

The Effect of Advertising on Industrial Mobility, 1947–72*

I. Introduction

In a recent article, Harold Demsetz (1979) suggested that the commonly observed link between firm or industry profit rates and advertising intensity was due to accounting errors rather than barrier-to-entry influences of advertising. Furthermore, Demsetz found "that the scrambling of profit rates seems to be greater for high-advertising-intensity industries than it is for low- or medium-advertising-intensity industries once the impact of accounting biases have been constrained" (p. 357). These results are interesting, not only because they tend to undermine the basis for the advertising-as-anticompetitive thesis, but also because they suggest that, far from hindering competition, advertising facilitates the efforts of firms which wish to "upset established positions" (p. 357).

Demsetz's findings suggest both a need to reconsider the effect of advertising on competition and the danger of doing so with profit data subject to accounting errors. An attractive method for addressing these issues is to consider the effect of advertising on entry rates and other measures of "industrial mobility" such as non-

This article considers the effect of advertising on industrial mobility as measured by rates of entry and established firm growth. Empirical findings suggest that the effect of advertising is to upset rather than reinforce the market share stability of established firms. Like some earlier findings, these results tend to support the advertising-as-procompetitive thesis.

*I would like to thank Richard E. Caves, Sam Peltzman, and an anonymous referee for many helpful comments and Knute W. Reichel for valuable research assistance. Research support by the Graduate School of Business of the University of Wisconsin—Madison is gratefully acknowledged.

(Journal of Business, 1981, vol. 54, no. 2)

© 1981 by The University of Chicago

0021-9398/81/5402-0003\$01.50

leading and leading firm growth (see Caves and Porter 1977). Such an approach minimizes the problems of accounting bias, since these mobility measures are unaffected by the failure to capitalize advertising expenditures accurately. Demsetz's rejection of the advertising-as-anticompetitive thesis would be supported if advertising inhibits neither entry nor nonleading firm growth. Alternatively, should advertising inhibit entry and/or nonleading firm growth while facilitating leading firm growth, the barrier-to-mobility (entry) thesis of earlier studies (e.g., Mann 1966; Comanor and Wilson 1967) would be supported.

II. Methodology

Measures of Mobility

The theory of oligopoly suggests that successful collusion within industry will tend to manifest itself through both excess profits and market share stability (see Stigler 1964). One might expect, therefore, that relative rates of entry and established firm growth would constitute important indicators of the vigor of intraindustrial competition. Importantly, observed shifts in the market share of new and established firms will be dependent upon the magnitude of industrial barriers to mobility if these barriers confer significant insider advantages. Furthermore, such advantages will tend to be cumulative with firm size should mobility barriers be continuous rather than dichotomous in nature. This suggests that mobility barriers will be more onerous for entrant, as opposed to nonleading established, firms. This assumes, of course, that entrant firms are found largely at the bottom of the industry firm-size distribution.

Following previous studies (e.g., Peltzman 1965), a relative measure of net entry will be analyzed here so as to minimize distorting influences caused by varying industry sizes. Specifically, entry is measured by net entry as a percentage of the initial number of established firms. Leading firms are defined as the four largest competitors within a given industry, and nonleading firms are defined to include all other established competitors.¹ Average growth for firms in each size class is computed as the average percentage growth in total revenue (value of shipments) per firm.

Determinants of Mobility

The determinants of mobility include both institutional and physical factors which tend to either facilitate or impede mobility. Generally

1. Due to data limitations, I must make the strong assumption that industry groups of leading firms in 1972 are the same as (dominated by) those in 1947. This assumption was also made by Peltzman (1977) and allows one to address the mobility issue using conventional four-firm concentration ratio data.

speaking, institutional determinants of mobility relate to behavioral characteristics of an industry such as the initial level of competition, degree of customer loyalty, etc. Physical determinants of mobility refer to production-related phenomena such as the degree of economies of scale, tangible and intangible capital requirements, etc.

