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Scale Economics in Advertising

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SCALE ECONOMICS IN ADVERTISING

by

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ABSTRACT

Scale economies in advertising exist if the percentage of market advertising capital held by the largest brands is systematically lower than the market shares of those brands. We claim that all other definitions of advertising scale economies must imply this relationship. In a cross market analysis of brand market and advertising capital shares, we find scant evidence of the existence of advertising scale economies. Several definitions of largeness and several functional forms are tested, all leading to the same result.

This paper provides new evidence on the existence of what has traditionally been called "scale economies in advertising." An answer to the question of whether advertising possesses such "scale economies" has been of interest to Industrial Organization economists, antitrust practitioners, and those who formulate economic policy towards advertising. (For a summary of the policy debate, see Comanor and Wilson, 1979 and Albion and Farris, 1981.) The need for an accurate answer to the question arises from current policy issues and particularly from the presumption that large scale advertising increases the advantage of incumbancy and improves the market position of the largest firms in an industry vis á vis smaller ones (U.S. FTC, 1981).

It has been recognized that advertising expenditure has implications for both the demand and the costs of individual firms (Spence, 1979, p. 1). Nonetheless, the conceptual simplicity and long tradition of analyzing inter-firm advantages in terms of differential costs rather than demands has led naturally to search for competitive advantages of advertising in the classical estimation of scale economies. Following this line of reasoning, the demonstration that there are scale economies in advertising is taken to be a sufficient (and perhaps necessary) condition for finding anti-competitive effects of advertising.

But what is meant by the apparently self-contradictory phrase, "scale economies in advertising"? Classical production theory does not recognize the existence of scale economies in a factor. Advertising is a purchased input and the existence of scale economies is a property of a production function as a whole rather than of a single input. There may be scale economies to farming, but there are no scale economies to land; the

production of education may be characterized by scale economies, but there can be no economies of scale to teachers.

And yet, the reason why a particular production function exhibits economies of scale may be identifiable: the source of scale economies in pipeline transportation is undoubtedly the physical law which increases the throughput of a pipe more rapidly than the diameter (Moore, 1959). The source of scale economies in warehousing must be the decline in the variance of demand as volume increases. Thus it is not inherently illogical to ask if the source of scale economies in the breakfast cereal industry is the use of large scale advertising. An answer to this question cannot, however, be had by estimating econometrically parameters of particular functions. Such estimates can tell us, for example, whether there are economies of scale in breakfast cereal sale and production. They cannot tell us what it is about the technology that has led to the particular production/cost relationship observed. A correct answer to the question might be had by estimating a large number of production functions and relating scale economy estimates to the advertising intensity. But, we believe, this kind of analysis is not what those who have referred to advertising scale economies have had in mind.

We believe that the policy question that measurements of advertising scale economies have been meant to answer is "does the presence of large scale advertising in an industry improve the cost position of large firms vis á vis small firms in comparison with an industry situation where there is less advertising?" Neglecting possible non-advertising scale economies in production, the question can be stated as "do large firms support their market share with a relatively small advertising budget in comparison to

smaller firms?" This is the effect that we have estimated in the research reported in this paper. We believe that all policy oriented formulations of the measurement of scale economies in advertising can be reduced to determining this simple relationship.

We have chosen not to estimate advertising scale economies within a production function framework because we believe that it is theoretically incorrect to do so and because we believe that such estimates would answer the wrong question. At best, a production function estimate can give us an output elasticity of advertising (Brown, 1978), but it is unclear to us what the policy implications would be of a finding that in a particular industry, the output elasticity of some factor was greater or less than one. (For example, a finding that the output elasticity of capital in grain production was greater than one would surely not dictate a national policy on the sale of farm machinery).

The greater part of the work on advertising costs and advertiser size has nonetheless been on production functions of single products, and on one in particular--cigarettes (e.g., Schmalensee 1964 and Brown, 1978). This is doubly unfortunate, however, since the case of cigarettes is probably atypical, considering the extent of brand proliferation and banning of television advertising. As an example of the unusual nature of cigarette markets, in Brown's (1978) study of advertising scale economies, the inclusion of age of brand proved to be necessary before the existence of advertising economies in cigarette sales could be seen; it is hard to believe that such a variable is generalizable to other commodities.

We wish to emphasize that we have not tried to get a complete answer to the question of pro- or anti-competitive aspects of advertising since we have ignored possible demand effects which do not show up on the expenditure side of a firm's balance sheet. Our results in Section II (after, in

Section I, we have shown the logic of our estimating form) shed light only on the relationship between advertising expenditure and the "largeness" of the brand. Our data set, which is a multi-year panel of the brands of many large advertisers in a dozen heavily advertised small packaged product groups, (to maintain sample homogeneity, unadvertised and minor advertiser products have been excluded) enables us to test for a variety of brand and product specific relationships which could be called advertising scale economies. We draw some preliminary conclusions for advertising policy in Section III.

