

Advertising and Concentration: A Survey of the Empirical Evidence

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This paper examines the empirical evidence on the relationship between advertising and concentration. The survey begins with the seminal work of Telser and proceeds to more recent research that focuses on the impact of television advertising on concentration.

The evidence on the relationship between advertising and concentration suggests that the issue is far from resolved. The empirical results vary not only with the period under consideration, but also with the sample of industries examined.

INTRODUCTION

The relationship between advertising and competition has received considerable attention. Most research has focused on the relationship between advertising and concentration. Other studies have concentrated on the impact of advertising on profit rates or prices.

Bain (1956, 1968) maintains that advertising expenditures create a product differentiation barrier to entry into an industry. This barrier may increase concentration. In contrast, Brozen (1974) argues that the information provided by advertising facilitates entry of new firms. More recently the work of Schmalensee (1982, 1983, 1992) and Sutton (1991) suggests that the relationship between advertising and concentration may differ for varying conditions of entry, pioneering brands, and for markets that are advertising-intensive. If consumers prefer brands that are first in a market, then a product differentiation advantage may exist even in the absence of advertising. Telser (1964) and Comanor and Wilson (1979) suggest that the relationship between advertising and concentration is an empirical issue. Nevertheless, a positive relationship between advertising and concentration can be consistent with both the barrier-to-entry and advertising-as-information hypotheses.

This literature review examines the empirical evidence on the relationship between advertising and concentration. The articles reviewed all use a concentration variable as a

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measure of monopoly power. I discuss problems of simultaneous equation bias that arise in estimating the impact of advertising on concentration. I also discuss more recent research that focuses on the impact of television advertising on concentration.

SINGLE EQUATION MODELS

The earliest attempts to estimate the advertising-concentration relationship use single equation models in which concentration is assumed to be a linear function of several explanatory variables. These studies, therefore, are designed to test the hypothesis that higher advertising intensity results in greater concentration. Telser examines the relationship between the four firm concentration ratio and the ratio of advertising outlays to dollar sales in 42 three digit standard industrial classification (SIC) consumer goods industries for 1947, 1954, and 1958. He performs a regression of concentration on advertising intensity for each of these years. The basic model tested is:

$$(1) CR = a + b\left(\frac{A}{S}\right) + \mu$$

where:

- CR = The four firm concentration ratio;
- A/S = The advertising-to-sales ratio; and
- μ = An error term.

The coefficient of the advertising intensity variable is statistically insignificant in each case. He also regresses the change in concentration on the change in advertising-to-sales ratios for 1947 to 1958, 1947 to 1954, and 1954 to 1958. Again, the estimated coefficient for b is statistically insignificant.

Telser also presents some evidence on the market share stability and life expectancy of heavily advertised brands of consumer products versus less heavily advertised brands. He uses recalled brand market share data from consumer interviews compiled by the *Milwaukee Journal*. Recalled brand share is the percentage of consumers who name the various brands they typically purchase. Recalled brand share may differ from market share derived from sales data because of imperfect consumer memories regarding product use. Telser finds that the average recalled share of the leading brands is lower for the more heavily advertised product group, cosmetics-toiletries, than for the less heavily advertised group, soaps. Furthermore, the average recalled share of leading soap product brands is lower than that of the least heavily advertised group, food products. The cosmetics-toiletries shares are less stable than food product shares. In general, soap product shares demonstrate less stability than food product shares and more stability than cosmetics-toiletries market shares.

Telser's interpretation is that new brands of cosmetics and toiletries are introduced more frequently than new food brands. Thus, his findings contradict the view that advertising increases monopoly power.

Mann, Henning, and Meehan (1967) use more narrowly defined four digit SIC industries than the three digit ones analyzed by Telser. They investigate the advertising-concen-

tration relationship using advertising data from *National Advertising Investments* (NAI), *Printer's Ink*, and *Advertising Age*. NAI reports total advertising expenditures in only three media, whereas the latter two sources contain data for a larger number of media. Therefore, the authors run separate regressions for the NAI data and for the *Printer's Ink* and *Advertising Age* data combined. They regress concentration ratios for 1954, 1958, and 1963 on the average advertising-to-sales revenue ratios for the leading firms from 1952 to 1956, 1957 to 1961, and 1962 to 1965, respectively. The sample consists of 14 four digit industries for the first set of data and 12 four digit industries for the second set.

