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*Agriculture - Econ. Aspects*

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**PROCEEDINGS**

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INDUSTRIAL ORGANIZATION RESEARCH IN  
AGRICULTURAL MARKETING: THEORY, FINDINGS, AND  
POLICY IMPLICATIONS

Peter Helmberger\*

In response to harsh criticism of economic theory, Leonid Hurwicz noted several years ago that in the absence of a completely general and rigorous theory, "less satisfactory, but still highly useful, models have been and no doubt will continue to be used by economic theorists. One can hardly afford to ignore the social need for the results of economic theory even if the best is rather crude."<sup>1/</sup> This is good advice for the snooty purist. It is also good advice for the empiricist who insists that all conclusions be documented beyond the slightest shadow of doubt. And we can heartily agree with Willard Mueller when he writes, "Although economists have contributed much toward the development and enforcement of our antitrust laws, it is fortunate indeed that the development and enforcement of these laws did not await conclusive empirical verification of the relevant relationship between market structure and market performance."<sup>2/</sup> These views are relevant to the issues and problems surveyed in this paper, for we shall be concerned with a body of thought and research that focuses primarily on public policy issues rather than in providing private economic agents with advice on how to make money. And it is also regrettably true that the best we have is rather crude.

Perhaps from the beginning of trade, people wondered about the environmental conditions that are more favorable to sellers than to buyers in comparison with some usual situation or even in comparison with some normative situation that could only be conceived. People surely thought about these matters since the results affected their immediate welfare. Economists are still concerned with these issues in industrial organization research where the central premise seems to be that the economic environment exerts a strong influence over the outcome of trade among economic agents, with potentially important implications for resource allocation and income distribution. Increasingly of late, economists are wondering how the nature of the economic agents themselves--the organizational structure, goals, aspirations, etc., in the large firm, for example--might affect the results of trade.

This latter question--the manner in which various economic agents affect the outcome of trade--is not examined here. Attention is rather

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<sup>1/</sup> Leonid Hurwicz, "The Theory of Economic Behavior," reprinted in Readings in Price Theory, edited by George Stigler and Kenneth Boulding, (Chicago: Richard D. Irwin, Inc., 1952), p. 524.

<sup>2/</sup> See Willard Mueller's discussion in Market Structure Research, edited by Paul Farris (Ames: Iowa State University Press, 1964) p. 137.

focused on the field of industrial organization as it has developed around the assumption of profit maximization, giving some attention to the method and content of price theory, research methods, and research findings. Finally, at the end of the trail, we will sketch some policy implications associated with various points of interest that were noted along the way.

### Price Theory: Definitions and Suppositions

The word "model" is used frequently in everyday language, particularly for miniature representations of real objects. Economic models are similar in certain crucial respects to such commonplace models. All models capture or reflect some characteristics of the real object; other characteristics are abstracted away. In addition, models may be good or useful for some things, but not for others. Their application depends very much on just what has been abstracted away and on just what is represented. As regards economic models, usefulness depends in large part on their ability to help us predict real phenomena. Knowing how and under what circumstances such models can be applied fruitfully is in the nature of an art; and it is not surprising that controversy abounds over the question of their empirical relevance.

The models in price theory comprehend theoretical agents (decision makers) and theoretical environments. The postulated agents, usually consumers, producers and resource holders, are characterized through assumptions regarding goals, knowledge, and computational abilities. The environment envisaged varies a good deal from one model to another, but nearly always involves definite commitments regarding technological possibilities, extent of plant fixity, and what is commonly referred to as structure of the market. The object of analysis is to predict how the agents will behave in the hypothetical environments and with what consequences for certain interesting variables such as price, profits, costs, and outputs. The predicted consequences become hypotheses which may or may not be useful in problems of research and policy.

Before taking up the content of these hypotheses, it is advisable to examine the meaning and measurement of certain basic concepts, viz., selling industry; buying industry; market; and market structure, conduct and performance. 3/ A selling industry is an aggregate of firms selling products that are close substitutes in the eyes of a common group of consumers (buyers). This implies that the sellers are producing similar products and that the spatial and temporal distribution of buyers and sellers is such that the customers of one seller could

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3/ The following definitions are adapted from Joe Bain, Industrial Organization (New York: John Wiley and Sons, Inc., 1959).

readily turn to any of the others. The definition of a buying industry follows from that of a selling industry, and a market may be viewed as a selling industry plus the buyers to whom the sellers in common sell.

