



Advertising, Concentration, and Profitability: The Simultaneity Problem

Stephen Martin

The Bell Journal of Economics, Volume 10, Issue 2 (Autumn, 1979), 639-647.

Stable URL:

<http://links.jstor.org/sici?sici=0361-915X%28197923%2910%3A2%3C639%3AACAPTS%3E2.0.CO%3B2-X>

Your use of the JSTOR archive indicates your acceptance of JSTOR's Terms and Conditions of Use, available at <http://www.jstor.org/about/terms.html>. JSTOR's Terms and Conditions of Use provides, in part, that unless you have obtained prior permission, you may not download an entire issue of a journal or multiple copies of articles, and you may use content in the JSTOR archive only for your personal, non-commercial use.

Each copy of any part of a JSTOR transmission must contain the same copyright notice that appears on the screen or printed page of such transmission.

The Bell Journal of Economics is published by The RAND Corporation. Please contact the publisher for further permissions regarding the use of this work. Publisher contact information may be obtained at <http://www.jstor.org/journals/rand.html>.

The Bell Journal of Economics
©1979 The RAND Corporation

JSTOR and the JSTOR logo are trademarks of JSTOR, and are Registered in the U.S. Patent and Trademark Office. For more information on JSTOR contact jstor-info@umich.edu.

©2002 JSTOR

Advertising, concentration, and profitability: the simultaneity problem

Stephen Martin*

This article examines the identification of a system of equations which seeks to explain industrial profitability, concentration, and advertising intensity. We specify a concentration equation which reflects a dynamic adjustment to a long-run level which depends on the nature of entry conditions. The specification of the concentration equation is seen to be critical to the identification of the profitability equation. We test the model against a sample of input-output table detailed industries and find that the resulting estimates suggest the importance of avoiding the omission of relevant explanatory variables.

1. Introduction

■ Most empirical studies of industrial organization have been carried out in the context of single-equation models. From the beginning, however, simultaneous relations between measures of performance and structure have been suggested. Bain (1956, p. 191) indicates that profitability will be influenced by both entry conditions and seller concentration:

... we would anticipate some complex relationship of at least three variables—profit rate, degree of seller concentration, and the condition of entry—of such a character that some net positive association of the barrier to entry and the profit rate would be apparent.

He elsewhere (1968, p. 299) points out that seller concentration will be determined partially by the nature of entry conditions.

Studies of advertising intensity (e.g., Greer, 1971) argue that it will depend upon both seller concentration and profitability, while other work has explained profitability (Comanor and Wilson, 1967) or concentration (Ornstein *et al.*, 1973) by advertising intensity.

If a complete model involves the simultaneous determination of profitability, seller concentration, and advertising intensity,¹ then simultaneous estimation techniques are necessary. Pekelman (1977, p. 532) asserts that

* Michigan State University.

This paper has benefited from the comments of anonymous referees, and from the comments of participants at the August 1978 meetings of the Econometric Society on an earlier version. Responsibility for remaining errors rests with the author.

¹ Other variables have been endogenized elsewhere (Greer, 1971; Esposito and Esposito, 1974; Pugel, 1977) but the simultaneity problem is most severe for the three variables treated here. We assume that other variables are determined principally by factors other than those which explain the three variables endogenized here.

. . . the inconclusiveness of the empirical studies may have resulted from ignoring the simultaneity of the phenomenon in the model formation, and, consequently, from adapting an inappropriate estimation procedure.

