tests of the sales and promotion predictions employed brand data for orally-effective diuretic drugs and suggested that brand-to-brand variation in actual sales and promotion is consistent with the model. The data reveal that brands that are the first to offer better therapy receive both greater sales and greater promotion than later brands that merely duplicate existing therapy.[1] The results suggest that the promotion and sales

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[1] Recognizing the limited usefulness of advertising in overcoming sales disadvantages, late entrants may be prone to innovate and enter with better brands. Across different industries the height of an entry barrier will vary depending upon the potential for successful innovation to occur and the time necessary to place such innovations on the market. In the prescription drug industry, where the rate of new product introductions has slowed in recent years, the advantages held by existing brands may well be long lived.

of brands in this market are clearly influenced by consumers'--in this case physicians'--preferences for existing brands. Accordingly, the concept of advertising per se as an entry barrier should be reconsidered.

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