I: Sources of Advertising Scale Economies and the Identification of Largeness

By simplifying our scale economy measurement to one of whether or not small firms hold a disproportionately large share of advertising capital, we have made the measurement problem logical and tractable. However, in light of the multi-brand nature of most sellers of advertised products, the definition of "largeness" to which the putative benefits of advertising accrue remains ambiguous. For example, a brand with a 10 percent market share is generally considered to be a successful brand. But is it assumed to receive the advertising benefits of "largeness" even if it is only the third or fourth largest brand? What if in some product group there is no brand that has more than five percent of the market? Is the "largeness" to which advertising scale economies accrue presumed to go to the firm with a five percent market share because it is the leading brand despite the fact that, were it in another product group, it might rank well down the scale? Or do the benefits of scale depend on the sum of advertising expenditure of a firm across all of its brands regardless of market position of each particular brand? The choice of the correct scale measure to which the advertising cost benefits are presumed to accrue depends on the source of the economies.

Several sources of advertising scale economies have been suggested by previous authors. The distinction between "pecuniary" and "technological" scale economies, while borrowed from the classic analysis of scale economies within a production function, is a useful distinction. The former is associated with decreased prices of advertising messages purchased by large firms; such pecuniary economies may result from discriminatory pricing by advertising media, declining average costs of producing and distributing advertising messages, and economies of joint advertising of several products. Pecuniary economies are likely to accrue to large advertisers nationally regardless of the market positions of their brands within any product group (Ferguson, 1974, Chapter 4; Simon, 1970, Chapter 1).

On the other hand, "technological" increasing returns to advertising messages may result from such factors as a threshold effect wherein buyers remain unaware of an advertised brand until they have received a minimum level of impressions or the word-of-mouth flow of information about brands: such an effect may be reinforced by advertising, and may cause the proportion of buyers to increase at an increasing rate as advertising shares increase, especially for those products with large numbers of potential users (Ferguson, 1974, Chapter 4; Simon, 1970, Chapter 1). If such technological economies of scale exist, they should depend more on the advertising budgets of brands rather than the overall budget of the parent firm. But do benefits depend on the absolute share of advertising expenditure that brand holds, or its budget relative to competitors? We do not wish to prejudge what is meant by the "largeness" of a firm to whom advertising is claimed to yield benefits and thus in our statistical work we have measured largeness alternatively as market share or cumulative market position. Thus our test allows the advantaged brands in a scale economy measure to be 1) the largest ones in

a particular group; 2) those with large market share, regardless of whether in a particular product group there are others with larger shares yet; or 3) the identity of the firm possessing the brand as a large national advertiser.

Our basic estimating form encompassing the three size measures is:

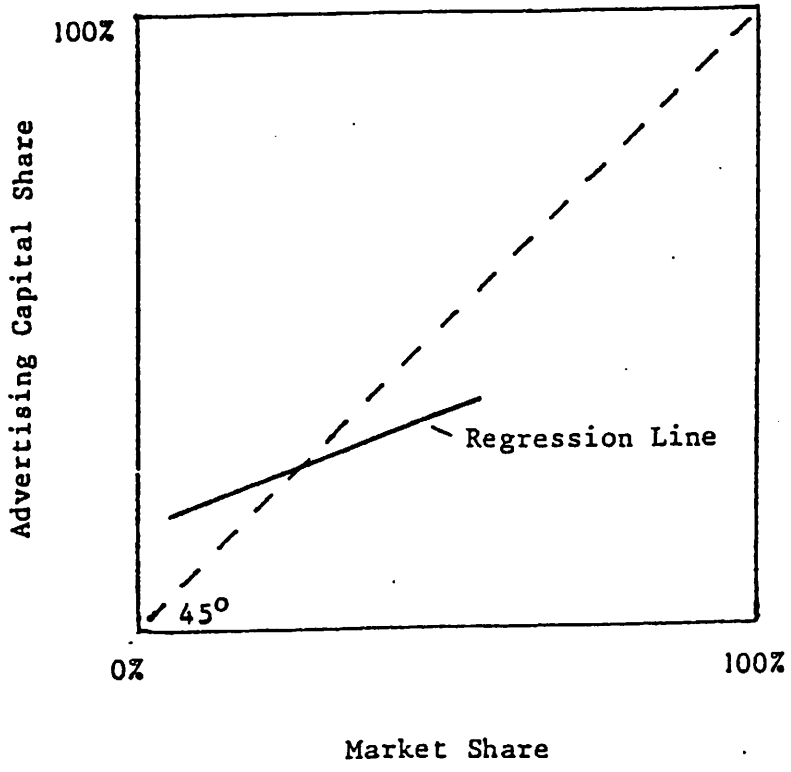
$$ADSHR_i = b_0 + b_1 MKTSHR_i + b_2 MKTSHR_i^2 + b_3 CUMSHR_i + \sum_{j=4}^{16} b_j D_{ji} + u_i \qquad (1)$$

where ADSHR represents the share of advertising capital in an industry held by a brand in 1976; MKTSHR is the market share of a brand within its product group; $CUMSHR_i$ is the combined market share of brand i and all smaller brands (CUMSHR = 1.0 for the largest brand in a product group); D_{ji} is a set of binary variables with D_{ji} = 1.0 if brand i is sold by a cross-product group advertiser j and 0.0 otherwise. Data sources and preparation procedures are described in Appendix I.

