

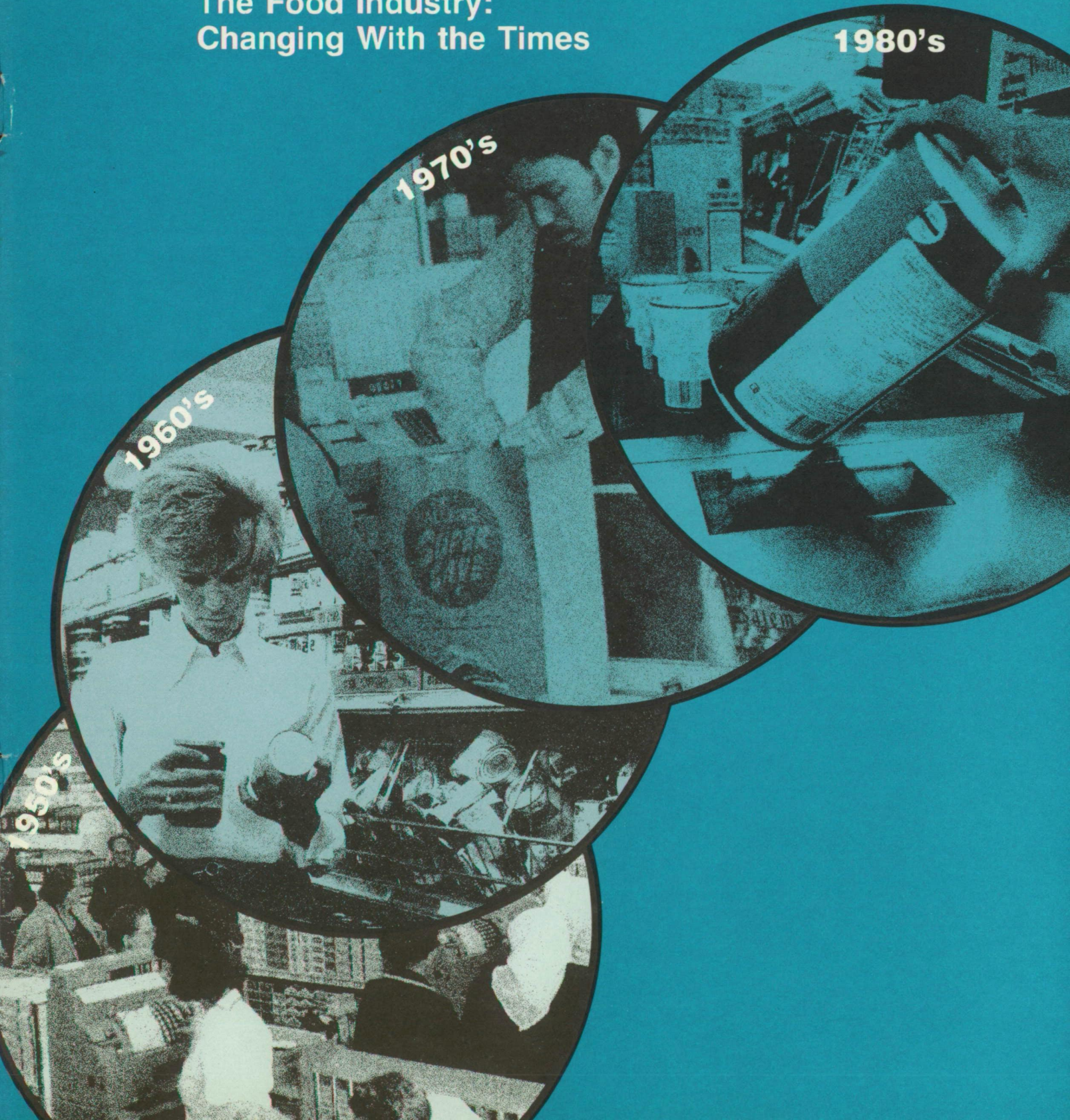
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The Food Industry: Changing With the Times



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The Food Industry: Changing With the Times



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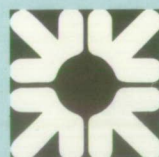
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Food Marketing—From Farm to Table

Anthony E. Gallo
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Food marketing—two words that encompass a wide range of activities that transform Indiana corn into breakfast cereal or Iowa beef into a fast food meal. Over 1 million establishments make up the food marketing system, including over 250,000 retailers, about 700,000 foodservice establishments, 40,000 wholesalers, and more than 16,000 processors.

The food marketing system is rapidly changing, affected by shifts in the population, consumer lifestyles, and health concerns, as well as by the industry's attempts to stimulate demand for agricultural products.

For Firms, It's Fewer but Larger

Food processing, wholesaling, and retailing firms, like most other major industries, have experienced a sharp decrease in numbers in recent years. The number of food manufacturing firms, for example, declined from more than 40,000 in 1947 to 20,616 in 1977, to 16,813 in 1982. Meanwhile, wholesalers dropped by nearly half (*table 1*).

Although the firms are fewer, they're larger. And this has had implications for large firms' shares of sales. The 50 largest food processing companies, for example, accounted for over 43 percent of U.S. shipments from all food processing establishments in 1982, compared with 35 percent in 1967.

In an expanding market for wholesaler services, the 50 largest general-line firms (handling a variety of groceries, household products, and health and beauty aids) increased their national share of wholesale food sales from 48 to 64 percent between 1972 and 1982. The 50 largest specialty wholesalers (handling perishable lines such as frozen foods, fish, and fresh fruit) also

This article was based on a larger study written by Anthony E. Gallo, James M. MacDonald, Walter B. Epps, Phillip R. Kaufman, Judith J. Putnam, Harold R. Linstrom, Michael G. Van Dress, Charles R. Handy, and Lester Myers of the Food Marketing and Consumption Economics Branch of the National Economics Division.

Table 1. Fewer But Larger Firms Dominate Food Marketing Sector

	1967			1972			1977			1982		
Manufacturers												
Number												
Firms	26,549			22,171			20,616			16,600		
Outlets ¹	32,517			28,193			26,656			21,316		
Share of value added, firms:												
Percent												
1-50 largest	35			38			40			43		
51-100 largest	13			13			12			13		
101-200 largest	9			10			11			11		
201-500 largest	10			11			11			10		
All others	33			28			26			23		

¹Firm may own more than one outlet.

increased their share from 26.5 to 34 percent. Only limited-line wholesalers—who carry dry groceries such as canned foods, coffee, tea, spices, bread, and soft drinks—lost shares.

Although no food retailers are national, a handful of very large firms account for a significant share of total industry sales. The

20 largest food retailers accounted for 27 percent of grocery store sales in 1948 and 34 percent in 1958. Since 1958, however, their share has increased negligibly, reaching just 35 percent in 1982.

The Nation's largest foodservice firms—those that dispense prepared meals and

snacks for on-site or immediate consumption—have increased their share of sales gradually over time. However, there is still not a significant concentration of sales among the largest firms. The four biggest foodservice firms, for example, accounted for only 5 percent of 1982 total foodservice sales, compared with 4 percent in 1972. The 50 largest firms comprise just 20 percent of foodservice sales, up from 13 percent in 1972.

Food Marketing: Contributing to the Economy

Food marketing is an important contributor to the Nation's economy. In 1984, it accounted for \$386 billion of the gross national product (GNP)—about 10.5 percent of the total.

The food marketing system as a whole, however, has shown relatively slow growth compared with other sectors of the economy. On the production side, its contribution to the GNP rose at a yearly compound growth rate of 1 percent between 1976 and 1984, while the nonfood marketing sector's rose 1.6 percent. Rising incomes in recent years meant consumers have allocated a smaller share of income to food and more to nonfood purchases. Consequently, the



The food marketing system is one of the largest employers in the Nation, generating approximately 12 million full-time jobs and employing more than 1 of every 10 U.S. workers.

food system's share of GNP fell from about 11.5 percent to roughly 10.5 percent. Employment by the food sector fell from 11.6 to 10.6 percent.

The food marketing system is one of the largest employers in the Nation, generating the equivalent of approximately 12 million full-time jobs and employing more than 1 of every 10 U.S. workers (table 2). These include over 3.5 million workers in retailing, wholesaling, and transportation; over 1.5 million in food processing; and 3.5 million in eating and drinking places. The food marketing system generates another 3.5 million jobs through other supporting sectors, such as packaging, advertising, and energy.

The food-away-from-home sector, having experienced phenomenal growth in the last several decades, is an increasing source of employment. About 2.1 million or 8 percent of the 25.6 million new jobs that the U.S. economy is expected to generate during 1982-95 should occur in foodservice, according to projections by the Bureau of Labor Statistics (BLS). Foodservice employment was conservatively estimated at 6.2 million, and BLS projections call for about a 33-percent increase by 1995.

Table 2. Food Marketing System One of Nation's Largest Employers

	1976	1978	1980	1982	1984	1976	1978	1980	1982	1984
Full-time equivalent employment	Millions					Percent				
Food Sector	11.2	11.5	12.2	12.0	12.0	11.6	11.2	11.4	10.9	10.6
Processing	1.5	1.5	1.6	1.6	1.4	1.6	1.5	1.5	1.4	1.2
Retailing and wholesaling	2.9	3.0	3.2	3.2	3.2	2.9	2.9	3.0	2.9	2.8
Transportation	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
Eating and drinking places	3.0	3.1	3.3	3.2	3.4	3.1	3.0	3.1	2.9	3.0
Other supporting sectors	3.4	3.5	3.7	3.6	3.6	3.5	3.4	3.5	3.3	3.2
Nonfood sector	85.0	90.8	94.7	98.2	101.5	88.4	88.8	88.6	89.1	89.4
Civilian labor force	96.2	102.3	106.9	110.2	113.5	100.0	100.0	100.0	100.0	100.0

Source: Lee, Chinkook, Gerald Schluter, William Edmondson, and Darryl Wills.

Measuring the Size of the U.S. Food and Fiber System. Forthcoming staff report. U.S. Department of Agriculture, Economic Research Service.

Growth in Eating Out Likely To Continue

Demographic projections from the U.S. Census Bureau also suggest continued growth in the away-from-home sector through the end of the decade. The percentage of the total population between 25 and 44 years old—those most frequently eating out—may increase 4 to 5 percentage points during 1980-90. Another category of frequent diners, one-person households, may rise from 23 percent of the total population in 1980 to about 25 percent by 1990. On a per-capita basis, one-person households spend 89 percent more than the average household for food away from home, while two-person households spend 29 percent more than average. One- and two-person households should constitute around 57 percent of all households by 1990, up from 54 percent in 1980.

Further increases in the number of women in the labor force should also enhance the prospects of the food-away-from-home industry and influence the marketing of many food products and services. In 1984, 53 percent of women 16 years or older were in the labor force, up from 43 percent in 1970 and 34 percent in 1960. Nearly 7 in 10 women age 20 to 44 years are now in the labor force. If most of these women remain in the labor force, and if succeeding generations of women participate at equal or higher rates, the number of working women will increase into the first decade of the next century.

The portion of the total U.S. population in the Northeast and Midwest should fall from 47.7 percent in 1980 to 39.6 percent by 2000. This means almost 6 of every 10 Americans could be living in the South and West by the end of this century. These projected regional shifts could mean greater opportunities for foodservice growth in the South and West and could influence national food purchase and consumption patterns. Cajun-type fried chicken, southern biscuits, oriental stir-fry dishes, and Mexican specialties, for example, are already popular in every major region and could continue to grow with the population shifts. Meanwhile, opportunities for expansion should continue

in the Northeast and Midwest, since population density will remain relatively high despite slower growth (and even moderate declines).

Increases in consumer income, after adjusting for inflation, should spawn additional foodservice growth. Studies have found that a 10-percent increase in consumer income results in a 5.5- to 11.6-percent rise in meals and snacks away from home, assuming other factors remain constant. Using the midpoint of this range, ERS economists forecasted the impact of changes in income on foodservice growth from 1984-94. They found that a 10-percent rise in income could mean an 8.5-percent rise in spending for meals and snacks. If inflation-adjusted (real) per capita disposable income rises 18 percent and population almost 10 percent, real sales of commercial eating places could rise 25 percent from 1984-94. However, the average compound annual increase of 2.3 percent during the period will be below the 3 percent rate of 1977-84. Changes in the

age and geographic distribution of the population, household size, consumer preferences, and improved marketing and merchandising efforts could further enhance growth.

Continuing efforts to contain the Federal budget will restrain foodservice sales in the noncommercial sector. This might create lucrative markets for commercial firms capable of providing efficient, cost-saving foodservice to such institutions as hospitals and schools, which traditionally run in-house feeding operations.

The Battle for the Food Dollar

For all sectors of the marketing system, competition for the food dollar should increase in the decade ahead. Food marketers are experimenting with new formats, merchandising strategies, and improved food products and services to satisfy an older, better educated, more diverse, and demanding population.

Nowhere will the competition be more keen than in the food-away-from-home sector, as an array of outlets try to capture more of this rapidly growing market. The fast food industry, for example, has moved in several new directions to build its market share. It is operating outlets in new locations, such as schools and college campuses, hospitals, military bases, toll roads, bus terminals, retail stores, shopping malls, central city office buildings, recreational sites, and international markets. Menus now include such items as salad bars, salad entrees, pasta dishes, baked potatoes, gourmet burgers, more fish and chicken items, soups, fruit juices, and whole grain buns.

Many foods have been added in response to demand from health- and diet-conscious individuals. The diet-conscious segment of restaurant menus has expanded as the scientific base linking diet and health mounts and as women, who are joining the labor force in large numbers, eat out more often.

Many fast food outlets have upgraded their decor and added driveup windows to attract more business. These outlets have also introduced breakfast and dinner specialties, extended operating hours, and estab-

Want More Information On Food Marketing?

Food Marketing Review, 1985, the first annual report on this important economic sector, details the firms comprising the processing, wholesaling, retailing, and foodservice industries. The future of the firms, workers, and the system as a whole are examined.

Food Marketing Review, 1986 will be published in early 1987. These reports may be purchased from the Superintendent of Documents, U.S. Government Printing Office (GPO), Washington, D.C. 20402. Order *Food Marketing Review*, 1985 by title and stock number 001-019-00455-0. The price is \$3.00 domestic, \$3.75 foreign. Stock number and price information for 1986 version of the report will be available early next year. Make check or money order payable to the Superintendent of Documents, or call GPO at (202) 783-3238 to charge your purchase to your VISA, Choice, MasterCard, or GPO Deposit Account.

lished a niche in the catering business to get full use of equipment and increase unit sales.

Many full-service restaurants are experimenting with lighter dishes and emphasizing freshness, quality, regional cooking, and seasonality to increase customer traffic. Compared with fast food places, these restaurants enjoy greater flexibility to adapt menus and preparation methods quickly to meet changing consumer preferences. Some full-service establishments are launching gourmet takeout foods to boost sales and expand the customer base.

Eating places, however, face competition from other areas of food retailing, with the microwave oven figuring prominently in the competition. Grocers, stepping up the battle for market share, are stocking more upscale frozen foods ready for heating in a microwave. Forty-two percent of U.S. households had microwave ovens in 1985, up from 13 percent in 1980. Campbell Soup Company estimates that microwave ovens will be in 70 to 80 percent of all homes by the year 2000. Convenience stores, with increasingly heavy investment in microwave ovens and other foodservice equipment, are also rapidly expanding foodservice sales. Fast food sales were up 50 percent from 1975, reaching 6.1 percent of their total sales in 1984 (table 3).

Food retailers are also responding to the growing popularity of convenience and prepared foods by installing salad and soup bars, adding in-store bakeries and delicatessens, and providing cut and prepared produce. Some supermarkets now also offer in-store restaurants.

Table 3. On-the-Go Consumers Boost Convenience Store Sales

	Total	Non Gasoline ¹	Gasoline
<i>Billion dollars</i>			
1971	3.6	NA	NA
1972	4.2	NA	NA
1973	5.1	NA	NA
1974	5.3	4.9	0.4
1975	6.2	5.5	.7
1976	7.4	6.3	1.1
1977	8.9	7.4	1.5
1978	10.6	8.7	1.9
1979	14.1	10.5	3.6
1980	18.9	12.4	6.5
1981	22.8	14.1	8.7
1982	25.4	15.1	10.3
1983	28.3	16.5	11.8
1984	34.0	19.7	14.3

NA = Not available. ¹Food and general merchandise.

Source: National Association of Convenience Stores. *State of the Industry Report*. 1984 and previous years.

A Look Ahead At Wholesaling and Retailing

While retailers attempt to expand into the away-from-home market, wholesalers are moving into the food store business, resulting in a profound change in food distribution. About 3 percent of the 10,000 retail food stores served by the leading wholesalers in 1984 were wholesalers' corporate stores. Wholesalers have long acquired supermarkets where chains have left the area; they also buy independents. Wholesalers

usually resell acquired supermarkets to independent operators. However, they have also retained some facilities and remodeled them to test prototypes of retail food stores.

Increasingly, the leading wholesalers are building larger stores, many of which are superwarehouse stores. Combining the scale of warehouse stores and the decor and variety of supermarkets, these giants involve capital outlays on a scale accessible only to operations with substantial retained earnings or extensive credit lines. The great volume required to sustain profitability also means drawing on a customer base extending up to 25 or 30 miles, and sometimes drawing customers away from other retailers supplied by the wholesaler.

For large wholesale firms, superwarehouse stores provide the means to increase profitability of the parent firm. Whether owned or licensed, warehouse stores of 50,000 square feet or larger generate tremendous wholesale volume.

In the decade ahead, we are likely to see more wholesaler-owned large retail stores as general-line firms attempt to expand. Large wholesalers will likely increase their volume through owning retail stores in growing areas and licensing independent retailers where ownership may involve competing with the wholesalers' other retail customers. Wholesaler expansion will also occur as firms continue to enter new geographic areas by acquiring local or regional distributors.

In addition, independent retailers will continue to grow, reopening former chain stores in central cities. Independents have competed aggressively and successfully with chains by offering personalized service, su-

pervising their operations closely, and receiving vital support from their wholesalers. The independents' success favors the continuing operation of those wholesalers who accept small orders, deliver frequently, and otherwise service low-volume retailers.

Despite the growth in independents, the trend toward fewer but larger supermarkets will probably continue. Grocery store capacity (sales, adjusted for inflation, as well as square footage of selling area) is still expanding, as many smaller supermarkets are replaced by superstores with 35,000 to 55,000 square feet of selling area and by superwarehouse stores and other large hybrid store formats, ranging from 45,000 to 200,000 square feet. In addition to potential size economies, these larger operations allow greater merchandising and ordering flexibility through delivery of many products direct from the manufacturer. The number of convenience stores has grown more than 40 percent since 1977, with a continuation of this trend expected.

The Outlook for Food Manufacturing

Clearly, where and what (*see article on page 6*) we eat in the decade ahead will shift dramatically. However, big changes also loom on the horizon for those who produce and market our food.

Foreign investment in U.S. food industries grew between 1976 and 1982, then stabilized. Thirty foreign firms entered the United States during that period (and 18 firms, smaller than the entrants, left, for a net gain of 12 firms). These 12 helped raise the share of U.S. food manufacturing employment held by foreign firms from 3 to 4.2 percent in just 6 years. Although foreign firms still constitute a small share of the U.S. food industry, they have the capacity to grow further.

The Nation's economy is becoming more international as real (adjusted for inflation) shipping and communications costs fall, and as incomes and tastes in foreign industrialized countries more closely approximate those here. Over the next 20 to 30 years, those trends should lead to steady increases in foreign investment in the United States and in U.S. investment overseas. Nevertheless, the pace of foreign investment in U.S. food industries has slackened in the last 4 years, after rapid growth during 1979-81, when a relatively low-valued dollar reduced stock prices of U.S. firms relative to foreign companies. The strong dollar of 1982-85 then reduced foreign acquisitions, even during a rising U.S. merger wave. With the dollar declining on foreign exchange markets in 1985 and 1986, the pace of foreign investment in the United States may begin to pick up.

Typically, foreign firms enter U.S. industries that are important in their home countries, where the firms have gained expertise. The largest entrants, accounting for 60 percent of employment in foreign-owned firms, are from the United Kingdom and are diversified producers of consumer food products. That is, they tend to be marketing-oriented firms. Cultural similarities, especially in language, and similar production and marketing techniques probably explain the large British presence. Firms from several other countries rapidly expanded their U.S. holdings in a few industries. For example, French firms expanded their small share, chiefly in dairy products (yogurt and cheese) and wines, both large domestic industries in France.

Japanese firms expanded rapidly during 1976-82, largely in fishing industries where they process some of the catch from U.S. coastal waters for the Japanese market. Firms such as Mitsui, Sugiyo, and others

have also introduced a variety of new surimi products to U.S. markets. Surimi are seafood analogs that allow low-value, widely available fish, such as pollock, to be marketed in forms that simulate the color, texture, and flavor of higher priced items, such as king crab. A drastic decline in the king crab catch since 1980 has led to widespread use of surimi-based crab analogs.

Many U.S. firms have opted to expand their operations by diversifying into other industries. Data show that some firms among the 50 largest in food manufacturing acquired even more food operations between 1976 and 1982. In total, the 50 largest food manufacturers participated in 435 food manufacturing industries in 1982, a 7.4-percent gain from 1976.

Major food manufacturers also expanded their interests in agriculture and in service-producing industries outside of manufacturing. The 50 largest food manufacturers increased their holdings of nonmanufacturing industries 15 percent between 1976 and 1982.

The key issue is whether firms that diversify can reduce costs. That is, will a single firm that produces in five industries have lower costs than five separate firms, one in each industry? The evidence is far from clear. However, if diversification reduces costs, it can have far-reaching effects on the industry. It will increase productivity growth, but it will do so in part by driving many small specialized firms from the industry. New entry and new products will come almost exclusively from existing diversified firms rather than new ones. What's more, the share of the food industry held by the largest firms may rise sharply. □

Meat, Poultry, and Dairy: What Does the Future Hold?

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The mix of animal products we eat has changed significantly in the last three decades. Today, it's more chicken, turkey, beef, and cheese, and less pork, butter, and eggs (*table 1*). Even the types of meat and dairy products we eat are different. For example, shoppers can purchase brand-name poultry, choose their favorite parts, and even select pan-ready items.

What's more, the decade ahead is likely to bring more changes. Technological advances will mean a host of new products in the meat counter and dairy case. With little increase in overall consumption of animal products expected in the next decade, the beef, pork, poultry, and dairy industries will try to capture a larger share of a stagnant market by offering more higher profit processed products. Furthermore, industry structure is likely to change because of this slow-growing market. Beef producers, for instance, may follow the lead of their poultry counterparts and assume more functions from farm to retail.

Explaining Three Decades of Change

A host of factors explain the changes in consumption of animal products, including growing incomes, new production and marketing technologies, and shifts in consumer preferences.