In all of these equations the coefficient of the advertising-to-sales ratio variable is positive and statistically significant. Mann *et al.* argue that their sample of industries is less prone to measurement error in the independent variable than the sample used by Telser due to aggregation problems in combining several four digit SIC industries. They use this evidence to refute Telser's results.

The Mann *et al.* study spawned controversy. Ekelund and Maurice (1969) argue that their sample is composed primarily of large national advertisers and that such a sample could bias the results because of a positive correlation between firm size and concentration ratios. Using the data from Mann *et al.* Ekelund and Maurice regress the changes in concentration ratios on changes in advertising-to-sales ratios for 1963 to 1954, 1963 to 1958, and 1958 to 1954. The basic model tested is:

$$(2) \Delta y = a + b\Delta x + \mu$$

where:

- Δy = The change in the concentration ratio;
- Δx = The change in the advertising-to-sales ratio; and
- μ = An error term.

They find no significant correlations between the two variables in any of the equations. Ekelund and Maurice argue that this finding suggests the possibility of biased results in the Mann *et al.* study. They maintain that because the correlations between concentration and advertising-to-sales ratios are significant in that study, significant correlation between changes in these variables also would be expected.

Telser (1969) argues that the advertising expenditure data used by Mann *et al.* are based upon list prices that are biased upward. Further, their advertising data do not include expenditures in all media. The latter would result in downward biased estimates of advertising expenditures.

Telser also criticizes the choice of industries used by Mann *et al.* who exclude several industries with high and moderate advertising intensities. When Telser expands the sample to 26 industries, his results indicate that there is no significant relationship between concentration and advertising intensity.

Marcus (1969) uses data from the Federal Trade Commission publication, *Industry Classification and Concentration*, which reports changes in concentration ratios for four digit manufacturing industries for 1947, 1954, 1958, and 1963. In contrast to the contin-

uous advertising variables of Telser and Mann *et al.*, Marcus uses product differentiation dummy variables based upon the level of advertising expenditures in the industry.

Using a sample of 78 consumer products industries from these data, Marcus specifies the following model:

$$(3) d_{it} = a_0 + a_1 g_{it-1} + a_2 CR_{it-1} + a_3 MD_i + a_4 HD_i + e$$

where:

- d_{it-1} = Change in eight firm concentration ratio between 1963 and each of three previous years ($d_{it-1} = CR_{i63} - CR_{it-1}$; $t = 1963, 1958, 1954$);
- g_{it-1} = Growth rate of industry; i.e., value of shipments in 1963 over shipments in each of previous three years;
- CR_{it} = Percentage of shipments, for industry i , year t , accounted for by the eight largest firms ($i = 1, 2, \dots, 78$; $t = 1947, 1954, 1958, 1963$);
- MD = A dummy variable with a value 1 for all industries classified subject to medium differentiation;
- HD = A dummy variable with a value 1 for all industries subject to a high degree of differentiation;
- e = An error term, assumed to have zero mean and constant variance.

The coefficient of the industry growth rate variable, a_1 , is negative and statistically significant for 1947 to 1963 and 1954 to 1963, but not significant for 1958 to 1963. The coefficient for the base period concentration ratio, a_2 , is negative and statistically significant for all three periods.

The coefficients of the dummy variable for moderate product differentiation, a_3 , are positive and statistically significant for 1947 to 1963 and 1954 to 1963. The same results occur for the coefficients of the dummy variables representing high product differentiation, a_4 .

Marcus' findings imply that there is a positive relationship between the level of advertising intensity and the level of concentration. Because Marcus treats differentiation and advertising synonymously, he concludes that advertising will result in a substantial increase in industry concentration.