Equation 1 represents an equilibrium condition: the percentage of advertising expenditure necessary to support a brand of a specific advertiser and with specific market position. The existence of scale economies in advertising associated with market share should be seen by a regression line that cuts the 45^o line from above in the relevant range. We illustrate this in Figure 1. As drawn, larger brands can support their market share with a smaller share of product group advertising capital than smaller brands. This is a reflection of lower advertising costs per sales dollar for large brands than small. The quadratic term on market share is included to allow for threshold effects.

If there are advantages to being the largest brand in a product group regardless of market share, this should appear as a negative coefficient

FIGURE 1--REGRESSION RELATIONSHIP EXHIBITING SCALE ECONOMIES IN ADVERTISING



on CUMSHR; such a result would indicate that leading brands support their market shares with lower shares of product group advertising than would otherwise have been predicted. If the term "scale economies in advertising" is meant to represent advantages to being the leading brand in the product group, a negative coefficient on CUMSHR is a confirmation of the existence of such economies.

Finally, if Procter and Gamble, Colgate and other leading national advertisers are able to buy advertising time more cheaply or spend their advertising budgets more wisely than smaller firms, we should expect the set of binary variables representing the identity of such advertisers to be generally negative. That is, if the advertising scale economy belongs to Procter and Gamble rather than to any of its brands, we should expect to find that it is able to support its brands' market shares with a smaller share of advertising capital than would otherwise have been predicted; a negative coefficient on Procter and Gamble's binary variable would thus be an indication of a third kind of scale economy in advertising.

We wish to emphasize that Equation 1 should not be taken to have a behavioral justification, but should be interpreted as an equilibrium relationship. Typically, a firm considering introducing a new brand will pick a target market share and advertising campaign before introduction. It will then adjust the advertising expenditures after observing market success of the brand and the perceived responsiveness of sales of the brand to advertising levels. In this sense, optimal market shares and optimal advertising shares of an actual brand should be considered as draws from an urn of jointly distributed random variables. Estimations of equation 1 attempt to measure parameters of the joint distribution.

We have chosen not to estimate Equation 1 with two stage least squares since we believe that it is impossible to identify the structural equations of such a system. Also, our interest is in the equilibrium relationship between market shares and advertising shares and not in what factors allow a firm to forecast that a brand or advertising campaign will be successful. Nonetheless we recognize that the stochastic nature of market share will result in inconsistent parameter estimates; we test the seriousness of this problem at the end of Section II below.

II. Results

With one exception, we find little support for the proposition that large brands support their market shares with a disproportionately small share of advertising expenditure. Table 1 displays a series of regressions of ADSHR on the market variables defined above using three different depreciation rates for advertising capital. In the absence of information on true advertising retention rates, the first group of equations uses an ADSHR variable in which advertising capital is created on the assumption that 0.0 percent of the advertising message is retained from one year to the next. The following two groups assume retention rates of .25 and .5 respectively. The choice of relatively low retention rates is based on Clarke's (1976, pp. 349-350) survey which implies that .36 is a reasonable upper limit for estimates derived from annual data. The selected rates ensure that our results hold under a reasonable variety of possible long term advertising effects.

An inspection of the results shows that the coefficient on CUMSHR is consistently positive. This contradicts the idea that there are advertising

advantages to being the leading brand in a product group. Instead, the leading brand appears to support its position with a larger share of product group advertising capital than would be predicted on the basis of its market share alone.

In addition, the coefficients for the cross-product group dummy variables are generally insignificantly negative or positive. Only Avon (D_1) has significantly negative coefficients; but this is easily explainable by Avon's reliance on personal selling which lets them support their market share with a lower advertising share than would otherwise be predicted. The coefficients for Procter and Gamble and other large advertisers are insignificantly different from zero but generally positive, indicating larger cross-product group advertising shares than would be predicted on the basis of market share alone.

The one place where advertising economies do appear to exist is in relation to market share. Figure 2a displays the regression line estimates in Equation 3, Table 1 for a 0.0 percent advertising capital retention rate. Figure 2b displays the relationship between market share and predicted advertising costs of maintaining that share (measured as a percentage of average product group advertising costs) based on the curve drawn in Figure 2a.

The results displayed in Figure 2a indicate a kind of threshold effect: advertisers holding market shares around 7.6 percent are predicted to have advertising costs 12 percent higher than average for the product group. Advertisers both with relatively large shares and relatively small shares have an advertising cost advantage. The mean market share of brands in our sample is six percent. At a market share of 20 percent the predicted advertising costs of a brand would be 85 percent of average. Table 2 displays the names of the brands in our sample which have market shares of 20 percent or above.