On the production side, the poultry industry has clearly been a leader in making physical and organizational improvements and in passing these benefits on to consumers. Improved productivity has enabled the poultry industry to produce and market chicken, turkey, and eggs at prices that have not risen as fast as overall consumer prices or prices of production inputs, such as labor, feed, and energy (*see NFR-23*). A 1983 report by the Economic Research Service (ERS) estimated that, in the absence of technological advances, the retail price for chicken would have been \$1.30 a pound in 1981—56 cents above the actual retail price. Similarly, improvements in producing

and processing turkeys meant that consumers paid only 93 cents a pound in 1981, instead of the \$1.77 that would have been necessary to cover the costs of production under 1960 technology.

Spurred by cost-savings at the farm and processing levels, per-pound retail prices for poultry have remained well below those of red meat products (*figure 1*). The Consumer Price Index shows that while retail pork, and beef and veal prices climbed about 190 percent between 1962 and 1985,

poultry prices rose a comparatively modest 112 percent. In 1985, consumers paid, on the average, 76 cents a pound for broilers and \$1.05 a pound for whole turkeys. Retail Choice beef prices, in contrast, averaged \$2.33 a pound, and pork was \$1.62.

Nevertheless, better production practices have also helped hold the line on costs in the beef and pork industries. Gains in efficiency have kept retail increases for beef and pork below what they would have been in the absence of industry changes, helping maintain consumer demand for these products over the last 20 years.

The story isn't much different in the dairy industry. Fewer but more productive milk cows are now supplying more than consumer needs. The number of cows declined from almost 22 million in 1950 to 11 million in 1985. At the same time, there was a significant increase in output per cow, from about 5,300 pounds in 1950 to over 13,000 in 1985—a 145-percent gain. Production per cow rose 26 percent just since 1975. Better producing cows pushed milk output from 117 billion pounds in 1950 to 144 billion in 1985.

Increases in milk supplies, however, have come in the face of relatively constant aggregate demand. Increases in population from 1950 to 1985 have been largely offset by decreases in per capita consumption, from 341 pounds in 1950 to 243 pounds in 1984 (product-weight basis).

Marketing—Meeting Consumer Needs

Clearly, the animal products industries made tremendous strides by increasing output with fewer resources. At the same time, changes in marketing have had implications for the foods we buy.

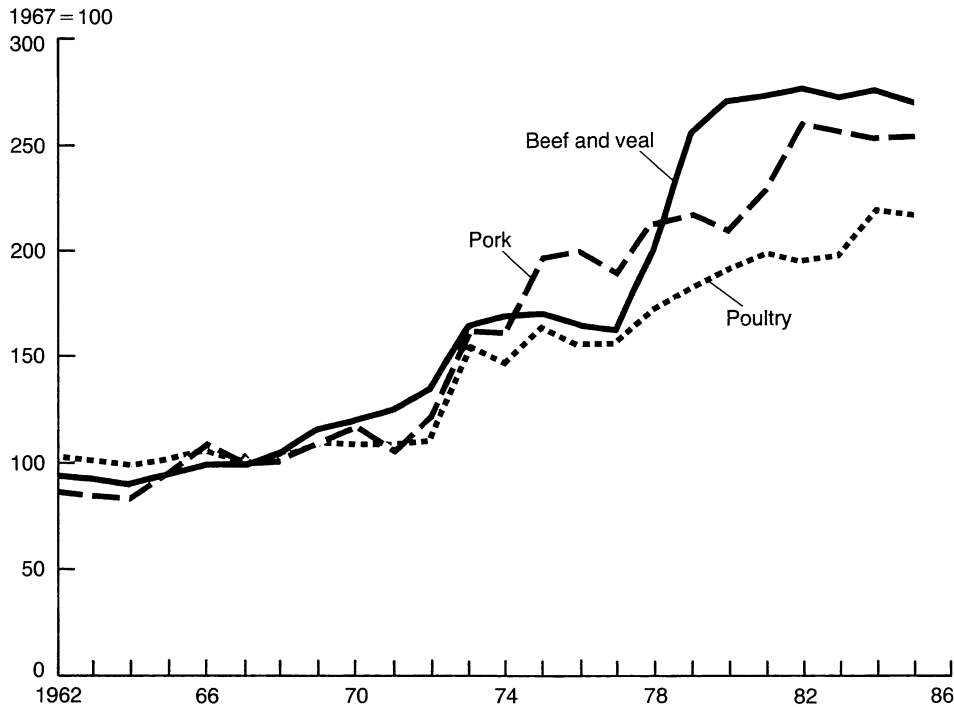
Take turkey, for example, which was once largely a seasonal product, available primarily in the fall. Turkey's graduation to year-round eating was prompted by a rapid increase in the use of further-processed turkey products beginning in the mid-1960's. At the end of the decade, about 25 percent of the volume was sold to shoppers as frozen raw meat in roasts, dinners, and pies

Table 1. Americans Ate Less Whole Milk, Eggs, and Butter, and More Chicken, Turkey, and Lowfat Milk in 1985

	1950	1985
<i>Pounds per capita</i>		
Fluid milk (product weight)		
Whole milk ¹	298.0	123.0
Lowfat milk ²	31.6	113.2
Cream and specialties	11.8	7.3
Total	341.4	243.5
Butter	10.7	4.9
Margarine	6.1	10.7
Cheese		
American	5.2	12.0
Other	2.2	9.7
Total	7.4	22.4
Red Meat		
Beef	50.1	78.6
Veal	7.3	1.8
Pork	64.4	62.0
Lamb and mutton	3.6	1.5
Poultry		
Chicken	20.6	57.4
Turkey	4.1	11.9
Eggs (number)	389.0	255.0
Fish and seafood	11.8	14.5

¹Includes flavored milks. ²Includes lowfat, skim, butter-milk, and yogurt.

The author is a staff economist with the Office of the Director of the National Economics Division.

Figure 1. Beef and Pork Prices Outpace Poultry

and to institutions as cooked turkey rolls. By the early 1980's, a variety of new consumer products, such as turkey ham, salami, and other less traditional forms, claimed over 40 percent of the market.

Apparent in the broiler industry is the shift to cut-up birds. A shopper in 1950 would likely have bought a whole bird simply labeled with the store name. Today, consumers can choose among many major advertised brands, and they can select only their favorite parts. Branded whole or cut-up broilers and turkeys now make up a significant portion of poultry sales. However, consumers are paying more for a "name" bird—about 10 cents more a pound in the case of at least one producer.

Consumers are also willing to pay more for convenience, prompting a wave of value-added products. Precooked poultry products, such as vacuum-packaged barbecue turkey and turkey roasts, are market-

ing successes. Holly Farms, Perdue, and other poultry producers are also offering more "upscale" raw products, such as boneless breasts and chunks to appeal to consumers' desires for convenient, time-saving foods. Boneless chicken, in fact, is becoming increasingly common, accounting for 15 percent of all chicken products marketed last year, up from 5 percent before 1980. The proliferation of pan-ready products has helped boost chicken and turkey's popularity with consumers.

The greater variety of products also means poultry is making in-roads in traditional red meat markets. To appeal to consumers concerned about fat, processors have begun marketing chicken or turkey franks, turkey breakfast sausage, and turkey salami and ham. In fact, in a 1985 survey of consumer attitudes conducted for the American Meat Institute (AMI) and the National Livestock and Meat Board (NLMB), 34 percent of the respondents reported that they bought chicken more often because more varieties of products were sold.

The trend to value-added poultry products differs from the more commodity-oriented beef industry. For poultry, most of the value added is at the producer level, reflecting the industry's extensive vertical integration (single firms raising, processing, and marketing birds). In contrast, trimming or special cuts of beef are generally done by the retailer.

However, restaurants and other foodservice outlets have been demanding more precut and portion-controlled red meat items. Foodservice firms tend to use meat products that have already been cut, trimmed, weighed, individually wrapped, and in some cases, even cooked.

With "upscale" the watchword in the food industry these days, even the dairy industry has jumped on the bandwagon. The dairy case reveals a range of products designed to appeal to more diverse tastes. Yogurt, for example, comes in a wide variety of textures and flavors. One firm is currently advertising its yogurt as "so rich you can eat it for dessert," hoping to carve out another niche for its product.

Like the poultry industry, dairy processors have moved to more value-added products. Shredded cheese is available in packages, for example, for cooks in a hurry. Cheeses with Mexican flavorings and spices are also a growing trend, along with a host of cream cheese flavors, such as strawberry, peach, or onion. One cooperative, Land O' Lakes, has broadened its product line to include an upscale time-saving product—pourable quiche.

Convenience and Nutrition Affect Consumer Choices

In the 1985 AMI/NLMB study of consumer attitudes, convenience was cited as an important consideration in consumer purchasing. Respondents expressed a greater concern about limiting the time and effort devoted to meal preparation.

Health concerns were also up substantially from a previous AMI/NLMB study in 1983. Sixty-eight percent of the 1985 respondents strongly agreed that it is important to limit fat in the diet, compared with 57 percent



Spurred by cost-savings at the farm and processing levels, per-pound retail prices for poultry have remained well below those of red meat.

just 2 years before. Those voicing extreme concerns about salt totaled 53 percent, up from 46 percent in 1983, and cholesterol was cited by 45 percent, versus 39 percent.

A 1984 national survey by the Food Marketing Institute indicated that many Americans feared that some of the chemicals used in producing, processing, and preserving foods were not safe. What's more, they claimed that they avoided buying products they believed to be risky.

This growing health and safety awareness has, of course, been cited as one factor driving changes in consumption patterns. Medical evidence suggesting a correlation between consumption of foods high in satu-

rated fats and increased risk of heart disease and obesity has led some consumers to choose poultry over red meat, skim milk over whole, and margarine over butter.

However, the link between health concerns and changes in dietary patterns is not completely clear. A study of household garbage by a University of Arizona archeologist finds apparent conflicts in consumer eating habits. On the one hand, the amount of meat fat discarded by a sample of Tucson households rose from about 3.5 grams per household per day in 1979 to around 7 grams in 1985. Furthermore, there was a decrease in purchases of red meat with separable fat. At the same time, however, there was an increase in purchases of ground beef, hot dogs, lunch meats, sausages, and bacon—the largest contribu-

tors to fat in the American diet, according to the Department of Health and Human Services' Health and Nutrition Examination Survey II. The Arizona study suggests that a desire for convenience may explain the increase in these sources of nonseparable fat. The answer, too, may lie in the problem of "visible" versus "invisible" fat.

Cost Still the Bottom Line

Despite the desire for greater convenience and growing concerns about health and the safety of food, research reveals that the major economic determinants of demand—price of the product, price of substitutes and complements, and consumer incomes—are more important in determining consumer purchasing patterns.

Between 1965 and 1985, real (adjusted for inflation) per capita disposable income rose 50 percent, leading to an increase in total per capita meat consumption and helping to maintain the demand for beef. Red meat purchases are fairly responsive to changes in income, rising about 0.7 percent for each 1-percent change in income, according to a 1982 ERS study. Beef is more sensitive to income changes than pork.

There is research evidence, however, that the average consumer is becoming less responsive to both changes in income and prices. The 1982 ERS study compared price and income responsiveness for a wide range of meat items in 1965 with the same items in 1977. For virtually every meat, the consumer response was smaller in 1977 than in 1965. The report concluded that consumer preferences for meat and meat items consumed at home may be declining, especially with respect to lower priced ones. Loin and rib steaks, chicken parts, and other poultry and shellfish were among the few items for which the amount spent in response to a change in income increased between the two surveys.

Higher per capita incomes have also meant a boost in away-from-home eating. Eating away from home increased from 28 percent of food expenditures in 1962 to over 43 percent in 1985, with fast food outlets getting a growing share. The traditional

fare of hamburgers and roast beef at fast food outlets helped maintain the demand for beef. A 120-percent increase in the number of full-menu steak franchises also contributed.

Many outlets also began offering chicken. Between 1973 and 1985, the number of franchise establishments primarily selling chicken rose 81.5 percent, while those selling primarily hamburger and roast beef increased 48 percent.

Looking Ahead to the Next Decade

With an understanding of the factors influencing consumer eating patterns, what about the future? ERS recently looked at how income and demographic changes may affect American food spending. The rate of growth in national food expenditures through 1995 may not be much different from the rate for 1965-80. However, two factors—higher incomes and an older population—could mean significant shifts in expenditures among food groups. Combining population growth with income growth and the aging of the population could mean an almost 32-percent national increase in expenditures for fish between 1980 and 1995, a 24-percent rise for beef, and a 22-percent gain for poultry. Dairy products are expected to rise about 20 percent and eggs, 17 percent (*for more detail, see NFR-32*).

The ERS estimates do not account for the impact of the trend toward more value-added products. Following the poultry industries' lead, the beef industry is likely to abandon its traditional commodity orientation in favor of more value-added products. If the strategy is adopted, even greater expenditures may be expected for meat and poultry products in the decade ahead.

But what about the amount we'll be eating? While meat and poultry consumption grew from 164 pounds in 1955 to 211 pounds in 1985, the rate of growth has slowed. Our appetites for meat and poultry increased at an average of 1.4 percent annually in the 1950's and 1960's, but declined 0.5 percent a year during the first half of the 1980's.

Continuation of the trend to slower growth in total per capita meat and poultry consumption is reinforced by several factors. USDA's recent Continuing Survey of Food Intakes by Individuals, initiated in 1985, indicates a growing preference by women and their children ages 1 to 5 for food as mixtures of two or more ingredients. Women ate an average of one-third more meat, poultry, and fish mixtures than in 1977—mainly in such forms as stews, sandwiches, and frozen entrees. Grain mixtures, such as spaghetti and pizza, were up more than two-thirds.

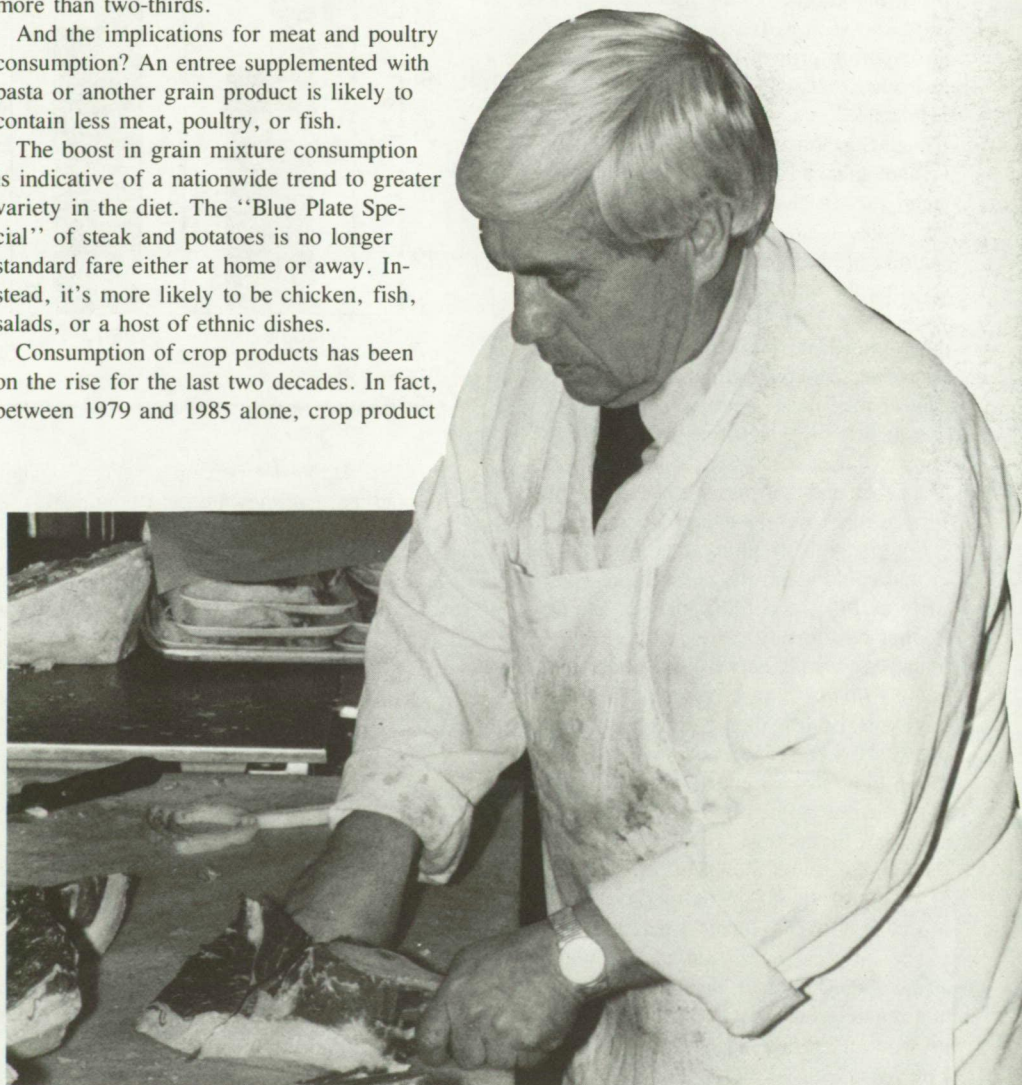
And the implications for meat and poultry consumption? An entree supplemented with pasta or another grain product is likely to contain less meat, poultry, or fish.

The boost in grain mixture consumption is indicative of a nationwide trend to greater variety in the diet. The "Blue Plate Special" of steak and potatoes is no longer standard fare either at home or away. Instead, it's more likely to be chicken, fish, salads, or a host of ethnic dishes.

Consumption of crop products has been on the rise for the last two decades. In fact, between 1979 and 1985 alone, crop product

consumption rang up a 12-percent increase. At the same time, total animal product consumption increased less than 4 percent, largely due to a drop in milk, milk products, and eggs.

With the overall level of the meat consumption not expected to increase dramatically, we are likely to see continued shifts in the shares of consumption. During 1960-64, red meat accounted for almost 75 percent of total meat, poultry, and fish consumption. Its share is currently about 66



For the beef industry, trimming, special cuts, or other value-added services are generally done by the retailer.

percent. At the same time, poultry's share has jumped from about 19 to 27 percent.

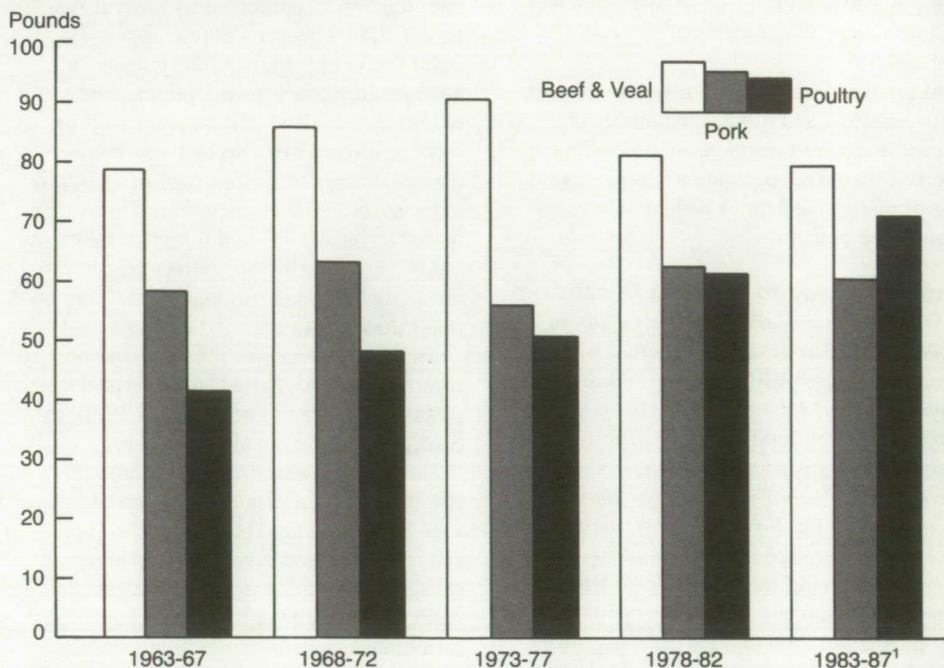
The fish industry's impact on total consumption also cannot be ignored. Indeed, fish consumption has grown from 11.8 pounds per person in 1950 to almost 14 pounds in 1984. Once regarded as being too difficult and time-consuming to prepare, the development of convenience products, such as frozen seafood dinners, breaded shrimp, and prepared fish cakes, has encouraged consumers to include more seafood in their diets. What's more, improvements in preparing and marketing processed seafood products, such as frozen fish fillets, have also spurred growth in seafood restaurants and other outlets.

Increased consumption of seafood in the United States may be further stimulated by technological advances. New production techniques, such as aquaculture, and new processing methods, including simulated seafood products, hold the promise of increasing the quantity and quality of seafood while moderating prices. Economists with the National Marine Fisheries Service estimate that fish could climb to almost 8 percent of total meat, poultry, and fish consumption by the year 2000, up from 7 percent during 1960-64. A slow rise admittedly, but one that means a shrinking pie for red meat and poultry producers.

Poultry is likely to continue to be a gainer and could claim the number one spot as early as 1987, according to ERS estimates. Poultry has already surpassed pork by 7.3 pounds and trails beef by just under 10 pounds (figure 2). Chicken alone lags behind pork by less than 5 pounds. ERS estimates show per capita poultry consumption rising to almost 79 pounds by 1987—about a 12-percent gain from 1985. Beef consumption, in contrast, is expected to slip to second place with a total of 73.6 pounds, a 7-percent decline. Pork is predicted to drop 6.5 percent to 58 pounds a person.

The story becomes even clearer looking at the annual rates of change in beef, pork, and poultry consumption. Beef consumption grew at an average annual rate of 1.5 percent from 1965 to 1975. But from 1976 to

Figure 2. Poultry Gains on Red Meat



¹1986 and 1987 forecasts.

1985, it declined 1 percent a year. Chicken, in contrast, has shown almost continual growth, rising from 2.6-percent a year to 3.6 percent annually. Pork increased at about 0.39 percent for the first 10 years, but gained 2 percent from 1976-85. An 8-pound per person gain in 1979, however, significantly, raised the average annual increase for pork for 1976-85.

What Will Be on Store Shelves?

While we'll be much more likely to sit down to a chicken dinner in the decade ahead, what about the types of meat, poultry, and fish products we'll find at the store? Value-added will continue to be the name of the game. Value-added products meet consumer demands for greater convenience while ensuring greater returns and new growth opportunities for the producer or processor. Hormel, for example, known for its canned meat products, has already begun charting an aggressive growth strategy that involves a range of value-added products, from frozen entrees to nonmeat

items, such as barbecue sauce and salads. With fish a potential big gainer, Hormel has also acquired the Farm Fresh Catfish Co., Inc.

This continuing shift to value-added could have significant implications for the beef and pork industries in particular. Further processing means a smaller share of the consumer's meat dollar for slaughtering plants—a fact the beef and pork industries have not failed to notice. It suggests that we may see greater vertical integration by those industries in an attempt to capture additional revenue, greater market control, and hopefully increased profits.