Mueller and Hamm (1974) focus on the change in concentration using cross-sectional industry data from 1947 to 1970. Their model also includes product differentiation dummy variables based on the level of advertising expenditures in the industry. Mueller and Hamm, however, use product differentiation dummy variables that measure the extent to which each consumer goods industry's product is differentiated relative to producer goods industries. This classification is based on Parker's (1967, undated) studies that classify industries as having low differentiation if they have advertising expenditures of less than 1 percent of sales. Those industries classified as highly differentiated have advertising expenditures mostly greater than 10 percent of sales and usually are heavy users of television advertising. Mueller and Hamm estimate separate equations for 1947 to 1970, 1947 to 1958, and 1958 to 1970 (because a larger sample of industries is available for the latter period).

Like Marcus, Mueller and Hamm find the variable for the beginning level of concentration and the product differentiation dummy variables to be significant explanatory variables. Based on their results the authors conclude that product differentiation had a strong positive impact on concentration from 1947 to 1970.

Ornstein and Lustgarten (1978) criticize the Mueller and Hamm study. Ornstein and Lustgarten observe that many industries are misclassified. Further, industries that are incorrectly classified as consumer goods industries have an average weighted change in concentration that is more than twice as large as that of all consumer goods industries in the sample. This circumstance biases the results toward a significant positive relationship between advertising and concentration.

Within the consumer goods group many industries are misclassified in their product differentiation category. Because the results obtained by Mueller and Hamm depend on the classification of industries, Ornstein and Lustgarten's criticisms are substantial.

In contrast to the previous studies, Nelson (1975) uses a different industry classification based on the information context of advertising. He distinguishes two types of goods: search goods whose qualities can be determined before purchase and experience goods whose qualities cannot be determined before purchase. He argues that the relationship between advertising and monopoly power varies according to the type of product in terms of search, experience, and durability.

Nelson criticizes previous empirical studies for failing to consider the effect of monopoly power on advertising. He argues that advertising will be greater the more inelastic is the firm's demand curve. This circumstance would tend to generate a positive effect of concentration on advertising because concentration is inversely correlated with elasticity of the firm demand curve. On the other hand, collusion to reduce advertising expenditures would increase with an increase in concentration. This situation would tend to generate a negative effect of concentration on advertising.

Nelson examines the relationship between advertising and concentration as well as other variables used to measure monopoly power for nondurable experience goods, durable experience goods, and search goods. He uses Telser's classification of durable and non-durable goods, classifying the durable goods into search and experience categories based on an estimate of the level of repair expenditures in the industry. Using data for 1957 and 1958 he obtains the correlation coefficients between concentration and advertising-to-sales ratios for consumer goods within these information categories. The only statistically significant relationship between concentration and advertising is a positive correlation coefficient for search goods. This result is due to the impact of concentration on advertising, according to Nelson. Therefore, he argues that these results support Telser's earlier findings that also contradict the hypothesis that advertising increases concentration.

In contrast, Ornstein (1977) tests for a quadratic relationship between advertising and concentration. A quadratic relationship exists if advertising increases with concentration up to a certain level of concentration and thereafter decreases. This would occur, for example, if collusion restricts advertising expenditures at high levels of concentration.

Ornstein offers two hypotheses for a positive relationship between advertising intensity and concentration. First, advertising may facilitate entry into larger markets, resulting in increases in firm size and increasing concentration. Second, large firm effects may cause concentration and advertising to be spuriously correlated.

To test these hypotheses Ornstein estimates equations with the industry advertising-to-sales ratio and the logarithm of total industry advertising expenditures as dependent variables. The sample consists of 261, 329, and 324 four digit manufacturing industries for 1947, 1963, and 1967, respectively. He obtains advertising data from the U.S. input-output tables for those years. He divides the samples into consumer, producer, durable, and nondurable goods industries for each year. This classification is based on the percentage of the industry's final output shipped to consumers and the percentage shipped to producers for use as investment goods or material inputs.