Strickland and Weiss (1976) (hereafter SW) have addressed the simultaneity problem. They estimate the following three-equation system for a sample of four-digit SIC industries:²

$$\frac{A}{S} = a_0 + a_1 PCM + a_2 \frac{CD}{S} + a_3 CR4 + a_4 \overline{CR4}^2 + a_5 GR + a_6 DUR \quad (1)$$

$$CR4 = b_0 + b_1 \frac{A}{S} + b_2 \frac{MES}{S} \quad (2)$$

$$PCM = c_0 + c_1 \frac{K}{S} + c_2 GR + c_3 CR4 + c_4 GD + c_5 \frac{A}{S} + c_6 \frac{MES}{S} \quad (3)$$

SW report two-stage least squares estimates of this model. 2SLS is an instrumental variables technique, and it will yield coefficient estimates whenever the order condition for identification is satisfied (which is the case here). But equation (3) does not satisfy the rank condition for identification: there is no explanatory variable in the system which is missing from (3) but present in (2).³ If the three equations are correctly specified, no estimation technique will yield consistent estimates of the coefficients of the third equation.

We examine below the specification of each equation in the SW model and develop an extension within which each equation satisfies both rank and order conditions for identification. We estimate this extended model for a sample of input-output table detailed industries.

2. Profitability

■ SW estimate a linear version of a general profitability equation which can be described as

$$PCM = f(C, BE, \epsilon_p). \quad (4)$$

Phillips (1976, p. 241) discusses a similar model of profitability. Variables in the vector C ($CR4$ and GD in the SW model) describe the ease of collusion. Variables included in BE ($MES/S, A/S$) indicate the nature of entry conditions. ϵ_p contains variables which measure variations in the price elasticity of demand (GR). When the measure of profitability is the price-cost margin, the capital-sales ratio should appear to allow for a normal rate of return on capital.

Caves *et al.* (1975, p. 133), Cowling (1976, pp. 2–3), and Phillips (1976) have

² Here A/S is the advertising-sales ratio, PCM is the price-cost margin, CD/S is the fraction of sales going to final consumer demand, $CR4$ is the four-firm seller concentration ratio, GR is the growth rate of industry sales, DUR is a durable good dummy, MES/S is the fraction of industry sales accounted for by a plant of minimum efficient scale, K/S is the industry capital-sales ratio, and GD is a measure of geographic dispersion.

³ Fisher (1966, pp. 127–151) discusses the conditions for identification in nonlinear systems. 2SLS fails when an equation fails to meet the order condition for identification because the procedure requires the inversion of a singular matrix. When the order condition is met, but the rank condition is not, 2SLS requires the inversion of a matrix which will be singular in the probability limit, although it will be nonsingular for any particular sample; see Fisher (1966, pp. 52–56). I am grateful to Peter Schmidt for helpful discussion on this point.

emphasized the importance of allowing for variations in demand conditions. It is reasonable to suppose that the demand characteristics of industries will differ, depending on the fraction of sales going to final consumer demand (CD/S), which SW include in their advertising equation but not in their profitability equation. If CD/S is added to equation (3) as an explanatory variable, then that equation fails even the order condition for identification.

Cross section studies have employed other variables to describe the demand side of the market. Esposito and Esposito (1971) and Jones *et al.* (1977) include the fraction of industry sales provided by foreign suppliers (IM/S) as a variable explaining profitability. A greater IM/S should increase the price elasticity of demand for domestic suppliers. To the extent that greater imports reduce the ease of collusion, IM/S should appear in C above, as well as in ϵ_p .⁴

Lustgarten (1975) finds a significant role for the estimated four-firm buyer concentration ratio (BCR) in explaining profitability. SW include the advertising-sales ratio in their profitability equation as an index of product-differentiation barriers to entry; to the extent that advertising reduces the price elasticity of demand, it belongs in ϵ_p as well.

Among variables describing entry conditions, the cost disadvantage ratio of Caves *et al.* (1975) will supplement a measure of minimum efficient scale (MES/S) by indicating the disadvantages inherent in below- MES operation.⁵ The success of advertising in establishing product differentiation may well depend on the share of industry sales going to final consumer demand.