Having said as much the question arises how one might proceed to measure these aggregates of decision makers in practice. Although there is a considerable literature on the use of cross-demand curves in market measurement, the fact remains that as a practical matter delineation of industries and markets is a rough-and-ready business in which researchers are thrown back on subjective evaluation of similarity of products and the spatial and temporal patterns of trade.<sup>4/</sup>

According to Bain, the market conduct of sellers encompasses (1) "the manner in which, and devices and mechanisms by which, the intrinsically rivalrous action of different sellers in an industry are coordinated, adapted to each other, or made mutually consistent in reacting to the demands for products in the common market; and (2) the principles and the methods and formulae which sellers employ in arriving at market policies determining selling prices, outputs, product designs, and sales promotion outlays."<sup>5/</sup> One phase of conduct, then, focuses on decision making within the firm, including goals, and the way in which managers actually decide on policy. The other phase focuses on interaction of business and the manner in which actions are coordinated, whether through collusion, for example, or through the market mechanism.

By market structure is meant those environmental conditions that determine or strongly influence the market conduct of buyers and sellers in the market. Some writers distinguish between factors that are internal to a market and those that are external, insisting that only internal factors should be viewed as elements of structure. Such advice would be meaningful were we also supplied with a list of criteria by which we could classify environmental factors according to whether they were internal or external to a market. Whether meaningful or not, the advice would be of dubious merit if some factors were said to be external to a market, but were none-the-less important in explaining market conduct. In attempting to explain the emergence of certain types of market conduct, we are in sufficient difficulty already without excluding from the list of causal factors those factors that are in some sense or another external to the market.

Thus, I could not imagine how the student of industrial organization could explain the absence of written collusive agreements among the captains of industry where no attempt at secrecy is made, without attaching considerable significance to our antitrust program. Yet many students of industrial organization research would not view antitrust law as a structural dimension. Another point is that if we are interested in explaining differences among conduct patterns in the various

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<sup>4/</sup> Willard W. Cochrane, "The Market as a Unit of Inquiry in Agricultural Economics Research," Journal of Farm Economics, Vol. XXXIX, No. 1, pp. 21-39.

<sup>5/</sup> Joe Bain, op. cit., 266.

industries, some environmental factors will be common to all or nearly all and might therefore be neglected.

As to the important dimensions of market structure, economists are fond of emphasizing concentration, product differentiation, and barriers to entry. Concentration can be measured by the number and size distribution of firms in the industry. <sup>6/</sup> Elaborate theoretical schemes have been proposed to measure product differentiation and barriers to entry but without much practical success. Such evidence as amount of advertising expenditure, nature of the products involved, consumer buying habits, and price premiums received by the various brands have been used in assessing the degree of product differentiation. In the case of barriers to entry, judgments are framed through examining (1) the output of a firm of minimal optimum scale in relation to the total industry output; (2) price discounts that would be needed in order to establish brand names; and (3) any absolute disadvantages an entrant would incur because of a lack of patents, control over natural resources, and a good reputation in money markets.

There can be little doubt but what the above dimensions are of general and crucial importance, but at the same time I would argue that one of the gravest shortcomings of industrial organization research is the inadequate attention given to other dimensions. To the above list of dimensions, Bain would add (1) the geographic dispersion of buyers and sellers in light of transfer costs, (2) product durability, and (3) trend in demand, although in his empirical research he has done little about any of them. In the case of a selling industry (buying industry), elasticity of demand (supply) must be viewed as an extremely important dimension of market structure. Thus we are concerned with a firm's share of the market if changes in that share could be expected to have a noticeable impact on total output and price. But the impact of whatever change a single firm might make will surely depend on the elasticity of demand. My expectation is that cross-section analyses would be greatly improved if elasticity of demands were measured and treated as structural dimension. In agricultural markets and in some non-agricultural markets as well, it would be folly to neglect the extent and impact of cooperative enterprise in a study of competition.

