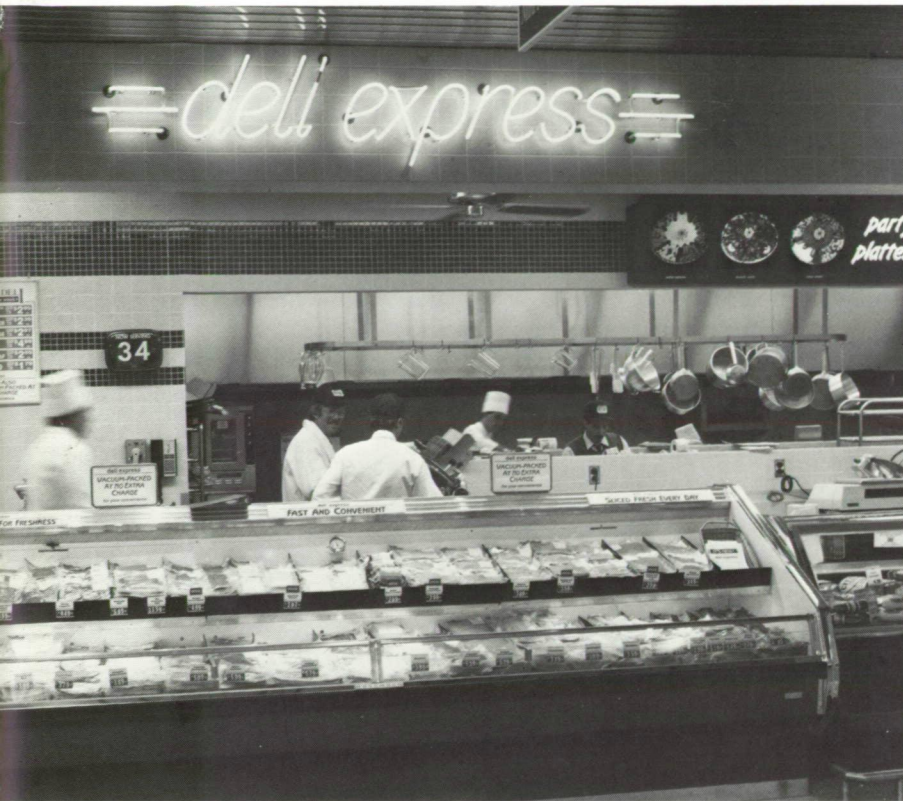


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What's New in Food Retailing



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The Globalization of Food Marketing

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Food marketing is going international. Around the world, food processors, wholesalers, and retailers, as well as foodservice firms, are looking to foreign nations to expand their markets.

The U.S. food processing firm, Borden, for example, operates 44 of its 183 plants in foreign countries. H.J. Heinz has 47 foreign plants. U.S. foodservice firms are also expanding their overseas operations. Visitors to Moscow will now find McDonald's golden arches, and the Persian Gulf is home to 30 new Wendy's restaurants.

U.S. companies' sales from their foreign food processing, wholesaling, retailing, and foodservice operations reached \$82 billion in 1988 (*table 1*). Food manufacturing affiliates had \$60 billion in sales, food wholesaling affiliates nearly \$11 billion, and food stores and restaurant affiliates over \$11 billion.

At the same time, foreign firms are gaining ground in U.S. markets by purchasing U.S. firms and establishing affiliates here. Such familiar names to U.S. consumers as Pillsbury, Green Giant, and Alpo pet foods are owned by a British firm, Grand Metropolitan, PLC. The world's largest food processor, Nestle, based in Switzerland, operates 421 plants in 60 countries. Sixty-seven of these plants are in the United States. Burger King and Roy Rogers are now foreign-owned firms (*see box*).

Food marketing affiliates in the United States owned by foreign firms had sales of \$72.6 billion in 1988. Food manufacturing affiliates accounted for \$30 billion, food wholesaling affiliates over \$14 billion, and food retailing and restaurants, \$28 billion.

