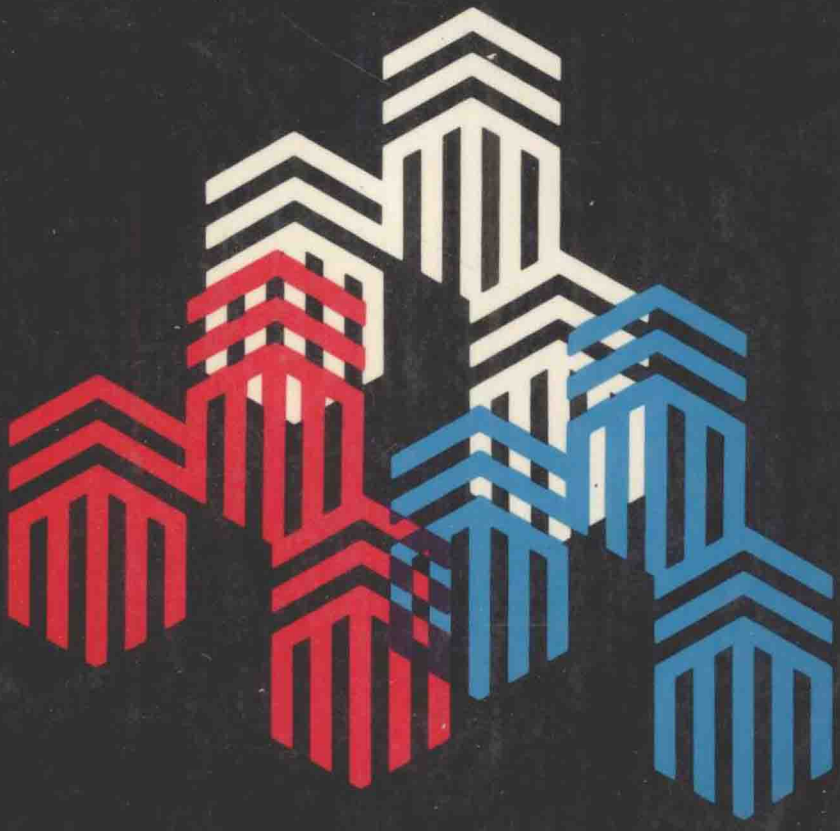
WALTER ADAMS

THE STRUCTURE OF AMERICAN INDUSTRY

SEVENTH EDITION



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WALTER ADAMS
MICHIGAN STATE UNIVERSITY
editor

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Preface

One of the major transformations in political economy since the first edition of this book appeared in 1950 is a renewed awareness that the power relationships in society—and especially the role of the state—are a matter of profound social concern and require continuing confrontation by public policy makers.

In the aftermath of Watergate and related revelations, it has become less fashionable to dismiss the Founding Fathers as anachronistic philosophers or to ridicule Lord Acton's warning about the consequences of concentrated power. The excesses of the "imperial" presidency, and the abuse of executive authority to harass and oppress individual citizens, have underscored the importance of a decentralized power structure within a framework of checks and balances. As Madison put it in *The Federalist*, No. 51, "If men were angels, no government would be necessary. If angels were to govern men, neither external nor internal controls on government would be necessary. In framing a government which is to be administered by men over men, the great difficulty lies in this: You must first enable the government to control the governed; and in the next place oblige it to control itself. A dependence on the people is, no doubt, the primary control on the government; but experience has taught mankind the necessity of auxiliary precautions . . ." And these auxiliary precautions, said Madison, require primarily a separation of power between the different branches of government, and secondarily a dispersion of power among the citizenry. The underlying purpose, he wrote, is to prevent the rulers from oppressing the ruled, and to render it improbable, if not impracticable, for one segment of society to oppress another.

This traditional, peculiarly American distrust of concentrated power is, of course, relevant not only to political but also to economic institutions. Despite the recent reemergence of Social Darwinism, there is a persistent recognition that economic power is not merely a decorative status symbol to be passively enjoyed in the counting houses and country clubs. Economic power, we are constantly reminded, may be used with statesmanlike for-

bearance and diplomatic skill. It may be used only where circumstances absolutely demand it, or when the political climate is particularly propitious. It may be accompanied by sophisticated public relations campaigns to purify its venality or sanitize the corporate image. But the fact remains that, in the long run, the possession of great power and the exercise of such power tend to coalesce. Wherever economic power exists it tends eventually to be used, and for ends chosen by those who control it.