3. Concentration

■ The model of concentration developed here is rooted in Gaskins' (1971) model of profit maximization when the rate of entry depends on the gap between market and limit price. When industry sales are growing, Gaskins (1971, p. 317) shows that a dominant firm or group will price to allow some entry and that

. . . growth of the product market not only raises the long-run price level . . . but it also allows dominant firms with insignificant cost advantages to maintain a constant market share over the long haul.

Suppose that the long-run market share of the dominant group, CR^* , depends in general on entry conditions and in particular on the growth rate of sales.⁶ The observed market share will approach the long-run level at a rate λ , which will itself depend on entry conditions and on the inducement to entry, which can be represented by past profitability:

$$CR - CR_{-1} = \lambda[CR^*(GR, BE) - CR_{-1}] \quad (5)$$

or

$$CR = \lambda CR^*(GR, BE) + (1 - \lambda)CR_{-1}. \quad (6)$$

⁴ Preliminary tests included the export share of sales as a variable describing the demand side of the market; it failed conventional tests of statistical significance, and is excluded here.

⁵ Preliminary tests included a measure of absolute capital requirements, computed as the shipments of a minimum efficient scale plant times the industry capital-sales ratio, as a measure of entry conditions. Perhaps because of collinearity, this variable failed conventional tests of statistical significance, and is excluded here.

⁶ Baumol and Fischer (1978) discuss the relation between industry structure and underlying cost conditions.

In general, current concentration will depend on sales growth, entry conditions, past profitability, and past concentration:

$$CR = g(GR, BE, PCM_{-1}, CR_{-1}). \quad (7)$$

The expected derivative of lagged profitability in (7) is negative: all else equal, greater past profitability should induce more rapid entry and reduce current concentration. Something along these lines seems called for by Pashigian (1968) and Schmalensee (1972, pp. 40–41). It is consistent with the argument of Nelson and Winter (1978, p. 543) that “industrial concentration is to be understood as a dynamic, historical phenomenon, endogenous to the market system in which it appears.”

4. Advertising

■ Dorfman-Steiner type models of advertising (see Schmalensee, 1972, pp. 20–43) suggest that the advertising-sales ratio will equal the product of the price-cost margin and the advertising elasticity of demand.⁷ Seller concentration will proxy both the ease of collusion to obtain this optimal advertising intensity and the possibility of oligopolistic infighting, with rivalry diverted from price competition to promotional competition. We expect in general

$$\frac{A}{S} = h(PCM, CR4, \epsilon_a), \quad (8)$$

where ϵ_a consists of variables influencing the advertising elasticity of demand. Following SW (1976, p. 1111) and the references cited there, we expect equation (8) to be roughly quadratic in concentration.

Following SW, we include in ϵ_a a durable good dummy (DUR), the percentage of sales going to final consumer demand (CD/S), and the growth rate of industry sales (GR). The buyer concentration ratio (BCR) and the import-sales ratio (IM/S) may also affect the success of advertising in influencing demand.

5. The system of equations

■ Except as noted for the advertising equation, we specify linear functional forms for estimation;⁸ the resulting equations are:

$$\frac{A}{S} = a_0 + a_1 DUR + a_2 \frac{CD}{S} + a_3 \frac{IM}{S} + a_4 BCR + a_5 GR + a_6 PCM67 + a_7 CR467 + a_8 \overline{CR467}^2 \quad (9)$$

$$CR467 = b_0 + b_1 REG + b_2 \frac{CD}{S} + b_3 GR + b_4 \frac{A}{S} + b_5 \frac{MES}{S} + b_6 CDR + b_7 PCM63 + b_8 CR463 \quad (10)$$

⁷ See Martin (1978) for an extension of the Gaskins model, which allows for advertising by the dominant firm and which yields a Dorfman-Steiner type optimality condition.

