1-1-1977

Market Structure and Performance in US Food Processing Industries

Emilio Pagoulatos

Robert Sorenson
sorensen@umsl.edu

Occasional Papers
No. 772

MARKET STRUCTURE AND PERFORMANCE IN U.S. FOOD PROCESSING INDUSTRIES

By

Emilio Pagoulatos and Robert Sorensen*
University of Missouri-St. Louis

*The authors are respectively: Associate Professor of Economics and Research Associate at the Center for International Studies, University of Missouri-St. Louis; Associate Professor of Economics at the University of Missouri-St. Louis.

MARKET STRUCTURE AND PERFORMANCE IN U.S. FOOD PROCESSING INDUSTRIES

I. Introduction

The relationship between market structure and profitability has been one of the most thoroughly tested hypotheses in industrial economics.[1] Nonetheless, a number of authors have recently reexamined the specification of these studies and cautioned on a number of conceptual difficulties implicit in this type of research. It has been argued, for example, that the influence of the price elasticity of demand and the role of international factors-such as multinational activity and foreign trade, should be explicitly incorporated into the model [7, 8, 15, 16]. In addition, closer attention should be paid to the interpretation of empirical results in light of the paucity of theoretical evidence linking the seller concentration ratio to allocative performance [17].

This paper examines these basic questions regarding the nature and empirical specification of the structure-performance model, and incorporates the modifications suggested by this analysis into an empirical test of the relationship between price-cost margins and market structure in U.S. food-processing industries. The organization of the paper is as follows: Section II discusses the conceptual issues raised in the literature in more detail. Section III describes the data and variables used in the empirical analysis. The statistical results are presented in Section IV, and the conclusions and implications of the study are summarized in Section V.

II. Some Conceptual Problems.

Price Elasticity of Demand

A common element among empirical studies of the structure-profits relationship has been a neglect of variables which account for inter-industry differentials in market price elasticities of demand. This ommission, however, does not appear justified by the underlying theoretical models.[2] For example, it is well known that in the short run monopoly case, profit maximizing behavior results in a systematic inverse relationship between price-cost margins and market price elasticity of demand. More specifically this relationship is expressed as $(P-MC)/P = 1/e$, where P,MC, and e represent price, marginal cost, and price elasticity of demand, respectively. This result implies that given two monopolists with identical cost conditions their profit margins will differ depending upon differences in market price elasticities of demand at the profit maximizing level of output. The importance of demand elasticity in affecting profit margins has been demonstrated by Cowling [7] and Hause [10] also to apply to the case of oligopoly.[3]

In long run equilibrium, price elasticity of demand will influence profit margins only if some barriers to entry exist. In the absence of entry barriers the long run competitive result will obtain so that each firm's price-cost margin will approach zero, and market demand elasticity becomes irrelevant. Indeed, it is this type of thinking which has led some economists [26, 27] to suggest that it is the supply function of potential entrants and the heights of barriers to entry which determine the long run profit maximizing margin, to the exclusion of demand elasticity considerations. However, given varying degrees of barriers to entry, the theories of limit pricing [14] suggest that demand elasticity should still be inversely related to margins, since it represents one of the determinants of the height to which the limit price can

be raised above competitive levels.

All of the above arguments thus suggest that a proper empirical specification of the structure -profits relationship should account for inter-industry differentials in price elasticities of demand.

Concentration and Oligopoly Theory:

One of the continuing criticisms of structure-profits studies concerns the use of the concentration ratio to describe the degree of oligopoly or monopoly power within an industry. While a rather large number of existing oligopoly theories suggest relationships between profits and the number offirms in the market or a Herfindahl index of the size distribution of firms [7, 17, 22], virtually no theoretical justification exists for predicting a direct relationship between concentration ratios and industry profitability. The only model that indicates a precise theoretical relationship between concentration and profits, as demonstrated by Saving [18], is the collusive dominant firm oligopoly model.[4] Thus, empirical findings of higher profits in concentrated industries could be attributable, as Demsetz [9] has pointed out, to any number of factors (such as greater efficiency) and not exclusively to monopoly restrictions.