High initial levels of industry profitability will be an enticing inducement to both entry and nonleading firm growth to the extent that indicated levels are attainable and not limited to larger, possibly more efficient leading firms (see Peltzman 1977). A high level of initial profitability can also facilitate leading firm growth by providing the necessary resources for future expansion. Industry price-cost margins, $(P - MC)/P$, or the Lerner Index of Monopoly Power, will be adopted as the profitability measure which reflects most clearly the extent to which the benefits of market power may have been realized via "excess profits" (see Qualls 1977). Initial price-cost margins will be measured (as is typical) by the share of total industry shipments represented by the residual of value of shipments minus payroll minus cost of materials.

In considering the potential for profitable expansion, both new and established firms must consider the supply effect of their initiatives. Expansion in stable or declining industries will be limited by the need to overcome customer loyalty. High rates of industry growth, therefore, will facilitate not only entry but also nonleading and leading firm growth. Similarly, the relative size of efficient scale production will provide an important indicator of the supply effect of mobility (Orr 1974). The larger (smaller) is relative minimum efficient production scale, MES, the greater (lesser) is the impediment to entry and nonleading firm growth.² Industry growth will be measured as the percentage change in the total value of industry shipments. Following Weiss (1963), relative MES will be measured as the share of industry value added accounted for by the industry midpoint plant size.

Important barriers to mobility may also be created by the magnitude of tangible capital requirements. While capital-output ratios have often been adopted in previous analyses as a method of correcting for capital intensity, such ratios are not likely to provide accurate indicators of tangible capital barriers. For example, many industries which are highly capital intensive (such as agriculture) have only minimal levels of initial capital requirements. A more appropriate measure of the mobility barrier created by initial capital requirements would be the capital requirements of an MES-size firm. Potential capital barriers will be analyzed here by considering the mobility effect of the initial level of capital investment (measured by gross book value of the plant) of an MES-size firm.

2. For example, if the difference between minimum efficient scale and average firm size is large and positive, one would anticipate that increasing demand would be largely met through internal expansion (or large firm entry).

A further potential determinant of mobility, and of primary interest in this study, is advertising intensity. A common thesis in economics is that large-scale advertising leads to the creation of significant entry barriers, due largely to probable economies of scale (e.g., Comanor and Wilson 1967). However, Demsetz is part of a significant minority (e.g., Telser 1964; Nelson 1970) which holds that advertising may actually facilitate rather than impede competitive forces. Empirical resolution of the issue has been unnecessarily hampered through an *almost universal use of an inappropriate measure of advertising scale*, namely, the advertising-sales ratio, A/S . If significant economies of advertising scale are operative in industry, then the advertising "cost" of an additional dollar of sales will decline as advertising scale increases. This implies that low A/S ratios will tend to be observed in industries with high levels of minimum efficient advertising scale, MES_a . Due to this inverse correlation, A/S ratios constitute a particularly poor proxy for MES_a . Since necessary advertising scale is determined by the marketing effort of new and established rivals, the average level of advertising expenditures per firm, A/N , is likely to provide an accurate indicator of industry MES_a . Therefore, the effect of advertising will be considered here by analyzing the effect of initial A/N on subsequent industrial mobility. Of course, not only current but past levels of advertising may be partly responsible for a potential advertising barrier to mobility. However, if advertising expenditures both grow and depreciate at a constant rate, "advertising capital" will be strictly proportionate to current advertising expenditures. Therefore, analyses of the mobility effect of current advertising expenditures will be indicative of the effects of advertising capital (see Hirschey 1978).

And, finally, a method similar to that for advertising would be preferred for analyzing the competitive implications of research and development intensity. Unfortunately, sufficient data for such an analysis are not available. As a second-best alternative, I have assigned a dummy variable equal to one if an industry is research and development intensive, and zero otherwise on the basis of data made available at the two- and three-digit level. Research and development intensity will inhibit entry and nonleading firm growth to the extent that significant economies of large-scale or intangible capital barriers are present.