Ornstein finds only one statistically significant relationship between concentration and advertising intensity for the 1947 sample: a positive association for the consumer durable goods industries. Many of the equations for the 1963 and 1967 samples, however, show a positive and statistically significant relationship between concentration and advertising for both consumer and producer goods industries. There is no evidence of a quadratic relationship between concentration and advertising.

Ornstein argues that the similar results for both consumer and producer goods industries suggests that concentration and advertising are spuriously correlated because of large firm effects. He finds a positive association between concentration and advertising in producer goods industries although there is no basis for this relationship in traditional theory. Ornstein infers that a positive relationship between concentration and advertising in consumer goods industries occurred for some reason other than because advertising is a barrier to entry.

To determine whether findings similar to those of Marcus and Mueller and Hamm or contrary findings such as those of Ornstein would result from different databases and industry classification procedures, Asch (1979) examines the change in concentration from 1963 to 1972 and for two subperiods for 1963 to 1967 and 1967 to 1972. He regresses the relative change in concentration over the period on the beginning level of concentration, the level of advertising intensity, and the rate of sales growth over the period:

$$(4) \Delta CR = a + bCR + c\Delta VOS + d\left(\% \frac{A}{S}\right) + \mu$$

where:

- ΔCR = The four firm concentration ratio in the last year of the period divided by the four firm concentration ratio in the first year of the period;
- CR = The four firm concentration ratio in the first year of the period;
- ΔVOS = The value of shipments in the last year of the period divided by the value of shipments in the first year;
- $\% A/S$ = The percentage of industry value of shipments used to purchase inputs from the advertising sector; and
- μ = An error term.

Asch estimates separate equations for the entire sample, consumer goods, and producer goods as well as for both consumer and producer durable goods and nondurable goods. Despite obtaining a significant negative coefficient on the advertising variable for

consumer goods for 1967 to 1972, he concludes that the lack of a consistent result implies that advertising has a largely insignificant effect on concentration.

The results of some of the earlier studies may be biased due to specification of the dependent variable, the change in concentration. As explained by Wright (1978), this bias results from concentration being limited to a value between zero and one. Therefore, the higher the original level of concentration in the industry, the smaller is the maximum possible increase over the period. Consequently, as Levy (1985) points out, a negative correlation between changes in concentration and the level of concentration may be induced.

Levy seeks to overcome this bias problem by examining the change in concentration from 1963 to 1972 for a sample of 197 four digit industries using advertising data from the U.S. input-output tables. He uses a dynamic model that allows for partial adjustment to deviations of concentration from its long-run equilibrium value. In addition, Levy employs Wright's nonlinear transformation of the concentration change variable to adjust for bias in the dependent variable. This form of the variable adjusts changes in concentration into proportional terms. Thus, the method improves on previous work by accounting for concentration trends and by correcting for bias in the concentration variable.

Levy's specification is:

$$(5) \quad \frac{\Delta C_4}{(50-150-C_{4t})^{1/2}(50-150-C_{4t-1})^{1/2}} = \alpha_0 + \alpha_1 C_4 + \alpha_2 \text{MES} + \alpha_3 \text{CAPR} + \alpha_4 \text{ADV} + \alpha_5 \text{MGR} + \varepsilon$$

where:

$\frac{\Delta C_4}{(50-150-C_{4t})^{1/2}(50-150-C_{4t-1})^{1/2}}$	= The proportional change in the four firm concentration ratio using Wright's nonlinear transformation where C_{4t} = initial concentration in 1963 and C_{4t-1} = concentration in 1972;
MES	= The ratio of average plant size among the largest plants producing 50 percent of industry sales to total industry sales;
CAPR	= Ratio of MES multiplied by the gross book value of fixed assets to industry sales;
ADV	= The ratio of advertising outlays to sales;
MGR	= The ratio of the difference between present period sales and previous period sales to previous period sales; and
ε	= An error term.

The results suggest that advertising has an insignificant effect on concentration because the effect of ADV on the change in concentration is generally weak.