The above arguments notwithstanding, the concentration ratio continues to be the measure of choice in empirical analyses of the structure-profits relationship. The simple explanation for this appears to be the unavailability of data for other indicies of monoply power which cover so broad a spectrum of industries and time periods as the available concentration data. Since data limitations require the continued use of concentration ratios, it would be helpful to have a better idea of the appropriate specification of the concentration-profits linkages. One way to approach this problem is to more carefully analyze the importance of firm interdependence in oligopoly situations. For example, if it is assumed that firms are profit maximizers, one would expect that they will evaluate the potential costs and benefits of collusive action. The greater the

extent to which firms recognize their mutual interdependence, the greater is the liklihood of their recognition of the benefits attributable to some form of collusive behavior. If collusion is successful, the monopoly result provides an upper bound on the spread between price and marginal (average) cost. To the extent that collusion is ineffective or impossible, results closer to the competitive case should prevail.

While concentration is not synonymous with a firm's perception of interdependence, it is not unreasonable to expect that as markets become more concentrated, firms may become increasingly aware of their mutual interdependence. This suggests that a more appropriate specification of the concentration - profits relationship should focus on changes in the variables rather than levels. Moreover, since it has been pointed out [7, 19] that collusion is likely to be facilitated when firms have a history of experience with one another, lags may be involved in the relationship, which further supports a specification based upon changes rather than levels.

Import Competition, Exporting and Multinational Activity

Another common element of most structure-profit studies has been the exclusion of variables to account for inter-industry differences in foreign trade and investment. Recent theoretical and empirical evidence, however, suggests that these foreign factors are important determinats of industry performance.[5] For example, the market power usually associated with highly concentrated degrees of actual or potential import competition. In effect, import competition increases the number of firms within an industry and dilutes the degree of domestic seller concentration and theoretically should result in prices and profits being closer to competitive levels.

Exporting opportunities may also effect performance in the domestic market, but no unambigious relationship can be theoretically derived. Caves [5] for example has shown that in the case of monopoly, the existence of export markets

can constrain the departure from a competitive pricing outcome in the domestic market if the firm is unable to price discriminate internationally. He has further argued that this result is equally plausible in the context of oligopoly, in that, expansion into foreign markets may render sellers less conscious of their mutual interdependence in the domestic market. Nonetheless, to the extent that domestic firms are able to engage in international price discrimination, then expansion into foreign export markets (assuming a more elastic demand in foreign markets) will result in increases rather than decreases in domestic prices and profits.

Finally, it has been argued [5, 11] that the performance of firms in the domestic market may be significantly influenced by the degree to which foreign direct investment in markets abroad has taken place. Although there exist many channels and theories concerning the possible feedback effects from foreign investment operations on domestic activities, perhaps the most important effect, from a market structure point of view, is that the existence of multi-national activity may act to discourage entry in the domestic market. For example, foreign investment may open up new opportunities for firms to engage in price discrimination and predatory pricing, or provide them funds that otherwise might not be available to maintain expensive advertising programs or new product development in the domestic market. If foreign investment does indeed act to discourage entry or confer economies of size, this should be reflected in higher profits being earned in the domestic market in industries with foreign investments than in those without.