Market performance may be viewed as certain results of market activities that appear to be crucial in affecting the material welfare of society. Those that are commonly mentioned include level of output, prices, costs, technological and economic efficiency, sales outlays, conservation, product design, range of available qualities, and progressiveness in terms of investment and the adoption and development of new technologies. Together, the performance dimensions determine the manner in which the basic economizing problem of any society (the

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<sup>6/</sup> See M. A. Adelman, "The Measurement of Industrial Concentration," reprinted in Readings in Industrial Organization and Public Policy, edited by Richard Heflebower and George Stocking (Homewood: Richard D. Irwin, Inc., 1958) pp. 1-45.

allocation of resources that are scarce in relation to consumer wants) is solved. 7/

Evaluation of performance comprehends measurement of performance dimensions and comparison of measured results with "ideal" results. Once this is accomplished, departures from "ideal" results may be compared with market structure in search of systematic relationships. Albeit measurement is possible in many cases, determining "ideal" results is at best extremely difficult.

Perhaps the aspect of performance receiving the most attention is profit expressed as a percentage of sales or, more importantly, as a percentage of net worth. The differences between "economic" profit and accounting profit are well known, and there are ways of making the latter correspond more-or-less to the former. The ideal level of profit is usually judged to be that which would yield a normal return on stockholder's equity. Of interest is not just the profit of a single firm, but the average profits of all firms in an industry over a fairly long period of time. The importance of profit analysis stems from the possible implications of high excess profit over a long period of time for resource allocation among industries. High excess profit is probably good evidence of undesirable output restriction where (1) the marginal cost curve is quite flat in the relevant region and (2) where there would appear to be no good explanation such as growth in demand, for high profit except market power.

The basic premise of industrial organization research is that market structure determines market conduct which, given technology and consumers preferences, in turn determines market performance. Over time, of course, market conduct and performance influence structure. In the spirit of dynamic economics, one might say that the ultimate goal of industrial organization research is accurate prediction of all subsequent patterns of conduct, performance, and structure, beginning with a certain initial market structure.

What does theory have to say about such causal chains? Unfortunately, theory has the most to say about the polar cases of perfect competition and monopoly but is speculative and extremely iffy on the in-between cases of oligopoly. In the case of an industry with many small firms, no barriers, and insignificant product differentiation theory would lead us to expect a tendency toward (1) normal profits, (2) efficient sized firms, and (3) rapid adoption of new technologies. Trends in demand and technological advance might lead to persistent departures from the expected results in which case we would expect to see a steady stream of entry or exit of firms and perhaps other changes as well. At the opposite extreme of an industry that approaches monopoly, we would not rule out the possibility of persistent excess profit; entry of new competitors would not be expected even with high profits; and substantial advertising outlays might be expected if product differentiation were the major barrier to entry.

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7/ See Stephen Sosnick, "Operational Criteria for Evaluating Market Performance," Market Structure Research, pp. 81-125.

In the case of oligopoly where there may be few firms, some product differentiation, and important barriers to entry, the deductive mill of the economist has rather ground to standstill, and this in spite of decades of effort on the part of the best theorists in the business. Theory does have the following to offer, aside from particular models that make special assumptions about structure (dominant firm theory) or the psychology of sellers (as in kinked demand curve theory). First, it suggests the nature of the competitive process and the intrinsically rivalrous nature of competitors. Second, it suggests the nature of gains that can be had through monopolization and identifies a great many ways whereby such gains can be secured. Gains that can be had through monopolization are present in every industry, but the competitive process acts as a barrier that needs overcoming if such gains are to be secured. As one moves from the perfectly competitive extreme toward monopoly potential monopoly gains are always present but competitive barriers diminish with the resulting implication that performance tends more and more toward the monopoly result. The exact nature of the functions or relationships between structure and performance is an open question and one might hope that empirical research will succeed where theory has failed.

The failure of theory in the area of oligopoly is particularly unfortunate in light of its near silence on the important performance dimension of progressiveness. While economists are generally not well known for their support of monopoly, Schumpeter and Galbraith have advanced the view that oligopoly is conducive to rapid technological advance. <sup>8/</sup> As will be shown at a later point, this possibility raises the prospect of inconsistent goals.