Eckard (1987) has a slightly different focus; his study examines the impact of advertising on market share instability. Eckard analyzes changes in the four firm concentration

ratio for a sample of manufacturing industries for 1963 to 1982. The study also improves on some of the previous work by adjusting for downward bias in the independent variable representing the beginning level of concentration in the industry. The results obtained by Marcus, Mueller and Hamm, and Asch, for example, may have been biased due to this problem. Leahy (1981, 1988) shows that the coefficient of the variable representing the beginning level of concentration in an industry contains a bias due to the influence of transitory components included in the measured values. The measured value of the beginning level of concentration includes both a permanent and a transitory component. This transitory component of the measured beginning level of concentration imparts a downward bias to the coefficient of this variable and, if correlated with the other independent variables, could bias their coefficients as well.

The basic models tested are (excluding interaction variables):

$$(6) \text{ DEVM} = f(\text{VS}, \text{VSG}, \text{VSGV}, \text{CRDEV}, \text{CR}, \text{ASR})$$

and

$$(7) \text{ DEVT} = f(\text{VS}, \text{VSG}, \text{VSGV}, \text{CRDEV}, \text{CRG}, \text{CR}, \text{ASR})$$

where:

DEVM	=	The mean of the absolute deviations from the mean of the five four firm concentration ratio observations available for each industry over the period;
VS	=	The mean value of industry shipments measured in 1982 dollars;
VSG	=	The absolute value of the average annual compounded real growth rate of industry shipments;
VSGV	=	The ratio of the mean of the absolute deviations of the five value of industry shipments observations from the compound growth trend line to VS;
CRDEV	=	The deviation of the four firm concentration ratio from the midpoint of its range;
CR	=	The average value of the five four firm concentration ratio observations;
ASR	=	The advertising-to-sales ratio;
DEVT	=	The mean of the absolute deviations from the simple time trend of the four firm concentration ratio over the period; and
CRG	=	The absolute value of the slope of the linear regression of the five four firm concentration ratio observations on time.

Eckard finds no support for the theory that advertising reduces market share instability and no evidence that the market share instability of leading firms is lower in advertising-intensive industries because the coefficient of ASR is insignificant in both models. Thus, Eckard's results do not support the theory that advertising promotes market power.

Table 1—Empirical Results of Estimation of Advertising and Concentration Relationship, Single Equation Models

Study	Data	Major Findings*
Telser (1964)	Three digit SIC consumer goods industries 1947-1958, 1947-1954, & 1954-1958	Insignificant
Mann et al. (1967)	Four digit SIC industries 1952-1956, 1957-1961, & 1962-1965	Positive
Ekelund and Maurice (1969)	Four digit SIC industries 1954-1963, 1958-1963, & 1954-1958	Insignificant
Telser (1969)	Four digit SIC industries 1958	Insignificant
Marcus (1969)	Consumer products industries 1947-1963, 1954-1963, & 1958-1963	Positive
Mueller and Hamm (1974)	Four digit SIC industries 1947-1970, 1947-1958, & 1958-1970	Positive
Nelson (1975)	Consumer goods 1957-1958	Insignificant
Ornstein (1977)	Four digit SIC manufacturing industries 1947-1963, & 1967	Mixed
Asch (1979)	Consumer and producer goods 1963-1972, 1963-1967, & 1967-1972	Insignificant
Levy (1985)	Four digit SIC industries 1963-1972, 1963-1967, & 1967-1972	Insignificant
Eckard (1987)	Manufacturing industries 1963-1982	Insignificant

**Insignificant* indicates the results of the study suggest no relationship between advertising and concentration. *Positive* denotes findings suggesting that advertising increased concentration and/or concentration increased advertising. *Mixed* refers to those studies that obtained both positive and insignificant results on the relationship between advertising and concentration. *Negative* refers to the results of those studies that suggest that advertising decreases concentration

The results of the single equation model studies are summarized in Table 1. Because the results vary considerably, there does not appear to be consensus regarding the relationship between advertising and concentration.