Marketers are likely to continue responding to the clear signal from consumers—make it light, lean, and convenient, even if it costs more. Continued efforts by the National Cancer Institute to encourage lower consumption of the foods associated with cancer means concerns about fat are proba-

bly more than a passing trend. As a result, such retail giants as Kroger and Safeway are already trimming more. Indeed, some industry analysts suggest that completely trimmed meat may not be too far off in the future. The question then becomes how will this filter back to the farm level? Store buyers are likely to want packers to trim more, meaning that packers will increasingly want to buy leaner cattle. As a result, the industry already has an eye towards leaner breeds of cattle.

At least two poultry producers have already responded to the call for leaner products and are currently marketing a lower fat chicken. The new Perdue chicken contains an average of 21 percent less fat, Holly Farm's 14 percent.

The growing trend toward lowfat products as supplements to traditional lines suggests that market segmentation will be an often-used competitive tool. Products will be increasingly offered for segments of the population concerned about fat, salt, sugar, and others. Looking at the dairy case, for instance, you'll find Kraft's Philadelphia Cream Cheese and its lowfat counterpart. The notion of segmentation is already surfacing in the meat industry, as stores offer lean or extra lean products, along with Choice cuts.

With additives also a concern, the meat industry is looking at products free of these. In response to concerns about antibiotics in beef, organic meat is already being marketed. Grand Union Co. recently became the first U.S. supermarket to offer "natural beef"—free of synthetic or chemical additives. It is now available in more than 300 Grand Union stores in 11 Eastern States. The natural beef appears to be a marketing success, showing steady sales growth despite its 40-cent to \$2.00 per pound higher price tag. Indeed, natural beef may bode well for the industry, as sales of the new product take some from regular beef but also attract consumers who previously shunned red meats.

To encourage more red meat in the Nation's diet, beef and pork producers are financing research and promotion programs.

Beef producers will pay \$1 per head of cattle marketed and pork producers, $\frac{1}{4}$ to $\frac{1}{2}$ percent of the market value of hogs or pork. These programs follow the lead of the dairy industry's product promotion, research, and nutrition education program intended to reduce milk supplies and increase consumption of milk and dairy products. The dairy industry spent over \$60 million for a national advertising and promotion effort.

Looking ahead for the dairy industry, we find bovine growth hormone (bGH) and a host of other technological advances looming on the horizon (see article on p. 12). The bGH, isoacid nutritional supplements, computerized feeding equipment, embryo transfer techniques, and other technologies promise greater productivity at the farm level.

At the same time, analysts see dim prospects for growth in the demand for dairy products beyond that consistent with population increases. The future for dairy products is clouded somewhat by an aging population that doesn't drink as much milk and a growing proportion of blacks, who generally cannot tolerate the lactose in milk. Contributing, too, are the increased concerns about fat and calories and stiff competition from other beverages, particularly soft drinks. The proliferation of imitation products, notably coffee whiteners and cheeses designed to address consumer concerns about fat and calories, may also play a role.

On the other hand, the growing sophistication of the population in the area of nutritional knowledge means dairy products are increasingly being perceived as wholesome and nutritious. The proliferation of milks with different fat content has helped change public perception of how fattening milk can be. Reduced-calorie counterparts for items such as sour cream, cream cheese, and cheese may also maintain or encourage greater consumption by some groups. Increased awareness of the importance of calcium and growing concern about osteoporosis may boost dairy consumption among women—one group with traditionally low intake.

Finally, one magazine, *Restaurants and Institutions*, recently launched a campaign

aimed at promoting the use of dairy products away from home. This is a growth area because, traditionally, consumption of dairy products away from home has been confined to cheese and butter. □

References

- Blaylock, James and David Smallwood. *U.S. Demand for Food: Household Expenditures, Demographics, and Projections*. U.S. Dept. Agr., Econ. Res. Serv. Technical Bulletin 1713. February 1986.
- Bunch, Karen and Grace Simon. *Food Consumption, Prices, and Expenditures, 1964-84*. U.S. Dept. Agr., Econ. Res. Serv. Statistical Bulletin 736. December 1985.
- Haidacher, Richard C., John A. Craven, Kuo S. Huang, David M. Smallwood, and James Blaylock. *Demand for Red Meats, Poultry, and Fish*. U.S. Dept. Agr., Econ. Res. Serv. AGES 820818. September 1982.
- Huang, Kuo S. *U.S. Demand for Food: A Complete System for Price and Income Effects*. U.S. Dept. Agr., Econ. Res. Serv. Technical Bulletin 1714. December 1985.
- Lasley, Floyd A. *The U.S. Poultry Industry: Changing Economics and Structure*. U.S. Dept. Agr., Econ. Res. Serv. Agricultural Economics Report 502, July 1983.
- Rathje, W.L. *Meat Fat Madness: Meat Fat, Consumer Knowledge, and Public Health*. Bureau of Applied Research in Anthropology, University of Arizona. Paper presented at the American Dietetic Association meetings, October 10, 1985.
- U.S. Department of Agriculture. *Livestock and Poultry Situation and Outlook Report*. LPS-21. August 1986.
- Yankelovich, Skelly, and White, Inc. *The Consumer Climate for Meat Products*. Report prepared for the American Meat Institute and the National Livestock and Meat Board. August 1985.

Bovine Growth Hormone Brings Progress to Dairy Farms

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The union of biology and technology is propelling agriculture into a new era of advancement. Biotechnology—the use of living organisms to modify existing products—could mean large gains in the variety, quality, production efficiency, and output of food before the turn of the century.

The dairy industry, policymakers, and many consumer groups are currently taking a hard look at one of the emerging biotechnologies, bovine growth hormone (bGH). A naturally occurring protein hormone, bGH could mean sizable gains in milk output per cow. In an industry already burdened by overproduction relative to consumption, the adoption of this and other innovations will lead to further gains in productivity and continued adjustments both in the dairy sector and Federal policies over the next several decades.

A Century of Technological Advances

Technological innovation is nothing new to the dairy industry. At the beginning of the 1900's, the development of a simple test to measure butterfat content and commercial adoption of pasteurization were significant advancements for dairy producers.

In the 1950's, technological advances such as bulk handling of milk, barn cleaners, silo unloaders, and improved milking equipment spurred tremendous changes in dairying. New handling methods meant time and labor savings for farmers. Greater knowledge of animal nutrition and better ways to produce quality feeds and feed supplements increased the productivity of the dairy cow. Development of artificial insemination, progeny testing, and progress in the control and eradication of disease also contributed to increased productivity in dairying. Furthermore, improved processing plant technology meant that fewer and larger facilities provided the farm-to-retail link.

Improvements in transportation and refrigeration influenced the location, structure, and efficiency of milk processing and marketing.

These technologies boosted the productivity of the entire industry. From 1955 to 1975, the milk yield per cow increased 2.9 percent annually. The rate since 1976 has been 2.3 percent. Today, the average cow yields over 13,000 pounds of milk a year, compared with 5,842 pounds in 1955 (*table 1*). For some large, well-managed herds, annual output per cow exceeds 20,000 pounds.

These rapid gains in productivity have forced the industry to adjust, resulting in fewer but larger farms. The number of dairy farms declined from 2.8 million in 1955 to 274,000 in 1985. At the same time, the average herd size grew from 8 cows per farm to 40.

Technology Will Continue To Boost Production

Scientists have known for some time that bGH stimulates milk production. The hormone works by increasing the cow's metabolic rate, leading to higher bloodflow in the cow's mammary gland and more milk production.

In the early days of experimentation, the only hormone supply available for injection was extracted from the pituitary glands of slaughtered animals. This process was slow, expensive, and produced limited quantities. However, in recent years modern bioengineering techniques have made it possible

to produce bGH in sufficient quantities to be commercially feasible.

Laboratory-produced bGH is made in a fermentation system, similar to that used to produce human insulin. The gene responsible for bGH is extracted from the pituitary glands of slaughtered cattle and is scientifically linked to harmless strains of *E. coli* bacteria. The bacteria multiply rapidly, enabling bGH to be reproduced on a large scale.

The Food and Drug Administration (FDA) has not approved bGH for general commercial use. Effects of the hormone have not been studied for more than one lactation period (305 days). Multiple lactation trials are currently in progress. Sufficient data for approval of bGH is not likely to be available before 1989 or the early 1990's.

Concerns have been raised about the possible effects of bGH on human safety, animal health, and the overall environment. Bovine growth hormone is a species-specific hormone and is not biologically active in humans. Also, published research indicates that the product has had no short-term ill effects on animal reproduction, nor does it increase the incidence of mastitis, a disease of the mammary glands, or nutritional disease in cows. From an environmental standpoint, the bacteria used to produce the hormone pose no threat because they are able to survive only in a controlled environment.

Questions about the long-term impacts of bGH on animal health and productivity re-

Table 1. Today It's Fewer But Larger Dairy Farms

Item	1955	1975	1985	Percent change per year ¹	
				1955-75	1975-85
Number of cows (thousands)	21,044	11,139	11,025	-3.1	-0.1
Farms with cows (thousands)	2,763	444	274	-8.7	-4.7
Average number of cows per farm	8	25	40	5.9	4.8
Milk per cow, annual (lbs.)	5,842	10,360	13,031	2.9	2.3
Total milk produced (mil. lbs.)	122,945	115,398	143,667	-0.3	2.2

¹Compound annual rate.

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main, however. Of particular concern are the effects of animal stress on feed consumption, animal health, and milk production in high-temperature, high-humidity regions.

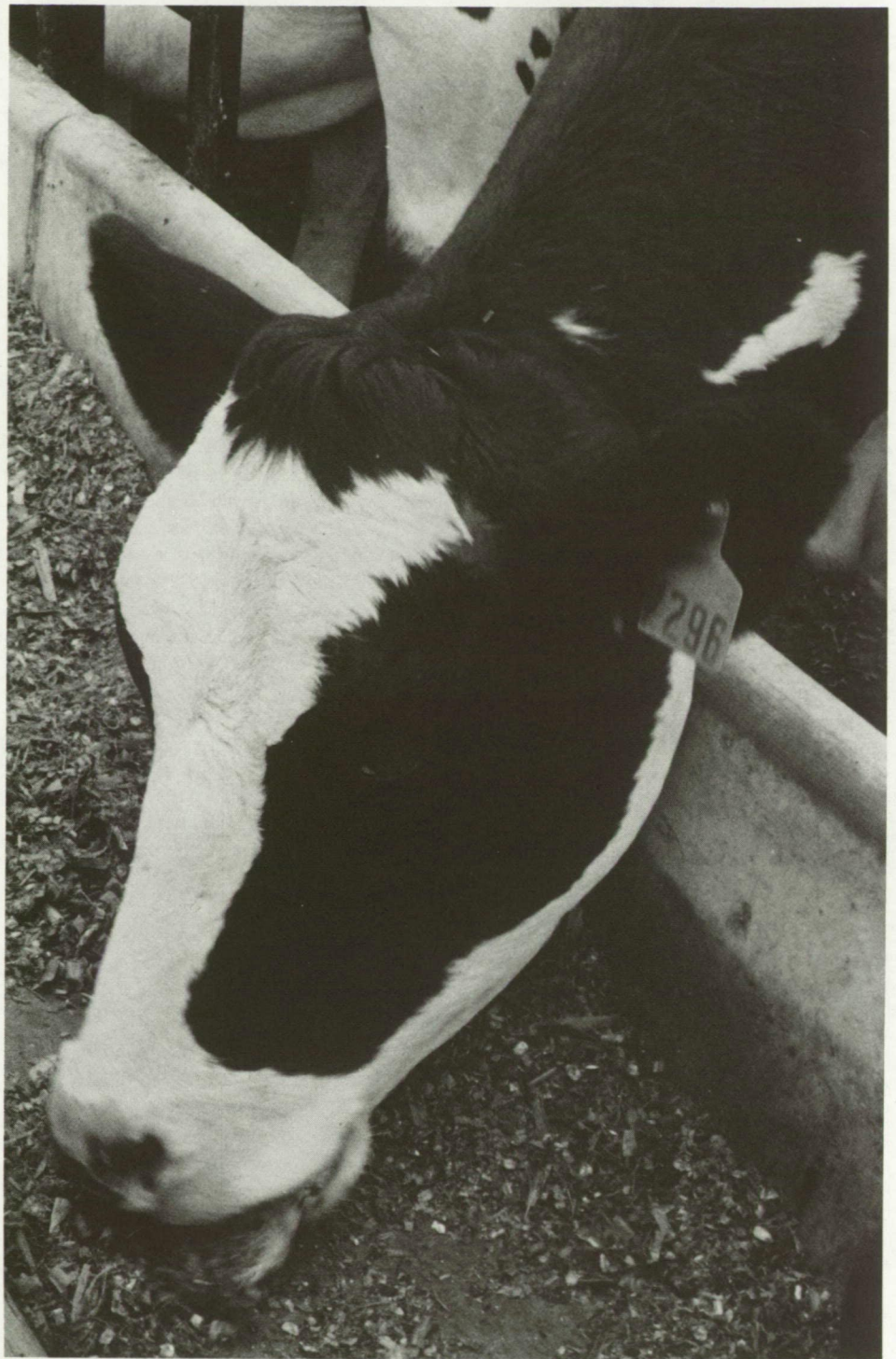
Commercial Use Hinges on Several Factors

Following FDA approval, the commercial adoption of bGH will depend on the expected gains in production, cost of using the technology, the initial milk price, and the impact of greater supplies on milk prices, which are regulated by Federal policies.

Research conducted in controlled experiments has shown milk yields during middle and late lactation increase 10 to 40 percent within 3 days of initial injections and persist as long as daily injections are continued. Thus, 10- to 40-percent increases over the latter 225 days of lactation translate to annual gains of 6 to 25 percent. Somewhat lower yield increases may be expected under actual farm use. In addition, while most controlled experiments have been conducted with injections during middle and late lactation, when milk yields tend to decline, the optimal time for administering bGH is still being researched.

The actual effects of bGH will vary among farms, depending on such factors as management skills, resources, and weather. The heat and humidity in some areas of the South, for example, lower the amount cows eat and the rate at which they convert feed into milk. As a result, Southern farmers may not see output gains as large as their counterparts in more moderate climates.

Greater feed use is one apparent cost of using bGH. Cows treated with the hormone require more nutrients to adjust for the increased milk production. However, because fewer cows are needed to produce the same amount of milk, total feed consumption of a herd could decrease 5 to 10 percent. Greater efficiency would result as a smaller portion of feed goes toward maintenance of the herd and a larger share to producing milk.



Today, the average cow yields over 13,000 pounds of milk a year, compared with 5,842 pounds in 1955.

Under current technology, the hormone must be injected daily. Estimates by USDA's analysts indicate the daily cost of the injections will run from 15 to 50 cents per cow. The actual price will depend on the

cost of producing bGH, the number of manufacturers competing in the market, and whether sufficient supplies of bGH are available to meet demand. As with many new technologies, the cost per dosage

should go down as bGH is more widely produced and adopted.

Because bGH is likely to be relatively inexpensive, it will be accessible to most dairy producers. This could mean that even farmers with small to midsize herds will benefit from adoption of the growth hormone. It has even been suggested that because bGH is administered through daily injections, the technology might favor smaller producers who manage their herds more closely. Research is underway, however, to develop labor-saving, time-release implant doses of bGH or a system requiring less frequent injections.

In deciding whether to adopt bGH, the individual producer will weigh the additional revenue from increased milk production against the costs of the treatment and associated changes in feed costs and other

variable expenses. Over the longer term changes such as the rate of animal replacement will also be a factor. Consider the following simplified example of a hypothetical dairy farmer with 50 cows that produce an average of 13,600 pounds each (*table 2*). Based on a farm price of \$12.40 per hundredweight, the base revenue for this hypothetical dairy farm is \$84,320 annually.

Adopting bGH means higher costs for the farmer. The growth hormone is assumed to cost 25 cents per cow per day for injections over 225 days of the 305-day lactation period. Increased feed and other expenses are estimated to total \$3.75 for every additional hundredweight of milk produced.

If bGH boosts output by 5 percent, the per-cow gain would be 680 pounds of milk. At \$12.40 per cwt, the producer would earn an additional \$84 per cow from bGH. Costs

per cow, however, would rise slightly less than \$82 annually. The net revenue to the producer would be \$2.57 per cow, or about \$128 for a farmer with a 50-cow herd.

If output increases 10 percent with bGH, each cow would produce 1,360 more pounds of milk a year. The change in net revenue would be about \$61 per cow, for a total gain of about \$3,050 for this farm. If bGH produces 15 percent more milk per cow, the extra net revenue would rise to over \$6,000.

The benefits of bGH to the dairy producer depend on the price of milk (largely determined by the Federal price support program). At a 5-percent increase in productivity, the 10 million cows now on dairy farms would produce 7 billion pounds more milk, 14 billion pounds more with a 10-percent increase in output, and 21 billion

Table 2. Hypothetical Farm Shows Possible Gains from bGH

Item	Units	Base	Increase in per-cow output		
			5 percent	10 percent	15 percent
Current prices and policies:					
Milk output per cow	Lb.	13,600.00	680.00	1,360.00	2,040.00
Value at \$12.40 per cwt	Dol.	1,686.40	84.32	168.64	252.96
Changes in costs per cow:					
bGH (\$0.25 a day with injections for 225 days)	Dol.	NA	56.25	56.25	56.25
Added feed and misc. expenses (\$3.75 per cwt milk)	Dol.	NA	25.50	51.00	76.50
Total change in costs	Dol.	NA	81.75	107.25	132.75
Change in net revenue per cow:					
Value to a 50-cow farm	Dol.	84,320.00	2.57	61.39	120.21
			128.50	3,069.50	6,010.50
Change in U.S. milk:¹					
Production	Bil. lb.	NA	7.02	14.04	21.06
Removals	Bil. lb.	NA	7.02	14.04	21.06
Change in dairy program costs	Bil. dol.	NA	.90	1.80	2.71

NA = Not applicable. ¹Assumes 100-percent adoption.

pounds more with a 15-percent gain. Such increases in the total milk supply in the face of relatively constant demand would mean lower prices or substantial increases in Government costs.

Returning to the hypothetical farm, bGH is profitable to use even if it increases milk production by only 5 percent. But what if the support price of milk was reduced by a comparable 5 percent in an effort to cope with increased supplies? The additional revenue earned would drop to \$80, but costs would remain at \$82, yielding a deficit of \$2 per cow.

As the price of milk declines, bGH must increase milk output by a larger percentage for the technology to be profitable. For the hypothetical farm, a 6.6-percent increase in output would be necessary if the price of milk falls to \$10.00 per cwt (*table 3*). A decline to \$6.00 per cwt would boost the needed output gain to 15 percent.

The actual effect of increased supplies on prices is uncertain and will depend on how quickly producers adopt bGH, the resulting increase in output, and the number of producers who adopt the new technology. However, declining prices in the short run may prompt supply adjustments—either fewer milk cows will be needed or some dairy

Table 3. Breakeven Increase in Output Needed at Various Milk Prices

If milk price is:	bGH must increase milk output by:
<i>Dollars</i>	<i>Percent</i>
12.00	5.0
11.00	5.7
10.00	6.6
9.00	7.9
8.00	9.7
7.00	12.7
6.00	15.0

producers may decide to leave dairying. Because the Federal dairy program relies on rigid price supports, the price of milk will fall until it reaches the support price. At that point, the extra milk will be purchased by the Government.

In the long run, market demand, Government programs, and price will determine how much milk is produced. If fewer farmers are needed to produce all the milk the market and the Government are willing to absorb, prices will drop and there will be further adjustments toward a smaller national dairy herd and fewer but larger dairy farms.

Implications of bGH for Dairy Policy

With the clear abundance of milk in the United States, many believe it is undesirable to pursue technology that will enhance production and possibly force a large number of dairy farmers out of business.

Technological advances like bGH, thus, can be a double-edged sword. Technology has increased yields and cut unit production costs to the point that Americans spend a smaller share of their income on food than people in any other nation. This same technological change has imposed significant structural and financial adjustments on farmers. Large investments in technology have eroded the margin between farm costs and prices, yet farmers are forced to either keep pace or leave the sector. This “technological treadmill” has been a major contributor to the continuing drop in the number of U.S. farms and growth in farm size.

An implication of bGH, like the technologies that came before, is the prospect of lower prices and perhaps fewer farmers. However, the potential benefits of bGH are greater efficiency, lower costs of production, the essential ability to compete in the world dairy market and with substitute dairy products, and increased consumption at lower consumer prices. □

Membership Wholesale Clubs: A Low-Price Alternative

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Offered the choice of paying \$3.29 or \$2.79 for a 12-pack case of 12-ounce Pepsi's, obviously most buyers would choose the lower price. This price appeal goes a long way toward explaining the meteoric rise of wholesale clubs—fully computerized “no-frills” operations offering a limited selection of first quality, name-brand merchandise to small businesses and selected groups of consumers.

Today's clubs trace their lineage to the cash-and-carry operations started more than 50 years ago by wholesale food distributors to serve their small business customers who couldn't buy in large quantities. As the name implies, customers pay cash at these outlets and assume responsibility for receipt and delivery of their order, thus avoiding distributor service charges.

The wholesale club was born in 1976, when the San Diego-based Price Company added a new twist to the cash-and-carry industry by opening a member-only warehouse where businesses and individuals were allowed to shop. Since then, 17 other companies have started operations patterned after the Price Company outlets, creating a booming mini-industry.

In 1985, membership wholesale clubs did an estimated \$4.4 billion worth of business, roughly double that of 1984. In 1986, sales will likely exceed \$8 billion. By December 1986 (table 1), there will be close to 230 wholesale clubs, compared with 80 at the end of 1984. The industry has attracted such heavyweights as Zayre, Wal-Mart, Kroger, and Pay 'n Save, who have their own versions. Clubs can now be found in most of the 100 largest U.S. metropolitan markets.

A New Type of Store

Clearly different from the conventional supermarket or discount store, the wholesale club is more accurately described as a retail/wholesale hybrid. These membership-only distributors straddle the line between wholesaling and retailing by offering discounted prices previously available only to



With no frills and limited variety, low prices largely explain the meteoric rise of wholesale clubs.

larger businesses that ordered merchandise in bulk.

The clubs have two classes of members: wholesale and group. Wholesale members include retail grocers; restaurants; professional service providers, such as accountants and lawyers; and other business establishments. Normally, these firms use the purchases in their businesses and view clubs essentially as their wholesale suppliers. Members pay an annual fee to buy products at posted wholesale prices. In 1985, the fee averaged \$25.00.

Group members are individuals whose employment by banks, credit unions, public utilities, government agencies, or any other organization designated by the club qualifies them for membership. These customers usually buy food and other products for home use. The inclusion of these group members, in particular, has enlarged the customer base of wholesale clubs over that of traditional food distributor cash and carries. Some clubs charge group members an annual fee. Those that don't usually require that members pay a stated percentage above

posted wholesale prices, about 5 percent in 1985.