Foreign Markets Provide Opportunities for Expansion

While many large U.S. food processing firms have gone international, most are not major exporters—especially of highly processed consumer food products. The value of U.S. exports of processed food products is large and growing—reaching \$17.8 billion in 1989—but for most large food processors, exports average less than 3 percent of their total sales. Rather, the world's largest food processors continue to expand aggressively in foreign markets by increasing their investments in foreign plants or expanding licensing arrangements with foreign firms to produce and distribute their branded products. Nestle,

for example, recently signed a joint venture agreement with General Mills to produce and market General Mills cereals, as well as jointly develop new brands. Philip Morris announced its acquisition of Jacobs Suchard, the largest confectionery firm in Europe, with annual sales of about \$4.5 billion.

Establishing production facilities in foreign countries avoids tariff and most nontariff trade barriers. But even where trade barriers are minor, many firms apparently prefer producing in the foreign country rather than exporting. Those firms find it easier to deal with local governments and regulatory agencies when the product is produced in the host country. For consumer value-added

Table 1. U.S. and Foreign Firms Look Overseas for Expanded Markets¹

Sector	Foreign affiliates of U.S. firms		U.S. affiliates of foreign firms	
	Sales	Assets	Sales	Assets
<i>Million dollars</i>				
All food manufacturing	60,264	39,488	30,053	30,317
Meat	2,924	1,437	1,699	310
Dairy	3,941	2,150	3,938	2,005
Fruits and vegetables	3,675	2,815	D	D
Grain mill	15,117	8,167	D	D
Bakery	4,761	3,554	2,515	1,751
Beverages	11,275	8,955	7,745	13,982
Other food	18,572	12,390	11,844	9,308
Food wholesaling	10,634	4,698	14,244	3,502
Food stores, eating and drinking places	11,151	6,233	28,295	8,894
Total food marketing	82,049	50,419	72,592	42,713

D = data suppressed to avoid disclosure of data of individual companies.

¹1988 data.

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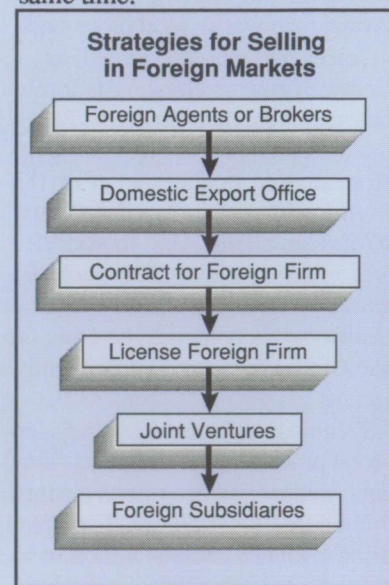
Strategies To Access International Markets

There are many strategies that firms can use to enter foreign markets. Some involve considerably more investment of time, money, and expertise than others, and greater risk. Most firms enter the export market by using foreign agents or brokers. As export sales increase, many firms set up separate export offices or divisions within their U.S. companies. U.S. processors can also package food under contract for a foreign firm. For example, several Japanese manufacturers of soda and fruit drinks contract production of their brands to American bottlers.

Firms may also choose to produce and market their branded

products in foreign countries under licensing agreements with foreign firms. While this generally requires no direct investments in foreign production facilities, considerable investments are required to identify appropriate licensees, develop production and marketing procedures, and establish quality control safeguards. Joint ventures allow U.S. firms to tap into the production, marketing, and regulatory know-how of host-country firms without the expense of acquiring wholly owned subsidiaries. Finally, U.S. processors can acquire or build foreign manufacturing facilities and operate them as wholly owned subsidiaries. In actual practice, firms can use any

one or all of these strategies at the same time.



Over 50 percent of Coca-Cola's processed food sales are from their foreign subsidiaries. The Hong Kong bottling plants make many deliveries in the city. (Photo Credit: Joe Stewardson)

products, it is also easier to keep abreast of local tastes and opportunities for new product development or reformulations when products are produced in the foreign country.

Some firms prefer to acquire established brands in foreign countries and use those facilities as a base for further expansion. Furthermore, producing a product in a foreign plant may improve access to local food distribution firms and facilitate a variety of marketing and promotional activities involved in selling a branded consumer product.

U.S. Firms Operating Overseas

In 1988, 96 U.S. parent firms had 966 foreign food marketing affiliates with about one million employees. About 75 percent of U.S. foreign investment in food marketing was in Europe and Canada (*see box*).