SIMULTANEOUS EQUATION MODELS

Single equation models have not addressed the question of the direction of causality between advertising and concentration. One potential problem with empirical research on advertising and concentration is simultaneous equation bias due to correlation between the explanatory variable and the error term. There are valid reasons for concentration to influence advertising as well as for advertising to influence concentration. This simultaneity results in biased and inconsistent least squares estimates.

It has been shown by Leahy (1981) that a firm would tend to advertise more the greater is the inelasticity of its demand curve. This inverse relationship would tend to produce a positive impact of concentration on advertising. On the other hand, collusion to reduce mutually offsetting advertising expenditures may increase with an increase in concentration, according to Nelson (1975). This circumstance would generate a negative impact of concentration on advertising expenditures.

The influence of advertising on concentration is mixed. First, as Nelson (1974) has shown, advertising is not distributed randomly among different firms. Rather, the more efficient firms have the greatest incentive to advertise, and these firms would tend to grow larger as a result of advertising. This situation would produce a positive effect of advertising on concentration.

On the other hand, advertising facilitates entry into an industry as long as consumers are using nonrandom sampling procedures prior to advertising. Nelson (1975) presents evidence that consumers tend to use nonrandom sampling procedures. He predicts concentration ratios from knowledge of the consumer's optimal sample size for the number of brands of a product (Nelson, 1970). This prediction depends upon the brands being sampled by one consumer being correlated with those brands sampled by another consumer. Further, this correlation requires nonrandom sampling on the part of consumers. Therefore, because entering firms tend to be smaller than existing competitors, this circumstance would generate a negative impact of advertising on concentration (Nelson, 1975).

Several attempts have been made to handle this problem using simultaneous equation techniques. Greer (1971) employs the same sample of 41 three digit consumer goods industries as Telser. He divides these industries into three classes according to the degree to which their product characteristics make them conducive to differentiation via advertising. These classes range from class I, containing those industries whose products are considered by Greer to have the smallest potential for differentiation through advertising, to class III, whose products have the greatest possibility of differentiation through advertising. The classification is based on Greer's estimation of the potential profitability of advertising to the respective product classes. For example, standard, low priced goods such as food and clothing are placed in class I.

Using these data for 1948, 1954, and 1957 pooled, Greer estimates a simultaneous equation model for each of the three classes of industries using two stage least squares (TSLS). His specification is:

$$(8) A = a_1 + a_2C + a_3C^2 + a_4G$$

$$(9) C = b_1 + b_2X + b_3M + b_4\log K + b_5A + b_6XA + b_7G$$

$$(10) G = c_1 + c_2P + c_3E + c_4A$$

where:

- A = Advertising as a percentage of sales (endogenous);
- C = Four firm concentration ratio (percent) (endogenous);
- G = Short-run growth in real terms for the periods 1947 to 1950, 1951 to 1954, 1954 to 1957 (endogenous);
- X = A dummy variable keyed on concentration to allow for the nonmonotonic nature of the advertising-concentration function when concentration is the dependent variable;
- M = Minimum efficient size plant (economies of scale) as a percentage of the national market;
- K = Absolute capital requirements for establishing a minimum efficient size firm;
- P = Relative price change, P_t/P_{t-3} ; and
- E = Disposable income elasticity of demand.

There is some evidence of a quadratic relationship between advertising and concentration; however, the results are the least robust for class III because the coefficient of the advertising variable is not statistically significant in the concentration equations. Class III contains those industries whose products have the greatest possibility of differentiation through advertising according to Greer's classification. Therefore, any hypothesized relationship between advertising and concentration should be stronger for this class.

Using a much larger sample than that of Telser and Greer, Strickland and Weiss (1976) estimate a simultaneous equation model with the advertising-to-sales ratio, the concentration ratio, and the price-cost margin as endogenous variables. Their sample consists of 408 four digit SIC manufacturing industries from the 1963 *Census of Manufactures*.