Most wholesale clubs stock 4,000 to 6,000 items. This compares with up to 25,000 items offered by conventional supermarkets and 30,000 to 50,000 items stocked by traditional discount stores. However, a club's range of items is broad—from microwave ovens to plastic trash bags. Within any product category, clubs stock only a couple of fast-moving, well-known brands. Grocery items account for 40 to 60 percent of clubs' sales, with general merchandise making up the remainder.

Included in their food lines are canned peas, trout fillets, and frozen french fries. In short, there is the range of products, though not the variety of brands and sizes found in supermarkets. Also offered are brooms, soap, paper towels, light bulbs, and similar products typically found in grocery stores.

Clubs' food lines are geared primarily to supply restaurants and other foodservice operations. Therefore, their lines include institutional sizes and packs, such as No. 10 cans of string beans (108 ounces) and prepared trays for quick heating and service.

Clubs' general merchandise lines include hardware, appliances, auto supplies, consumer electronics, clothing, and furniture.

Warehouse Clubs in Profile

Whether a business or consumer, members of wholesale clubs will usually find everyday prices below those charged by any other type of retailer and, oftentimes, by many wholesalers and distributors. The products are almost always purchased directly from the manufacturer, often at discounted prices, and sold to the membership from the warehouse floor. Clubs do not guarantee daily availability of any item.

Many of the “frills” that would otherwise raise overhead costs are absent in wholesale clubs. Gone are the use of advertising; catalogs; fancy showrooms or fixtures; credit cards sales; sales help; bagging groceries; delivery service for large appliances, such as refrigerators and washing machines; and after-sale service.

Although clubs lack many amenities, one central feature of all clubs is the widespread use of computers in all phases of their oper-

The authors are agricultural economists with the Food Marketing and Consumption Economics Branch.

ations, from preparing data bases of membership sales and demographics to tracking inventory and checkout scanning.

Sophisticated computer technology, the "bare-bones" format, and large sales volume form the core of clubs' operating

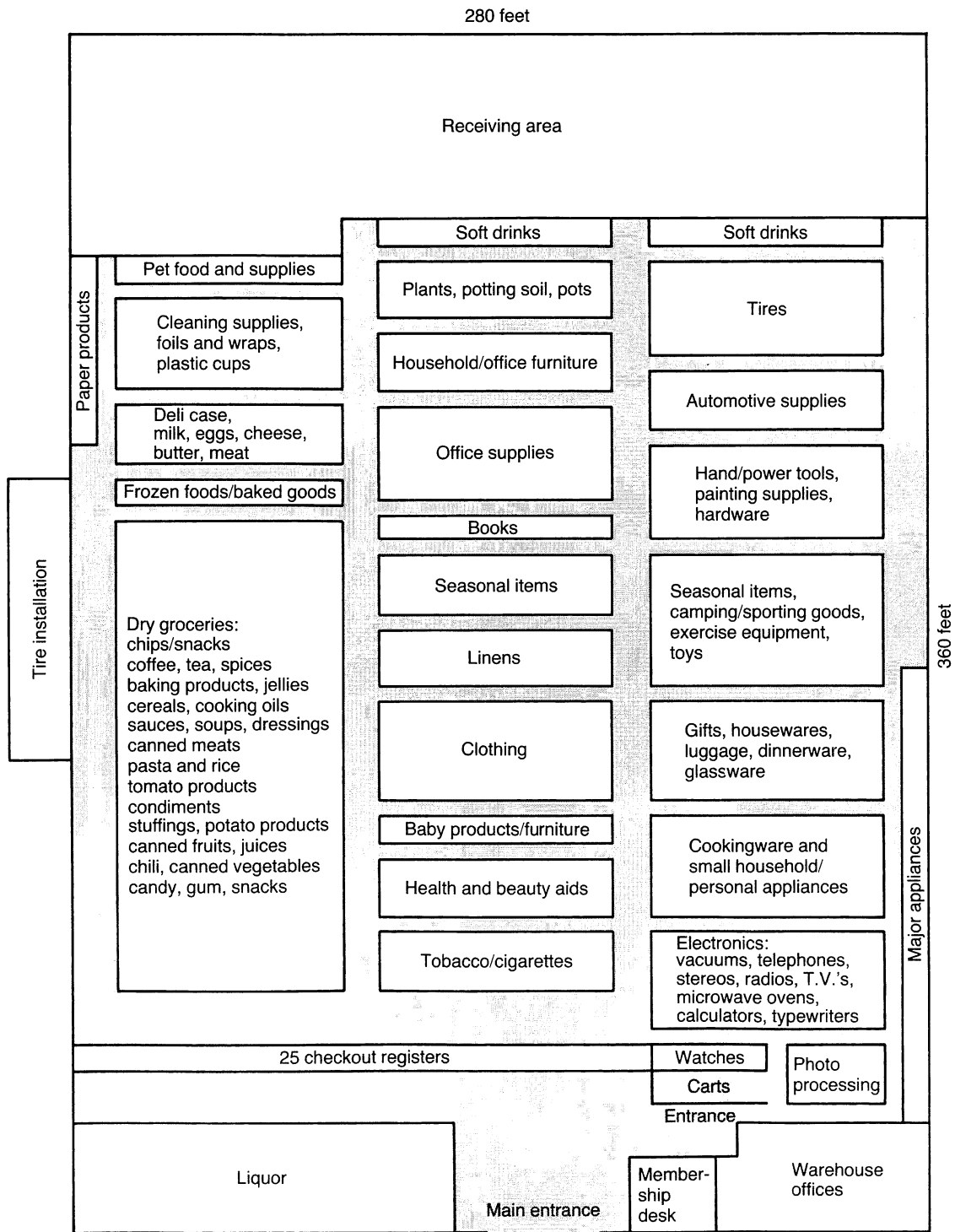
efficiency. Price Company, the industry leader, generates annual sales of around \$1,000 per square foot, but the typical club

Table 1. Membership Wholesale Clubs Growing

Company	Operating as of July 1986				Total	Expected by	
	NE	S	By region ¹ NC	W		Dec. 1986 ²	Dec. 1987
Sam's Wholesale Club (Wal-mart Stores, Inc.), Bentonville, AR	—	31	4	2	37	45	³
The Price Company, San Diego, CA	—	3	—	22	25	30	40
Costco Wholesale Club, Seattle, WA	—	5	2	14	21 ⁴	35	50
PACE Membership Warehouse, Denver, CO	1	13	2	4	20	25	35-39
Super Saver Wholesale Warehouse Club, (A. Howard Wholesale), Monroe, LA	—	13	1	—	14	21	36
BJ's Wholesale Club (Zayre Corp.), Natick, MA	8	1	3	—	12	15	25-27
The Warehouse Club (Pay 'N Save Corp.), Skokie, IL	—	—	9	—	9	14	19-21
The Wholesale Club, Indianapolis, IN	—	—	6	—	6	11	18-20
Value Club (Southwest Merchandising), San Antonio, TX	—	6	—	—	6	6	6
Price Saver's Wholesale Club (The Kroger Co.), Salt Lake City, UT	—	—	—	5	5	9	³
Makro Self-Service Wholesale (SHV Holding), Cincinnati, OH	1	2	1	—	4	4	
Buyer's Club, Aurora, CO	—	—	—	2	2	3	12
Club Wholesale (Elixir Industries), Boise, ID	—	—	—	2	2	2	5
D-Mart Wholesale Club, Salt Lake City, UT	—	—	—	2	2	2	
Member\$ Warehouse, Winston-Salem, NC	—	2	—	—	2	3	7
Wholesale Plus, Plantation, FL	—	1	—	—	1	1	1
American Wholesale Club, Richardson, TX	—	1	—	—	1	1	
Save Club, Concord, CA	—	—	—	1	1	1	
Total	10	78	28	54	170	228	³

¹NE = Northeast; S = South; NC = North Central; W = West. ²Company estimate as of July 1986. ³No estimate available. ⁴Costco operates two clubs in Canada, one in Alberta and one in British Columbia.

Figure 1. Typical Membership Warehouse Layout



averages between \$400 and \$600.

Clubs' labor costs average 5 percent of sales, compared with around 10 percent in conventional supermarkets. However, some clubs achieve a labor cost average of only 2.5 to 3 percent.

Labor-saving steps permeate every phase of operations. For example, clubs specify shipments on wooden pallets where possible, so that goods may be placed directly on the sales floor with minimum handling. Bulky items are displayed close to receiving docks. Restocking, a primary task of store labor, is accomplished using forklifts that pass up and down wide aisles.

Operating efficiencies are reflected in a minimal gross margin, resulting in prices that are hard to beat. The gross margin, or markup, is the difference between what the retailer pays for a product and its retail price. For a typical discount store, the markup is equal to about 30 percent of what the manufacturer charges for the product. Markups for conventional supermarkets are close to 20 percent, while those for department stores are 40. For wholesale clubs, on the other hand, the overall gross margins range from 8 and 11 percent, depending on the club's efficiency of operation and volume of sales. Margins on groceries range from 6 to 9 percent.

Customer Appeal—Low Prices

Wholesale clubs operating profitably on low margins have created a niche that appeals to a legion of small businesses who use the clubs to stock their own outlets and who typically view the club as a wholesale supplier. For example, a small restaurant operator can buy one case of ketchup or even one bottle at a wholesale club. A full-service, general-line wholesale distributor, in contrast, requires larger minimum orders because of the high cost of servicing small accounts. However, there are some higher costs for the small business buyer—for example, the expense of picking up the goods from the club. Usually the large wholesale distributors deliver.

Clubs are also economical suppliers of stationery, filing cabinets, and other office

supplies needed in professional offices.

Considering the economy and accessibility of wholesale clubs, it is not surprising that small retailers, restaurateurs, and other businesses are the main customers, accounting for over 50 percent of all clubs' sales.

For some consumers, the discount prices offset the limited variety, drab decor, and out-of-the way locations. Clubs generally offer 20 to 40 percent lower prices than traditional establishments. For example, in the Washington, D.C., area in mid-1986, an 8.5-ounce package of Stouffer's Lean Cuisine glazed chicken with vegetables cost \$3.29 at a large supermarket chain, but \$2.39 at Pace Warehouse Club. Of course, customers' savings depend on the products they buy.

The Industry Now...

Still in its infancy, the wholesale club industry is highly concentrated, with just four firms accounting for 75 percent of all sales. Price Company captured 41 percent of all club sales in 1985, Sam's accounted for 16 percent, Costco 11 percent, and Pace 7 percent.

Although sales concentration is high, the industry continues to be very competitive. Fueling the competition is rapid expansion by existing firms and entry by new firms. For example, all of the leaders scheduled new openings for the latter half of 1986, ranging from five locations for the Pace Membership Warehouse firm to 14 for the Costco Wholesale Club.

The geographical dispersion of the clubs also may figure prominently in shaping competition. Early in their development, clubs were concentrated on the West Coast. In 1983, that distribution changed substantially. The South now has 80 clubs, nearly half of the units operating in mid-1986. One result of this geographic expansion is direct competition among clubs. For example, the Makro Company was the sole firm operating in the Washington, D.C., area until Pace's entry in 1985.

Equally important in determining the state of competition in the industry is the entry of new firms. In the first half of 1986 alone, four new firms opened six clubs. Continuation of this trend will mean lower concentration in the future.

...And in the Decade Ahead

The success of wholesale clubs lies with their targeting a market that is not served or only partly served by existing businesses. Some industry observers estimate wholesale club sales at \$24 to \$29 billion by 1991, at least three times the 1986 level.

However, certain limitations could slow growth. Market saturation is one potential drag on wholesale club expansion. The population needed to support a club is estimated at 400,000. Thus, even areas with high population concentrations can support only a limited number of clubs.

Yet another possible brake on wholesale clubs' expansion is the competition from traditional wholesale establishments, supermarket chains, specialty stores, and other retail outlets that handle the same kinds of products. These firms can be expected to offer competitive prices where wholesale clubs encroach on their markets. Thus, these other outlets' lower prices, coupled with attractive decor, delivery, bagging, and other services, may limit the growth of wholesale clubs.

Profitability in a low-margin operation greatly depends on economies achieved through rapid inventory turnover and huge sales volumes. Faced with increased competition, both among themselves and from their more traditional counterparts, wholesale clubs may be tempted to loosen membership requirements, expand variety, upgrade decor, and add services to increase unit volume. The risk is that such deviations from the wholesale club format could increase the cost of operations, thereby negating their greatest strength—low prices.

For all of their similarities, clubs strive to differentiate themselves from each other. For example, Makro offers greater variety within product lines than its competitors. Sam's mails seasonal flyers to its members and is opening stores in smaller cities. Differentiation will assume greater importance as firms expand and find themselves in direct competition with each other and with traditional retailers. □

Supermarket Characteristics: A Continual Evolution

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One-stop shopping may be as close as your local grocery store. Some new stores make it possible for you to buy groceries, have prescriptions filled, and even do your banking—all at one location and at almost any hour.

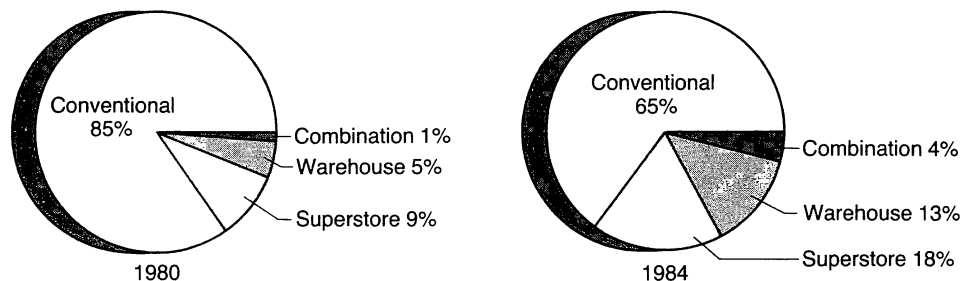
The trend to “more-than-food” stores signals significant changes in the supermarket industry, brought about by changing demographics, lifestyles, and purchasing patterns. More working women, for example, means less time to go to several different stores for food and other items. The convenience of one-stop shopping has also prompted rapid growth in the number of supermarkets in shopping centers and malls. Furthermore, the multiple-career household means it may be more difficult for families to shop during traditional store hours. Thus, many retailers have adopted 24-hour schedules and Sunday hours.

The approximately 30,831 supermarkets in operation in 1977 accounted for 17.2 percent of all grocery stores, including convenience food stores and small supermarkets and grocery stores. By 1984, the number of supermarkets had declined to 26,947, 16.4 percent of the total. Though this was the case, supermarkets still accounted for 75 percent of sales by all grocery stores.

Major changes occurred in the supermarket industry during the late 1970's and early 1980's. Not only were larger stores built, but they offered a greater variety of products, services, and departments. Today's store formats may include a complete bookstore, video cassette library, wine and cheese shop, leisure wear boutique, and health food center. Popular formats in use today are: conventional, combination food and drug stores, superstores, and warehouse and limited assortment stores (*see sidebar box*). The majority of supermarkets (65 percent) still fit the conventional format (*figure 1*). However, the use of other formats is increasing.

The authors are agricultural economists with the Food Marketing and Consumption Economics Branch of the National Economics Division.

Figure 1. New Formats Account for Growing Share of Supermarkets



Source: Economic Research Service, USDA.

A nationwide survey by the Economic Research Service (ERS) in 1982 provided a closer look at the new and conventional supermarket formats. Of course, changes have occurred in the few years since the survey, but what was revealed then still holds true today. The survey examined the types of services offered, as well as other characteristics, such as chains versus independents, formats, and size of a representative sample of 747 stores. Of these stores, 491 were chain stores and the remainder were independents (retailers with fewer than 11 outlets). Conventional supermarkets accounted for 81 percent of the ERS sample, while combination food and drug, and superstores made up 15 percent. Warehouse and limited assortment stores made 4 percent of the sample.

The survey also evaluated formats according to size and found that the new store types were larger than the conventional ones. Most conventional supermarkets were about medium-sized, with 10,000 to 19,999 square feet of selling area (the total store area minus backroom and storage). Combination food and drug and superstores, however, were typically much larger, ranging between 20,000 and 39,999 square feet. Warehouse and limited assortment stores had the smallest selling areas—below 10,000 square feet.

Conventional stores were just as likely to be located in suburban as central city areas. In contrast, the new store formats, because they generally require more space, were often found in suburban areas. All of the

new format stores were most often located in shopping complexes, though a slightly higher percentage of warehouse and limited assortment stores were stand-alone units.

According to the survey, the majority of stores were open 15 hours or less a day. Most of these were conventional stores and stores with 10,000 to 19,999 square feet of selling area. Conventional stores also figure prominently among stores open more than 15 hours. These stores, along with combination and superstores, accounted for the largest shares of stores with extended hours. Twenty-nine percent of the total sample were open more than 15 hours a day, and 42 percent of these (12 percent of the sample) were open 24 hours. The primary location for stores open longer than 15 hours a day was in shopping complexes.

Store Services Provide New Competitive Tool

The services provided in the supermarket system of the 1980's not only offer customers flexibility and convenience, but serve to attract more people and increase store sales.

Supermarkets offer a diversity of services—from bagging groceries to handling utility bill payments. Of the 20 services included in the ERS survey, 11 were offered by a majority of the stores (*figure 2*). Coupon redemption, the most common service, was offered by over 97 percent of the stores. Bagging was second in frequen-

cy, followed by check cashing, product price marking, in-store music, employee uniforms, express checkout, bottle deposits, unit pricing, and carryout (loading customers' packages in their vehicles). Utility bill payments was the service offered the least.

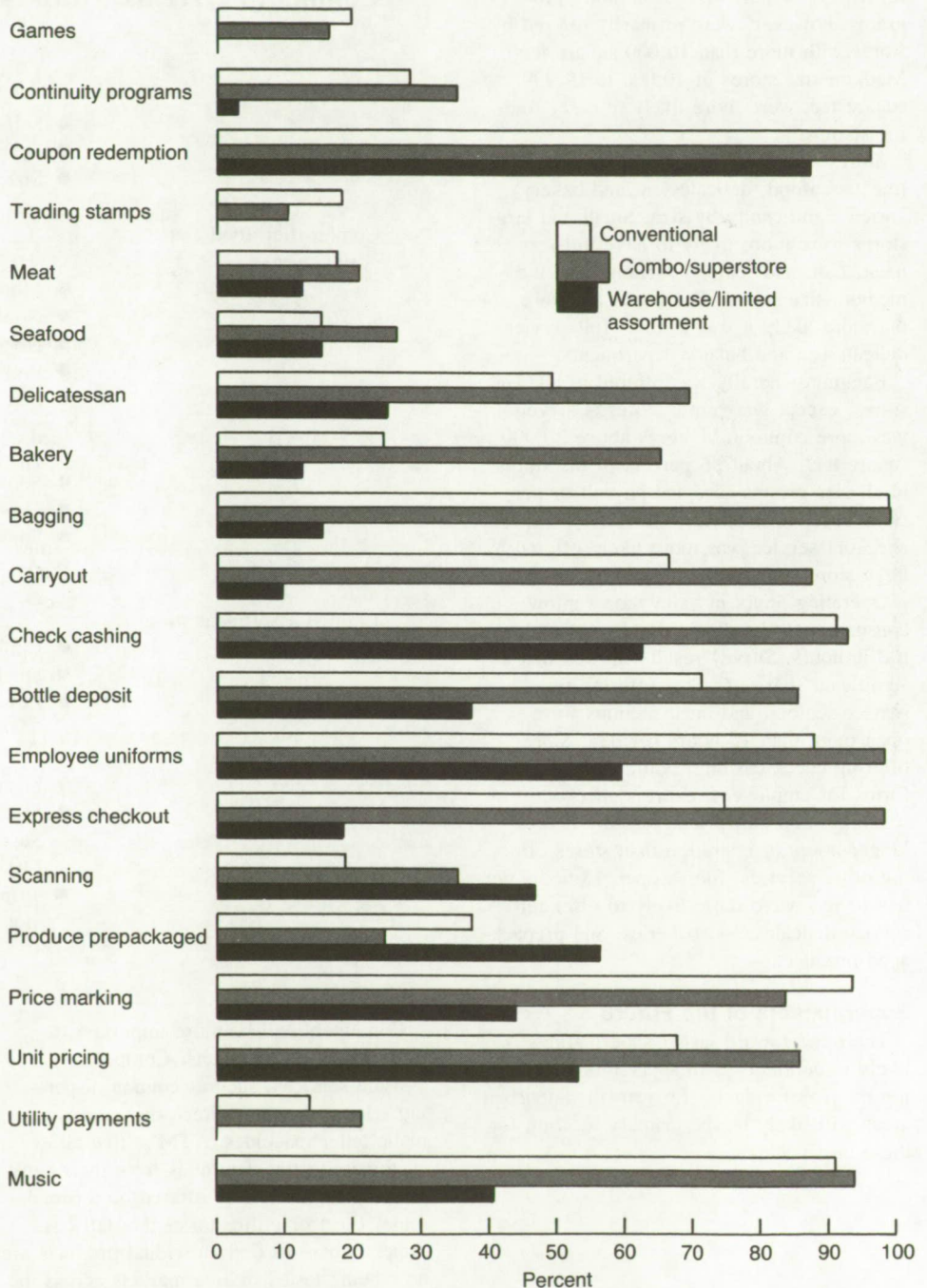
Chain stores offered more contests and games than did independent stores. Continuity programs—where each week consumers can buy a different item in a set, for example, dishes, flatware, or encyclopedias—were also more common in chain stores. Chains were more likely to offer full-service delicatessens and bakery departments. However, more independent stores offered full-service meat departments than did chain stores. Independent stores were less likely to offer employee uniforms, express checkouts, scanning, unit pricing, utility bill payments, and in-store music.

The services offered also varied among stores with different formats. Combination and superstores, for instance, were more likely to offer full-service seafood, delicatessens, and bakery sections than conventional stores. Carryout service, bottle deposits, employee uniforms, express checkout, and unit pricing were also more common for these two new formats.

When stores install scanner systems, prices no longer need to be marked on individual items. The scanning systems read prices at the cash register from the Universal Product Code (UPC) printed on the package. Survey results showed that while small stores more often marked prices, larger stores (which are more likely to use scanners) had only shelf tags listing the price per item and per unit of measure (ounce, pound, count, etc). More warehouse stores offered scanning systems than did any other type of store.

Promotional services are generally used to attract more customers into the store and may include contests and games, coupon redemption, continuity programs, and trading stamps. Survey results showed that stores offering games had no significant

Figure 2. Services Offered by Supermarkets Vary With Format



differences by store size. Coupon redemption also seemed to be a popular service regardless of store size. Continuity programs, however, were primarily offered by stores with more than 10,000 square feet. Medium-size stores of 10,000 to 19,999 square feet were more likely to carry trading stamps.

Stores offering full-service departments (meat, seafood, delicatessen, and bakery) varied significantly by size. Small and large stores were more likely to have full-service meat, fish, and seafood sections than the medium-size stores. The larger the store, the more likely it was to offer full-service delicatessen and bakery departments.