⁸ A variety of linear and nonlinear specifications of the profitability equation are tested in Martin (1979).

$$PCM67 = c_0 + c_1REG + c_2 \frac{CD}{S} + c_3 \frac{IM}{S} + c_4BCR + c_5GR + c_6 \frac{A}{S} + c_7 \frac{K}{S} + c_8 \frac{MES}{S} + c_9CDR + c_{10}CR467. \quad (11)$$

The advertising equation, (9), and the profitability equation, (11), differ from SW mainly by the inclusion of explanatory variables which have been tested elsewhere with some success. But the specification of the concentration equation, (10), differs fundamentally from that of SW: being based on a dynamic view of industrial concentration, it includes as explanatory variables lagged profitability (the inducement to entry) and lagged concentration.

There are 10 exogenous variables in this system (constant, *REG*, *DUR*, *K/S*, *CD/S*, *IM/S*, *BCR*, *GR*, *MES/S*, and *CDR*) and two predetermined variables (*PCM63* and *CR463*). No equation has more than 11 coefficients to be estimated, so all equations satisfy the order condition for identification. Since *DUR* and *CR467*² appear only in (9), *PCM63* and *CR463* appear only in (10), and *K/S* appears only in (11), all equations satisfy the rank condition for identification as well.⁹

In the SW model, the profitability equation fails identification, since there is no explanatory variable missing from it but included in the concentration equation. We argue that the critical misspecification in the system is not in the profitability equation but in the concentration equation, which reflects a static, rather than a dynamic viewpoint.

Equation (10) is equivalent to an equation of the form

$$\Delta CR = CR - CR_{-1} = (b_8 - 1)CR_{-1} + \dots, \quad (12)$$

which explains the change in concentration in terms of initial concentration and other variables. Such equations have been tested by Mueller and Hamm (1974) and Jenny and Weber (1978).¹⁰ They seem to identify a negative coefficient of lagged concentration in an equation like (12) with a decline in concentration over time; thus Jenny and Weber (1978, p.196) note:

. . . a negative and significant sign for the initial concentration variable . . . will reveal either a dominant strategy of short-run profit maximization or an unsuccessful attempt at preventing potential entry whereas a positive sign . . . will point towards a successful limit price strategy.

(See also Mueller and Hamm, 1974, p. 518.) A negative coefficient in (12) would correspond to a coefficient less than one in (10). In terms of dynamic adjustment to a long-run concentration level, it is clear that a coefficient less than one need not imply decreasing concentration: it only means that the dynamic process is stable, and will converge over time. If current concentration is above the long-run level, then concentration will indeed decline. But if current concentration is below the long-run level, and the adjustment process is stable, then concentration will rise to the equilibrium level. A positive coefficient for lagged

⁹ Following Fisher (1966, p. 146), the rank condition for the identification of an equation in this system can be expressed as the requirement that the rank of a matrix formed from the columns of the structural coefficient matrix which correspond to variables which do not appear in the equation equal 2.

¹⁰ Wright (1978) explores alternative specifications of equations explaining the change in concentration.

concentration in (12) would correspond to a coefficient greater than one in (10), indicating an unstable dynamic process.

6. An empirical test

■ The sample consists of 209 detailed industries from the 1967 input-output tables for the United States; lagged values refer to 1963. For the most part, this classification corresponds to the 4-digit SIC level; 28 of the industries in the sample correspond to the 3-digit SIC level. All industries for which a complete set of variables could be obtained were included in the sample, except those described as “miscellaneous” or “not elsewhere classified.” The sample was divided into 53 consumer good industries and 156 producer good industries, following the classification of Ornstein (1977).

We employ a regional industry dummy (*REG*), following Schwartzman and Bodoff (1971), to correct for the fact that national concentration ratios understate market concentration in regional or local markets. The durable good industry dummy (*DUR*) was set equal to one for industries classified as producing durable goods by Ornstein (1977), and zero otherwise. Other variables were constructed either from input-output tables or from the Census of Manufacturers. Variables used here which were employed by SW follow their construction. The buyer concentration ratio (*BCR*) observations were kindly provided by Professor Steven Lustgarten; for details of construction, see Lustgarten (1975). The definition of the cost disadvantage ratio (*CDR*) follows Caves *et al.* (1975).