TABLE 1--REGRESSIONS OF BRAND ADVERTISING CAPITAL SHARE ON BRAND MARKET SHARE, BRAND MARKET SHARE SQUARED, CUMULATIVE PERCENTILE RANKING OF BRAND (BASED ON MKTSHARE), FOR ALL BRANDS AND FOR BRANDS BELONGING TO MULTI-INDUSTRY FIRMS (N = 174, YEAR = 1976)

Eqtn.	Constant	MKTSHR	$MKTSHR^2$	CUMSHR	D_1	D_2	D_3	D_4	D_5	D_6	D_7	D_8	D_9	D_{10}	D_{11}	D_{12}	D_{13}	$\bar{R}^2$	F
Advertising Capital Retention Rate = 0.00																			
1	-.0202[a]	.7395[a]	-1.0168[b]	.0993[a]	-.0146	.0257[a]	.0274[a]	.0267[b]	.0520[a]	-.0191	.0086	.0600[c]	-.0014	.0143	.0132	.0045	-.0045	.7471	32.95[a]
	(.0055)	(.1402)	(.4539)	(.0126)	(.0176)	(.0081)	(.0101)	(.0129)	(.0202)	(.0200)	(.0215)	(.0344)	(.0136)	(.0142)	(.0171)	(.0241)	(.0240)		
2	-.0153[a]	.4521[a]		.1090[a]	-.0089	.0268[a]	.0309[a]	.0330[a]	.0591[a]	-.0181	-.0039	.0648[a]	.0041	.0146	.0123	.0047	-.0053	.7407	33.95[a]
	(.0051)	(.0572)		(.0120)	(.0177)	(.0082)	(.0101)	(.0128)	(.0202)	(.0202)	(.0211)	(.0348)	(.0135)	(.0144)	(.0174)	(.0244)	(.0243)		
3	-.0031	1.3452[a]	-2.2319[a]		-.0467[b]	.0193	.0023	.0007	.0189	.0237	-.0094	.0532	-.0161	.0009	.0099	-.0151	-.0060	.6504	22.46[a]
	(.0060)	(.1375)	(.5016)		(.0202)	(.0094)	(.0113)	(.0147)	(.0233)	(.0235)	(.0252)	(.0404)	(.0158)	(.0166)	(.0202)	(.0282)	(.0282)		
4	-.0140[a]	.9102[a]	-1.3575[a]	.0845[a]														.7240	152.32[a]
	(.0050)	(.1297)	(.4297)	(.0118)															
Advertising Capital Retention = .25																			
1	-.0181[a]	.7885[a]	-1.1784[a]	.0862[a]	-.0156	.0262[a]	.0282[a]	.0282[a]	.0548[a]	-.0137	.0106	.0597[c]	.0019	.0144	.0105	.0051	-.0039	.7642	36.06[a]
	(.0051)	(.1290)	(.4176)	(.0116)	(.0162)	(.0074)	(.0093)	(.0119)	(.0186)	(.0184)	(.0198)	(.0316)	(.0125)	(.0131)	(.0158)	(.0222)	(.0221)		
2	-.0125[a]	.4568[a]		.0974[a]	-.0090	.0275[a]	.0322[a]	.0353[a]	.0631[a]	-.0125	-.0039	.0653[b]	.0084	.0149	.0094	.0054	-.0048	.7540	36.35[a]
	(.0047)	(.0531)		(.0112)	(.0164)	(.0076)	(.0094)	(.0118)	(.0188)	(.0188)	(.0195)	(.0323)	(.0126)	(.0134)	(.0161)	(.0227)	(.0225)		
3	-.0032	1.3142[a]	-2.2282[a]		-.0434[b]	.0207[b]	.0063	.0056	.0261	-.0177	-.0050	.0538	-.0107	.0028	.0076	-.0119	-.0052	.6892	25.98[a]
	(.0054)	(.1246)	(.4543)		(.0183)	(.0086)	(.0103)	(.0133)	(.0211)	(.0213)	(.0228)	(.0366)	(.0143)	(.0150)	(.0183)	(.0256)	(.0255)		
4	-.0117[a]	.9719[a]	-1.5372[a]	.0705[a]														.7301	161.04[a]
	(.0047)	(.1211)	(.3984)	(.0110)															
Advertising Capital Retention Rate = .5																			
1	-.0146[a]	.8098[a]	-1.2111[a]	.0701[a]	-.0170	.0275[a]	.0288[a]	.0272[a]	.0637[a]	-.0093	.0150	.0588[b]	.0038	.0162	.0075	.0113	-.0033	.7824	39.87[a]
	(.0046)	(.1168)	(.3782)	(.0105)	(.0147)	(.0067)	(.0084)	(.0108)	(.0169)	(.0166)	(.0179)	(.0287)	(.0113)	(.0118)	(.0143)	(.0201)	(.0200)		
2	-.0088[b]	.4674[a]		.0817[a]	-.0103[a]	.0288[a]	.0330[a]	.0347[a]	-.0723[a]	.0080	.0000	.0646[b]	.0104	.0166	.0064	.0116	-.0042	.7696	39.53[a]
	(.0043)	(.0484)		(.0102)	(.0150)	(.0069)	(.0086)	(.0108)	(.0171)	(.0171)	(.0178)	(.0294)	(.0114)	(.0112)	(.0147)	(.0207)	(.0206)		
3	-.0025	1.2375[a]	-2.0691[a]		-.0397[b]	.0230[a]	.0111	.0088	.0403[b]	-.0125	.0022	.0540[c]	-.0065	.0067	.0052	-.0025	-.0044	.7230	31.10[a]
	(.0047)	(.1099)	(.4010)		(.0161)	(.0075)	(.0090)	(.0117)	(.0186)	(.0188)	(.0201)	(.0323)	(.0126)	(.0133)	(.0161)	(.0226)	(.0225)		
4	-.0077[c]	1.0009[a]	-1.5721[a]	.0534[a]														.7412	166.22[a]
	(.0044)	(.1128)	(.3711)	(.0102)															