With the election of President Reagan there was a renewed emphasis on the decentralization of economic power. Competition was touted as an instrument for achieving "the best allocation of resources, the lowest prices, the highest quality, and the greatest material progress"; a device to be used by society for social purposes; a blueprint for limited power operating in a comprehensive framework of checks and balances; a network of safeguards against the abuse of power to the detriment of the public; and, perhaps, above all, a regulatory system for the economy which obviates intervention and control by an all-pervasive state.

Unfortunately, the Administration's rhetoric has not always been matched by concrete action. "Deregulation" has often meant the curtailment of government regulations with respect to clean air, pure water, automotive safety, and fuel efficiency rather than the economic deregulation of inherently competitive industries. "Free trade" has meant resistance against the crasser forms of protectionism (e.g., for roses and water beds) but has not been considered inconsistent with "voluntary" import restraints negotiated on a bilateral or multilateral basis (e.g., for steel, textiles, and automobiles). "Antitrust policy" has not been mobilized to stem a rising tide of mega-mergers and joint ventures which are structurally transforming our industrial landscape. Government still seems content to protect, subsidize, and bail out vested interests which ought to be compelled to live by the Darwinist survival principles they preach to others.

In the context of the current debate over the proper role of government, the virtues of the competitive market, the challenge of international competition, and the need to "reindustrialize" America, the seventh edition of this book seems felicitously timed. It offers a kaleidoscopic view of American industry—a collection of case studies illustrating different types of structural organization, different behavior patterns, and different performance records—with an emphasis on international comparisons, where relevant, with industries in Japan and the European Economic Community. Although each industry is, of course, an "individual," the case studies offer to the student of industrial organization a "live" laboratory for clinical examination, comparative analysis, and the evaluation of public policy alternatives. For that reason the book, I hope, constitutes a useful supplement, if not a necessary antidote, to the economist's penchant for the abstractions of theoretical model building.

East Lansing, Michigan *Walter Adams*

Contributors

WALTER ADAMS is Distinguished University Professor, Professor of Economics, and Past President of Michigan State University. A member of the Attorney General's National Committee to Study the Antitrust Laws (1953–55), he has been an expert witness before Congressional Committees and the International Trade Commission as well as in antitrust proceedings.

GERALD W. BROCK is an economist in the Office of Plans and Policy of the Federal Communications Commission. He previously served as a consultant to the Department of Justice and to private firms in matters related to their antitrust suits against IBM.

JAMES W. BROCK is Associate Professor of Economics at Miami University (Ohio). He has served as a consultant on antitrust matters.

KENNETH G. ELZINGA is Professor of Economics at the University of Virginia. He served as Special Economic Assistant to the Chief of Antitrust Division and is co-author (with William Breit) of *The Antitrust Penalties*, *Murder at the Margin*, and *The Fatal Equilibrium*.

ARNOLD A. HEGGESTAD is William H. Dial Professor of Banking and Chairman of the Department of Finance, Insurance, and Real Estate at the University of Florida. He has previously served as financial economist, Board of Governors of the Federal Reserve System, specializing in public policy issues regarding the banking structure.

MANLEY R. IRWIN is Professor of Economics in the Whittemore School of Business and Economics at the University of New Hampshire. He has served as Chief, Western Electric Investigation, Federal Communications Commission (1972–74). He has also appeared as an expert witness in several antitrust proceedings.

JAMES V. KOCH is Professor of Economics and Provost, Ball State University.

STEPHEN MARTIN is Associate Professor of Economics at Michigan State University. He has served as an economic expert in antitrust proceedings.

WALTER S. MEASDAY formerly served as economist (1957–74) and chief economist (1974–80) of the U.S. Senate Antitrust and Monopoly Subcommittee. He also taught at the University of Maryland from 1950–1978.

HANS MUELLER is Professor of Economics and Finance, Middle Tennessee State University. He has been a consultant on steel industry problems to the World Bank, the Federal Trade Commission, and various private organizations. He has also appeared as an expert witness before Congressional committees and the U.S. International Trade Commission.

WILLARD F. MUELLER is William F. Vilas Research Professor of Agricultural Economics, Professor of Economics, and Professor in the Law School, University of Wisconsin-Madison. He served as Chief Economist and Director of the Bureau of Economics, Federal Trade Commission (1961–68) and Executive Director of the President's Cabinet Committee on Price Stability (1968–69).

FREDERIC M. SCHERER is Joseph Wharton Professor of Political Economy at Swarthmore College. From 1974 to 1976 he was director of the Federal Trade Commission's Bureau of Economics. He has also served as a consultant in diverse antitrust, international trade, and defense economics matters.