III. Sample and Variables

The empirical investigation of the structure-profitability relationship in the U.S. food-processing sector utilizes multiple regression analysis. The basic tests of this study are applied to 52 Census four- and five-digit food manufacturing industries for the years 1967 and 1972.[6]

The dependent variable used to measure industry profitability is the price-cost margin constructed from Census date [24]. The price-cost margin PCM is defined as the percentage gross return before taxes on industry sales:

$$PCM = \frac{\text{Value added - Payroll - Rentals}}{\text{Value of shipments}} \times 100$$

Value added was derived by the Census by subtracting from value of shipments the costs of materials, supplies, fuel, electric energy, cost of resales and contract costs. The choice of the price-cost margin as the measure of profitability was predicated upon a number of factors. First, it is the only measure of profitability available at a level of aggregration consistant with the concentration data. Thus, the calculation and interpretation of weighted concentration ratios is avoided.[7] Second, it allows the use of industry as opposed to firm data, which should minimize the problems encountered due to diversification that have been shown [12, 13] to present severe estimation problems. Finally, the price-cost margin, which approximates a rate of return on sales may indeed by conceptually superior, as Weiss [25] has recently argued, to rates of return on equity or assets.[8]

The estimated regression equations include nine independent variables. Along with the more traditional structural variables-such as seller concentration, scale economies, the capital-output ratio, the rate of growth in industry demand, and the extent to which markets are national or localized - the model

incorporates the impact of demand elasticity and international factors on industry price-cost margins.

The measure of seller concentration CR utilized in the analysis is the four-firm concentration ratio obtained from Census date [24]. The implicit assumption regarding the published concentration ratios is that of a national market which tends to understate the extent of concentration in industries such as bread and milk which have local or regional markets. In order to account for the regional or local content of some industries in the sample, a dummy variable RD was constructed on the basis of information presented by Schwartzman and Bodoff [20] and Siegfried and Grawe [21]. This regional dummy is defined so that its expected sign is positive:

RD = 1, if regional or local industry,
= 0, otherwise.

In addition to seller concentration, the barriers to entry from economies of scale in production have been included as a determinant of profit margins. In the absence of direct scale economy measures - such as those based on survey and engineering methods - a statistical proxy was constructed, based upon work by Caves, Khalilzadeh-Shirazi, and Porter [6]. The economies of scale ES barrier utilized in this study was expressed as the following interaction variable:

$$ES = (MES / CDR) * 100$$

where MES is the conventional minimum efficient plant scale, calculated as the average plant size among the largest plants accounting for 50 per cent of industry value added and expressed as a percentage of industry value added. CDR is the cost disadvantage ratio, computed as the average value added per employee in plants producing the lower 50 per cent of industry value added divided by average value added per employee in plants producing the top

50 per cent. Under a number of assumptions [6, pp. 133-34], CDR can be viewed as measuring the diseconomies of small scale. Thus, the use of the ratio MES/CDR as a proxy for scale economies implies that the barriers to the potential entrant are higher, the larger is minimum optimal plant size relative to the size of the market, and the greater is the extent of productivity disadvantage suffered by smaller plants. Given the construction of our variable, profit margins should be positively related to the height of scale barriers to entry. (ES).

Since gross capital costs are included in our definition of the price-cost margin, the capital-output ratio was utilized as an explanatory variable in order to account for the possible bias arising from the fact that our computed margins would be higher in capital-intensive industries. The capital-output ratio K/O measure is defined as the ratio of net book value of depreciable assets to value of shipments.

In addition, two market characteristics - market growth and elasticity of demand- were included in the model. The expectation is that the growth in output is positively related to industry profit margins. Growth in output may be attributable to increases in product demand, decreases in industry costs, or both. Reductions in costs lead directly to greater profitability, while increased prices and/or reductions in unit cost due to greater capacity utilization. The growth in demand variable (GR) was defined as the percentage change in nominal value added over the last six years. As suggested in an earlier section, the theoretical expectation is that a lower elasticity of demand will be associated with higher profit margins. While it would have been interesting to attempt our own estimates of demand elasticity, this task was beyond the scope of this paper. As an alternative, estimates of price elasticity of demand (PED) for food products calculated by Brandow [2] and Imel [12] were

utilized. Since their estimates for a number of cases did not conform to our industry classification, some averaging was necessary. These demand elasticity estimates should be interpreted to reflect relative elasticity differences across industries, rather than an exact level figure.