Note: "a" indicates regression coefficient or F ratio significant at the .01 level; "b" indicates the .05 level; "c" indicates .01 level. Standard errors are in parentheses.

Our results show the existence of a region of "increasing returns to advertising" for market shares somewhat above the mean of our sample. This finding should be considered tentative, however, for the following reasons:

1) Despite the fact that the regression parameters of the equation used to draw Figures 2a and 2b are highly significant, the 45^{o} line falls easily within the standard error of the regression for the range of our data. Thus, for each market share, the prediction that advertising expenditure is equal to the average cannot be rejected.

2) Figure 2 is drawn neglecting the effects of cumulative market share. Since the consistent effect shown in our regressions predicts higher advertising expenditure for leading brands than would be predicted on the basis of market share alone, the inclusion of such effects will be to raise the predicted advertising expenditure for large firms. The extent to which the regression lines will lose their curviture depends on the distribution of market shares within a product group. If market shares are tightly grouped, including rank effects can change the concavity of the predicted relation, suggesting a region of first declining and then increasing costs. For example, if the relationship between market share and cumulative market share is CUMSHR = .1657 + 1.0627 MKTSHR + 16.0651 $MKTSHR^2$, then the predicted relationship between market share and advertising share coincides with the 45^{o} line. (This quadratic reaches a 100 percent cumulative share at a 20 percent market share, which is reasonable for our sample.)

3) Finally, any statistical bias deriving from the stochastic properties of the market share variables should be in the downward direction. While we believe that it is far more likely that firms treat the market shares of successful products as given and treat advertising as a cost of maintaining those shares (Quandt, 1964), we recognize that market share and advertising

share may usefully be considered jointly distributed random variables. If this is true, and if the joint distribution is symmetrically distributed around the 45° line, then classical regression bias will cause the slope of the predicted regression line to be less than 1.0 regardless of which variable is taken as dependent. This is precisely what appears to have happened in Table 3 where, in apparent contradiction to the results in Table 1, the coefficient on ADSHR is less than 1.0.

In view of biases introduced by stochastic regressions, in Table 4 we subtracted advertising share from market share and regressed the difference solely on the non-stochastic variables, CUMSHR and the binary variables. The binary variables remain generally insignificant and the CUMSHR coefficient is either negative or insignificant, thus suggesting no advertising cost advantages to being a leading brand or leading advertiser (Gillette, the one firm with a significantly positive binary variable is far from the largest advertiser).

III. Policy Implications and Suggestions for Further Research

We are not surprised to find scant evidence that firms operate in a region of "increasing returns to scale in advertising." Advertising is a purchased input (albeit one which has effects both on costs and demands) and profit maximizers should hire factors until their marginal return declines to their purchase price. "Returns to scale," it will be recalled, is a misnomer for the relationship investigated, and most inputs are subject to diminishing marginal returns.