We estimated the system of equations separately for consumer good and producer good industries by using three-stage least squares to obtain consistent parameter estimates which are asymptotically equivalent to full-information maximum likelihood estimates. Following Kelejian (1971) and Edgerton (1972), we included squares of all nondummy exogenous and predetermined variables as instrumental variables to allow for the nonlinear nature of the reduced-form equations. The estimates appear in Table 1.

Profitability and seller concentration are the most significant explanatory variables in the advertising equation. No one of the variables describing demand characteristics is significant for the consumer good sample, but three (*CD/S*, *IM/S*, and *BCR*) are significant for the producer good sample. The 2SLS estimates for SW indicate a more significant role for *CD/S*, for each sample; this may be owing to the omission of relevant explanatory variables.

Lagged concentration is clearly the most important variable on the right-hand side of the concentration equation. For each sample, the estimated coefficient is very significantly different from zero. Perhaps more important, the estimated coefficients are significantly less than one. This is consistent with the existence of a stable dynamic adjustment process toward a long-run level of seller concentration. Variables which describe technical entry conditions (*MES/S* and *CDR*) have significant coefficients, although for our sample advertising intensity does not. The significant coefficients which SW report for *A/S* may result from their omission of lagged concentration and the cost disadvantage ratio as explanatory variables. The estimated coefficient of lagged profitability is negative for the consumer good sample, as expected, but not statistically significant.¹¹

¹¹ Orr (1974) similarly fails to find a statistically significant induced entry effect.

TABLE 1
SYSTEM ESTIMATES

	SAMPLE					
	C		P		C	
	DEPENDENT		VARIABLE		DEPENDENT	
	A/S	A/S	CR467	CR467	PCM67	PCM67
C	-5.1542	-.2816	7.1531	9.1457	1.0905	17.0440
REG			-2.0775 (1.0987)	-1.6988* (1.4068)	2.3329 (.8258)	1.9511* (1.4319)
DUR	-.9766 (.6378)	.1231 (.9173)				
CD/S	-.0354 (.6551)	.0188*** (2.5794)	.0826** (1.6854)	-.0074 (.1422)	.0821 (.9232)	.1272** (2.1902)
IM/S	-.0108 (.0687)	-.0176* (1.4727)			-4083** (1.7055)	-.1724** (1.7757)
BCR	-.1909 (1.1449)	-.0069** (2.0579)			.0900 (.4090)	-.0182 (.6687)
GR	.0196 (.3901)	-.0019 (.7806)	-.0197 (.4357)	-.0040 (.2486)	.1284** (1.7047)	.0966*** (5.0166)
A/S			.0552 (.3398)	-.4378 (.7302)	.6108*** (2.5151)	3.8905*** (5.8020)
K/S					.0703 (.8351)	.1146*** (7.3816)
MES/S			.3096** (1.8674)	.0934 (.8868)	.4824* (1.6801)	-.0376 (.3229)
CDR			-.0722* (1.4801)	-.0743** (1.9956)	.0194 (.2663)	-.0587* (1.4539)
PCM67	.2755*** (2.8109)	.0377*** (4.0712)				
PCM63			-.0684 (.6245)	.0459 (.7581)		
CR467	.3648** (2.1955)	.0171* (1.5503)			.0782 (.8959)	.0405* (1.3367)
CR467 ²	-.003964** (2.1567)	-.000174* (1.5503)				
CR463			.8741*** (17.7113)	.9243*** (38.1116)		
GOF	.1953	.1807	.9510	.9461	.3978	.4154

* INDICATES STATISTICAL SIGNIFICANCE AT THE 10-PERCENT LEVEL.
 ** INDICATES STATISTICAL SIGNIFICANCE AT THE 5-PERCENT LEVEL.
 *** INDICATES STATISTICAL SIGNIFICANCE AT THE 1-PERCENT LEVEL.
 t—STATISTICS IN PARENTHESES.
 THE GOODNESS OF FIT MEASURE (GOF) IS THE SQUARE OF THE
 CORRELATION COEFFICIENT BETWEEN ACTUAL AND FITTED VALUES;
 SEE HAESSEL (1978).
 C INDICATES CONSUMER GOOD SAMPLE; P INDICATES PRODUCER GOOD SAMPLE.