A USDA Economic Research Service data base for 64 of the largest U.S. food processing firms, which account for about half of all U.S. food processing,

Food Processing Around the World

Who are the world's largest food processing firms and where are they located? Nestle, headquartered in Switzerland, was the largest food processor in 1989. Philip Morris (Kraft General Foods),

headquartered in the United States, was the second largest. Unilever, a widely diversified consumer products firm headquartered in both the United Kingdom and The Netherlands, was number three. ConAgra (U.S.) joined the top four following its recent acquisition of Beatrice

Foods, and Kirin Brewery, Japan, was number five.

Of the world's 10 largest food processing firms, 7 are U.S. companies. In addition, 12 of the 20 largest, and 15 of the 25 leading food processors are U.S. firms.

World's Largest Food Processing Firms in 1989

Firm	Headquarters	Processed food sales	Total sales	Major products
<i>Billion dollars</i>				
1. Nestle	Swiss	31.0	32.0	Diversified foods, restaurants
2. Philip Morris/Kraft General Foods	US	25.8	43.0	Foodstuffs, tobacco, beer
3. Unilever	UK/Netherlands	17.2	34.4	Diversified foods, soaps
4. ConAgra (includes Beatrice) ¹	US	16.0	19.0	Foodstuffs, meats, poultry
5. Kirin Brewery	Japan	11.2	11.4	Beer, soft drinks
6. RJR Nabisco	US	9.9	16.9	Foodstuffs, tobacco
7. IBP	US	9.5	9.5	Meats
8. Anheuser-Busch	US	9.3	9.7	Beer, snacks
9. Pepsico	US	9.0	15.2	Soft drinks, snacks, restaurants
10. Coca-Cola	US	8.5	8.9	Soft drinks, fruit juices
11. Taiyo Fishery	Japan	8.1	9.0	Seafood products
12. BSN	France	7.5	8.0	Snacks, bakery, beverages
13. Archer Daniels Midland	US	7.3	7.9	Food products, grains
14. Sara Lee	US	7.1	11.7	Frozen foods, meats
15. Mars	US	7.0	8.0	Confectionery, pet foods
16. Snow Brand Milk Products	Japan	6.6	6.6	Dairy products
17. Borden	US	6.5	7.6	Dairy, pasta, adhesives
18. Hillsdown Holdings	UK	6.5	7.0	Poultry, flours, seafoods
19. Ralston Purina	US	6.1	6.7	Food products, cereals, pet foods
20. Bass	UK	6.1	6.1	Beverages
21. Cargill	US	6.0	43.0	Meats, grains
22. H.J. Heinz	US	5.9	6.0	Diversified food products
23. Campbell Soup	US	5.8	6.0	Soups, prepared foods
24. Elders	Australia	5.8	8.4	Beer, food products, meats
25. Asahi Breweries	Japan	5.7	5.7	Beer

¹ConAgra announced its acquisition of Beatrice in 1990.

gives insight into these firms' international activities. In 1988, 38 of the 64 firms owned a total of 682 food processing plants in foreign countries. These plants accounted for 26 percent of the 38 firms' sales of \$154 billion in 1988. In contrast, exports of processed food from these firms amounted to only 2.6 percent of their U.S. sales.

Two companies, CPC International and Coca-Cola, sold over 50 percent of their processed food from their foreign subsidiaries. Philip Morris led U.S. food processors in sales at foreign subsidiaries, with \$5.9 billion in 1988. In total, 13 U.S. food processors, including RJR Nabisco, Mars, Pepsico, Kellogg, Sara Lee, Quaker Oats, and Borden, received

over \$1 billion each in annual sales from their foreign subsidiaries.

Unlike the processing sector, U.S. food retailing companies are almost entirely domestic-market oriented. Safeway Stores and convenience store firms Circle K and Southland Corporation are the only U.S. food retailers with substantial investments in foreign foodstore operations. In 1988, Safeway had sales of