Bagging generally was offered in all size stores, except warehouse stores. Carryout was more common in stores above 20,000 square feet. About 86 percent of the stores in all size groups accepted payroll or personal checks for grocery purchases. Express checkout service was more likely offered by large stores than by small ones.

Operating hours in many stores allow consumers to shop before and after peak traffic hours. Survey results showed that a significant share of stores offering full-service seafood and meat sections were open more than 15 hours per day. Stores offering check cashing, bottle deposits, uniforms for employees, express checkout, scanning, and unit pricing usually had longer hours of operation than stores offering other services. Stores open 15 hours per day or less were more likely to offer full-service delicatessens, bakeries, and prepackaged produce.

Supermarkets of the Future

The trend toward larger supermarkets is likely to continue, with superstores becoming the major vehicles for growth. Suburban areas will likely be the primary location for these larger stores.

Coming to "Terms" with Supermarket Formats

Conventional

- Self-service.
- Highest percent of food versus nonfood items.
- Size range from 3,000 to 30,000 square feet.

Combination food and drug store

- More product variety.
- Nonfood items 25 to 35 percent of sales.
- Nonprescription drugs and general merchandise.
- Prescription drugs.
- Size range from 35,000 to 45,000 square feet.

Superstore

- Some prescription drugs carried.
- Generic and specialty product areas.
- Some self-serve bulk foods.
- Average size 35,000 square feet.

Limited assortment store

- Limited number of product brands.
- Stock the most popular size products.
- Less than 10,000 square feet.

Warehouse store

- Strong price appeal.
- Size ranges from 12,000 to 35,000 square feet. Super warehouse stores range from 50,000 to 140,000 square feet.
- Primarily food, some health and beauty aids, but low general merchandise emphasis.

Computers will be more important in tomorrow's supermarkets. Computer-assisted services, such as coupon dispensing, electronic store directories, and automatic teller machines (ATM's) that allow customers to transfer funds from their bank accounts, will soon be offered on a broad scale. Electronic directories that tell customers where to find individual products are now being tested in area markets across the country, and the ATM's are already in use in some supermarkets.

With specialty services such as delicatessens, bakeries, and seafood sections already commonplace, there will likely be a growing trend toward more prepared food and snack bars in supermarkets. This will enable supermarkets to compete with the eating-away-from-home sector, which is claiming a larger share of the food dollar—43 percent in 1985, versus 28 percent in 1962. □

Where the Food Dollar Goes

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Except for housing, Americans spend more on food than any other item. With so much being spent, the question arises: What part of the dollar pays for the food and what part for the services that bring it to the plate? The answer lies with the marketing bill, which reflects the costs of processing agricultural commodities into food and bringing them from the farm to consumers.

Consumer expenditures for foods originating on U.S. farms totaled \$343.6 billion in 1985 (*table 1*). This amount was less than the total consumers spent for all food because it excluded expenditures for imported foods and fishery products.

The farm value represented about a fourth of the almost \$344 billion, with the marketing bill accounting for the rest. The farm value portion of total expenditures has dropped from about a third in 1975. The smaller share is due both to weak farm prices and rising marketing costs.

The farm value share varies greatly among foods, depending on the degree of processing and the amount of services required to move a given commodity through the marketing system. In general, animal products have the highest ratios of farm value to retail price, and the more highly processed crop products have the lowest. For example, the 1985 farm value of eggs, a commodity requiring little processing, represented 61 percent of retail prices. On the other hand, the farm value of cereal and bakery products, which require much processing and marketing, accounted for only 10 percent of retail prices.

The marketing bill encompasses four food industry functions—processing, wholesaling, transporting, and retailing. Generally, the bill accounts for a higher portion of total expenditures in the away-from-home market. The farm value share is smaller in the away-from-home market because the cost of the increased labor needed to prepare food for this sector diminishes the relative value

Table 1. Consumer Expenditures, Marketing Bill, and Farm Value: At-Home and Away-From-Home Markets

	Total expenditures	Food at home ¹	Food away from home ²
<i>Billion dollars</i>			
Food expenditures			
1975	167.0	116.2	50.8
1980	264.4	180.1	84.3
1981	287.7	194.0	93.7
1982	298.9	196.7	102.2
1983	315.0	204.6	110.4
1984	332.0	213.1	118.9
1985 ³	343.6	219.4	124.2
Marketing bill			
1975	111.4	72.2	39.2
1980	182.7	113.9	68.8
1981	204.5	127.0	77.5
1982	215.2	129.9	85.3
1983	229.3	136.5	92.8
1984	240.6	140.0	100.6
1985 ³	257.2	150.4	106.8
Farm value			
1975	55.6	44.0	11.6
1980	81.7	66.2	15.5
1981	83.2	67.0	16.2
1982	83.7	66.8	16.9
1983	85.7	68.1	17.6
1984	91.4	73.1	18.3
1985 ³	86.4	69.0	17.4

¹Primarily purchased at retail food stores for use at home. ²Includes food purchased in restaurants, snackbars, hospitals, schools, etc. ³Preliminary.

Totals may not add due to rounding.

of the farmer's contribution to the final product (*figure 1*). For the same reason, foodservice costs are much greater than the retailing counterpart in the at-home market—62 cents of the food dollar versus 22 cents. Processing is a larger share of at-home than away-from-home food expenditures. However, when allowance is made for the large cost of foodservice relative to food retailing, the processing cost is about the same. This suggests that retail stores and away-from-home outlets purchase about

the same proportions of raw and processed foods.

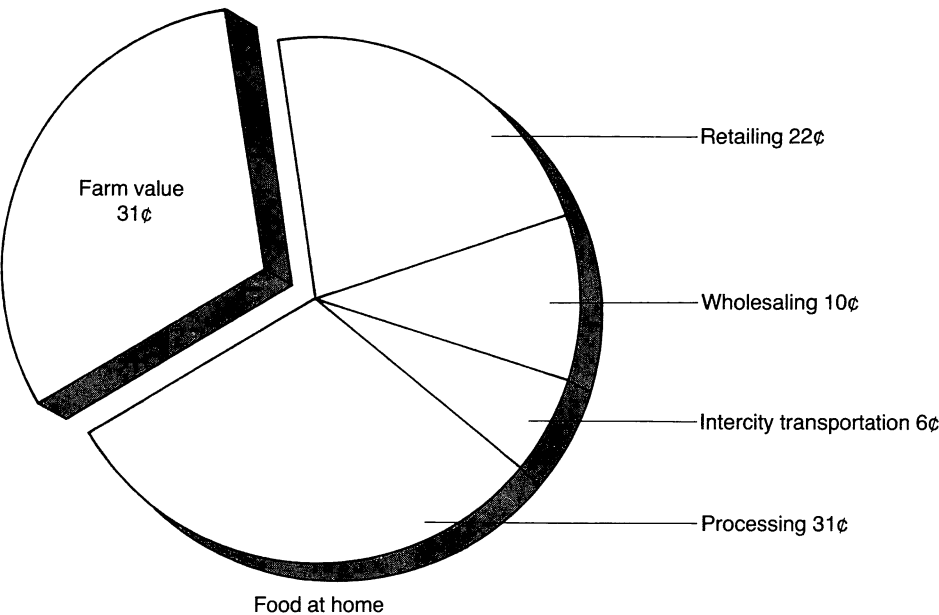
Increased eating away from home is reflected in the marketing bill. In 1975, food away from home represented only 35 percent of the marketing bill. By 1985, this figure had increased to nearly 42 percent.

Labor Makes Up Almost Half of Marketing Bill

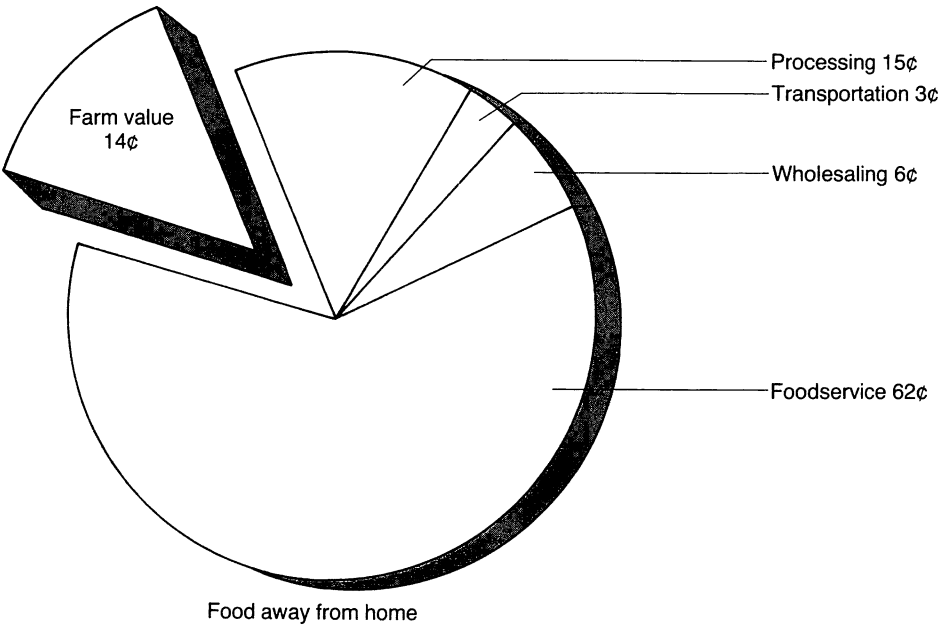
Consumers paid \$257.2 billion to cover the costs of processing and marketing

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Figure 1. Farm Value Takes Larger Share of Dollar Spent for Food At Home



Based on 1985 data.



Based on 1985 data.

domestic farm food in 1985. Labor, packaging, and transportation costs represented almost 47 percent of the total food dollar (table 2).

Labor costs accounted for 34 percent of total consumer expenditures and 45.4 percent of the marketing bill in 1985, a 7.1-percent gain from 1984 to 1985. Higher management compensation and increased employment were primarily responsible for the hike. Also, employee benefits rose because of higher costs of pensions and insurance plans, as well as legally mandated increases for Social Security and unemployment compensation.

Total food industry employment increased 4.6 percent, from 10.4 million workers to 10.9 million. Eating and drinking places constituted the largest employer, accounting for over half of the total food marketing work force. Increased sales due to the 1984 economic recovery accounted for a 4.8-percent rise in employment in this sector in 1985. Although food-away-from-home establishments were the largest employer, the greatest increase in employment occurred in the retail sector, which gained 6.3 percent. Much of this increase was due to rising employment in specialty departments, such as in-store bakeries and delicatessens.

Employment in food manufacturing showed the smallest increase, only 1.4 percent. The slight gain reflects continued mechanization and increased employee skills that raise productivity. Furthermore, food manufacturers generally reinvest profits in capital, such as plants and equipment, rather than in unrelated industries, thereby producing more capital-intensive operations.

Wholesale employment rose slightly, reflecting increased demand for wholesaling services from marketing functions at the consumer level. Interestingly, the two segments dealing directly with consumers—retailing and foodservice—had 5-percent increases in employment, double the increase for manufacturing and wholesaling combined. Despite the increase, the manufactur-

Table 2. Labor Accounts for the Largest Share of the Food Marketing Bill

	1975	1980	1981	1982	1983	1984	1985 ⁴
<i>Billion dollars</i>							
Total marketing bill	111.4	182.7	204.5	215.2	229.3	240.6	257.2
Labor ¹	48.3	81.5	91.0	96.6	102.4	109.1	116.8
Packaging	13.3	21.0	22.8	23.2	24.3	26.3	27.1
Transportation ² (rail and truck)	8.4	13.0	14.3	14.7	15.4	15.9	16.3
Fuel and power	4.6	9.4	10.3	11.3	12.0	12.7	13.3
Corporate profits (before taxes)	7.1	10.9	12.0	13.0	14.7	15.9	17.0
Other ³	29.7	46.9	54.1	56.4	60.5	60.7	66.7

¹Includes supplements to wages and salaries, such as pensions and health insurance premiums. Also includes imputed earnings of proprietors, partners, and family workers not receiving stated remuneration. ²Excludes local hauling charges. ³Includes business taxes, depreciation, rent, advertising, interest, and other costs. ⁴Preliminary.

ing and wholesaling industries employed only 22 percent of all food industry workers.

While the number of workers in retailing has grown, so has productivity. Several innovations in food retailing have enhanced output per store. First, smaller grocery stores are being replaced by "superstores" that offer a number of specialty departments. These departments allow operators to take advantage of economies of size by offering a greater diversity of merchandise per square foot of store space. Second, more items can be offered in a given amount of space by presenting products in a warehouse-type format, as opposed to traditional displays. Third, electronic scanning equipment eliminates manual price marking, thereby offering large labor savings. The number of grocery stores using this technology has more than tripled since 1980. Furthermore, the share of total grocery sales accounted for by scanner-equipped stores increased from 15 to 50 percent between 1980 and 1985.

Despite the productivity achieved by these innovations, some stores' gains have been offset by added services that require more

The Marketing Bill

The marketing bill discussed in this article is an estimate of the total charge for marketing all U.S. farm foods, including those consumed in restaurants and other eating places and those bought in retail food stores. It is the difference between total civilian expenditures for these foods, or the total food dollar, and total farm value. Marketing bill statistics are affected by changes in prices, volume, type of products marketed, and the quantity of marketing services per unit of product. Marketing bill statistics show the distribution of the food dollar between the many participants and cost components involved in marketing food.

labor, such as salad bars. As a result, the total change in labor productivity may be relatively small.

Packaging Costs Show A Small Increase

Packaging materials were the second largest marketing cost in 1985, accounting for 7.9 percent of the total food dollar. Packaging materials' share of the marketing bill has been relatively constant over the last de-

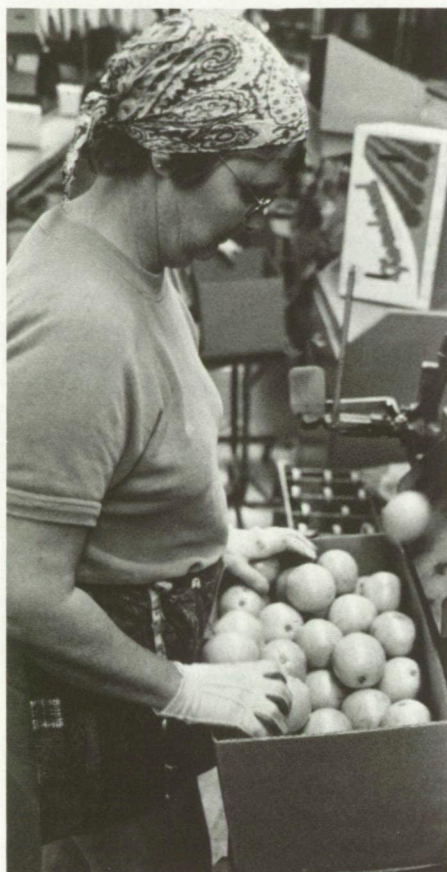
cade and totaled 10.5 percent in 1985.

Costs rose only 3 percent in 1985, as larger oil supplies led to lower petroleum prices, decreasing the cost of producing plastics and metal. Furthermore, overall prices of packaging materials rose only 0.2 percent. Thus, most of the 3-percent cost increase was due to more food moving through the marketing system and changes in the types of packaging, including more microwave-ready containers.

Major packaging materials, in order of importance, include fiber boxes; sanitary food containers for products such as fluid milk, ice cream, and frozen foods; folding boxes; metal containers; plastic; and glass. Most of the increase in packaging costs was due to greater use of paper and paperboard products, reflecting larger quantities of food in the marketing system. These materials accounted for 40 percent of packaging costs in 1985.

The packaging industry has benefited from a trend toward single portion meals, reflected in a larger market for fast food and convenience food. Aseptic food packaging and ovenable paperboard are two other technological developments contributing to growth in this industry. About a third of all the paper used by the food industry goes into the fiber boxes that ship nearly all processed foods.

Plastics account for approximately 15 percent of packaging costs and are used for a number of functions, including trays, bottles, and wrapping. The plastics industry is making inroads into several competing markets. Plastic bottles are being substituted for metal cans and glass for fruit drinks and are also replacing glass for such products as ketchup, mustard, and peanut butter. Finally, plastic bags are competing with paper in grocery stores. The 75-percent share of the grocery bag market currently held by the paper industry is expected to decrease in the face of stiff competition from plastics. However, this decrease may be tempered



Labor accounts for the largest share of the marketing bill. Packaging costs are the next largest.

because some consumers seem to favor paper grocery bags over plastic ones.

Energy Costs Moderated by Petroleum Surplus

Energy costs accounted for 5.2 percent of the marketing bill and 3.9 percent of total consumer expenditures in 1985. Costs increased 4.7 percent last year. Higher electric rates and greater use of fuels and energy were primarily responsible for the increase. This situation is in marked contrast to the 1970's, when energy costs increased as much as 20 percent a year because of petroleum price hikes. Last

year's increase approximated the general rate of inflation. The foodservice market accounted for about a third of total energy costs. Energy costs equaled 3.8 percent of foodservice sales. Most of this was electricity for lighting, air conditioning, and refrigeration.

The retail industry is similarly dependent on electric power. Energy costs accounted for 1.5 percent of total retail sales. Retailing and processing functions each encompassed 25 percent of energy costs. The wholesaling sector took the remaining 17 percent.

Transportation and Corporate Profits Show Gains

Transportation accounted for 6.3 percent of the marketing bill and 4.7 percent of total consumer expenditures in 1985. This figure included food shipped by rail or truck, but not items shipped intracity or by water. Transportation costs increased only 2.5 percent in 1985, mainly because of low diesel fuel prices. Furthermore, trucking firms have negotiated union contracts that impose multilevel wage structures which have lowered the salaries of newly hired employees. Operating costs for trucks increased only 1 percent in 1985. The only major increase was a 1-cent-a-mile levy on trucks weighing more than 55,000 pounds. Railroad freight rates rose less than 1 percent in 1985.

Before taxes, total food industry profits rose 6.9 percent in 1985, but remained at 4.9 percent of consumer expenditures and 6.6 percent of the marketing bill. Total profits have increased as the volume of sales has grown over the years. Increased profits can be attributed to greater consumer spending, particularly in the away-from-home market. With a stronger economy, consumers purchase more processed food and eat out more frequently.

Food manufacturers' profits have also increased, reflecting lower farm value. Changes in farm prices are generally not fully reflected in prices at other marketing levels. Higher food prices are often attribut-

ed to growth in profits, but are more often caused by increased costs.

What's Ahead

Several economic and sociological trends are expected to affect the size of the marketing bill over the next 5 to 10 years. On the farm side, agricultural production adjustments will reduce surpluses that have depressed commodity prices during the 1980's. However, commodity price increases will probably not be sufficient to raise farm value relative to overall food expenditures.

Fast-paced, two-income lifestyles have reduced the amount of time available for preparing food in the home. Therefore, consumers will continue to boost demand in the foodservice sector by purchasing a higher percentage of their meals from foodservice outlets. The resulting increase in demand for restaurant personnel will mean greater marketing costs for meals away from home.

Changing lifestyles and rising per capita income have also increased the likelihood that food consumed at home will be in the form of convenience items, such as frozen dinners and entrees. Marketing services, such as deboning, portioning, cooking, seasoning, and storing, are being added to farm foods as the labor required for preparation is shifted from the consumer to the marketing system. Furthermore, supermarkets are responding to foodservice competition by expanding their operating hours and adding specialty departments, such as salad bars, in-store bakeries, and delicatessens. The increased demand for labor, resulting from both greater purchases of convenience items and augmented supermarket operations, will boost at-home costs for the consumer.

As a result of these trends, marketing costs will increase at a faster rate than the farm value. The marketing bill will continue to occupy an increasing share of total consumer food expenditures. However, the decline in the farm value share of food expenditures is expected to be at a slower rate than during the last 5 years, when farm prices were depressed. □

Consumer's View of Tomato Quality

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Most consumers aren't even aware of the grading system for fresh fruits and vegetables. Yet, grades can make a difference in what's available in the produce section. Wholesalers, food processors, and buyers for retail stores rely on grades because they purchase large quantities, often long distance. A buyer in Maine, for example, will order from a shipper in Florida. Grading allows buyers to choose product quality and helps assure that they get what they pay for.

The grades of produce wholesalers, processors, and retailers purchase depend on consumer preferences. Consumers purchase according to price and quality, and how they buy sends signals back through the marketing chain, encouraging producers to grow what's in demand. In principle, then, grades should be based on consumers' perceptions of quality. However, because quality, like beauty, is in the eye of the beholder, no standardized grading system can perfectly reflect consumer preferences.

A study by the Economic Research Service (ERS) explores consumer demand for different grades and sizes of tomatoes and assesses the implications for the current grading system. The results indicate that the standards used to grade Florida tomatoes seem to draw finer quality distinctions than consumers do. Therefore, changing tomato grades to more closely reflect consumer perceptions could increase the efficiency of tomato marketing.

Florida Supplies Most Tomatoes

Tomatoes are one of the leading fresh market vegetables. Although grown in most States, Florida supplies over 90 percent of U.S. commercial tomatoes from November to mid-June. Florida production totaled about 30 billion pounds in 1985, at a farm value of \$720 million.

Most commercially grown tomatoes are harvested as either "mature green" or "breakers." A mature green tomato has a completely green skin but has reached the stage where it will turn red on or off the vine. A breaker is a tomato in the first stage of changing color; it is primarily green with a tinge of yellow or pink, usually at the blossom end. Breakers are commonly termed "vine ripe" in the tomato industry. About 80 percent of the Florida commercial tomatoes are mature green.

Most tomatoes marketed in Florida are sold under grade and size standards specified by Federal Marketing Order 966 (see sidebar box). Although consumers may think of tomato quality largely in terms of flavor, grades are based on freshness, appearance, maturity, and the percentage of defects. The four grades—U.S. No. 1, U.S. Combination, U.S. No. 2, and U.S. No.

3—are each divided into four sizes. The largest size is at least 2 24/32 inches in diameter. In the industry, these tomatoes are termed 5x6, reflecting the fact that they can be packed in a standard box six in a row, five rows per layer, three layers deep. The other tomato sizes, in descending order, are referred to as 6x6, 6x7, and 7x7. Naturally, the better grade and larger sized tomatoes command the highest prices (table 1).

Price, Income, and Quality Effects

Economists typically explain consumer demand for a product in terms of income, price, and the price of its substitutes. Income was found to have little effect on purchases of tomatoes.

In the ERS analysis, the price effects were considered in terms of three grade and size combinations: high-quality (No. 1 and combination grades), medium-quality (No. 2



What tomatoes consumers buy sends signals back through the marketing chain, encouraging producers to grow what's in demand.

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Table 1. Better Grades Command Higher Prices

Grade	Per capita consumption ¹	Price ²
	lbs.	Cents/lb.
No. 1	.42	11
Combination	.21	11
No. 2	.13	9
No. 3	.11	7

¹Estimated from shipment data for Florida only for November through mid-June. ²Price is measured at 1967 dollars to account for inflation.