Model

What determinants of mobility influence, from a theoretical point of view, is the threat of competitor encroachment upon the profitable domain of established firms. This threat takes the form of a probability which may be expressed as

$$P = g_1(X), \quad (1)$$

where P is the probability of encroachment and X represents a vector of x important determinants of mobility. While such probabilities are unobservable, one might anticipate that actual mobility, M , observed as entry, nonleading firm growth, and leading firm growth would serve as an accurate indicator of this threat where

$$M = g_2(P), \quad (2)$$

and substitution yields

$$M = f(X). \quad (3)$$

Equation (3) is important because it provides a necessary link between mobility and its determinants. The discussion above suggests that this general relation may be specified as

$$M = f(\text{MGN}, \text{IG}, \text{MES}, \text{K}, \text{A/N}, \text{R \& D}), \quad (4)$$

or, in linear form,

$$M = a_0 + a_1 \text{MGN} + a_2 \text{IG} + a_3 \text{MES} + a_4 \text{K} + a_5 \text{A/N} + a_6 \text{R \& D}, \quad (5)$$

where M is mobility, MGN is the price-cost margin, IG is industry growth, MES is relative minimum efficient production scale, K is capital requirements, A/N is advertising requirements, and R & D represents a dummy variable equal to one if an industry is research and development intensive, and zero otherwise. All variables relate to the i th industry.

III. Empirical Analysis

Data

In defining a relevant sample an attempt was made to achieve both generality and a limitation of potential measurement errors. The 1947-72 period was analyzed because 25 years is a sufficiently long period for any fundamental changes in industry structure to emerge. Furthermore, this period is recent enough so that fairly reliable industry data could be obtained. To limit measurement errors, many current four-digit industries were dropped because of classification changes between 1947 and 1972, low or changing coverage or specialization ratios, profound technological changes, or an absence of reliable advertising data. This left a sample of 29 consumer and 58 producer goods industries for analysis. The entire sample of 87 industries comprises an estimated 28% of total industry shipments in 1947, and 20% of total shipments in 1972. A listing of sample industries is provided in the Appendix.

Most of the nonadvertising data analyzed had the *Census of Manu-*

facturers (various years) as an original source and were generously provided by Sam Peltzman. Industry advertising data were obtained from appendix B of Ornstein's (1977) book on advertising and concentration. Following Ornstein, if 50% or more of an industry's output went to consumption, it was classified as a consumer goods industry. Similarly, if 50% or more of output went to investment plus materials, an industry was classified in the producer goods category. The dummy variable for research and development intensity was assigned on the basis of data published by the National Science Foundation in *Research and Development in Industry* (1977, p. 59). If an industry devoted 2% or more of revenues to research and development, it was judged to be of high research intensity.

Estimation Technique

The model expressed in equation (5) is designed to test the hypothesis that intraindustrial rivalry embodies some of the characteristics of a zero-sum game and therefore that entry, nonleading firm growth, and leading firm growth are determined jointly by a common set of exogenous factors. A fully simultaneous framework is not proposed because it seems difficult to imagine a single determinant of industrial mobility which affects entry, for example, but has only an indirect, albeit different, effect on growth by nonleading and leading firms. A "systems" approach is not necessary for estimating the proposed model because all three equations have an identical set of observations for exogenous variables. Zellner (1962) has shown in this instance that generalized least-squares and ordinary least-squares results are equivalent, as both provide maximum-likelihood estimators.

Estimation Results

In testing the hypothesized model, it is useful to consider the possibility of various subsample differences. In particular, the effects of various determinants of mobility may differ between consumer and producer goods industries. For example, Comanor and Wilson (1967), Porter (1974), and others have argued that buyers of producer goods are more highly informed than buyers of consumer products. Because of this, consumers may be more susceptible to the persuasive powers of advertising. While this perception that advertising's effect is most significant in the consumer goods sector is widely held, Strickland and Weiss (1976) and Ornstein (1977) have found similarly significant concentration effects of advertising in both consumer and producer goods industries.³ Due to such conflicting evidence, the "intersectoral homogeneity" issue seems somewhat unsettled and worth considering here.