Table 2. U.S. Restaurants Overseas Have Grown Rapidly Since the 1970's¹

Location	1971	1974	1976	1978	1981	1982	1984	1985	1986
<i>Number of restaurants</i>									
Canada	519	860	1,047	1,196	1,220	1,172	1,591	1,542	1,869
Mexico	44	71	87	84	99	100	119	119	121
Caribbean	40	70	96	150	198	234	290	312	280
United Kingdom	63	429	433	454	442	481	567	615	608
Continental Europe	40	101	103	164	316	360	514	539	642
Australia	163	223	224	384	468	522	581	635	691
Asia	37	306	468	710	1,336	1,535	1,921	1,935	2,100
Japan	NA	265	415	590	1,106	1,259	1,490	1,436	1,548
Other	NA	41	53	120	230	276	431	499	552
Other	24	109	162	198	246	271	398	425	458
Africa	NA	NA	NA	NA	NA	124	172	195	198
New Zealand	NA	NA	NA	NA	NA	71	88	92	112
Central America	NA	NA	NA	NA	NA	45	75	71	76
South America	NA	NA	NA	NA	NA	31	63	67	72
Total	930	2,169	2,620	3,340	4,325	4,675	5,981	6,122	6,769

NA = Not available.

¹Includes company-owned, franchisee-owned, and joint-venture establishments.Source: *Franchising in the Economy, 1988-90*, January 1990. International Trade Administration, U.S. Department of Commerce.

over \$3 billion from its 240 supermarkets in Western Canada. Circle K licenses firms to operate stores in Japan, the United Kingdom, Indonesia, Canada, and Hong Kong. Southland, operator of 7-Eleven stores, had licensing agreements covering about 4,000 stores in Japan and several other countries.

Bringing U.S. Fast Food To the World

As growth opportunities in the U.S. fast food market slowed, several large chains began tapping into foreign markets. Overall, U.S. restaurant firms now operate nearly 7,000 establishments in foreign countries, up from 900 at the start of the 1970's (table 2). Kentucky Fried Chicken (a subsidiary of Pepsico, Inc.) operates 3,000 units outside the United States—about 40 percent of the total Kentucky Fried Chicken system.

About 25 percent of McDonald's 11,000 outlets are outside the United States. Major markets include Japan (700 units), Canada (600), and Germany (300). McDonald's of Canada now has an outlet in Moscow where a new 108,000-square-foot McDonald's food processing and distribution center will supply joint venture restaurants. Twenty additional McDonald's units are planned in the Moscow area.

Early in 1989, Wendy's International entered into a franchise agreement with a Saudi Arabian food company to open 30 fast food outlets along the Persian Gulf over the next 5 years.

Foreign Firms in the United States

While U.S. firms have increased their foreign investment, foreign firms have also expanded into U.S. food marketing operations. The top five in the processing sector include Nestle (Swiss) and its

U.S. subsidiaries: Stouffers Food, Hills Brothers Coffee, and Carnation Food; Grand Metropolitan (U.K.); Pillsbury, Almaden, and Haagen Daz; United Biscuits (U.K.); Seagram Co. (Canada); and Allied Lyons (U.K.). Nestle and Grand Metropolitan were the only firms with sales from U.S. food processing subsidiaries over \$1 billion (table 3). However, 22 additional foreign companies had sales of \$100 million or more from their U.S. food processing subsidiaries.

Foreign investment in the U.S. wholesale food industry totaled \$3.5 billion in 1988, or 11 percent of the industry's assets. One of the five leading U.S. food wholesalers, Scrivner, Inc., is owned by Haniel et Cie of West Germany. A Canadian firm, Provigo, owns two small operations in the United States—Market Wholesale in California and Tidewater Wholesale Grocery Company in Virginia.

Table 3. Nestle Ranks First in Sales by Foreign Parents of U.S. Food Processors

Foreign parent/ country	Major U.S. subsidiaries	Total estimated U.S. sales
		<i>Million dollars</i>
Nestle SA-Switzerland	Nestle Foods Corp. Stouffers Food Corp. L.J. Minor Corp. Hills Bros. Coffee Co. Carnation Food Co. Wine World, Inc. Beringer Wines Co. Fresh-Nes Food Co.	1,760
Grand Metropolitan-UK	Pillsbury Green Giant Tortino's Jeno's Joan of Arc Heubilen Almaden Christian Brothers Alpo Pet Foods Haagen-Daz	1,200
United Biscuits PLC-UK	Keebler Co. Bernardi Food Co.	900
Seagram Co. Ltd.-Canada	Tropicana Products, Inc. Seagram Co.	875
Allied Lyons PLC-UK	DCA Food Industries, Inc. Tetley Tea, Inc. Hiram Walker, Inc.	825

Foreign firms are investing in U.S. food retailing at a much faster rate than their U.S. counterparts are expanding into foreign countries. Regulations restricting the internal growth of large retailers in many foreign countries and the declining U.S. dollar in 1980-85 have encouraged foreign investment in U.S. food retailing.