Source: Annual report of Florida Tomato Committee.

and No. 3, sizes 5x6 and 6x6), and small tomatoes.

Consumers bought about 1.3 percent fewer high-quality tomatoes for each 1-percent increase in price. Conversely, for every 1-percent decrease in price, consumers bought about 1.3 percent more. Demand for medium-quality, larger sized tomatoes was more responsive to price changes, falling between 1 and 3 percent with each 1-percent increase in price. Purchases of small tomatoes, in contrast, were relatively unresponsive to price changes. A 1-percent increase in the price reduced consumption of these tomatoes by less than 0.5 percent.

Economic theory suggests that, as consumers purchase more of one quality of tomato, the price of its substitute must decline to make it more attractive. In fact, this was true only for the high- and medium-quality tomatoes. For example, a 10-percent increase in purchases of combination grade tomatoes would lower the price

of No. 1 tomatoes by 2.7 percent and No. 2 tomatoes by 2.2 percent. Consumers do not seem to substitute No. 3 tomatoes for higher grades. While the exact reason is not clear, the lack of substitution between low- and high-grade tomatoes means that removing low-grade ones from the market probably does not increase demand, and thus prices, of the higher grades.

Going beyond the traditional demand factors, the ERS analysis also examined how quality alone influences consumer demand for tomatoes. Looking first at the impact of size, the analysis revealed that for high- and medium-quality tomatoes, biggest was not always best in the eyes of the consumer.

The second largest size tomatoes (6x6) were consumed more than any other. Even the next size, 6x7, was slightly preferred over the largest No. 1 grade tomatoes. Purchases of medium tomatoes ranged from 0.1 to 0.3 pounds per person more than large tomatoes of the same grade.

The above phenomenon did not apply to the lower quality grades. Consumers seem to regard size as a more effective quality indicator than grade for low-quality tomatoes. For example, consumers do not seem to differentiate between small No. 2 and No. 3 tomatoes. Consumers tend to regard the smallest size of both grades as being equal. On the other hand, smaller, high-grade tomatoes are preferred to larger size

Understanding Federal Marketing Orders

Federal marketing orders represent an important agricultural policy tool for growers and handlers of fruits, vegetables, and specialty crops in the United States. In general, a marketing order is a program that regulates certain aspects of the marketing of an agricultural commodity to enhance both price and quality. The orders are operated under the supervision of the U.S. Department of Agriculture.

Marketing orders permit three broad categories of activities in order to improve grower returns—quality control, quantity control, and market operation and improvement. Quality control provisions allow for the determination of minimum grades, sizes, and maturity standards to be enforced through Federal inspections. Such quality standards promote product uniformity and, so in-

directly, allow for higher market prices by raising the level of product quality. Withholding poor-quality produce from the market also effectively limits the total supply of produce. Reduced supplies, in turn, may imply higher farm prices.

Quantity controls directly affect available supply and, thus, price. Supply may be controlled by limiting the short-term flow of products to market, allocating supplies between fresh (primary) and processed (secondary) markets, or restricting the quantity marketed by limiting each producer's sales.

The final category of provisions comprises a variety of activities designed to enhance commodity marketing. These include standardization of containers or packs, research and development, and a provision prohibiting unfair trade practices.

tomatoes of a lower grade. For instance, purchases of the smallest size No. 1 tomatoes were 0.06 pounds per person higher than the third size (6x7) No. 2 and No. 3 tomatoes.

Implications for the Marketing Order

Quality standards are administered by the Florida Tomato Committee, composed mainly of growers and handlers of the product. Over the years, the committee has made technical changes in the grading system to improve marketing procedures. Occasionally, the committee applies a supply management program to restrict the marketing of lower grade tomatoes in order to raise the overall quality of the product.

The standard currently employed in grading Florida tomatoes seems to delineate finer quality differences than consumers generally can perceive. Take, for instance, the undifferentiated demand between the smallest tomatoes of grades No. 2 and No. 3. This may suggest the need to eliminate the No. 3 grade.

Restricting inferior quality tomatoes has implications for tomato prices and grower returns. Limiting the supply to higher quality, higher priced tomatoes, in theory, could mean greater revenue for growers. The effect of such a restriction, however, would depend on how consumers substitute low- and high-quality tomatoes and the responsiveness of consumer purchases to a price change.

The ERS analysis reveals little substitution between the smallest No. 3 tomatoes and high-quality ones. It may be that there are different uses for these tomatoes, such as for processed products versus salads. In this case, a decrease in the supply of small No. 3 tomatoes may not mean greater consumer demand for large tomatoes and an increase in their price.

At the same time, the ERS analysis indicated that consumers do substitute small, low-quality tomatoes for small, higher-grade ones. Therefore, a reduced supply of small No. 3 tomatoes could mean higher prices for other small tomatoes. Because consumer demand for small tomatoes was relatively unresponsive to price, however, there would likely be little decline in sales. As a result

of eliminating the smallest grade No. 3 tomatoes, grower revenue would increase only about \$3.41 million (in 1982 dollars). □

References

- Bockstael, N. E. "Economic Efficiency Issues of Grading and Minimum Quality Standards." Paper presented at the Conference on Economic Efficiency in Agricultural and Food Marketing, Washington D.C., October 1-2, 1985.
- Godwin, M. R. and W. T. Manley. *An Economic Evaluation of Grade and Size Standards for Mature Green Tomatoes*. Bul. 652, University of Florida, Ag. Experiment Station, 1963.
- VanSickle, J. J. and G. E. Alvarado. "Florida Tomato Market Order Restrictions—An Analysis of Their Effects and Implications." *Southern Journal of Agricultural Economics*, Vol. 15, 1983, pp. 109-113.

International Guidelines for Consumer Protection

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Guidelines to protect consumers in developing countries from unsafe food and drugs have been adopted by the United Nations (UN). This is the first time consumer issues have moved into the international arena.

The UN first proposed international guidelines to protect consumers in 1981, following disputes between countries over safety and quality standards for the food products they trade. The origins of the guidelines, however, actually go back to 1977, when the UN's Economic and Social Council requested a survey of nations' regulatory and legal arrangements for consumer protection. The Council recognized that the developing world's efforts at advancement in production and technology would be enhanced if they were accompanied by adequate consumer protection.

After 3 years of debate, the UN adopted the guidelines in 1984. They are strictly voluntary and do not establish any law or system of international regulation. The guidelines set forth minimum standards that are usually accepted by UN members. If adopted worldwide, they could serve to increase international trade by removing differences in safety and other standards that limit trade.

Guidelines Have Three Components

The guidelines are divided into three parts: objectives, general principles, and suggested actions. The objectives of the guidelines are to improve consumer protection, encourage standards of conduct for producers and distributors, curb business practices that harm consumers, stimulate development of independent consumer groups, and improve global cooperation in the entire field.

The guidelines are based on what are the main principles of consumer protection in nearly all developed countries.

- Products should be safe and not of inferior quality.

- Business practices that negatively affect consumers' economic interests should be regulated.

- Consumers should have the necessary information and education required to make rational choices.

- Procedures should be provided for speedy redress of complaints.

The guidelines call for specific actions that carry out the objectives and principles. For example, in the area of physical safety, participating governments are to encourage manufacturers and distributors to comply with safety regulations and voluntary standards, maintain safety records, and educate consumers on proper handling and storage of products.

Government development of consumer education and information programs that are in keeping with the country's cultural traditions is also a key element of the guidelines. Special attention is urged for disadvantaged, low-income, or illiterate people.

The guidelines cover everything from food and water to pharmaceutical products. In the area of food, the guidelines encourage systematic monitoring by governments to assure that manufacturers, distributors, and others adhere to established laws and standards to prevent adulteration of foods, false or misleading claims in marketing, and service frauds.

Implications for International Trade

If the voluntary guidelines are implemented by individual countries, they could have worldwide implications. National standards intended to protect consumers in one country can limit international trade. The stricter standards of developed countries often serve as nontariff barriers for imported food products that might take away sales from domestic producers. Inadequate hygiene practices in food processing and handling, for instance, can cause importing countries to reject another country's products. However, if the developing countries adopt the physical safety and labeling standards

recommended by the guidelines, importers would be assured of the composition and quality of foods. International standards and practices, therefore, might enable exporters in developing countries to compete with domestic producers in developed countries.

Without standards regulating product quality and safety, developing countries may also be vulnerable targets for inferior and unfit products. Unscrupulous manufacturers in countries with rigid safety standards and practices have produced substandard products for export. International standards would lessen the incidence of "dumping" inferior products.

Efforts are being made to implement the guidelines in developing countries. As the consumer movement strengthens in developing countries, more groups are springing up to address issues related to consumer rights—the right to complain, to safe products, and even to sufficient food and housing. These groups, plus the fact that consumer advocates are urging legislators in developing countries to pass protection laws, will probably lead to guideline implementation in many nations.

In May 1986, delegates from 35 developing countries met in New York City to set goals for implementing these guidelines. Consumer groups have already formed in some of these nations, but others are still trying to initiate them. China, for example, started its first consumer rights organization, the China Consumer Council, in December 1984. The council hears consumer complaints and negotiates solutions with manufacturers and retailers. Brazil is another example. Although the country has a consumer defense organization, consumer advocates are also pressing legislators to include protection laws in their new constitution. In October 1986, Esther Peterson, lobbyist for the International Organization for Consumers' Unions, traveled to Uruguay to discuss implementation of the guidelines in South American countries. □

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Food Spending and Income

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Personal consumption expenditures were about \$2.7 trillion (seasonally adjusted annual rate) in the second quarter of 1986, an increase of 6.2 percent from a year earlier. Of this total, \$434 billion was for food, up 4.7 percent from 1985 (*table 1*). Spending rose because of price increases, greater purchases of convenience foods, and growth in the total market. After adjusting for higher prices, food expenditures were up 2.5 percent from the second quarter of 1985.

Food-at-home expenditures reached \$295 billion, up 3.6 percent from a year earlier, while away-from-home food spending was up 6.9 percent to \$139 billion. After adjusting for inflation, which has been low in the food-at-home market, expenditures on food at home were up 2.4 percent from last year. In the away-from-home food market, expenditures rose 2.9 percent after adjusting for inflation. Prices in the restaurant industry have risen at a higher rate than those for food at home because marketing costs make up a larger share of restaurant meal prices than of food store prices.

Food expenditures were 14.6 percent of personal disposable (after-tax) income in the second quarter of 1986, unchanged from 1985. Data from the Bureau of Labor Statistic's 1984 Consumer Expenditure Interview Survey (the latest data available) reveals that the proportion of income spent on food varies widely among different income groups and generally declines as income rises. The percentages for the income groups were:

- less than \$5,000, 49.7 percent of income;
- \$5,000-9,999, 25.7 percent;
- \$10,000-\$14,999, 20.4 percent;
- \$15,000-\$19,999, 16.7 percent;
- \$20,000-\$29,999, 13.6 percent;
- \$30,000-\$39,999, 11.6 percent; and
- \$40,000 and up, only 8.7 percent.

These figures include only households reporting income but do not account for

possible underreporting of income. The average for all households surveyed was 13.1 percent of before-tax income. This figure is smaller than the percent of dispo-

able income spent for food because food spending from the survey is measured against before-tax income, a larger number than disposable income. □

Table 1. How Disposable Personal Income Is Spent¹

	1985 II	1986 I	1986 II
<i>Billion dollars</i>			
Disposable personal income	2,842.3	2,935.1	2,981.7
Total personal consumption expenditures	2,576.0	2,697.9	2,735.3
Nondurables	902.3	929.7	929.1
Food	414.7	429.9	434.1
At home	285.1	295.0	295.5
Away from home	129.6	134.9	138.6
Alcoholic beverages	53.6	54.7	55.9
At home	20.7	21.1	22.1
Away from home	32.9	33.6	33.8
Cleaning and household supplies	26.1	27.0	27.0
Toiletries	22.9	23.7	24.1
Tobacco	30.5	34.4	32.7
Drugs	28.2	29.3	30.2
Clothing and shoes	155.0	161.3	165.5
Gas and oil	92.8	87.6	78.2
Fuel oil and coal	15.3	14.9	13.7
Other	63.2	66.9	67.7
Durables	354.0	360.8	375.7
Motor vehicles and parts	165.3	163.5	173.3
Furniture and household equipment	125.9	132.1	136.2
Other	62.8	65.2	66.2
Services	1,319.7	1,407.4	1,430.5
Housing	399.1	424.8	434.8
Household operation	171.4	174.3	177.2
Transportation	88.1	93.5	95.3
Personal care	31.0	32.5	33.0
Medical care	287.7	307.9	313.3
Personal bus. service	167.9	189.4	192.0
Recreational services	67.6	70.5	70.4
Other	107.0	114.5	114.5
Savings	183.6	145.6	152.7
Other ²	82.7	91.6	93.7

¹Reflects data as of August 18, 1986. ²Includes interest paid by consumers to businesses and personal transfer payments to foreigners.

Source: U.S. Department of Commerce, Bureau of Economic Analysis.

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Current Trends in Domestic Food Programs

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Participation and program costs discussed in this article compare the April-June quarter of 1986 with the same 3 months of 1985, unless otherwise noted. Preliminary data are reported as of August 1986 and are subject to revision. Costs of entitlement and bonus commodities are included where applicable.

Average participation in the Food Stamp Program (FSP) fell 2 percent during the second quarter of 1986, to 19.6 million people. Food stamps are designed to assist low-income households to purchase a nutritionally adequate diet. Average monthly food stamp benefits per person increased from \$44.79 to \$45.46.

Federal expenditures for the FSP totaled \$2.94 billion, virtually the same as in 1985. The value of benefits declined slightly, from \$2.69 to \$2.67 billion. Administrative expenses and other costs rose from \$243 million to \$271 million.

Child Nutrition Programs

Average participation in the National School Lunch Program in April and May increased about 1 percent, from 23.2 million participants in 1985 to 23.4 million in 1986. This program provides approximately one-third of the recommended dietary allowances for school-age children. Eligibility for free or reduced-price lunches is based on family size and income criteria. Approximately 42.5 percent of the lunches were free, 6.7 percent at a reduced price, and 50.8 percent full price. These percentages have remained relatively stable over the past several years.

Federal expenditures for the school lunch program, including cash, commodities, and cash-in-lieu of commodities, totaled \$812 million in the second quarter of 1986, up from \$759 million. Schools also received



Participation in the WIC program increased from an average of 3.1 million in second-quarter 1985 to 3.3 million a year later.

bonus commodities worth \$40.3 million in 1986, compared with \$42.4 million in 1985.

The School Breakfast Program provided subsidized breakfasts to an average of 3.6 million children each day in April and May of 1986 and 3.5 million in the same months of 1985. A rise in free breakfasts, from 2.9 million to 3 million, accounted for most of the increase in 1986. Federal expenditures from the School Breakfast Program rose from \$98.9 million to \$107.3 million.

Day care homes and child care centers served an average of 59.1 million meals a day under the Child Care Food Program during the second quarter of 1986, an increase of 5.6 percent. Approximately 78 percent of the meals were free, 6 percent reduced price, and 16 percent paid. Program costs rose 9 percent, from \$114 million in 1985 to \$125 million in 1986.

The number of half-pints of milk served under the Special Milk Program declined slightly from 39 million in the second quarter of 1985 to 38 million in 1986. Federal expenditures remained virtually the same at \$3.7 million.

Approximately 12.8 million meals were served to children under the Summer Food Service Program in 1986, a 1-percent decline from 13.6 million in the second quarter of 1985. Program costs in May and June were \$21 million in 1986 and \$20.7 million in 1985.

Supplemental Food Programs

Participation in the Special Supplemental Food Program for Women, Infants, and Children (WIC) increased from an average of 3.1 million in 1985 to 3.3 million in the second quarter of 1986. Food costs for the WIC program rose from \$300 million to \$318 million, a 6-percent increase. Average monthly benefits per person increased from \$31.92 to \$32.17. WIC provides low-income participants with foods that are rich in protein, iron, calcium, and vitamins A and C, nutrients that are often lacking in the diets of the target population.

The Commodity Supplemental Food Program (CSFP) operates in 12 States and the District of Columbia. The CSFP serves the same target population as the WIC program, but persons may not participate in both programs simultaneously. CSFP served an average of 136,000 persons per month in the second quarter of 1986, down from 137,400 in the same period in 1985. Food costs for CSFP, including bonus commodities, totaled \$8.4 million in the second quarter of 1986.

Average participation in the Elderly Feeding Pilot Projects (which operate under the auspices of the CSFP) increased slightly from an average of 19,500 in 1985 to 19,800 in 1986. Food costs for the projects were \$547,000, down from \$570,000 in 1985.

Food Distribution Programs

Participants in the Food Distribution Program on Indian Reservations and the Trust

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Territories increased from 138,300 in the second quarter of 1985 to 145,900 in 1986. Lower food costs meant a decline in program spending, from \$12.3 million in 1985 to \$11.8 million in 1986.

Average daily participation in the Nutrition Program for the Elderly was 886,000

in second-quarter 1986, a decline of 2.2 percent from a year earlier. In the same period, Federal expenditures dropped from \$31.2 million to \$30.7 million. This program provides cash and some USDA-donated foods for people over 60 years of age and their spouses.

Federal expenditures for the Temporary Emergency Food Assistance Program were \$220.5 million in 1986, compared with \$253 million in 1985. This program provides food to the needy while reducing Government stocks of surplus commodities. □

Table 1. Federal Benefit Cost of USDA Food Programs¹

Program	1983	1984	1985 ²	1985 ² (Quarters)				1986 ²	
				I	II	III	IV	I	II
Million dollars									
Family Food									
Food Stamps	11,119	10,673	10,703	2,771	2,691	2,580	2,662	2,691	2,673
Nutr. Asst. Prog. in Puerto Rico ³	825	825	825	206	206	206	205	205	205
Food Distribution									
Food Distribution on Indian Reservations	36	43	48	12	12	12	12	12	12
Schools ⁴	821	828	851	273	159	144	275	270	160
Other ⁵	229	225	201	45	56	59	41	50	89
Temporary Emergency Assistance ⁶	1,106	1,057	908	260	253	189	206	209	220
Cash-in-lieu of Commodities ⁷	126	133	142	35	35	35	37	37	35
Child Nutrition ⁸									
School Lunch	2,443	2,552	2,609	807	644	327	831	827	695
School Breakfast	357	378	391	117	99	51	124	123	107
Child Care Food and Summer Food Serv. Prog.	407	454	500	101	119	173	107	110	129
	17	16	16	4	4	4	4	4	4
WIC ⁹	1,194	1,417	1,511	368	375	382	387	394	397
Total ¹⁰	18,680	18,601	18,705	4,999	4,653	4,162	4,891	4,932	4,726

¹Calendar years. Administrative costs are excluded unless noted. ²Preliminary. Quarterly data may not add to annual total due to rounding. ³Puerto Rico transferred from the Food Stamp Program to a substitute nutrition assistance program on July 1, 1982. Represents appropriated amounts. ⁴National School Lunch, Child Care Food, Summer Food Service programs, and commodity schools. ⁵Commodity Supplemental Food Program, Elderly Feeding Pilot Project, Nutrition Program for the Elderly, and donations to charitable institutions. ⁶Initiated December 1981. ⁷Child nutrition programs and the Nutrition Program for the Elderly. ⁸Cash expenditures. ⁹Special Supplemental Food Program for Women, Infants, and Children. Includes administrative costs. ¹⁰May not add due to rounding.

Source: Data from the Food and Nutrition Service.

USDA Actions

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USDA regularly implements operational and regulatory changes that affect the status of food and nutrition in the United States. Here are some actions relevant to the food situation.

Autogenous Biological Products. New regulations proposed by USDA would allow Federal licensing of veterinary biologics manufacturers who produce only autogenous products. An autogenous biologic is a product that has been prepared from a culture of microorganisms that was derived from a sick animal. The infected herd or flock is then treated with the finished product. Such biologics are used primarily during emergencies to treat animal diseases for which there is no licensed product. Currently manufacturers are licensed if they make nonautogenous products, such as vaccines or bacterins, but once licensed, they may then produce autogenous products as well.

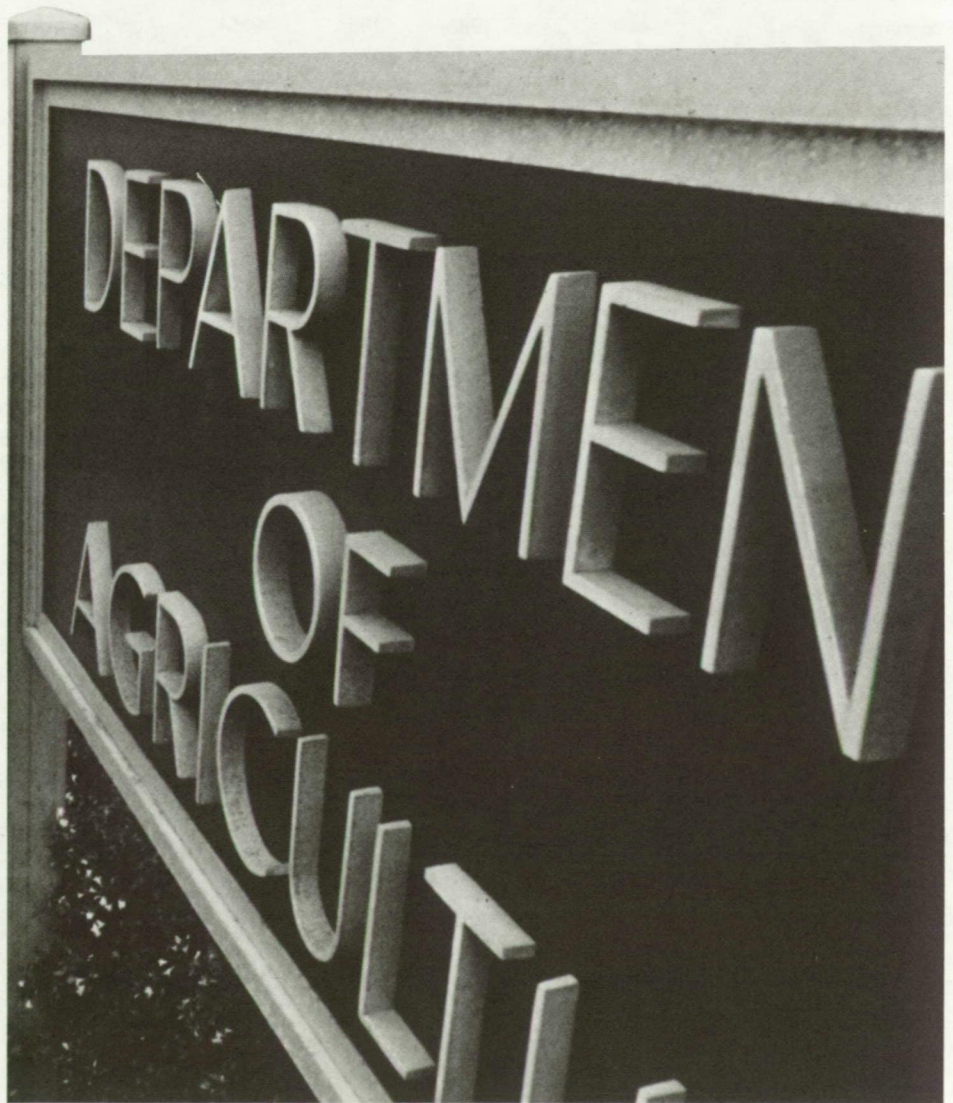
Beef Promotion and Research. USDA issued a final rule implementing a national beef promotion and research order to strengthen the position of beef in the marketplace. The program is funded by a mandatory \$1 per head assessment on all cattle marketed in the United States, as well as an equivalent amount on imported cattle and beef. The program will be administered by the Cattleman's Beef Promotion and Research Board, made up of about 113 cattle producers and importers nominated by the industry and appointed by the Secretary of Agriculture. Producer assessments began October 1.