WILLIAM G. SHEPHERD is Professor of Economics at The University of Michigan. The economic advisor to the Chief of the Antitrust Division (1967–68), he has also been an expert witness in several antitrust proceedings.

DANIEL B. SUITS is Professor of Economics at Michigan State University and Fellow of the East-West Population Institute. He has served as consultant to the U.S. Secretary of the Treasury (1961–70) and to a number of other federal and state agencies.

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I. INTRODUCTION

As supplier of most of the food we eat and of raw materials for many industrial processes, agriculture is clearly an important sector of the economy. But the importance of the industrial performance of agriculture transcends even this function. In nations where the productivity of farmers is low, most of the working population is needed to raise food and few people are available for production of investment goods or for other activities required for economic growth. Indeed, one of the factors that correlates most closely with the per capita income of a nation is the decline in the fraction of its population that is engaged in farming. In the poorest nations of the world, more than half of the population lives on farms, as compared to less than 10 percent in Western Europe and less than 4 percent in the United States.

In short, the course of economic development in general depends in a fundamental way on the performance of farmers. This performance, in turn, depends on how agriculture is organized and on the economic context, or market structure, within which agriculture functions. In this chapter, the performance of American agriculture is examined, beginning with a consideration of its market structure.

II. MARKET STRUCTURE AND COMPETITION

Number and Size of Farms

There are about 2,241,000 farms in the United States today. This is roughly 40 percent of the peak reached sixty years ago, and as the number of farms has declined, the average size has risen. Farms in the United States still average fewer than 460 acres, but this average can be misleading. In fact, modern American agriculture is characterized by large-scale operations. Although only 162,000 farms—5.5 percent of the total—are as large as 1,000 acres or more, they include more than 40 percent of total farm acreage. Nearly a quarter of all wheat, for example, is grown on farms of 2,000 acres

or more, and the top 2.6 percent of wheat growers raise roughly 50 percent of our wheat.

Sizes of farms vary widely by product, but even where typical acreage is small, production is concentrated. Nearly 65 percent of our tomato crop is grown on farms smaller than 500 acres, but the remaining 35 percent is marketed by the largest 9 percent of tomato growers. Broiler chickens are raised on still smaller farms, with 55 percent coming from farms with fewer than 100 acres. However, more than 70 percent of all broiler chickens are raised by the largest 2 percent of growers.

Size of farm also varies with production technique as this is affected by region, climate, and other factors. In the southern United States, 60 percent of cotton output comes from farms of fewer than 1,000 acres, whereas farms that small produce only a third of cotton grown in the more capital-intensive western states. Over all, however, the largest 3 percent of all cotton growers produced 40 percent of all cotton and cotton seed in the United States.

With the advent of large-scale commercial agriculture, the family farm, long the American ideal, is no longer characteristic. Only about half of all present-day farmers earn their livelihood entirely from farm operations. The others must supplement farm income with industrial jobs or other off-farm employment. Moreover, large-scale agriculture is increasingly characterized by corporate operations. Although only 2 percent of all farms are incorporated, corporations own 12 percent of all land in U.S. farms and market 22 percent of the total value of all farm crops.

Corporate farms are especially important in states like California, where they operate a quarter of all acreage in farms and market 40 percent of the value of all farm crops (including almost 60 percent of all California sweet corn, melons and vegetables). But even in a state like Kansas, over a third of all farm products are marketed by corporate farms.

Competition in Agriculture

Despite the scale and concentration of production, however, modern agriculture remains an industry whose behavior and performance are best understood in terms of the theory of pure competition. Although agricultural production is concentrated in the hands of a relatively small percentage of growers, total numbers are so large that the largest 2 or 3 percent of the growers of any given product still constitute a substantial number of independent firms. For example, although only 2 percent of grain growers produce about 50 percent of all grain in the United States, this 2 percent consists of 27,000 firms. Numbers like this are a far cry from those for manufacturing. The largest number of firms of all sizes found in any one manufacturing industry are the 10,000 sawmills and planning mills engaged in the production of lumber. However, manufacturing industries typically have many fewer firms—even industries like men's work clothing (277 firms) and cotton-weaving mills (218 firms), which are widely recognized as highly competitive. Thus, even if we ignore the competitive influence exerted by the thousands

of smaller farms in each line of production and look only at the very largest, we are still talking about nearly 100 times as many independent firms as are found in the most competitive manufacturing industries.