Aside from its usefulness in searching for associations between structure and performance, price theory also has something to say about the desirability of the alternative configurations. Put in its simplest terms the question is "What's wrong with monopoly?" The sophomore who knows his principles would quickly point out that a monopolist restricts output and raises price unduly. At a later point in his intellectual development he might argue the following: If the economy were made up of perfectly competitive industries, all in longrun equilibrium, and granting certain assumptions, it would be impossible to make anyone better off without making someone else worse off. Moreover, it would not be possible to raise the real national income by removing one unit of input from any one industry and putting it to work in another industry. Now introduce into this sea of perfect competition an island of pure monopoly, merrily maximizing its profit. Then it can be shown that it might well be possible to make some people (consumers) better off without making anyone else (the monopolist) worse off. It can also be shown that national income can be increased by a transfer of inputs from the competitive industries to the monopolistic industry. Abstracting from the problem of distribution, the

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<sup>8/</sup> Joseph A. Schumpeter, Capitalism, Socialism and Democracy (New York: Harper and Brothers Publishing, 1950); and John K. Galbraith, American Capitalism--The Concept of Countervailing Power (Boston: Houghton Mifflin Company, 1956).



more national income is always preferred to less. As to income distribution, the creation of (note, not the purchase of) monopolies might well be a source of vast fortunes that might do some violence to socially acceptable distributions of income. Aside from the level of national income, then, there might be grounds for opposing the development of monopoly positions merely on the basis of equity considerations.

It seems to me that the best theoretical argument which the economist can muster in support of an antimonopoly or antitrust program is that monopoly power whether in the base of monopoly or oligopoly can lead to economic inefficiency in that it tends to lower real national income. But here are loose ends that tend to weaken the case just made. A few of these are discussed here. First, oligopoly might be the source of rapid technological advance as well as of market power. In this case society might have to choose between a high national income today but a slower rate of growth, on the one hand, and a lower national income today but with a higher rate of growth, on the other. Secondly, economies of scale might prohibit anything closely approaching perfect competition. In fact, this is exactly how the regulation of public utilities is justified. But who would have ever supposed that there is a sharp line or gap between industries where economies of scale justify regulation and industries where economies of scale allow atomistic competition. A final argument does not weaken so much the case against allowing monopoly to develop as it does the case for breaking up one that already exists. In the case of a corporation with publicly held stock, monopoly profit becomes capitalized in stock values. Any policy that destroys the power position also destroys capital value, thus raising the question of the manner in which ensuing capital losses are to be distributed among the members of society.

#### Some Research Findings and Unresolved Issues

So much for concepts and theoretical associations between structure and performance. What have researchers found in practice? There can be little question that the theory has been substantiated at the polar extremes. It is true that agriculture is atomistic and that independent behavior and low profits are pervasive. The U.S. sulphur industry between 1925 and 1932 was virtually a duopoly, with Texas Gulf accounting for roughly 66 percent of total industry output.<sup>9/</sup> Its profits after taxes expressed as percentage of invested capital amounted to 67.9 percent in 1927. Parenthetically, Texas Gulf has remained the largest firm in the industry which continues to be highly concentrated and highly profitable.

It is in the inbetween cases where research results are less conclusive and where traces of monopoly power are more difficult to discern. This, of course, is precisely the area where price theory because

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<sup>9/</sup> Jesse Markham, The Fertilizer Industry: Study of an Imperfect Market (Nashville: The Vanderbilt University Press, 1958), pp. 75-83.

of its indeterminateness and iffish character is very difficult to refute. The question is how close to the monopoly extreme must an industry structure become before we can expect to see monopolistic results? From his researches, Joe Bain has suggested the following tentative benchmark. When the top eight firms account for between 70 and 80 percent of the total putput, one can expect a tendency toward substantial monopolistic excess profits.<sup>10/</sup> To some extent, this level of concentration reflects barriers to entry, but nothing is implied regarding product differentiation. Using the Bain benchmark, it might be useful to survey the levels of concentration in some of the major agricultural processing industries.

The Bureau of the Census has prepared concentration ratios for a wide spectrum of U.S. manufacturing industries, including numerous agricultural processing industries.<sup>11/</sup> These data are subject to many shortcomings, perhaps the gravest of which is the lack of correspondence between theoretic and census industries. Confronted with this problem many researchers in agricultural economics have simply put all the agricultural processing industries as defined by the census in one pot, stirred well, and served generous portions of assertions regarding levels and changes in concentration. <sup>12/</sup> An alternative approach, and one adopted here, is to assemble theoretic industries from Census data as best one can and ignore collections of enterprises that simply cannot be interpreted as industries.