3. Strickland and Weiss (1976) also found similar results with respect to the price-cost margin effects of advertising in the consumer and producer goods industries.

A second potential source of subsample differences in the mobility influences of various factors may be possible nonstationarity problems ("intertemporal heterogeneity"). For example, the introduction of television advertising in the 1950s may have important consequences for the growth and entry effects of advertising during recent years. Interestingly, both Porter (1976) and Hirschey (1978) have found television advertising to be more profitable than other forms of media promotion. These findings may be consistent with a barrier to mobility effect of television advertising, or they may simply indicate comparatively low rates of television advertising depreciation.

In order to formally consider the possible subsample differences suggested above it is necessary to test the hypothesis that various subsets of sample observations come from the same population. The relevant *F*-statistic is obtained by comparing subsample sums of squared error with those for the combined sample (see Kmenta 1971). Such a test was performed over the consumer, producer, and combined industry samples, and the hypothesis of intersectoral homogeneity (i.e., drawn from the same population) was not rejected at even the $\alpha = .10$ level for the 1947-72, 1947-63, or 1963-72 period. These results tend to support the findings of Strickland and Weiss (1976) and Ornstein (1977). The 1947-63 and 1963-72 periods were considered along with 1947-72 in order to investigate possible differences in the mobility influences of recent, as opposed to past, forms of advertising promotion.⁴ Some qualification is necessary, however, because a rejection of the intertemporal homogeneity hypothesis can result from a change in the influence of the determinants of mobility (nonstationarity) or simply because fundamental changes in industry structure are a gradual (25-year) rather than a rapid (9- or 16-year) process. Whatever the cause, the intertemporal homogeneity hypothesis was rejected. Therefore, table 1 displays ordinary least-squares estimation results for the entry, nonleading-firm-growth, and leading-firm-growth equations over the 87-industry sample for each of the 1947-72, 1947-63, and 1963-72 periods.

The effect of initial industry price-costs margins on subsequent industrial mobility seems equivocal. While the generally positive inducement to nonleading firm growth is quite consistent with previous expectations, entry into industries with high price-cost margins seems to have been impeded over much of the 1947-72 period. While somewhat puzzling, this finding may provide some support for Peltzman's (1977) suggestion that high price-cost margins may be most reflective of superior operating efficiency by leading firms. The mobility effect of

4. As Strickland and Weiss (1976) note, by 1963 the television revolution in advertising was more than a decade old, so that advertising (including television advertising) had probably come close to equilibrium levels.

TABLE 1 Estimation Results: The Effect of Advertising on Industrial Mobility, 1947-72 (*t*-Values in Parentheses)