In any event, the number and size of existing firms are only partial measures of the competitiveness of market structure. An important additional consideration is the extent to which ease of entry generates potential competition beyond the firms engaged in production at any given moment. Not only do the many smaller farms produce and sell in the same market with the larger ones, but there are no special barriers to entry into agriculture. Moreover, many existing farms are adapted to the production of a variety of products and can shift output from crop to crop on the basis of the outlook for prices and costs.

As a result of this structure, even large modern farms are powerless to exert any appreciable individual influence on total output or prices through their own economic behavior. They can only plan production schedules on the basis of their own best expectations, with the knowledge that the ultimate price will be virtually unaltered by anything they might decide. Plans for how much of which crops to grow and by which methods are arrived at on the basis of price and cost expectations. The resulting crop comes on the market and sells at prices that are determined by total volume in conjunction with existing demand.

Demand for Farm Products

Another important element in the structure of agriculture markets is the nature of the demand for farm products. Before exploring farm products in particular, however, it is useful to review some of the properties of demand curves in general. Potatoes are fairly typical farm products and can be used as a convenient illustration.

Demand for Potatoes. In Figure 1, the average farm price of potatoes in the United States is plotted vertically against the annual per capita consumption of potatoes, measured horizontally. Each point represents data for a recent year. The downward drift of the scatter of points from upper left to lower right confirms the everyday observation that people tend to buy more at low than at high prices. At the high price of $2.57 for example, average consumption of potatoes in the United States shrank to 133 pounds per person in 1980, whereas at the low price of $1.46, consumption reached 152 pounds per person in 1979. Of course, as a glance at the chart reveals, price is not the sole influence on buying habits. Consumption during 1981 was somewhat greater, and that during 1979 somewhat less than would have been expected from the price of potatoes alone. Part of this variation can be traced to changes in buyers' incomes, and part to changes in the prices of other foods that can substitute for potatoes in the diet. Some of the variation is associated with changes in consumer tastes for potatoes, connected

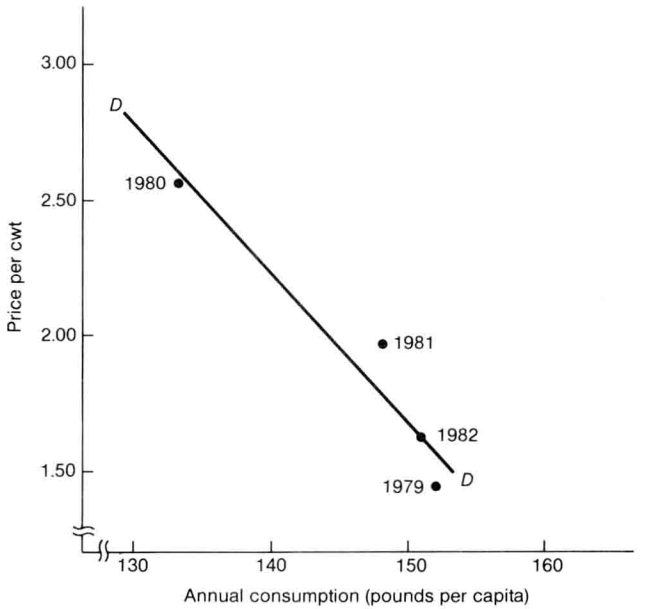

FIGURE 1. Demand for potatoes. *Source:* Data from the U.S. Department of Agriculture, *Agricultural Statistics,* various issues. Prices have been divided by the consumer price index to adjust for inflation.

with the shifting popularity of such things as packaged mashed potatoes, or "fries" at fast-food outlets.

By the use of appropriate statistical procedures it is possible to allow for the effects of many of these other influences and to estimate the effect of price alone on potato purchases. The result is shown by the curve *DD*, drawn through the midst of the observations. Such a curve, called a *demand curve,* represents the quantity of potatoes buyers would be expected to purchase at each price, other influences being held constant.

Demand Elasticity

Elasticity Defined. The responses of buyers to changes in price are measured by the *elasticity of demand* which expresses the percentage change in quantity purchased to be expected in response to a 1 percent change in price. For example, if a 1 percent price increase induced the buyers of a product to cut their purchases by 2 percent, the elasticity of demand for the product would be expressed as -2 to indicate that percentage changes in quantity purchased tend to be double the percentage change in price. The negative sign reminds us that quantity is altered in the opposite direction to the change in price, a rise in price being accompanied by a reduction in quantity, and vice versa. In a similar fashion, elasticity of $-.7$ would characterize the demand for a product when a reduction of only .7 percent in

purchases would occur in response to a 1 percent price increase. An elasticity of −1 would indicate that percentage changes in quantity and price tend to be equal, and so on.