The detailed results of this type of analysis are given in the appendix. A summary of major findings is given here. Of 30 agricultural marketing industries 19 were unconcentrated, according to Bain's criterion, 10 were concentrated, and one was not classified. The tobacco industries and specialties accounted for most of the concentrated industries. There were 21 industries for which concentration data were available for 1954 and 1958. Over this period, concentration ostensibly fell in seven cases, stayed the same (changed by no more than one percent) in six cases, and increased in eight cases. In light of the increasing range of food substitutes open to consumers and the broadening of market boundaries, it appears likely that concentration actually declined in 13 out of the 21 cases. Whether concentration actually increased in the remaining eight industries is an open question.

These data on concentration, while useful, fall far short for that necessary for cross-section evaluation of competition and monopoly. As far as they go, the data support some optimism. Others will doubtless disagree, but in any event the following areas merit further thought and research if we seek a consensus.

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<sup>10/</sup> Joe Bain, op. cit., pp. 412-416.

<sup>11/</sup> Bureau of the Census, Concentration Ratios in Manufacturing Industry, 1958, Part 1, Report of the Bureau of the Census to the Subcommittee on Antitrust and Monopoly of the Committee on the Judiciary, U.S. Senate, 87th Congress.

<sup>12/</sup> For example, see the paper by Lehman Fletcher in Iowa Center for Agricultural and Economic Development, Farmers in the Market Economy: Market Organization and Competitive Behavior in Relation to Farmers, Prices, Costs and Incomes (Ames: Iowa State University Press, 1964).

### Local Markets

The industries considered above refer by-and-large to industries that are national in scope. Excluded are industries that make up local and regional markets. Such markets are extremely important in marketing and farm supply. I am thinking of retail markets for groceries and fluid milk and local markets for farm supplies such as petroleum and fertilizers. In addition, many of the industries referred to above are national from the point of view of sales, but purchase raw materials in local farm markets. The existence of such markets stems from the spatial distribution of economic activities, and pose special problems for research and policy. Meaningful delineation of markets and industries may become especially difficult where firms over broad geographic areas seemed linked together by overlapping trade zones. A thorny policy problem arises if high concentration in local markets is justified by economies of scale. Obviously this whole area is particularly relevant to a discussion of cooperatives. My expectation is that the strongest theoretical case for farmer cooperatives can be based on (1) the likelihood that high concentration in local markets arises out of economies of scale at the processing level of the channel, and (2) the need in such circumstances for firms that are organized to further the interests of farm producers. 13/

### Barriers to Entry and Product Differentiation

As was noted earlier, both barriers to entry and product differentiation pose serious measurement problems in industrial organization research. We have only a handful of studies on marketing and farm supply that deal meaningfully with these aspects of market structure.

In future work, one might hope that more attention is given to identification of the most favored entrants in each of the various industries. Another important area is the competition between private labels and brand names. The private label route can be a very efficient route to mass merchandising. Competition with big brand names can lead to an increasing share of the business going to private labels and/or a decreasing of margins on brand name merchandise. Obviously, the rise of big food chains is relevant both to the question of entry and private labeling.

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13/ Peter Helmerger, "Cooperative Enterprise as a Structural Dimension of Farm Markets," Journal of Farm Economics, Vol. 46, No. 3, pp. 603-617.

## Countervailing Power

In addition to concentration in processing and fabricating industries, there is also concentration in procurement from these industries, thus raising the question of the effectiveness of countervailing power in protecting the public weal. This issue is particularly germane to the present discussion because of trade between large chain store buyers, and large processor-sellers. In their work on the baking industry, Walsh, Evans, and Birch have raised important questions regarding the beneficial effects that countervailing power is supposed to have. 14/

## Elasticities of Demand and Supply

On an argument briefly sketched earlier, elasticity of demand facing a selling industry and elasticity of supply facing a buying industry might well be considered extremely important dimensions of market structure. In fact, I am not sure that what accurate evaluation of concentration is impossible without some commitments made regarding demand (supply) elasticity. The results of price analysis in agricultural economics ought to be useful to structuralists in this matter. Thus the near zero elasticity of the demand for fluid milk has important implications for conduct and performance of firms in those markets. On the other hand, the high elasticity of demand for lamb might well neutralize the relatively high concentration in lamb slaughtering. A study of local fruit and vegetable processor-grower markets concludes that for a wide range of these commodities, the very high elasticities of supply functions facing processor-buyers are important contributors to competition in procurement. 15/ An aspect of this problem that merits a good case study or two is the manner in which transfer costs over space affect demand and supply elasticities. An example will illustrate the point. Consider a relationship showing the quantity demanded at a supermarket in some shopping center at the various prices that might be charged. A lowering of the price (or more accurately, the price structure) might not only attract more sales from the customers in the initial trade zone, but would, in addition, expand the trade zone.