Finally, three explanatory variables that capture the international dimensions of our industry sample were incorporated in the model. First, to measure the extent of direct foreign investment activity (MN) undertaken by U.S. food-processing industries, estimates were obtained for 1965 from Bruck and Lees [3], and for 1971 from Horst [11]. This measure, based on data for Fortune's 500 largest corporations, consists of the percentage foreign content of total economic activity for the largest firms within each industry. Foreign content was measured by either one or a combination of the following factors; sales, earnings, employment, or production abroad. The expectation is that direct foreign investment will exert a positive influence upon industry profitability. To complete the model, the ratio of exports to value of shipments (XVS) that represents the industry's reliance on export sales, and the ratio of current imports to value of shipments (MVS) as a proxy for foreign competition were included.[9]

IV. Statistical Results

Table 1 shows the estimated regressions for our sample of 52 U.S. food-processing industries for the years 1967 and 1972. Two specifications of the model - with and without the price elasticity of demand variable - are presented. Due to the interactive nature of the explanatory variables, a multiplicative form of the relationship between price-cost margins and market structure seems appropriate. For example, the influence of concentration is not likely to be independent of the effect of price elasticity of demand and the degree of import competition. For this reason a double-logarithmic equation form was utilized.

A comparison of the statistical results for 1967 and 1972, both in terms of the significance of the individual coefficients and the coefficient of determination, indicates that they are stronger for the later period. Furthermore, the coefficients for the traditional market structure variables possess the hypothesized sign. In particular, the concentration ratio (CR) and the capital-output ratio (K/O) are directly associated with industry margins and are statistically significant at the one percent level. The economies of scale variable (ES) has the expected positive sign but is significant at the one percent level only in 1972. The coefficients for the growth in demand variable (GR) and the regional dummy (RD) also display the hypothesized positive sign and both are significant in all cases at the 10% level or better.

While these results confirm the importance of traditional domestic structural variables, some interesting results are obtained from the introduction of the price elasticity of demand variable and the foreign factors. The regression coefficients for the demand elasticity variable (PED) display the expected negative sign and are significant at the 5% level. In order to evaluate the contribution of the price elasticity of demand to the structure-profit relation-

TABLE 1

Regression Equations Relating Price-Cost Margins to Structural Variables

in U.S. Food-Processing Industries, 1967 and 1972

Year	Intercept	Log(CR)	Log(ES)	Log(K/O)	Log(GR)	PD	PED	Log(MN)	Log(XVS)	Log(MVS)	F	R^2
1967	-2.72[c] (1.49)	.546[a] (3.47)	.145 (1.00)	.628[a] (4.61)	.775[b] (2.11)	.291[c] (1.55)		.183[b] (2.01)	-.079 (1.20)	-.007 (.12)	7.32	.576
1967	-2.40[c] (1.38)	.578[a] (3.84)	.178 (1.28)	.646[a] (4.97)	.600[b] (1.68)	.294[b] (1.68)	-.421[b] (2.32)	.192[b] (2.21)	-.060 (.95)	-.012 (.22)	7.77	.625
1972	-3.29[b] (1.92)	.498[a] (3.25)	.325[a] (3.11)	.522[a] (4.14)	.778[a] (2.67)	.256[c] (1.38)		.137[b] (1.77)	-.112[b] (1.87)	-.002 (.05)	8.73	.619
1972	-3.30[b] (1.99)	.499[a] (3.38)	.335[a] (3.32)	.558[a] (4.53)	.738[a] (2.61)	.232[c] (1.30)	-.331[b] (2.01)	.139[b] (1.85)	-.101[b] (1.73)	-.006 (.12)	8.76	.652

t-values in parentheses

[a] Significant at 1% level.

[b] Significant at 5% level.