Foreign firms' U.S. food store sales reached \$22.1 billion in 1988. The five largest foreign parents accounted for \$18.9 billion, or 86 percent of the total. Tengelmann A.G. (West Germany), which owns A&P, had the largest U.S. food store holdings in 1988. A&P's sales totaled \$8.2 billion in 1988. Delhaize, Le Lion (Belgium), owner of

Food Lion, ranked second with U.S. sales of \$3.8 billion. Ahold International (The Netherlands) owns First National, BI-LO, and Giant Food Stores (Pennsylvania) with combined U.S. sales of \$3.5 billion. George Weston, Ltd. (Canada) owns National Tea Co. with U.S. sales of \$1.9 billion. Sainsbury, Ltd. (U.K.) owns Shaw's Supermarkets and Iandoli's Supermarkets with combined U.S. sales of \$1.5 billion.

Other foreign-owned firms include Furr's, located in Texas with sales of \$1.2 billion, owned by a West German firm, and Smitty's Super Value in Arizona, with U.S. sales of about \$725 million, owned by a Canadian firm. In addition, several French firms including

Euromarche, Carrefour, Promodes, Auchan, and Societe Alsacienne de Supermarches operate supermarkets in the United States. Marks and Spencer, PLC, (U.K.) entered U.S. food retailing in 1988 by acquiring Kings Super Market, Inc., in New Jersey.

Foreign Foodservice Firms Expand into U.S. Markets

The number of U.S. restaurants owned by foreign parents took a significant jump when Grand Metropolitan, PLC, of Great Britain acquired the number two fast food chain, Burger King Corp., with the purchase of Pillsbury in 1988. Burger King had \$5.8 billion in sales from nearly 6,000 units in 1989.

Late in 1989 the Marriott Corporation sold most of its Roy Rogers restaurants to Imasco, a Canadian firm, for \$365 million. Imasco also owns the Hardee's, Inc., chain, which had sales of \$3.3 billion through nearly 3,200 outlets in 1989.

In 1989 and 1990, Allied Lyons, PLC, acquired both the Dunkin' Donuts and Mr. Donut chains. In 1989, Dunkin' Donuts had about 1,900 units with combined sales of over \$800 million. Mr. Donut operated about 800 units with sales of nearly \$250 million in 1989. Allied Lyons also owns Baskin-Robbins ice cream stores with estimated sales of \$693 million.

Westin Hotels and Resorts is owned by the Aoki Corporation of Japan. In 1989, Westin operated 265 units with total estimated food sales of \$439 million. The Japanese firm of Seibu/Saison also recently acquired Inter-Continental Hotels Corp., from Great Britain's Grand Metropolitan, PLC. Inter-Continental operates several hotels in the United States and in 1988 had food sales of about \$420 million. ■

Supermarkets Seek Growth in Foodservice

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Having dinner at your local grocery store? Hiring the supermarket down the street to cater a wedding? These choices may sound strange, but they indicate some of the many new developments in food retailing.

Foodservice (dispensing prepared meals and snacks for on-premise or immediate consumption) has become one of the most exciting new growth opportunities in the grocery store industry. Unlike the supermarket of yesteryear, which had limited foodservice and convenience, today's supermarkets offer everything from fresh prepared foods to sit-down restaurants and catering.

The concept of the supermarket as a full-service center is coming into its own at many stores. Supermarkets are increasingly becoming one-stop shopping places, including florist shops, bakeries, photo finishing centers, pharmacies, and even providing home delivery. The full-service supermarket will be even more important in the future as consumer demand for speed and convenience grows.