	Constant	MGN	IG	MES	K	A/N	R & D	R ²	F
Entry:									
1947-72	.043 (.09)	-2.886 (-1.60)	.274 (5.13)***	5.200 (1.39)	.022 (.78)	-.169 (-.46)	.134 (.42)	.313	6.70***
1947-63	.239 (.54)	-2.614 (-1.56)	.477 (4.04)***	1.217 (.35)	.019 (.73)	-.236 (-.68)	.027 (.09)	.204	3.42***
1963-72	.429 (-3.97)**	.436 (1.16)	.355 (5.21)***	3.056 (2.22)**	.002 (.80)	.042 (2.73)***	.161 (1.95)*	.453	11.04***
Nonleading firm growth:									
1947-72	1.207 (1.49)	5.007 (1.64)	.177 (1.96)*	-12.339 (-1.95)*	.048 (1.04)	1.505 (2.41)**	-.557 (-1.04)	.170	2.73**
1947-63	.257 (.52)	2.386 (1.26)	.344 (2.59)**	-3.898 (-.99)	-.042 (-1.45)	5.968 (15.32)***	-.20 (-.60)	.765	43.40***
1963-72	.478 (2.69)***	.044 (.07)	.435 (3.89)***	-2.761 (-1.22)	.014 (3.38)***	-.060 (-2.33)**	-.290 (-2.14)**	.304	5.82***
Leading firm growth:									
1947-72	1.386 (1.64)	-2.653 (-.84)	1.100 (11.73)***	-3.988 (-.61)	-.048 (-.98)	-.097 (-.15)	-.866 (-1.55)	.647	24.44***
1947-63	.216 (.58)	-3.388 (-2.27)	1.202 (12.07)***	-1.439 (-.49)	-.019 (-.89)	-.094 (-.32)	-.160 (-.64)	.653	25.09***
1963-72	.326 (2.21)**	-.641 (-1.25)	1.095 (11.79)***	-1.270 (-.67)	-.004 (-1.08)	-.001 (.04)	-.285 (-2.52)**	.638	23.50***

* Indicates significance with 90% confidence.

** Indicates significance with 95% confidence.

*** Indicates significance with 99% confidence.

industry growth is uniformly positive and significant as expected. This finding reveals the importance of customer loyalty as a barrier to mobility, and probably some spurious correlation as well. The effect of MES on mobility seems to be to facilitate entry but impede nonleading firm growth. These results support Miller's (1978) suggestion that, far from creating a barrier to entry, economies of scale may actually induce entry as firms seek to achieve the productive advantages (and superior profitability) of large-scale operation. The effect of capital requirements is unexpectedly positive.⁵ This effect is generally insignificant, however, and the overall importance of capital requirements as a determinant of mobility seems quite limited.

The effect of advertising on mobility is both interesting and somewhat striking. Over the 1947–72 period, only a weak and insignificant impeding effect on entry, but a large positive and highly significant effect on nonleading firm growth, is discovered. Interestingly, during the most recent 1963–72 period advertising appears to have the effect of facilitating entry while having a small limiting effect on nonleading firm growth.⁶ Taken as a whole, these findings support Demsetz's contention that advertising may be used to upset established market positions and suggest a possibly important procompetitive influence of advertising. The fact that large-scale advertising does not engender leading firm growth is further evidence against the barrier-to-mobility (entry) hypothesis.

And finally, as was the case with advertising intensity, no anticompetitive influence of R & D intensity is noted over the 1947–72 period. Like advertising, R & D intensity seems to induce entry but limit nonleading firm growth in the 1963–72 period. Because these influences result in a negative effect on leading firm growth, a possibly procompetitive (deconcentrating) influence of R & D intensity is indicated.

IV. Conclusions

The purpose of this article was to reexamine the competitive consequences of large scale advertising by considering its effects on industrial mobility as measured by entry and growth by established nonleading and leading firms. An attractive feature of such an approach is that it avoids well-known problems of profit comparability across industries. In so doing, the approach permits an independent evaluation of Demsetz's recent contention that the observed link between profit rates

5. A negative sign on the capital requirements coefficient is only expected if profitability is controlled for. Otherwise a positive coefficient would result. Note that if entry is a function of historical profit rates such that $E = \alpha + \beta \pi/K$, and $\beta > 0$ (as seems reasonable), then $\partial E/\partial K = -\beta(\pi/K^2)$.

6. These results support earlier findings by Telser et al. (1975) of a positive correlation between entry and advertising intensity during the 1963–72 period.

and advertising intensity is due to accounting bias rather than barrier-to-entry influences. Interestingly, this analysis reveals that the mobility effect of advertising is to upset rather than reenforce the market share stability of established firms. Like Demsetz's earlier findings, these results tend to support the advertising-as-procompetitive thesis.