[c] Significant at 10% level.

ship, a statistical test was undertaken. The error sum of squares was computed for an unrestricted form of the model which included the demand elasticity, and a restricted form of the model which excluded this variable. The significance of including the demand elasticity was then determined by an F test for the reduction in error sum of squares between the restricted and unrestricted regression models. The F statistics obtained are 5.66 for 1967 and 4.24 for 1972, and both are significant at the 5% level. This result further reinforces the conclusion that the demand elasticity is an important determinant of profit margins in U.S. food-processing industries.

With regard to the international factors, the most striking results were obtained for the direct foreign investment variable (MN). The coefficients for this variable are positive as expected, and are significant in all cases at the 5% level. The results obtained for the export share variable (XVS) indicate that the coeffieient has the hypothesized negative sign, but is significant at the 5% level only in the equations for 1972. Finally, the evidence regarding the import share variable (MVS) was less conclusive. While the coefficient for this variable displays the expected negative sign, it was never statistically significant. This may be attributed in large part to the small position import competition occupied in food processing during our sample period. In only 7 out of 52 industries was the import share greater than 10%, while in the majority of cases virtually no imports entered the domestic market.

Thus far the empirical analysis has focused upon the relationship between levels of variables in two distinct time periods. It was indicated earlier, however, that a potentially more meaningful approach is to analyze the relationship between changes in profitability and changes in structure over time. A specification which utilized as a dependent variable changes in profit margins

V. Conclusions

This paper has reviewed some conceptual problems inherent in studies of the market structure-profitability relationship and provided an empirical test of the hypotheses advanced based on U.S. Food-processing industries. The major issues discussed included the role of price elasticity of demand, the influence of foreign factors and the use of concentration ratios in the specification of structure-performance studies. The statistical results obtained suggest that international factors, and in particular the extent of multi-national activity, constitute an important influence upon the performance in the domestic market of the U.S. food-processing sector. Moreover, domestic structural factors, such as the degree and changes in seller concentration, have a statistically significant impact on industry price-cost margins even when account is made for inter-industry variations in price elasticity of demand.

over the 1967-72 time period was also estimated.[10] The results are as follows:

$$\ln(PMG_{72}/PMG_{67}) = \underset{(.10)}{.002} + \underset{(1.52)}{.172}\ln(CR_{72}/CR_{67}) + \underset{(1.18)}{.041}\ln(ES_{72}/ES_{67}) + \underset{(2.16)}{.329}\ln(K/O_{71}/K/O_{67}) +$$

$$+ \underset{(3.75)}{.336}\ln(GR_{72-67}/GR_{67-63}) - \underset{(.41)}{.028}\ln(MN_{71}/MN_{65}) - \underset{(1.14)}{.065}\ln(XVS_{71}/SVS_{67}) -$$

$$- \underset{(1.61)}{.105}\ln(MVS_{71}/MVS_{67}) \qquad F = 3.92 \qquad R^2 = .384$$

The results for the equation utilizing rates of change are similar to those provided in Table 1. Of particular note, the coefficient for changes in the concentration ratio remains positive and is significant at the 10% level. Other domestic variables such as changes in the capital output ratio and changes in growth rates of demand display the expected positive signs and are significant at the 5% level or better. While the coefficient for changes in economics of scale is positive, as expected, it was not stastically significant. With regard to the foreign variables some differences arise. First, the coefficient for changes in import share now becomes significant and has the expected negative sign. Second, the coefficients for changes in multinational activity and export share are not significant. Overall, however, the results obtained from the rate of change variables conform well to those obtained utilizing levels.

Footnotes

* We gratefully acknowledge the financial support given by the Center for International Studies at the University of Missouri-St. Louis.