FIGURE 2--REGRESSION RELATIONSHIP
ESTIMATED BY EQUATION 1

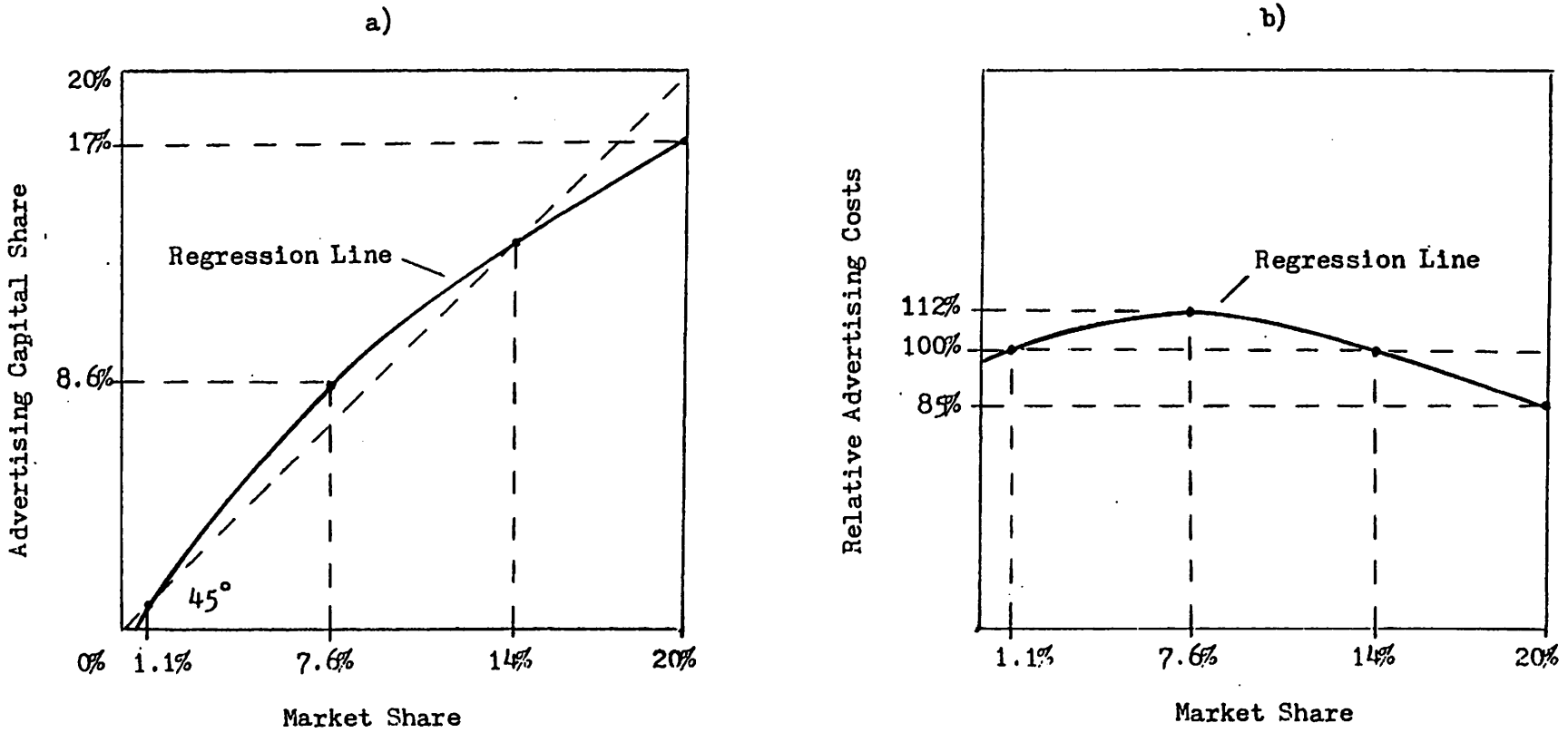


TABLE 2--BRANDS WHICH HAVE REACHED THE REGION WHERE ADVERTISING SHARE SHOULD BE LOWER THAN MARKET SHARE (MKTSHR $\geq$ 20%)

Brand	Firm	Adjusted Market Share (%)*	Actual Market Share (%)
Right Guard	Gillette	20.2	16.6
Nice 'n Easy	Clairol	20.3	11.1
Palmolive	Colgate-Palmolive	21.2	13.3
Ban	Bristol-Myers	22.8	18.7
Dial	Armour-Dial	25.1	20.1
Joy	Procter & Gamble	25.2	15.8
Crest	Procter & Gamble	26.0	23.6
Ivory Liquid	Procter & Gamble	26.2	16.4
Tide	Procter & Gamble	31.2	26.9
Foamy	Gillettee	37.4	23.3

*Note: Adjusted market share is equal to actual market share divided by 1.00 minus the market share of "other" brands in the product category. See Appendix I for further explanation.

TABLE 3—REGRESSIONS OF BRAND MARKET SHARE ON BRAND ADVERTISING CAPITAL SHARE, BRAND ADVERTISING CAPITAL SHARE SQUARED, CUMULATIVE PRECENTILE RANKING OF BRAND (BASED ON MKTSHARE), FOR ALL BRANDS AND FOR BRANDS BELONGING TO MULTI-INDUSTRY FIRMS (N = 174, YEAR = 1976)

Eqtn.	Constant	ADSHR	CUMSHR	D_1	D_2	D_3	D_4	D_5	D_6	D_7	D_8	D_9	D_{10}	D_{11}	D_{12}	D_{13}	$\bar{R}^2$	F
Advertising Capital Retention Rate = 0.00																		
5	.0047	.6260[a]	.0268	.0364[c]	.0127	.0104	.0066	.0037	.0491[b]	.0885[a]	.0231	.0283[a]	-.0015	-.0101	.0082	-.0019	.6203	19.84[a]
	(.0062)	(.0792)	(.0173)	(.0206)	(.0099)	(.0123)	(.0153)	(.0245)	(.0235)	(.0238)	(.0413)	(.0158)	(.0170)	(.0204)	(.0288)	(.0286)		
Advertising Capital Retention Rate = .25																		
5	.0040	.6975[a]	.0224	.0356[c]	.0089	.0058	.0012	-.0052	.0446[b]	.0845[a]	.0149	.0235	-.0031	-.0088	.0068	-.0015	.6392	21.48[a]
	(.0060)	(.0811)	(.0167)	(.0201)	(.0097)	(.0121)	(.0151)	(.0240)	(.0230)	(.0232)	(.0404)	(.0154)	(.0166)	(.0199)	(.0280)	(.0279)		
Advertising Capital Retention Rate = .50																		
5	.0026	.7927[a]	.0187	.0352[c]	.0031	.0000	-.0035	-.0214	.0395[c]	.0755[a]	.0046	.0188	-.0065	-.0072	.0006	-.0012	.5667	2.07[a]
	(.0057)	(.0821)	(.0157)	(.0193)	(.0095)	(.0117)	(.0145)	(.0235)	(.0221)	(.0224)	(.0289)	(.0149)	(.0160)	(.0191)	(.0270)	(.0268)		