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14/ Richard G. Walsh, Bert M. Evans, and Eleanor M. Birch, "Some Consequences of Bilateral Oligopoly and Vertical Integration in Bread Markets," Journal of Farm Economics, Vol. 46, No. 1, pp. 161-172.

15/ Peter G. Helmberger and Sidney Hoos, Cooperative Bargaining in Agriculture: Grower-Processor Markets for Fruits and Vegetables (Berkeley: University of California, Division of Agricultural Sciences, 1965).



## Public Policy Toward Industrial Organization

Regardless of the grave difficulties encountered in searching for associations between market structure and conduct performance, the fact remains that we do have an antitrust policy. We do have a policy regarding labor. We do have a policy toward agricultural cooperatives. And in all these areas, and in others as well, intelligent policy required a knowledge of structure-performance associations; industrial organization research is in part a response to an urgent public need.

Perhaps the greatest roadblocks to agreement among economists on the nature of structure-performance relationships concern the matters of efficiency in production and progressiveness. The difficulties posed by these aspects of performance have been touched upon earlier, and the importance of these matters to policy merit little elaboration here. One must, however, guard against the naive notion that atomistic structure is indispensable to effective competition on the one hand, and that only substantial departures from atomistic structure are consistent with progressiveness and productive efficiency, on the other.

Aside from a knowledge of causal relationships and problem areas, choices must still be made as to whether structure or conduct is to be altered or policed or whether performance is to be regulated directly as in the case of public utilities. Controversy abounds over whether the main emphasis at the level of remedy is to be placed on structural change or rules of acceptable conduct. <sup>16/</sup> It is clear that up to now greater reliance has been placed on setting forth acceptable rules of conduct. Thus price-fixing and collusive behavior have been the major objects of concern under the Sherman Act. The chief difficulty with this approach arises out of the likelihood that monopolistic structure is inconsistent with competitive behavior, and policing conduct in such cases amounts to closing the proverbial barn door after the horse is out.

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<sup>16/</sup> See John Moore, "Policies for the Regulation of Competitive Behavior," in Agricultural Market Analysis, edited by Vernon L. Sorenson (East Lansing: Bureau of Business and Economic Research, Graduate School of Business Administration, Michigan State University, 1964), pp. 275-292.

Appendix Table. Concentration Ratios for Food Processing Industries 1/

Industry code	Class of Product	Value of Shipments (\$1000)	Share of Business Accounted for by Largest 4, 8, and 20 firms			Estimate for 8 largest firms 2/ Maximum Minimum		Concentrated (c) or uncon- centrated (u)
			4	8	20			
1. 2011								
2013	Meat Products							
2015	58	14,486,229				.39	.36	u
	54	12,238,670				.45	.38	u
2. 20210	Creamery Butter							
	58	802,316	11	15	24			u
	54	858,525	14	19	28			u
3. 20220	Natural Cheese							
	58	600,192	38	42	51			u
	54							
4. 20231	Dry Milk Products							
	58	414,707	22	33	49			u
	54							
5. 20232	Canned Milk							
	58	352,083	78	85	97			c
	54	341,167	79	86	97			c
6. 20233	Bulk Evaporated and Condensed Milk Products							
	58	84,236	38	54	76			u
	54	91,115	45	58	73			u

1/ The Author is indebted to Bahram Bahmanyar for his assistance in the preparation of this appendix.