The elasticity of demand for particular products is readily estimated from fitted demand curves by selecting two prices close together and reading the corresponding quantities shown by the curve. The elasticity is then calculated as the ratio of the percentage difference in the two quantities to the percentage difference in the two prices. For example, careful measurement on the demand curve *DD* indicates that purchasers would be ready to buy about 142 pounds per year at a price of $2.10, but if the price were lowered to $2.00, purchases would expand to about 144 pounds. The price reduction from $2.10 to $2.00 is a change of −5 percent, whereas the increase in purchased quantity from 142 to 144 pounds is a change of about 1.4 percent. This yields an estimated elasticity of demand for potatoes of about 1.4/−5, or about −.3.

We are rarely interested in such exact measurement of elasticity, but we do need a general idea of how elastic the demand for a given product is. For this purpose it is convenient to classify demand curves into broad categories, using elasticity of −1, called *unit* elasticity, as the dividing point. Demand curves with elasticity smaller than 1 (in absolute value) are then referred to as *inelastic* demands. In these terms, the demand for potatoes with an elasticity of −.3 would be classified as *inelastic*.

Demand curves with elasticity greater than 1 in absolute value are termed *relatively elastic*. The demand for lettuce—estimated to have an elasticity of −2.8—is classified as relatively elastic.

Causes of Differences in Elasticity. Because elasticity measures buyer response to price, it varies widely among products, depending in each case on the characteristics of the product and on buyers' attitudes toward it. Products like potatoes, which many people view as necessities, or food staples, have inelastic demands. Buyers feel that they need a certain amount in their diet and are reluctant to cut back on their use of the commodity as its price rises. By the same token, because buyers are already consuming about as much of it as they feel they need, they have use for only little more when prices fall.

In contrast, products that are viewed as luxuries exhibit relatively elastic demands, for their consumption can be reduced almost painlessly when prices rise, yet buyers are delighted at the chance to enjoy them when lower prices place them within reach of the budget. Among farm products, demands for fruits and fresh vegetables tend to be relatively elastic. The demand for peaches, for example, has been estimated to have an elasticity of −1.49, five times that of potatoes. The high elasticity reflects the ease with which households can do without peaches when the price rises, and the welcome accorded the fruit when it becomes cheap.

The elasticity of demand also depends on the relationship the product

Table 1: Elasticity of Demand for Selected Farm Products

Product	*Elasticity of Demand*	
	Price	*Income*
Cabbage	−.25	n.a.[a]
Potatoes	−.27	.15
Wool	−.33	.27
Peanuts	−.38	.44
Eggs	−.43	.57
Onions	−.44	.58
Milk	−.49	.50
Butter	−.62	.37
Oranges	−.62	.83
Corn	−.63	n.a.
Cream	−.69	1.72
Fresh cucumbers	−.7	.7
Apples	−1.27	1.32
Peaches	−1.49	1.43
Fresh tomatoes	−2.22	.24
Lettuce	−2.58	.88
Fresh peas	−2.83	1.05

[a]Not available.

Source: Estimated by the U.S. Department of Agriculture.

bears to others. In particular, products that have good substitutes to which buyers can turn as alternatives tend to have relatively elastic demands. Even small percentage changes in price lead large numbers of buyers to choose the cheaper substitute. This is probably one of the reasons that demands for fresh vegetables tend to be relatively elastic. The elasticity of demand for fresh tomatoes, for example, has been estimated at −2.2, and that of fresh peas at −2.8, largely because many other fresh vegetables can be used instead of these if the price is right.

Price elasticities of demand for a number of farm products are given in Table 1. Note that demands for basic commodities like potatoes and corn tend to be inelastic, as might be expected from their nature. On the other hand, many individual fresh fruits and vegetables have highly elastic demands, partly because of their less basic character and partly because of the availability of many close substitutes to which consumers can turn.