Pork Promotion, Research, and Consumer Information Order. Secretary of Agriculture Richard E. Lyng announced a final order implementing a national pork promotion, research, and consumer information order and the appointment of 160 pork

producers and importers to the National Pork Producers Delegate Body. The program will be funded by a mandatory assessment of up to $\frac{1}{4}$ of 1 percent of the market value of each hog sold in the United States, as well as an equivalent amount on imported hogs, pork, and pork products.

Substances in Fresh Pork. An interim final rule has been proposed by USDA that would permit the controlled use of sub-

stances that maintain the color of fresh pork cuts for the duration of their normal, safe shelf-life. The substances are ascorbic acid, erythorbic acid, citric acid, sodium ascorbate, and sodium citrate. Fresh pork cuts lose their color long before they become unsafe to eat, and some consumers find the off-color less desirable. USDA's Food Safety and Inspection Service reviewed data that indicated that certain acidic substances can safely extend the acceptable color and ap-



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pearance of fresh pork. Only processors operating under a USDA-approved partial quality control program will be allowed to use the substances. Under this program, plants establish controls at certain processing steps, which are monitored by USDA inspectors to assure correct operation. In addition, the prescribed conditions under which the substances are permitted will ensure they do not mask signs of food spoilage.

Inspection Exemption for Certain Central Kitchens. Certain central kitchens of restaurants are now exempt from routine inspection by USDA. The eligible kitchens—there are currently about 40—are those that transport ready-to-eat meat and poultry products directly to their satellite restaurants or vending machines for serving to customers. To be eligible for the exemption, a central kitchen's products may not be stored, sold, or otherwise change hands before arriving at the outlets, and both the central kitchen and the outlets must be owned or operated by the same legal entity.

Donated Food Delivery. USDA has proposed streamlining the two delivery systems used for getting surplus food to schools, charitable institutions, and other eligible participants into one system. The new National Inventory System (NIS), which is being tested this year in six States, would replace delivery systems now operated by States and USDA's Food and Nutrition Service. The Secretary of Agriculture will designate which donated foods are available through NIS. Under the current systems, these include cheese, nonfat dry milk, butter, and honey.

Restructured Meat Product Binder Use. The Department of Agriculture has begun permitting meat processors to use a combi-

nation of dry substances to create a binder for restructured meat products. The name of the binder must be included on the label next to the product's name. Restructuring is the process of taking flaked, sectioned, or chunked meat and binding the pieces to resemble intact cuts of meat. The final products take on a variety of shapes, such as nuggets, roasts, loaves, and steaks. The binder is formed by combining sodium alginate, calcium carbonate, lactic acid, and calcium lactate. When these compounds are added to raw meat pieces, they react to form calcium alginate, the compound that holds the pieces together. All of these substances have been approved by the Food and Drug Administration.

Pineapple Juice Grade Standards. The Agriculture Department has proposed revisions in its voluntary grade standards for canned pineapple juice to improve them and bring them into line with other revised standards. The major amendments would align U.S. grade standards with Food and Drug Administration standards, eliminate reference to the words "canned" or "canning" and substitute "processing" where appropriate, provide grade standards for pineapple juice from concentrate, establish minimum soluble solids content for pineapple juice from concentrate, and redesignate the grade name U.S. Grade C in the current canned pineapple juice standards to U.S. Grade B.

Sugar Sale to China. USDA sold its entire inventory of 145,850 metric tons of surplus raw cane sugar to the People's Republic of China at 4.75 cents a pound. The sugar was sold at a price that included its delivery on board ship at U.S. export ports and will be delivered during January-March 1987. No credit arrangements were involved in the sale.

Targeted Export Assistance Program for Canned Fruit. A \$5.1 million USDA program to expand exports of canned

peaches and fruit cocktail, especially to Pacific Rim and Middle East countries, will run through fiscal year 1987. The program is intended to help the U.S. industry counter or offset imports of subsidized products from the European Community.

Labeling Meat with Barbecue Sauce. USDA changed its labeling requirements for pork and beef products packed in barbecue sauce to be consistent with those for similar poultry and nonmeat products. Previously, "pork with barbecue sauce" and "beef with barbecue sauce" were the only products on which labels were required to state prominently that the sauce contained thickeners, binders, and similar substances. The new rule allows processors to remove the prominent labeling statements identifying these binding and thickening ingredients.

Meat and Poultry Plant Hours of Operation. USDA now allows qualified meat and poultry processing plants operating under the voluntary Total Quality Control (TQC) inspection system to expand hours per day from 8 to a maximum of 12. Approximately 500 plants use USDA-approved quality control systems to ensure wholesome and accurately labeled products. Under the new rule, plants that have operated under approved TQC systems for at least 1 year can request expansion of daily schedules to 12 hours. During the additional 4 hours of operation, plants can produce and transport products without an inspector being present. Several provisions of the new rule ensure adequate control of the products. For example, special codes are assigned to products processed after the regular 8-hour shift, and inspectors will spot check plants during the expanded hours and take samples when they feel it necessary. □

Food and Nutrition Legislation

Lewrene Glaser
(202) 786-1780

Numerous food and nutrition bills were introduced in the 99th session of Congress. Some of the legislation is described below.

Food Assistance

H.R.5133—Rep. Mickey Leland (D-TX)

The Food Assistance for the Homeless Act would permit State agencies to conduct food stamp outreach programs targeted at homeless individuals. The homeless would be able to use their food stamps at nonprofit shelters that offer food services. Persons using food stamps could not be charged more for a meal or packaged food than those paying cash.

H.R.5145—Rep. Bruce Vento (D-MN)

This bill would amend the Temporary Emergency Food Assistance Act of 1983 to require that excess cheese held by the Commodity Credit Corporation (CCC) be made available to States, at the request of the Governor, for distribution by eligible agencies. The Governor would have to certify need, and the CCC would have to deliver the cheese without charge and in usable form. Excess cheese is defined in the bill as that acquired by the CCC, minus quantities used for international market development, food aid, and other commitments.

Food Safety and Quality

S.2512—Sen. Orrin Hatch (R-UT)

The Food Safety Modernization Act of 1986 would amend the three so-called

Delaney clauses contained in the Federal Food, Drug, and Cosmetic Act. Presently, the law states that no food additive, color additive, or animal drug residue is safe if it causes cancer in man or animals. This bill would change the language so that no additive or residue is deemed safe if the substance as a whole is found to induce cancer in man or animals. For example, saccharin, and not its chemical components, would be evaluated for carcinogenic effects. The clause would not apply if the Food and Drug Administration (FDA) determined—based on scientifically adequate evidence—that the risk of cancer to humans from exposure to the substance under the intended conditions of its use was negligible. S.2512 would also define “safe” to mean a reasonable certainty that the risks to health from a substance under the intended conditions of use are negligible.

The bill contains new phaseout provisions for substances—including drug residues in meat and poultry—in use but no longer recognized as safe. FDA or USDA would be able to allow continued use of an additive or residue if there is no unreasonable risk to the public health. A phaseout period, however, would only be permitted as long as a practicable substitute did not exist. In determining the length and conditions of a phaseout, FDA and USDA would have to consider the risks associated with the use of the substance and those associated with prohibiting it; the effects of the substance on the nutritional value, cost, and availability of food; and the uses of the substance for dietary management and other health-related purposes. During the phaseout, the agencies would be authorized to reduce the amount

of the additive or residue allowed in food, restrict the foods in which it may be used, and issue labeling or packaging requirements.

S.2512 would also allow FDA to consider the benefits to human health of a food additive that has a long history of use and for which there are no practicable substitutes before prohibiting its use. Possible examples of this are saccharin, BHA, and nitrites. The FDA would be able to conduct risk-benefit analysis to determine how the public health would best be served. USDA and FDA would also be required to establish regulations that specify procedures for independent scientific peer review of “substantial scientific” issues related to food safety.

S.2622—Sen. William Roth (R-DE)
and H.R.5105—Rep. Beau Boulter (R-TX)

The Meat, Poultry, and Egg Products Inspection Improvements Act of 1986 asserts that periodic and unannounced inspections of meat, egg, and poultry processing plants would be less expensive and more effective than the continuous inspections currently made. The bill would authorize USDA to conduct inspections in such a manner and frequency as necessary, based on: the nature of the plant’s operations, the adequacy and reliability of the plant’s product monitoring system, the history of compliance with inspection requirements, and any other factor considered appropriate. Egg breaking operations, however, would still be continuously monitored. Meat and poultry labels would be changed to read “Prepared in a USDA inspected establishment.” □

The author is an agricultural economist with the Food and Agricultural Policy Branch of the National Economics Division.

In the News...

Processed Foods' Share Has Changed Little in a Century

The share of food that is processed (omitting food produced at home) has changed remarkably little in more than a century—87 percent of purchased foods were manufactured in 1869, 80 percent in 1909, and 90 percent in 1980. But the kinds of foods processed, the type of processing, and the nature of the food manufacturing industry have changed dramatically.

In 1869, flour and cornmeal accounted for 52 percent of processed food products. Cured meats, dairy products, and sugar accounted for another 37 percent. By 1982, flour and other grain products accounted for only 3 percent, bakery products 10 percent, meat and poultry 23 percent, processed fruits and vegetables 17 percent, and soft drinks 11 percent. Many new industries appeared and grew to considerable size during that period, mostly as a result of new technologies dealing with frozen and dehydrated foods, soft drinks, and fresh meat.

Large corporations have been a feature of agricultural processing and distribution for 100 years. The 50 largest firms have accounted for about 45 percent of all output, while the next 450 firms have maintained a one-third output share.

For further information, call Alden Manchester, (202) 786-1880.

Eastern Potato Growers Face a Shrinking Market

Potato producers in Maine and other traditional eastern growing areas are facing stiff competition from the Western States and, to a lesser extent, from Canada, in eastern U.S. markets. Since 1960, western growers have expanded fresh potato marketings in eastern U.S. cities. Maine and the other Eastern States (New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, Pennsylvania, and New York) both supplied about 28 percent of total U.S. potato production in the early 1960's. By the 1980's, Maine grew only about 7 percent and the other Eastern States 6 percent. On the other hand, the Western States increased production from about 31 to 54 percent. Producers of spring and summer crop



Western growers have gained market shares because they produce most of the russet potatoes consumers seem to prefer.

potatoes (Florida, Texas, California, New Mexico, South Carolina, Virginia, and Louisiana) also lost production shares between the 1960's and the 1980's.

The Western States have gained market shares in eastern U.S. markets because they produce most of the russet potatoes that consumers seem to prefer. Not only are russets the current favorite in the fresh market, they are also preferred by the expanding processing industry because they make the best frozen french fries. With growing fast food consumption and consumers' desire for convenience, processed products make up the majority of potato consumption in the 1980's. One processed product well suited to the East's round white potatoes is potato chips. However, production of chips has not increased nearly as fast as frozen potatoes. Production of chips has risen only 16.2 million hundredweight (cwt) since the early 1960's, compared with an increase of 75 million cwt for frozen products.

Canada has also pushed into the eastern growers' market, but not to the extent of the Western States. Canada's strongest gains have been in Boston, with about an 11-percent market share in the early 1980's, New York City 6.6 percent, and Philadel-

phia 5.4 percent. South of Baltimore, however, the Canadian market share is well below 1 percent and decreases as distance increases.

For more information, contact Katharine C. Buckley, (202) 786-1768.

Japan Remains Top Market for U.S. Farm Products

Japan remained the leading single-country market for U.S. agricultural exports in U.S. fiscal 1986, as it has been every year since 1963. Despite its number-one spot, U.S. farm exports to Japan dropped for the second straight year. After peaking at \$6.9 billion in fiscal 1984, sales fell to about \$5 billion in fiscal 1986. Depressed commodity prices and declining U.S. shares for key products were behind the drop.

Japan is a large and steady market for many U.S. agricultural products. The country usually ranks first or second in value as an importer of such major U.S. products as wheat, corn, sorghum, soybeans, cattle hides, cotton, tobacco, citrus fruit, beef and veal, pork, and poultry. Nevertheless, Japan is also a significant market for other exporters, namely New Zealand, Canada, and Australia. Furthermore, in the last 2 years, Japan has become a leading destination for corn and cotton from China, which is pushing agricultural exports as a means of reducing its trade deficit with Japan.

Although U.S. agricultural trade with Japan relies mostly on bulk commodities, such as grain and soybeans, the United States has been promoting expanded trade in high-value and processed products, including beef and citrus. Following trade talks in 1984, Japan agreed to expand its imports of U.S. beef, fresh oranges, and citrus juice through Japanese fiscal year 1987 (April 1987-March 1988).

The U.S. share of Japan's imports declined last year for several important commodities, including corn, soybeans, and cotton. China's emergence as an agricultural exporter, uncompetitive U.S. prices, and Japan's dissatisfaction with the quality of U.S. grains and oilseeds were chiefly responsible for the drop in the U.S. share

of these markets. In addition, the U.S. share of Japan's pork imports fell to a 6-percent low, hurt by the strong dollar, high U.S. prices, and stiff competition from Denmark and Taiwan. The U.S. share of Japan's poultry meat imports declined because of competition from Thailand and Brazil.

For more information, contact Lois Caplan, (202) 786-1611.

Brazilian Orange Industry Finds Growth in U.S. Market

Brazil, the largest orange producer in the world, accounted for one-third of the world's orange crop in 1984. Brazil has become a major force in the world market for frozen concentrated orange juice (FCOJ) in the last decade. While the Brazilian orange industry has been growing, Florida producers have encountered a series of disastrous freezes since 1981. These freezes have reduced orange production from a 206-million-box record in 1979/80 to 1985/86's 119 million. With the decline in U.S. orange production, U.S. imports of

FCOJ from Brazil almost tripled from 1980/81 to 1984/85. Consequently, Brazil's share of the U.S. FCOJ market has grown substantially during the last 5 years.

The orange crop in the commercial zone of San Paulo, Brazil, was a record 230 million boxes in 1985/86. Although the weather was extremely dry, other factors boosted output: more trees coming into production, less selective picking, and slightly higher yields. Brazil's total exports of FCOJ during 1985/86 were an estimated 600,000 metric tons, compared with 715,000 in 1984/85. The reduced exports were due primarily to the increased FCOJ pack in Florida and lower purchases from Europe. High prices meant reduced exports during the first half of 1985/86. However, exports improved somewhat during the last half of the year because of the dramatic decline in FCOJ prices.

Brazilian orange production in 1986/87 is expected to be down somewhat because of a drought from June 1985 until mid-January 1986. In addition, juice yields will likely fall because the drought caused the fruit to ripen unevenly. Nevertheless, a sharp in-

crease in FCOJ exports is expected for 1986/87 because of greatly reduced prices in Brazil.

After several extremely profitable years in a row for the Brazilian orange industry, due primarily to Florida freezes, processors have reportedly lost millions of dollars because of weak international prices and higher prices paid to orange producers. The Brazilian Government has removed the minimum export price and quota for FCOJ, which will significantly affect both producers and processors. Over time, it had become apparent that these policies were not accomplishing the Government's objective to strengthen Brazil's returns in the international market.

For more information, contact Ben Huang, (202) 786-1766.

Lower Production Forecast for Most Crops

Total domestic output for most of the 10 major field crops will be less this season than in recent years. For most crops, declines resulted from reduced plantings brought about by increased participation in commodity programs.

The season-long drought in the Southeast and, to a lesser extent, the hot, dry weather that developed midseason in the Delta, Kentucky, and Tennessee had a severe effect on regional crop production. But for most major field crops, particularly food and feed grains, the regional bad weather had a negligible impact on the country as a whole.

Growing conditions were good to excellent in the Midwest and Northern Plains, where the bulk of the U.S. corn, soybean, and spring wheat crops is grown. Consequently, above-average production in these regions is offsetting losses due to drought.

For 1986, 85 percent of the peanut crop, 94 percent of the tobacco crop, and a greater share of the soybean and cotton crops (compared with grains) were grown in the drought-affected Southern States. Consequently, the drought had a relatively greater impact on production of the four major non-grain field crops.

For more details, contact Michael Hanthorn, (202) 786-1841. □

Table 1. Brazil Takes Lion's Share of Steadily Rising U.S. FCOJ Imports

Season ¹	Brazil	Others	Total
	<i>1,000 gallons²</i>		
1969/70	1,308	153	1,461
1970/71	15,413	3,930	19,343
1971/72	29,210	8,865	38,075
1972/73	12,924	7,300	20,224
1973/74	12,699	5,549	18,248
1974/75	28,214	4,832	33,046
1975/76	29,755	1,647	31,402
1976/77	33,749	14,177	47,926
1977/78	139,451	11,290	150,741
1978/79	152,310	7,708	160,018
1979/80	97,676	2,338	100,014
1980/81	203,104	11,127	214,231
1981/82	373,988	22,084	396,072
1982/83	337,164	27,605	364,769
1983/84	510,094	23,476	533,570
1984/85	578,177	18,456	596,633

¹Season beginning December 1. ²Single strength.

Source: Foreign Agricultural Service, USDA.

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Food Cost Review, 1985, by Denis Dunham. AER-559. July 1986. 56 pp. \$2.75. Order SN: 001-019-00477-1.

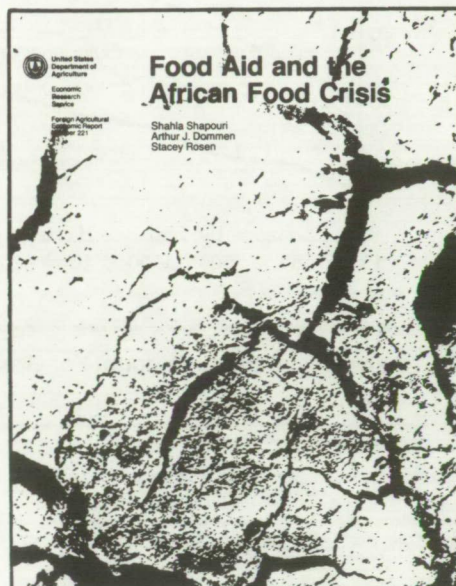
Discusses how much food prices rose in 1985 and why, how much of the retail food price is returned to the farm, and how farm-to-retail price spreads changed last year. Also shows how much Americans spend for farm-produced foods and how these dollars are divided among costs of producing and marketing food.

U.S. Demand for Food: Household Expenditures, Demographics, and Projections, by James R. Blaylock and David M. Smallwood. TB-1713. February 1986. 60 pp. \$2.25. Order SN: 001-019-00436-3.

The report finds that higher income households spend more per person on most food groups, especially beef, fish, cheese, vegetables, butter, and alcoholic beverages, than do lower income households. Elderly Americans spend less than younger people on food away from home and alcoholic beverages.

Potential Bans of Corn and Soybean Pesticides: Economic Implications for Farmers and Consumers, by Craig Osteen and Fred Kuchler. AER-546. April 1986. 28 pp. \$1.50. Order SN: 001-019-00438-0.

Through cost and yield assessments, this report finds that removing corn and soybean pesticides that present environmental and safety risks from the market could increase



U.S. farm production costs, crop prices, farm incomes, and consumer expenditures, causing farmers to gain and consumers to lose.

Florida and Mexico Competition for the Winter Fresh Vegetable Market, by Katharine C. Buckley, John J. Van Sickle, Maury E. Bredahl, Emil Belibasis, and Nicholas Gutierrez. AER-556. June 1986. 112 pp. \$5.00. Order SN: 001-01900474-6.

Discusses the cost competitive position of Florida and Mexico in supplying fresh tomatoes, bell peppers, cucumbers, squash, eggplant, and green beans to U.S. markets during the 1984/85 production season. The analysis shows that vegetable growers in the State of Sinaloa, Mexico, can produce the six vegetables more cheaply than Florida growers can. Import and export fees at the U.S. border, however, increase total costs for Mexican producers to the point that they exceed total costs in Florida for all vegetables, except cucumbers.

Assessment of a Marketing Order Prorate Suspension: A Study of California-Arizona Navel Oranges, by Nicholas J. Powers, Glenn A. Zepp, and Frederic L.

Hoff. AER-557. June 1986. 44 pp. \$2.25. Order SN: 001-019-00470-3.

Compares orange price and shipment data for 1984/85 with comparable weeks of several prorate periods. Finds that the market performed in about the same way during the 1984/85 season after the handler prorate was suspended as during the prorate periods.

U.S.-State Agricultural Data, by Letricia M. Womack, Larry G. Traub, and Mary H. Rivers. AIB-501. August 1986. 108 pp. \$4.75. Order SN: 001-019-00479-7.

Presents agricultural information for each of the 50 States and the United States, including data on population, land use, agricultural production, farm income, value of assets on farms, and selected characteristics of farms such as size, tenure, and farm organization.

Food Aid and the African Food Crisis, by Shahla Shapouri, Arthur J. Dommen, and Stacey Rosen. FAER-221. June 1986. 112 pp. \$5.00. Order SN: 001-019-00460-6.

Investigates the causes of the food crises in 11 selected African countries, analyzes the variability and slow growth in food availability, and examines why domestic resources were not adequate to support diets and prevent per capita food supplies from declining.

The 1984 U.S.-Japan Beef and Citrus Understanding: An Evaluation, by William T. Coyle. FAER-227. July 1986. 44 pp. \$2.25. Order SN: 001-019-00452-5.