Appendix Table Continued -- Page 2

			Share of Business Accounted for by Largest 4, 8, and 20 Firms						
Industry code	Class of Product	Value of Shipments (\$1000)				Estimate for 8 largest firms 2/		Concentrated (c) or uncon- centrated (u) 3/	
			4	8	20	Maximum	Minimum		
7. 20252	Process Cheese								
	58	161,690	71	80	91			c	
	54								
8. 20321	Canned Baby Foods (except meat)								
	58	184,060	94	99	100			c	
	54	148,746	n.a.	100					
9. 20322	Canned and Frozen Soups (except sea- food) and Canned Specialties Not Specified Separately								
	58	404,640	n.a. (but very high)					c	
	54								
10. 20331	Canned Fruits								
	58	560,303	28	43	65			u	
	54								
11. 20332 20372	Canned and Frozen Vegetables								
	58	903,719				.43	.34	u	
	54	n.a.							
12. 20334 20335 20371	Fruit and Vegetable Juices								
	58	716,771				.50	.29	u	
	54								

Appendix Table Continued -- Page 3

		Share of Business Accounted for by Largest 4, 8, and 20 Firms							
Industry code	Class of Product	Value of Shipments (\$1000)				Estimate for 8 Largest Firms 2/		Concentrated (c) or uncon- centrated (u) 3/	
			4	8	20	Maximum	Minimum		
13. 20336	Catsup and other Tomato sauces								
	58	245,621	55	65	80			u	
	54								
14. 20338	Jams, Jellies and Preserves								
	58	197,694	28	38	56			u	
	54	159,956	26	36	53			u	
15. 20352	Pickles and Pickled Products								
	58	170,058	20	30	50			u	
	54	135,598	18	29	49			u	
16. 20996	Vinegar and Cider								
	58	44,209	41	53	71			u	
	54	41,495	46	57	72			u	
17. 20411 20412	Wheat Flour and Bran								
	58	1,457,559				.59	.53	u	
	54	1,465,774				.58	.50	u	
18. 20415 20455	Prepared Flour								
	58	493,923	68	88				c	
	54	435,966	71	90				c	



Appendix Table Continued -- Page 4

Share of Business Accounted for  
by Largest 4, 8, and 20 Firms

Industry code	Class of Product	Value of Shipments (\$1000)				Estimate for 8 Largest Firms 2/		Concentrated (c) or uncon- centrated (u) 3/
			4	8	20	Maximum	Minimum	
19. 20430	Cereal Breakfast Foods							
	58	431,788	80	91	98			c
	54	330,970	78	89	98			c
20. 20980	Macaroni and Noodle Products							
	58	165,259	25	41	63			u
	54	151,136	25	37	57			u
21. 20440	Milled Rice and By- Products							
	58	281,273	44	65	82			u
	54	264,750	40	59	81			u
22. 20521	Biscuits, Crackers, and Pretzels							
	58	349,786	77	84	92			c
	54							
23. 20610	Sugar							
20620								
20630								
	58	1,446,034				.87	.64	N.C.
	54	1,217,524				.87	.63	N.C.
24. 20961	Shortening and Cooking Oils							
	58	895,443	50	73	94			u
	54	888,258	55	79	95			c

Appendix Table Continued -- Page 5

Share of Business Accounted for  
by Largest 4, 8, and 20 Firms

Industry code	Class of Product	Value of Shipments (\$1000)				Estimate for 8 Largest firms 2/		Concentrated (c) or dispersed (u)
			4	8	20	Maximum	Minimum	
25. 20962	Margarine							
	58	295,880	46	70	94			u
	54	278,484	39	64	93			u
26. 2092	Soybean Oil Mills							
	58	919,691	37	61	84			u
	54	762,850	37	62	87			u
27. 2091	Cottonseed Oil Mills							
	58	377,282	44	56	72			u
	54	559,551	44	54	70			u
28. 21110	Cigarettes							
	58	2,137,032	80	99	100			c
	54	1,623,895	82	99	100			c
29. 21210	Cigars							
	58	351,412	54	75	86			c
	54	333,273	45	64	81			u
30. 21310	Chewing and Smoking Tobacco and Snuff							
	58	192,772	53	78	98			c
	54	173,741	56	80	99			u

### Footnotes

2/ Estimation of maximum and minimum concentration ratios has been done according to procedures used by C. Kaysen and F. D. Turner, Antitrust Policy, An Economic and Legal Analysis (Cambridge: Harvard University Press, 1959).

3/ An industry is classified as concentrated if the top eight firms account for 75 percent or more of the total business. Where the top eight account for no less than 75 percent of the total business according to the maximum estimate but less than 75 percent according to the minimum estimate, the industry is not classified (N.C.).

Source: Concentration Ratios in Manufacturing Industry, 1958, Part I, Report of Bureau of Census to the Subcommittee on Antitrust and Monopoly of the Committee on the Judiciary, U.S. Senate, 87th Congress.