Strickland and Weiss present both ordinary least squares (OLS) and TSLS estimates of the equations for all industries in their sample and for consumer and producer goods separately. The major findings of the OLS estimation are that both concentration and the square of the concentration ratio have a statistically significant impact on advertising, except in the producer goods sample, with positive and negative coefficients, respectively, and that the coefficient of the advertising-to-sales ratio variable is positive and significant in the concentration equation.

The TSLS estimates of the advertising and concentration equations are similar to the OLS results; the association between advertising and concentration runs in both directions. Thus, this study yields conflicting results about advertising and concentration.

As in the Strickland and Weiss study, Gisser (1991) also examines the relationship between advertising, concentration, and profitability using 1977 data for 445 four digit SIC manufacturing industries. He presents both OLS and TSLS estimates of the equations for all industries in the sample and separate results for industries producing homogeneous and heterogeneous goods, respectively. The results suggest that advertising and concentration are positively related and that the direction of causality is from concentration to advertising. Gisser provides additional evidence that concentration drives advertising, not the reverse.

The results of the simultaneous equation models are summarized in Table 2. These studies do not provide consistent evidence of a systematic relationship between advertising and concentration.

RECENT STUDIES

Although single and simultaneous equation models attempt to address the role of advertising in industry concentration, these studies do little to assess whether differences in the *type* of advertising have differential effects on the relationship between advertising and concentration. More recent research focuses on the form as well as the level of advertising to analyze this relationship. Television advertising, in particular, has been isolated as having a distinct impact on concentration.

In an extension of the previous work of Mueller and Hamm, Mueller and Rogers (1980) examine the change in concentration from 1947 to 1972. Their sample consists of 167 four digit SIC industries for which comparable data are available over the period. They estimate some equations using dummy variables representing the degree of product differentiation in the industry. In other equations Mueller and Rogers use the industry

Table 2—Empirical Results of Estimation of Advertising and Concentration Relationship, Simultaneous Equation Models

Study	Data	Major Findings*
Greer (1971)	Three digit SIC consumer goods industries for 1948-1957	Mixed
Strickland and Weiss (1976)	Four digit SIC manufacturing industries for 1963	Mixed
Gisser (1991)	Four digit SIC manufacturing industries for 1977	Positive

See notes to Table 1

advertising-to-sales ratio as the measure of advertising intensity. In addition, they estimate equations using both a television-plus-radio advertising variable and an all other advertising variable to differentiate the effect of television advertising from advertising in other media. They estimate separate equations for 1947 to 1958 and 1958 to 1972. The results suggest that television advertising has a significant positive effect on concentration.

In a subsequent study Mueller and Rogers (1984) estimate the impact of advertising intensity on the change in concentration from 1947 to 1977 and for several subperiods for 1947 to 1958, 1958 to 1967, 1967 to 1977, 1947 to 1963, 1963 to 1977, and for five year intervals from 1954 to 1977. The sample consists of 165 manufacturing industries. Mueller and Rogers estimate some equations using the industry advertising-to-sales ratio as the measure of advertising intensity. In other equations television-plus-radio advertising and all other advertising variables are used as the measures of advertising intensity. The results again support their conclusion that television advertising results in an increase in concentration.

Lynk (1981) focuses on the underlying consumer information aspects of advertising. He examines the change in concentration from 1954 to 1963 and 1954 to 1967 for a sample of 58 four digit SIC industries producing primarily consumer products. Lynk's independent variables consist of the (log) change in the number of firms in the industry over the period, the advertising-to-sales ratio at the end of the period, and the fraction of the industry's total advertising expenditures spent on television in 1970 as the measure of advertising intensity. He finds that advertising has a negative impact on concentration.

Lynk's (1981) results are questioned by Leahy (1988) who argues that Lynk's sample period is likely to omit a major portion of the structural impact due to the introduction of television. Using a similar approach to Lynk Leahy finds a positive and significant effect of advertising on concentration for 1947 to 1967 and an insignificant effect for 1947 to 1972. In a later study Leahy (1989) obtains a positive and significant effect of advertising on concentration from 1947 to 1977.