For the profitability equations, the coefficients of variables tested by SW are roughly the same as those reported by SW. Their consumer good sample yields a negative coefficient for the capital-sales ratio, while the coefficient is positive here, but the coefficients are insignificant in each case. Our sample gives a growth variable which has a larger and more significant coefficient. The difference in results, however, lies in the coefficients of explanatory variables which SW do not test. For the consumer good sample, *IM/S* has a statistically significant negative coefficient. For the producer good sample, four variables (*REG*, *CD/S*, *IM/S*, and *CDR*) which SW do not test have statistically significant coefficients.

7. Conclusion

■ We have outlined a model of industrial organization within which advertising intensity, seller concentration, and profitability are simultaneously determined. Seller concentration is explained in terms of dynamic adjustment to long-run levels, while profitability and advertising depend on current levels of concentration and on variables quantifying the demand side of the market.

The dynamic specification of the concentration equation, which is critical to the identification of the profitability equation, is supported in tests against samples of consumer good and producer good industries.

Comparison of the estimates obtained here with other results suggests that bias due to the omission of relevant explanatory variables, especially those describing the demand characteristics of different industries, may be as important a problem as the use of inappropriate estimation techniques.

References

- BAIN, J. *Barriers to New Competition*. Cambridge: Harvard University Press, 1956.
- . *Industrial Organization*. New York: John Wiley & Sons, 1968.
- BAUMOL, W.J. AND FISCHER, D. "Cost-Minimizing Number of Firms and Determination of Industry Structure." *Quarterly Journal of Economics*, Vol. 92, No. 3 (August 1978), pp. 439–467.
- CAVES, R.E., KHALILZADEN-SHIRAZ, J., AND PORTER, M.E. "Scale Economies in Statistical Analyses of Market Power." *Review of Economics and Statistics*, Vol. 57, No. 2 (May 1975), pp. 133–140.
- COMANOR, W.S. AND WILSON, T.A. "Advertising, Market Structure, and Performance." *Review of Economics and Statistics*, Vol. 47, No. 4 (November 1967), pp. 423–440.
- COWLING, K. "On the Theoretical Specification of Industrial Structure-Performance Relationships." *European Economic Review*, Vol. 8 (1976), pp. 1–14.
- EDGERTON, D.L. "Some Properties of Two-Stage Least Squares as Applied to Nonlinear Models." *International Economic Review*, Vol. 13, No. 1 (February 1972), pp. 26–32.
- ESPOSITO, L. AND ESPOSITO, F.F. "Foreign Competition and Domestic Industry Profitability." *Review of Economics and Statistics*, Vol. 53, No. 4 (November 1971), pp. 343–353.
- . "Excess Capacity and Market Structure." *Review of Economics and Statistics*, Vol. 56, No. 2 (May 1974), pp. 188–194.
- FISHER, F.M. *The Identification Problem in Econometrics*. New York: McGraw-Hill, 1966.
- GASKINS, D. "Dynamic Limit Pricing: Optimal Policies under Threat of Entry." *Journal of Economic Theory*, Vol. 3 (1971), pp. 306–322.
- GREER, D.F. "Advertising and Market Concentration." *Southern Economic Journal*, Vol. 38 (July 1971), pp. 19–32.
- HAESSEL, W. "Measuring Goodness of Fit in Linear and Nonlinear Models." *Southern Economic Journal*, Vol. 44, No. 3 (January 1978), pp. 648–652.
- JENNEY, F. AND WEBER, A.P. "The Determinants of Concentration Trends in the French Manufacturing Sector." *Journal of Industrial Economics*, Vol. 26, No. 3 (March 1978), pp. 193–207.
- JONES, J.C.H., LAUDADIO, L., AND PERCY, M. "Profitability and Market Structure: a Cross Section Comparison of Canadian and American Manufacturing Industry." *Journal of Industrial Economics*, Vol. 25, No. 3 (March 1977), pp. 195–211.
- KELEJIAN, H.H. "Two-Stage Least Squares and Econometric Systems Linear in Parameters but Nonlinear in the Endogenous Variables." *Journal of the American Statistical Association*, Vol. 66, No. 34 (June 1971), pp. 373–374.
- LUSTGARTEN, S.R. "The Impact of Buyer Concentration in Manufacturing Industry." *Review of Economics and Statistics*, Vol. 57, No. 2 (May 1975), pp. 125–132.
- MARTIN, S. "Theoretical Issues in the Specification of Models of Industrial Organization." Paper presented at the August 1978 meetings of the Econometric Society (revised December 1978).
- . "Testing the Interaction between Concentration and Barriers to Entry." *Econometrics Workshop Paper No. 7810*, Michigan State University, Department of Economics, April 1979.