1. For a recent survey of these studies see Weiss [25].
2. This argument has been presented most forcefully by Cowling and Waterson [8]. While this argument loses its power under the assumption that demand elasticity is the same across industries, this assumption does not conform to the available evidence [2,12].
3. Caves [4] has further suggested that demand elasticity should be considered an element of market structure. His argument is that the penalties associated with price cutting are less severe in industries with more elastic demand, since a price cut by a rival will result not only in a potential increase in market share, but also an overall expansion in industry sales. Thus, if demand is more elastic, rivals are likely to find it more difficult to maintain overt or tacit agreements on price.
4. There is of course some correlation between the degree of concentration, the number of firms within an industry, and the Herfindahl index. But while extremely high or low values of concentration are likely to be good proxies for the number of firms, the association is less direct for intermediate ranges of concentration. For some recent results concerning the association of concentration ratios to other measures of monopoly power see Hause [10].
5. For a more complete analysis of the role of imports, exports, and multinational activity on domestic industry pricing and profits see Pagoulatos and Sorensen [15, 16].

6. The industries included in this study (with the 1972 S.I.C. number in parenthesis) are: 1) Meatpacking (2011); 2) Sausages and other prepared meats (2013); 3) Poultry dressing (2016, 2017); 4) Creamery Butter (2021); 5) Cheese (2022); 6) Condensed and evaporated milk (2023); 7) Ice cream and ices (2024); 8) Fluid milk (2026); 9) Canned specialities (2032); 10) Canned fruits and vegetables (2033); 11) Dried and dehydrated fruits and vegetables (2034); 12) Pickles, sauces and salad dressings (2035); 13) Frozen fruits, vegetables and juices (2037, 2038); 14) Flour and other grain mill products (2041); 15) Cereal breakfast foods (2043); 16) Milled rice and byproducts (2044); 17) Blended and prepared flour (2045); 18) Wet corn milling (2046); 19) Pet food (2047); 20) Prepared feeds (2048); 21) Bread and bakery products (2051); 22) Cookies and crackers (2052); 23) Raw cane sugar (2061); 24) Sugar refining (2062, 2063); 25) Confectionery products (2065); 26) Chocolate and cocoa products (2066); 27) Chewing gum (2067); 28) Cottonseed oil mills (2074); 29) soybean oil mills (2075); 30) vegetable oil mills (2076); 31) Animal and marine fats and oils (2077); 32) Shortening, table oils and margarine (2079); 33) Malt beverages (2082); 34) Malt (2083); 35) Wines, brandy and brandy spirits (2084); 36) Distilled liquor (2085); 37) Soft drinks (2086); 38) Flavoring extracts and syrups (2087); 39) Canned and cured seafood (2091); 40) Fresh or frozen packaged fish (2092); 41) Roasted coffee (2095); 42) Manufactured ice (2097); 43) Macaroni products (2098); 44) Dessert mixes (20991); 45) Chips (20992); 46) Sweetening syrups and molasses (20993); 47) Baking powder and yeast (20994); 48) Vinegar and cider (20996); 49) Cigarettes (2111); 50) Cigars (2121); 51) Chewing and smoking tobacco and snuff (2131); 52) Tobacco stemming and redrying (2141).
7. For an opinion on the appropriatness of weighted concentration ratios see Boyle [1].
8. One potentially serious problem with the price-cost margin is that advertising

expenditures are not netted out in arriving at margin figures. Given that the industries studied are all consumer goods within a specific sector this problem is probably minimized, but without detailed data on advertising it is difficult to determine the possible bias.

9. Values of exports and imports were obtained from [23].

References

1. Boyle, S.E., "The Average Concentration Ratio: An Inappropriate Measure of Industry Structure" Journal of Political Economy 81 (March/April 1973): 414-426.

2. Brandow, G.E., Interrelation Among Demand for Farm Products and Implications for Control of Market Supply, University Park, Penn.: Pennsylvania State University Agricultural Experiment Bulletin 680, August 1961.

3. Bruck, N.K. and Lees, F.A., Foreign Investment, Capital Controls, and the Balance of Payments, New York: New York University, Institute of Finance, Graduate School of Business Administration, April 1968.