Note: "a" indicates regression coefficient or F ratio significant at the .01 level; "b" indicates the .05 level; "c" indicates .10 level. Standard errors are in parenthesis.

TABLE 4--REGRESSIONS OF MARKET SHARE MINUS ADVERTISING CAPITAL SHARE ON CUMULATIVE PERCENTILE RANKING OF BRAND (BASED ON MKTSHARE), FOR ALL BRANDS AND FOR BRANDS BELONGING TO MULTI-INDUSTRY FIRMS (N = 174, YEAR = 1976)

Eqtn.	Constant	CUMSHR	D_1	D_2	D_3	D_4	D_5	D_6	D_7	D_8	D_9	D_{10}	D_{11}	D_{12}	D_{13}	$\bar{R}^2$	F
Advertising Capital Retention Rate = 0.00																	
6	.0116[b]	-.0363[a]	.0325	-.0042	-.0081	-.0121	-.0279	.0469[c]	.0697[a]	-.0161	.0194	-.0088	-.0141	.0088	.0013	.0761	2.01[a]
	(.0064)	(.0117)	(.0219)	(.0098)	(.0124)	(.0158)	(.0250)	(.0251)	(.0250)	(.0431)	(.0167)	(.0180)	(.0218)	(.0306)	(.0304)		
Advertising Capital Retention Rate = .25																	
6	.0087	-.0253[a]	.0324	-.0051	-.0096	-.0147	-.0321	.0411[c]	.0691[a]	-.0170	-.0150	-.0091	-.0112	.0030	.0008	.0587	1.77[b]
	(.0061)	(.0111)	(.0204)	(.0093)	(.0118)	(.0150)	(.0238)	(.0239)	(.0238)	(.0410)	(.0159)	(.0172)	(.0207)	(.0291)	(.0290)		
Advertising Capital Retention Rate = .50																	
6	.0051	-.0110	.0332[c]	-.0068	-.0108	-.0144	-.0419[b]	.0361	.0639[a]	-.0173	-.0124	-.0109	-.0082	-.0032	.0003	.0494	1.64[b]
	(.0057)	(.0105)	(.0196)	(.0088)	(.0111)	(.0141)	(.0224)	(.0224)	(.0223)	(.0386)	(.0149)	(.0161)	(.0195)	(.0274)	(.0272)		

Note: "a" indicates regression coefficient or F ratio significant at the .01 level; "b" indicates the .05 level; "c" indicates .10 level. Standard errors are in parentheses.

But our results also suggest that a few brands, by having extraordinary large market shares, may have lower advertising costs per sales dollar than does the average brand. If such a region exists, why do not firms advertise heavily to get there? The answer is two-fold: first, market share depends on much more than advertising share; it may be too expensive (and a firm may not be fortunate enough) to create the conditions necessary to achieve a very large market share. Second, market shares and advertising shares are not variables strictly under the control of a single firm. If advertising budget increases are matched by competitors, a firm may find itself unable to reach either a target market share or advertising share.

The main policy implication to be drawn from this paper is, then, that arguments on scale economies cannot justify the control of advertising as an element of competition policy. While there is some tentative evidence of the existence of such scale effects, they appear to be related to market share alone and are counteracted and probably overwhelmed by the higher costs of being a multi-product advertiser of leading brands.

If there is a threshold effect at work here, it is of an unusual kind. In order to avoid problems of comparing branded and unbranded commodities, our sample looked solely at branded commodities. We found that within this group, the smallest brands were at no disadvantage relative to the average; rather, the weak threshold effect which we observe disadvantages average size brands relative to both large and small brands. From the cost analysis in this paper, the branded group would appear easy to enter but costly to move up in.

This does not close the question of the effect of advertising on competition, however, since throughout this paper, we have followed the tradition of the literature in judging the effects of advertising on competition by

looking only at the expenditure side of the ledger. But anti-competitive (or pro-competitive) results can appear without any effect that appears on the expenditure side of a firm's balance sheet. For example, assume that before industry-wide use of advertising, buyers and sellers were loosely tied and purchasing decisions were made primarily by price and terms of sale. All sellers now advertise. Even if this has the sole effect of attaching each buyer more closely to the sellers previously patronized, an entry barrier has now been created in that advertising has convinced purchasers that expenditure in this market should be based primarily on seller reputation and brand name (what would usually be called goodwill). The effect of the increase in advertising by all sellers is to increase the value of existing goodwill stocks, or, alternatively, make a potential entrant purchase goodwill at a higher price than incumbants purchased it. This is, of course, a barrier to entry. Thus a finding that there are no scale economies in advertising does not reject the possibility that intense goodwill advertising can act as a barrier to entry. Whether or not some advertising has the effect of increasing buyer inertia is still an open question. Our results indicate that the competitive effects of advertising expenditure are far more likely to be found in the answers to such demand side questions than in the effect of advertising on inter-firm outlays.