Appendix

The 29 consumer and 58 producer goods industries included for analysis were:

Consumer Goods Industries	Producer Goods Industries	
2044	2041	3323
2051	2042	3333
2052	2063	3334
2071	2083	3352
2072	2091	3411
2073	2097	3425
2085	2141	3444
2092	2292	3471
2098	2293	3494
2111	2294	3541
2121	2295	3554
2391	2421	3551
2893	2431	3555
3011	2433	3561
3021	2521	3562
3141	2522	3582
3161	2892	3612
3171	2895	3641
3421	2911	3691
3621	3111	3693
3692	3131	3715
3732	3221	3731
3751	3229	3861
3851	3241	3953
3949	3272	3955
3951	3274	3962
3961	3275	3963
3994	3291	3964
3996	3321	3993

References

- Caves, R. E., and Porter, M. E. 1977. From entry barriers to mobility barriers: conjectural decisions and contrived deterrences to new competition. *Quarterly Journal of Economics* 91 (May): 241-61.
- Comanor, W., and Wilson, T. 1967. Advertising, market structure, and performance. *Review of Economics and Statistics* 49 (November): 432-40.

- Demsetz, H. 1979. Accounting for advertising as a barrier to entry. *Journal of Business* 52 (July): 345-60.
- Hirschey, M. 1978. Television advertising and profitability. *Economics Letters* 1, no. 3: 259-64.
- Kmenta, J. 1971. *Elements of Econometrics*. New York: Macmillan.
- Mann, H. M. 1966. Seller concentration, barriers to entry, and rates of return in thirty industries, 1950-60. *Review of Economics and Statistics* 48 (August): 296-307.
- Miller, E. M. 1978. The extent of economies of scale: the effects of firm size on labor productivity and wage rates. *Southern Economic Journal* 44 (January): 470-87.
- National Science Foundation. 1977. *Research and Development in Industry*. Washington, D.C.: Government Printing Office.
- Nelson, P. 1970. Information and consumer behavior. *Journal of Political Economy* 78 (March/April): 311-29.
- Ornstein, S. I. 1977. *Industrial Concentration and Advertising Intensity*. Washington, D.C.: American Enterprise Institute.
- Orr, D. 1974. The determinants of entry: a study of the Canadian manufacturing industries. *Review of Economics and Statistics* 56 (February): 58-66.
- Peltzman, S. 1965. Entry in commercial banking. *Journal of Law and Economics* 13 (October): 11-50.
- Peltzman, S. 1977. The gains and losses from industrial concentration. *Journal of Law and Economics* 20 (October): 229-64.
- Porter, M. E. 1974. Consumer behavior, retailer power and market performance in consumer goods industries. *Review of Economics and Statistics* 56 (November): 419-36.
- Porter, M. E. 1976. Interbrand choice, media mix and market performance. *American Economic Review (Proceedings)* 66 (May): 398-406.
- Qualls, P. D. 1977. A note on the Lerner Measure of Monopoly versus and rate of return in structure-performance studies. *Industrial Organization Review* 5, no. 1: 67-69.
- Stigler, G. J. 1964. A theory of oligopoly. *Journal of Political Economy* 72 (February): 44-61.
- Strickland, A. D., and Weiss, L. W. 1976. Advertising, concentration, and price-cost margins. *Journal of Political Economy* 84 (October): 1109-21.
- Telser, L. G.; Best, W.; Egan, J. W.; and Higinbotham, H. N. 1975. The theory of supply with applications to the ethical pharmaceutical industry. *Journal of Law and Economics* 28 (October): 449-78.
- Telser, L. G. 1964. Advertising and competition. *Journal of Political Economy* 72 (December): 537-62.
- Weiss, L. W. 1963. Factors in changing concentration. *Review of Economics and Statistics* 45 (February): 70-77.
- Zellner, A. 1962. An efficient method of estimating seemingly unrelated regressions and tests for aggregation bias. *Journal of the American Statistical Association* 57 (June): 348-68.

Copyright of Journal of Business is the property of University of Chicago Press and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.