Elasticity of Derived Demands. A particularly important aspect of demand for farm products is that most are purchased from the farm by canners, millers, and other manufacturers who process the raw product before selling it to final consumers. Wheat is milled into flour and baked into bread before it is purchased for the table; meat is butchered and packaged before con-

Table 2: Shares in Final Retail Value of Food Products

	Billions of Dollars	*Percent*
Final retail value	$297.6	100
Processing and marketing costs		
Labor	95.5	32
Rail and truck transportation	14.7	5
Power, containers, and other costs	90.8	31
Corporate profit (before taxes)	13.1	4
Farm value of products	83.5	28

Source: U.S. Department of Agriculture, *Agricultural Statistics*, 1983 (Washington, D.C.: U.S. Government Printing Office, 1983).

sumers buy it; and most fruit and vegetables are canned or frozen before consumers buy them. Even those to be sold fresh require transportation, packaging, and other retailing costs before they can be delivered to the table.

As shown in Table 2, only 28 percent of the retail value of food items purchased in the United States consists of their original value on the farm; 72 percent consists of value added by processing and marketing. These percentages vary widely among different farm products. Because of the lengthy production line required for bread and cereal products to reach the final consumer, farm value constitutes only 22 percent of the retail price. The value of the barley, rice, hops, and other farm products in the retail price of a can of beer is even smaller. In contrast, the farm share is 65 percent of the retail price of meat, poultry, and eggs that reach the table more directly.

Because of the value added by processing and marketing, the value of the farm product represents a small percentage of the retail price paid by ultimate buyers, and this tends to make the demand for raw farm products even less elastic. To make clear why this is so, let us consider a processed product with a relatively elastic demand—frozen peas with a demand elasticity of about -2. This elasticity would mean that a 5 percent reduction in the price of frozen peas would tend to increase consumption by about 10 percent. But if frozen peas are typical of other vegetables, farm value constitutes only about 30 percent of the final retail price, so a 5 percent reduction in the farm price of peas would result in no more than 1.5 percent reduction in retail prices for frozen peas. Given the elasticity of -2, this lower price would stimulate only 3 percent greater sales of frozen peas, and only a 3 percent increase in the purchase of raw peas to freeze. In consequence, then, a 5 percent price reduction at the farm level stimulates only a 3 percent increase in the quantity of peas bought from farmers, and this gives demand for peas an elasticity of only $-.6$ at the farm level, despite the highly elastic demand for frozen peas by consumers.

The relationship demonstrated for frozen peas holds for all derived demands. In general, the smaller the farm share in retail price, the lower the

elasticity of derived demand for the product tends to be at the farm level. Because farm value is only 38 percent of the retail value of foods and other farm products, demand at the farm level would tend to be inelastic even if retail demands for final products were relatively quite elastic. In fact, however, because retail demands for most food products are inelastic even at the consumer level, the small farm share in retail price tends to make demand at the farm level very inelastic indeed.

Commodities with Several Uses. As we have seen, the elasticity of demand for a product depends on what it is used for, but many commodities are used for more than one purpose. In such cases, demand elasticity varies among the different uses, depending on the degree to which each particular use is viewed as "necessity" or "luxury," and depending on the availability of substitutes to replace the commodity for each purpose. Wheat, for example, has two important uses. It is used not only to make bread and bakery products for the table, but also as a feed grain for poultry and livestock. As a component of bread, wheat is generally viewed as a basic necessity; moreover, because of its gluten content, wheat flour has no good substitutes in baking. Indeed, wheat is so outstanding in this regard that most recipes for "rye" bread, "corn" bread, and other "nonwheat" bakery products call for the addition of wheat flour to the other grain in order to impart cohesiveness to the dough. As a result, the demand for wheat to make into bakery products is quite inelastic. As a feed grain, however, wheat has many fine substitutes in corn, oats, sorghum grains, and other commodities, so that the demand for wheat as feed grain in relatively elastic.

Statistical measurement by the U.S. Department of Agriculture bears out these differences in elasticity. The demand for wheat destined to be made into flour has an elasticity of only $-.2$, whereas the demand for wheat to be used as a feed grain has an elasticity of -3.

Taking all the uses together, the overall elasticity of demand for a product having several uses is the weighted average of elasticities of demand in the different uses, with weights proportional to the quantity consumed in each use. Because wheat is used overwhelmingly for flour, its overall demand is highly inelastic, despite the high elasticity of demand in one of its uses.

Elasticity and Allocation of Available Crop. Differences in elasticity play an important role in the allocation of farm products among different uses. When supplies are short, the consumption of products must be cut back. Generally, there is some reduction in all uses, but the greatest reduction is in less essential uses, or uses for which the product can readily be replaced by close substitutes. These are, of course, the uses in which demand elasticity is high. Rising prices curtail consumption in these areas, leaving proportionally more for essential uses where replacement is difficult. Response to increased supply is the opposite. As price falls, more of the product is devoted