4. Caves, R.E., American Industry: Structure, Conduct, Performance, Englewood Cliffs, N.J.: Prentice-Hall, 1964.

5. Caves, R.E., International Trade, International Investment, and Imperfect Markets, International Finance Section Special Papers in International Economics No. 10, Princeton, N.J.: Princeton University, 1974.

6. Caves, R.E., Khalilzadeh-Shirazi, J. and Porter, M.E., "Scale Economies in Statistical Analyses of Market Power" Review of Economics and Statistics, 57, (May 1975): 133-140.

7. Cowling, K., "On the Theoretical Specification of Industrial Structure-Performance Relationships" European Economic Review 8 (1976) : 1-14.

8. Cowling, K., and Waterson, M., "Price-Cost Margins and Market Structure" Economica 43 (August 1976): 267-274,

9. Demsetz, H., "Two Systems of Belief About Monopoly" in H.J. Goldschmid, H.M. Mann and J.F. Weston, eds., Industrial Concentration: The New Learning, Boston, Mass.: Little, Brown and Co., 1974.

10. Hause, J.C., "The Measurement of Concentrated Industrial Structure and the Size Distribution of Firms" Annals of Economic and Social Measurement 6 (Winter 1977): 73-107.

11. Horst, T., <u>At Home Abroad: A Study of the Domestic and Foreign Operations of the American Food-Processing Industry</u>, Cambridge, Mass.: Ballinger Publishing Co., 1974.

12. Imel, B., <u>Structure-Profit Relationships in the Food Processing Sector</u>, Unpublished Ph.D. dissertation, University of Wisconsin, 1971.

13. Imel, B., and Helmberger, P. "Estimation of Structure-Profit Relationships with Application to the Food Processing Sector" <u>American Economic Review</u> 61 (September 1971): 614-627.

14. Modigliani, F., "New Developments on the Oligopoly Front" <u>Journal of Political Economy</u> 66 (June 1958): 215-232.

15. Pagoulatos, E., and Sorensen, R., "International Trade, International Investment and Industrial Profitability of U.S. Manufacturing" <u>The Southern Economic Journal</u> 42 (January 1976): 425-434.

16. Pagoulatos, E., and Sorensen, R., "Foreign Trade, Concentration and Profitability in Open Economies" <u>European Economic Review</u> 8 (1976): 255-267.

17. Phillips, A., "A Critique of Empirical Studies of Relations Between Market Structure and Profitability" <u>The Journal of Industrial Economics</u> 24 (June 1976): 241-249.

18. Saving, T.R., "Concentration Ratios and the Degree of Monopoly" <u>International Economic Review</u> 11 (February 1970): 139-146.

19. Scherer, F.M., <u>Industrial Market Structure and Economic Performance</u>, Chicago, Ill.: Rand Mc Nally, 1970.

20. Schwartzman, D. and Bodoff, J., "Concentration in Regional and Local Industries" <u>Southern Economic Journal</u> 38 (January 1971): 343-348.

21. Siegfried, J.J. and Grawe, O.R., "The Geographic Dispersion of Manufacturing Industry Employment in the United States: 1963" <u>Industrial Organization Review</u> 3 (no. 3, 1975): 146-169.

22. Stigler, G.J., "A Theory of Oligopoly" <u>Journal of Political Economy</u> 72 (February 1964): 44-61.

23. U.S. Department of Commerce, U.S. Commodity Exports and Imports as Related to Output (various issues)

24. U.S. Department of Commerce, Census of Manufactures, Vol. 1, Summary and Subject Statistics (various issues).

25. Weiss, L.W., "The Concentration-Profits Relationship and Antitrust" in H. J. Goldschmid, H.M. Mann and J.F. Weston, eds., Industrial Concentration: The New Learning, Boston, Mass.: Little, Brown and Co., 1974.

26. Williamson, O., "Economics as an Antitrust Defence: Reply" American Economic Review 59 (December 1969): 954-959.

27. Worchester, D., Monopoly, Big Business and Welfare in the Postwar United States, Seattle, Wash.: University of Washington Press, 1967.