- MUELLER, W.F. AND HAMM, L.G. "Trends in Industrial Market Concentration 1947 to 1970." *Review of Economics and Statistics*, Vol. 56, No. 4 (November 1974), pp. 511-520.
- NELSON, R.R. AND WINTER, S.G. "Forces Generating and Limiting Concentration under Schumpeterian Competition." *The Bell Journal of Economics*, Vol. 9, No. 2 (Autumn 1978), pp. 524-548.
- ORNSTEIN, S.I. *Industrial Concentration and Advertising Intensity*. Washington, D.C.: American Enterprise Institute for Public Policy Research, 1977.
- , WESTON, J.F., AND INTRILIGATOR, M.D. "Determinants of Market Structure." *Southern Economic Journal*, Vol. 39 (April 1973), pp. 612-625.
- ORR, D. "The Determinants of Entry: a Study of the Canadian Manufacturing Industries." *Review of Economics and Statistics*, Vol. 56, No. 1 (February 1974), pp. 58-66.
- PASHIGIAN, R. "Limit Price and the Market Share of the Leading Firm." *Journal of Industrial Economics*, Vol. 16 (July 1968), pp. 165-177.
- PEKELMAN, D. "The Firm's Adjustment to Abrupt Changes in Price Expectations." *The Bell Journal of Economics*, Vol. 8, No. 2 (Autumn 1977), pp. 525-533.
- PHILLIPS, A. "A Critique of Empirical Studies of Relations between Market Structure and Profitability." *Journal of Industrial Economics*, Vol. 24, No. 4 (June 1976), pp. 241-249.
- PUGEL, T.A. "A Structural Model of U.S. Manufacturing Industry." Harvard University, 1977. Unpublished paper presented at the Michigan State University Econometrics Workshop.
- SCHMALENSEE, R. *The Economics of Advertising*. Amsterdam: North-Holland, 1972.
- SCHWARTZMAN, D. AND BODOFF, J. "Concentration in Regional and Local Industries." *Southern Economic Journal*, Vol. 37, No. 3 (January 1971), pp. 343-348.
- STRICKLAND, A.D. AND WEISS, L.W. "Advertising, Concentration, and Price-Cost Margins." *Journal of Political Economy*, Vol. 84, No. 5 (October 1976), pp. 1109-1121.
- WRIGHT, N.R. "Product Differentiation, Concentration, and Changes in Concentration." *Review of Economics and Statistics*, Vol. 60, No. 4 (November 1978), pp. 628-631.