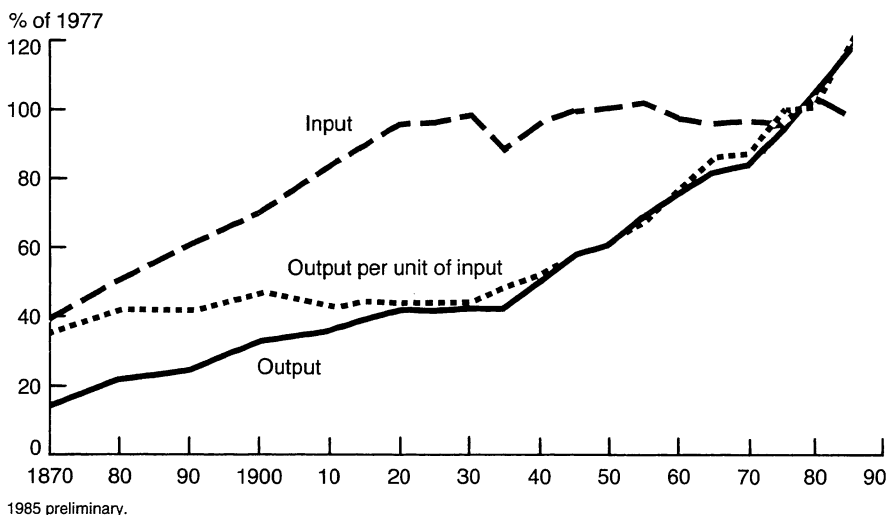
A 1984 understanding between the United States and Japan tempered, at least for the time being, U.S. accusations that Japan unreasonably restricts agricultural imports. This report outlines provisions of the understanding, puts the beef and citrus issue into a historical context, and evaluates the understanding's measures in terms of how closely they bring Japan's beef and citrus markets to "free trade" conditions.



Changes From Farm to Retail

Changes in agriculture boosted productivity. Output per unit of input rose 243 percent between 1870 and 1985, much of it during the past 30 years. These increases resulted from many factors, including the expansion of the Nation's agriculture into the more productive lands of the Midwest, shifts among crops, and improvements in farm management, pest control, and cropping techniques. Applied genetics alone has probably accounted for as much as 50 percent of harvest increases since the 1930's.

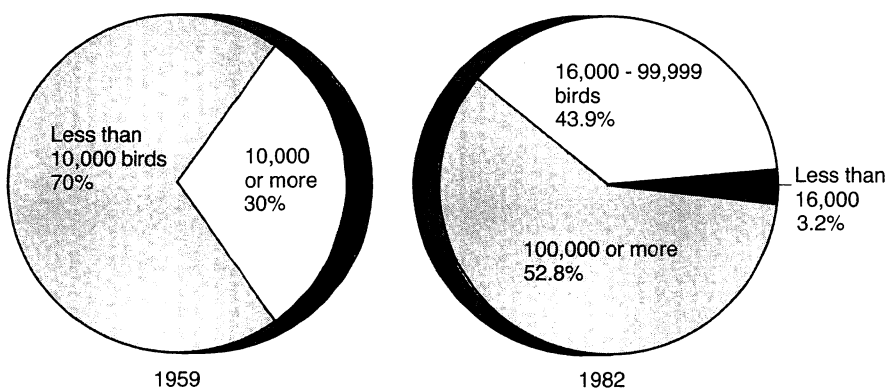
Greater Farm Productivity Means More Output From Inputs



Turkey production is a good example of expanded productivity in the farm sector. Turkey production has evolved from a secondary farm enterprise to a highly specialized industry over the past three decades. Specialization has meant fewer but larger operations. The number of farms producing turkeys, as listed in the Agricultural Census, dropped from 88,399 in 1959 to 26,638 in 1978. Most of the farms produced turkeys for home use, and by 1982, only 7,498 farms sold turkeys commercially.

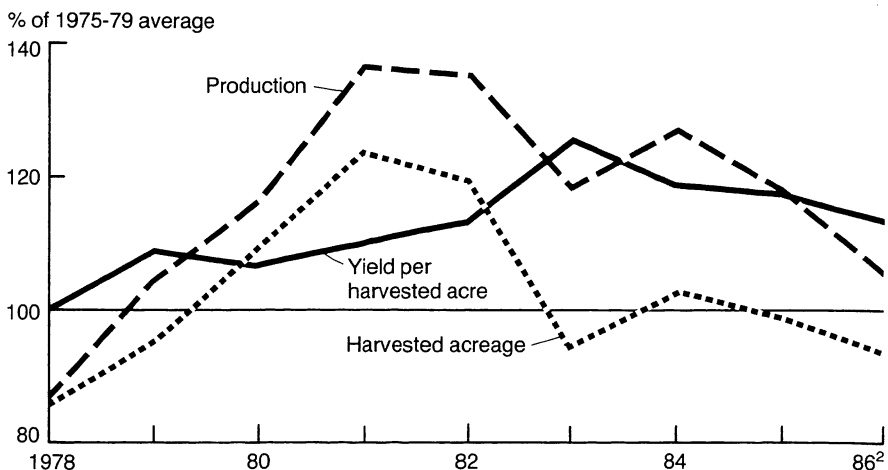
In 1959, 70 percent of turkeys were sold by farms with less than 10,000 head. By 1982, one-third of the farms raising turkeys sold 96 percent of all the birds. Farms with more than 100,000 head accounted for about 53 percent of all turkeys sold.

Larger Operations Account For Greater Share of Turkeys Sold



The widening use of high-yielding varieties of wheat has maintained U.S. production despite lower harvested acreage. Yield per harvested acre has risen 13 percent from the 1975-79 average, while acreage declined about 1 percent. Total production in 1985 was 18.5 percent above the 5-year average. In 1985, record yields in many producing States often increased production, despite heavy participation in Government acreage reduction programs. Preliminary estimates for 1986 indicate production likely exceeded the 1975-79 average by about 6 percent, despite an almost 7-percent decline in harvested acreage.

Wheat Acreage Declines While Yields Rise¹

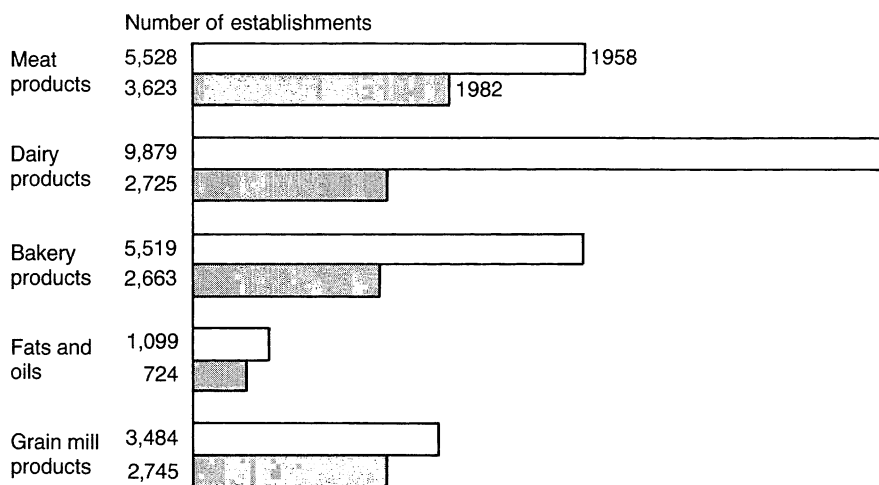


¹Crop year beginning June 1. September 1, 1986, indications.

²Preliminary.

Changes in the number and size of food processors have paralleled changes in the number and size of U.S. farms. The farms are fewer, and they are larger. All categories of manufacturing establishments processing the major farm products declined between 1958 and 1982, with the largest drop in the dairy industry. The smaller number of food processing plants, however, handled a substantially larger quantity of raw agricultural products. Improvements in transportation and processing techniques have made large-scale plants far more efficient.

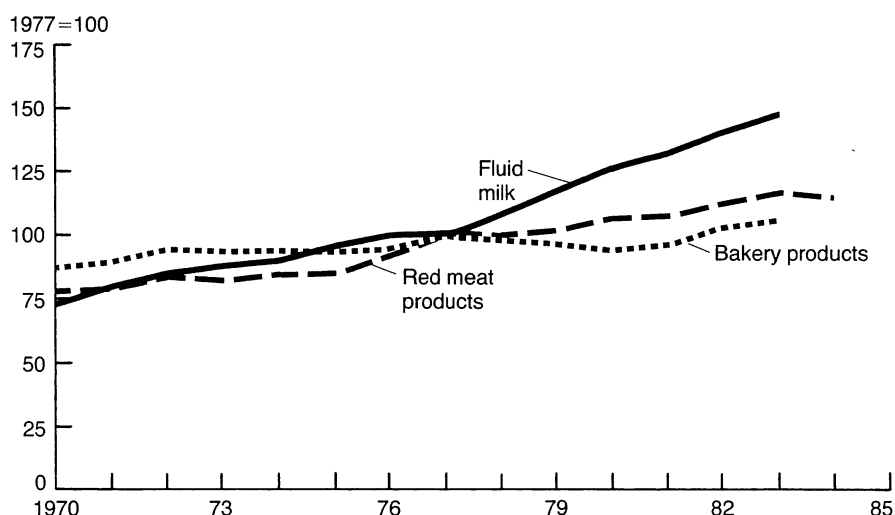
Food Processing Also Shows Trend Toward Fewer But Larger



Source: 1958 and 1982 Census of Manufactures.

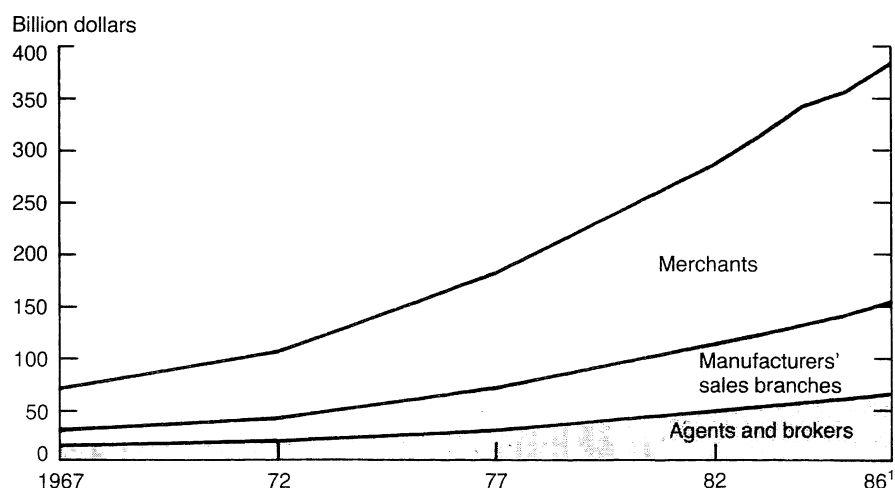
Output per unit of labor in food manufacturing has shown a steady increase of 2 to 3 percent a year over the past 15 years. These increases have resulted from an upward trend in output and a small decline in hours worked, reflecting in part the substitution of capital for labor as a consequence of new technology. Labor productivity among food manufacturers has increased the most for fluid milk processors. However, productivity has grown erratically for most other industries, partly because of ups and downs in farm output and business conditions.

Output Per Unit of Food Manufacturing Labor Gained Steadily



Sales by food wholesalers have grown about 10 percent a year over the past two decades and likely reached \$385 billion in 1986. Increases in the number of independent supermarket operations, rapid growth in convenience stores, and expanded service to chain stores have spurred demand for food wholesalers' services.

Sales by Food Wholesalers Show Rapid Growth

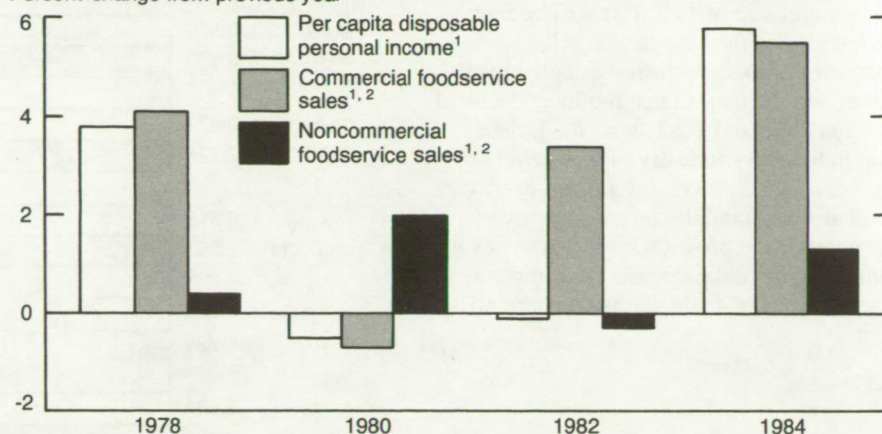


¹Estimated by Economic Research Service.

Looking at year-to-year changes reveals the impact of real income (adjusted for inflation) and other factors on foodservice sales. Factors contributing to slow growth from 1980 to 1982 include declines in real per capita disposable personal income (DPI), a sharp drop in median family income during 1979-82, high energy prices (which not only meant increased costs for foodservice operations but also influenced consumers to stay home more), and greater increases in foodservice menu prices than in grocery store prices. The economic upturn in 1983 and 1984—characterized by sizable increases in gross national product and per capita DPI, lower rates of inflation and unemployment, and lower energy prices—spawned significant increases in foodservice sales.

Income and Other Factors Influence Foodservice Sales

Percent change from previous year



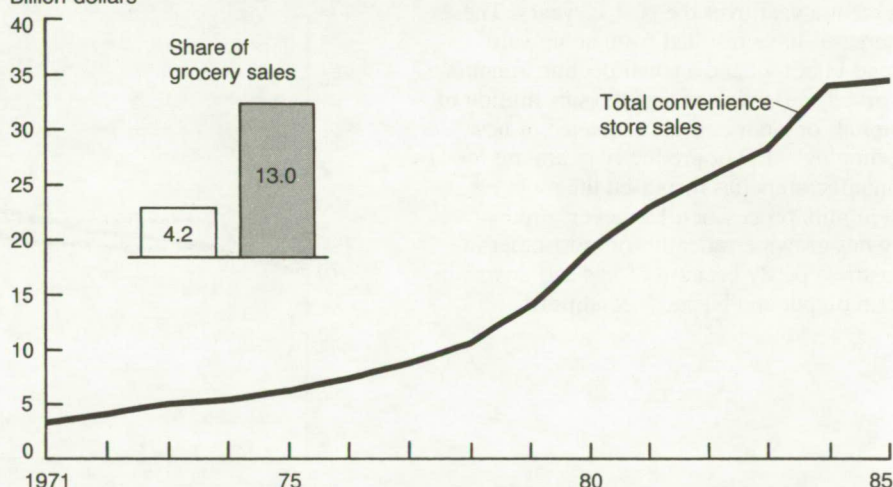
¹Adjusted for inflation.

²Commercial foodservice places include restaurants, cafeterias, and other separate eating and drinking outlets. Noncommercial operations include schools, hospitals, vending machine, etc.

Convenience stores—small grocery stores that offer a limited number of food and other products and are usually open long hours—have taken advantage of today's opportunities for growth. Convenience stores have continued to maintain high growth rates by introducing such products as self-service gasoline and fast food. A number of convenience store retailers have installed limited-menu food service, often with customer seating as well as carryout service. As a result, convenience stores accounted for 13 percent of all grocery store sales in 1985, up from 4.2 percent in 1971.

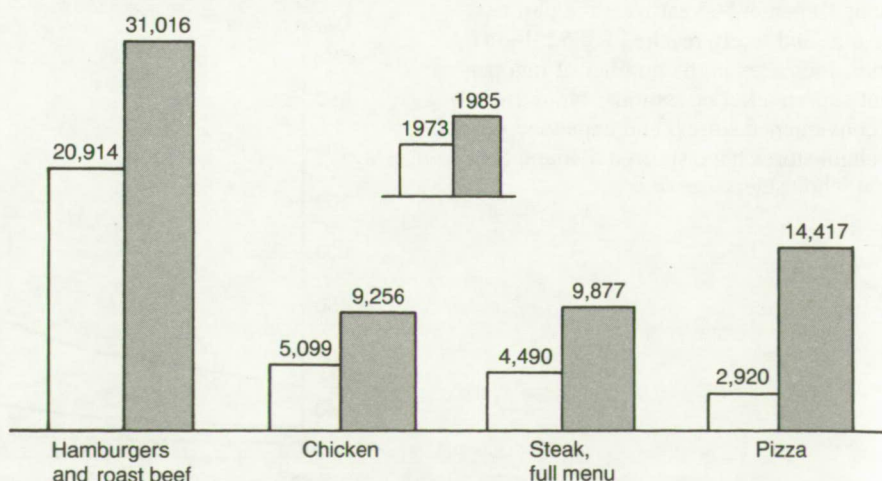
On-the-Go Consumers Boost Convenience Store Sales

Billion dollars



Eating away from home increased from 28 percent of our food spending in 1962 to over 43 percent in 1985, with fast food outlets getting a growing share. Between 1973 and 1985, the number of franchise establishments that primarily sell chicken rose almost 82 percent, while those selling primarily hamburgers and roast beef increased 48 percent. Pizza franchises were the big winners, rising almost 400 percent between 1973 and 1985.

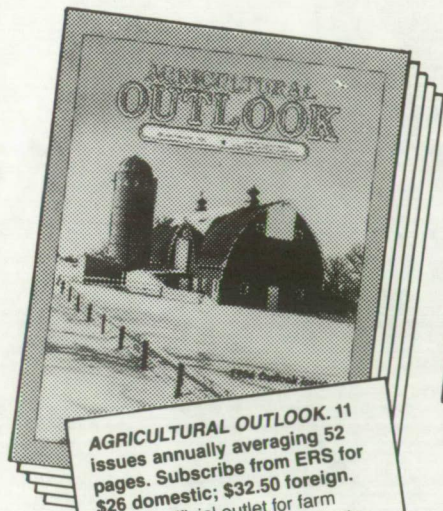
Pizza Franchises Show Largest Increase Since 1973



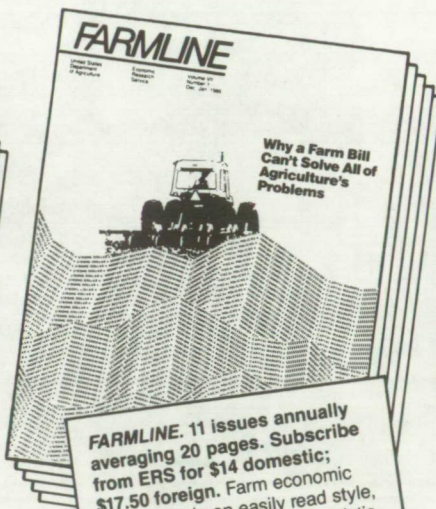
Source: U. S. Department of Commerce, *Franchising in the Economy*.

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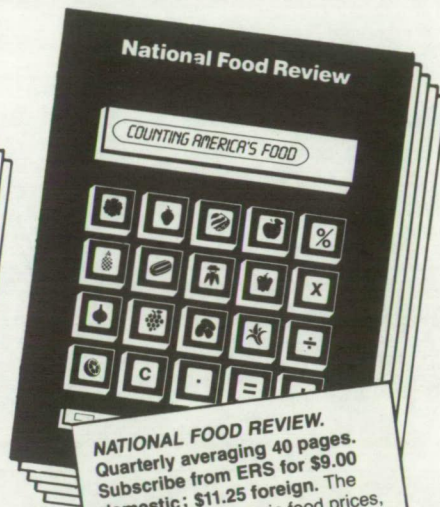
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If you have an agriculture degree or farming experience, your knowledge of crop development, plant protection, soil science, animal husbandry or agricultural economics is needed. As a Peace Corps volunteer, you could help close the food gap, working in developing countries to give people the skills they need to grow their own food.

It's one of many projects in more than sixty countries where Peace Corps volunteers are sharing their skills with others to make life better. And it's a unique opportunity to discover the world, and broaden your own capabilities with some real experience. At a professional level.

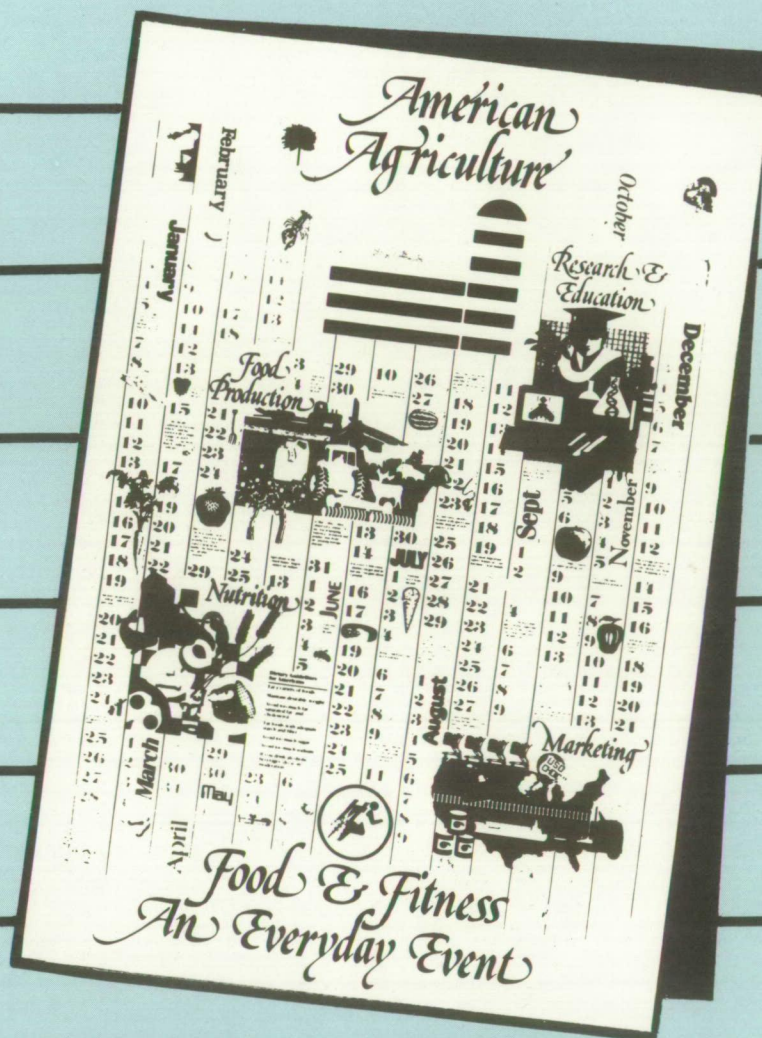
Whatever your degree or field of experience, there's a chance you can put it to work in today's Peace Corps. For further information, call Peace Corps, toll-free, 800-424-8580. And put your experience to work where it can do a world of good.

U.S. Peace Corps.
The toughest job you'll ever love.

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Interested in Food and Fitness?



USDA's Food and Fitness Program is designed to increase public awareness of the abundance and variety of foods provided by American agriculture, and the relationship of diet and exercise to good health. The program aims to encourage all Americans to use this bounty of food and physical fitness opportunities to their own advantage and health--every day.

As part of this effort, USDA has issued a poster, "Food and Fitness--An Everyday Event." The colorful poster resembles a calendar and is

filled with information about food and fitness. For example, more than 4,500 new food products are introduced each year in the United States. The poster--measuring 23-1/2 inches by 35-1/2 inches--is available for \$4.25 (\$5.35 foreign) from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402. Ask for the Food and Fitness poster, stock number 001-000-04475-3. Please make checks or money orders payable to Superintendent of Documents or call GPO at (202) 783-3238 and use your VISA, MasterCard, or CHOICE.

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