APPENDIX I--DATA PREPARATION PROCEDURES

An ideal data base for exploring these questions would include a quarterly or monthly time-series of brand, firm and industry gross rating points (a crude measure of advertising exposures), by media category, plus corresponding brand, firm and industry unit sales. However, scarcity of published data limits this study to an analysis of yearly brand advertising expenditures and of unit or dollar sales for 11 consumer, non-durable goods categories. Problems and opportunities presented by these annual data are discussed in detail.

Table 5 lists the product categories, the years and the number of firms and brands for which data are available.

Yearly brand, firm and industry sales in units and dollars are available regularly from approximately 75 issues of Advertising Age from 1971 through 1980. Advertising Age gathered some of the sales data, but obtained most of it from Maxwell Associates.

Yearly brand, firm and industry advertising media expenditures, which occur over the same calendar year as the sales data, are available from: LNA Class/Brand Year-to-Date Expenditures (1970-1976). LNA advertising media expenditures include magazines, newspaper Sunday supplements, network television, spot television, network radio and outdoor. Not included are newspaper, spot radio, direct mail and other media types.

LNA prepares its own Publishers Information Bureau, Inc. (PIB) Magazine Advertising Analysis for general consumer magazines and for nationally distributed newspaper Sunday supplements. Expenditures are based on current one-time gross rates before discounts.

TABLE 5--INDUSTRY SAMPLE

	LNA Code	Product Categories	1970	1971	1972	1973	1974	1975	1976	Firms	Brands
1.	D121	Toothpaste, mouthwash		X	X	X	X	X	X	9	15
2.	D122	Toilet soap			X	X	X	X	X	6	16
3.	D124	Deodorants		X	X	X	X	X	X	10	14
4.	D125	Shaving cream		X	X	X	X	X	X	7	7
5.	D141	Hair treatment		X	X	X	X	X	X	10	26
6.	D142	Shampoo, rinses			X	X	X	X	X	13	27
7.	D122	Cerals			X	X	X	X	X	7	47
8.	G112	Cigars	X	X	X	X	X	X	X	14	29
9.	G531	Pet foods				X	X	X	X	21	35
10.	H412	Detergents, light			X	X	X	X	X	4	8
11.	H413	Detergents, heavy			X	X	X	X	X	4	21
Total Firms and Brands										122	245*

*Total brands include 71 "other" brands, brands that are not advertised and brands for which a complete time-series of data is not appropriate or available.

The broadcast expenditure data LNA publishes are obtained from Broadcast Advertisers Reports, Inc. (BAR), which monitor every broadcast minute during the year for the three major television and radio networks.

> Average commercial minute costs for each program are provided to BAR by each network, based on the total revenues for each program before deduction of the agency commission. These rates are combined with the monitored brand activity to produce brand expenditures. (LNA, 1979, p.ii)

BAR monitors 260 television stations in 75 top markets one full week per month.

> BAR also contracts with a major advertising agency to provide commercial rates for each monitored station. These rates are a composite of this agency's experience in buying on these stations. Rates are individualized for each quarter hour, every day of the week, and are up-dated monthly. BAR combines the one-week data for 75 markets, projects it to monthly figures and produces national estimated brand expenditures. (LNA, 1979, p.ii)

LNA publishes outdoor advertising expenditures in cooperation with the Institute of Outdoor Advertising and the Outdoor Advertising Association of America. Outdoor expenditures represent national, poster and paint advertising in plant operator markets over 100,000 population.

ADSHR and MKTSHR were both adjusted by 1 - "other" brands' advertising and market shares respectively. This was necessary because the "other" brands' market share includes small advertisers as well as unadvertised fringe brands; the "other" advertising share includes only small advertisers with expenditures greater than $25,000 per year.

The share of advertising capital is the sum of past advertising shares weighted by a geometrically declining series of advertising capital retention rates. Alternate retention rates were examined; these included 0, .25 and .5.

CUMSHR is the sum of a brand's and all smaller competitors' market shares.

D_{ij} represents a series of binary variables equal to 1.0 for brands belonging to any of 13 cross-product group advertisers and equal to 0.0 otherwise. These include:

D_1 = Avon,
D_2 = Procter and Gamble,
D_3 = Colgate-Palmolive,
D_4 = Lever Brothers
D_5 = Carter Wallace,
D_6 = Armour,
D_7 = Gillette,
D_8 = Noxell,
D_9 = Clairol,
D_{10} = Alberto Culver,
D_{11} = Breck,
D_{12} = Mennan, and
D_{13} = Nabisco.

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