Several recent studies focus on advertising and concentration within specific industries. Tremblay (1985) analyzes concentration in the U.S. brewing industry using a pooled data set of 22 firms from 1950 to 1977. His results suggest that increasing concentration accompanied by higher advertising expenditures result in higher beer prices from 1950 to 1971. Tremblay's results, however, do not necessarily imply anticompetitive effects of advertising, because, as Lynk (1985) suggests, they could have resulted from a shift in the cost of advertising from the retail level to the manufacturer.

Table 3—Empirical Results of Estimation of Advertising and Concentration Relationship, Recent Studies

Study	Data	Major Findings*
Mueller and Rogers (1980)	Four digit SIC industries 1947-1958 & 1958-1972	Positive
Mueller and Rogers (1984)	Manufacturing industries 1947-1977, 1947-1958, 1958-1967, 1967-1977, 1947-1963, 1963-1977, & for five year intervals from 1954-1977	Positive
Lynk (1981)	Four digit SIC industries 1954-1963 & 1954-1967	Negative
Leahy (1988)	Four digit SIC manufacturing industries 1947-1967 & 1947-1972	Mixed
Leahy (1989)	Four digit SIC manufacturing industries 1947-1977	Positive
Tremblay (1985)	Beer industry firm data 1950-1977	Positive
Eckard (1991)	Cigarette industry brand and firm data 1960-1980	Negative

See notes to Table 1

Eckard (1991) uses a different measure of concentration to examine the impact of the ban on television advertising in the cigarette industry. Eckard uses concentration measured by the Herfindahl-Hirschman index as one of several proxies for the degree of competition and both brand and firm samples from 1960 to 1980. The results of this study (after adjusting for trend effects) indicate that both brand and firm market shares are more stable after the ban. These results are consistent with Eckard and Telser. In addition, leading brand shares and both brand and firm concentration were decreasing before the ban, but were stable or increasing after the ban. Thus, the results support the competitive theory of advertising.

The results of the above studies are generally more robust because these studies tend to find a significant relationship between advertising and concentration.

The results of the more recent studies are summarized in Table 3. Again, no consistent findings regarding advertising and concentration emerge. Nevertheless, it is noteworthy that most of these studies obtain significant results in light of the numerous previous studies that obtain either insignificant or mixed results.

CONCLUSION

This review of empirical research on the relationship between advertising and concentration suggests that the issue is far from resolved. The results vary not only with the period under consideration, but also with the sample of industries.

Theoretical reasons why a conclusive relationship between advertising and concentration is not reached are suggested by Nelson, Schmalensee, and Sutton. Nelson argues that the relationship between advertising and concentration varies according to the information context within which advertising operates (i.e., search versus experience). Schmalensee and Sutton suggest that this relationship may differ for varying conditions of entry, pioneering brands, and for advertising-intensive markets.

Asch presents several empirical reasons why the estimation of this relationship may be elusive: errors of measurement in both the industry and variable definitions; omitted variables that also influence concentration; and the possibility that the relationship varies with the period examined. Several more recent studies highlight the fact that trend effects can play an important role in the estimation of this relationship.

The obvious conclusion to draw about this empirical research is that the results do not vary systematically according to industry, estimation method, and sample period. Random elements may play a major role in concentration trends according to Scherer (1970). The evidence suggests that television advertising has a significant positive effect on concentration. Another area for further research is how the advertising-concentration relationship varies with the type of advertising involved, e.g., price versus nonprice advertising or national versus regional/local advertising. More work is needed to determine why television advertising has a more dramatic impact on concentration than other types of advertising. Most of the studies of advertising and concentration have used cross-sectional industry data. It may be possible using time series data to examine these issues and avoid problems associated with controlling for interindustry concentration differences. These data are available for some industries, but the results cannot be generalized. Further research also may shed light on how differences by industry in the ability to collude affect the relationship between advertising and concentration as suggested by Nelson. The theoretical and empirical problems involved in the estimation of this relationship suggest that future research is far from closed.

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