The Deli and Bakery: The Roots Of Supermarket Service

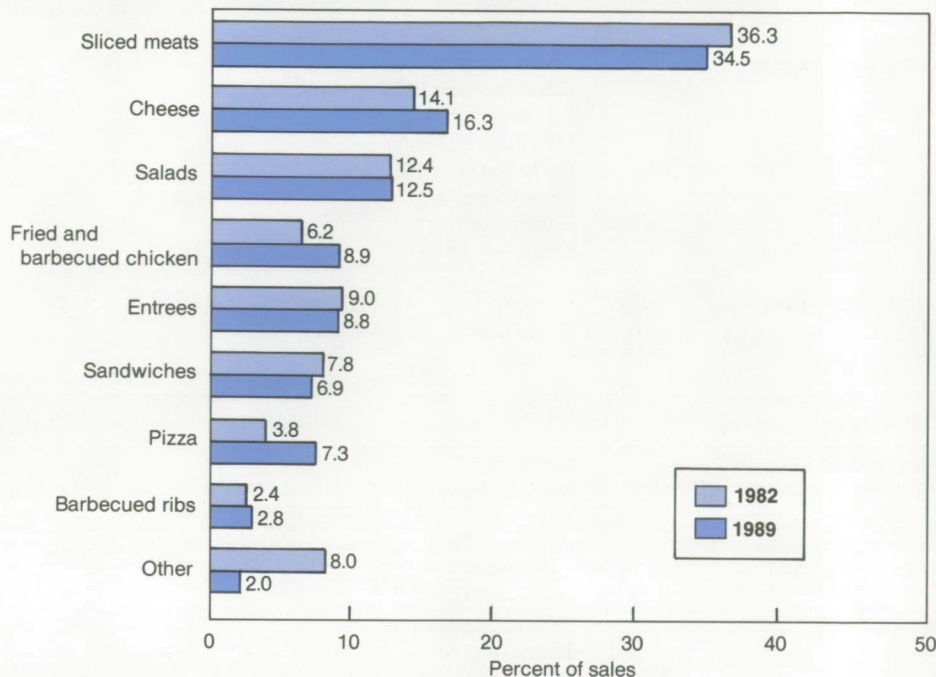
Foodservice in supermarkets began more than 50 years ago with in-store delicatessens and bakeries. During the 1980's, the number of delis, their size, and selections grew, so that today's consumers have wide varieties of ready-to-eat and ready-to-heat products.

Ready-to-eat products are fully cooked and sold hot or cold, with no additional preparation time required. Top-selling items include fried chicken, barbecued ribs, lasagna, and traditionally prepared products like lunchmeats and salads.

Ready-to-heat products are cooked, and prepared entrees are sold frozen or

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Figure 1. Sliced Meats Still Account for the Largest Share of Deli Sales



Source: *Supermarket Business*. FM Business Publications, Inc. 1983 and 1990.

refrigerated, or as a microwaveable/shelf stable product. Frozen and refrigerated products include pot pies, macaroni and cheese, stuffed peppers, and a wide assortment of other items. Microwaveable/shelf stable products include soup, pasta dishes, hamburgers, french fries, etc. Many consumers use these products as the central part of a meal, adding their own side dishes and salad.

According to a 1989 *Supermarket Business* study, service delis are in 65.8 percent of all supermarkets in the Nation, up from 51.8 percent in 1982. Service delis still account for the largest share of foodservice in supermarkets, with sales reaching \$11.13 billion in 1989, a 16-percent increase over 1988. Total supermarket sales rose 7 percent. Average weekly deli sales climbed to a high of \$10,600 in

1989, a 13.6-percent increase from the previous year.

Self-service delis are growing also, but at a much slower pace. Fifty-seven percent of the retailers in the *Supermarket Business* study indicated that they believed their operations would be moving toward more self-service in the future. Self-service reduces retailer labor costs and still provides much of the variety found in full-service supermarket delis.

While sliced meats and cheese still dominate deli department sales, prepared foods have made great inroads since 1982 (figure 1). Although total entree sales were down slightly in 1989, refrigerated entrees increased and will probably continue to gain faster than hot entrees. Hot entrees accounted for 4.9 percent of deli sales in 1989 compared

with 3.9 percent for refrigerated entrees, although hot entree sales decreased or products were discontinued more than any other deli items. Other prepared foods have also increased their share of deli sales since 1982: pizza's share is now 7.3 percent; barbecued ribs, 2.8 percent; and barbecued/fried chicken, 8.9 percent. The market share for salads has stabilized at about 12 percent.

Much of the food served in delis is purchased in bulk ready to portion and serve. A good deal of the food is prepared in stores or commissaries. The number of central commissaries is increasing. Twenty-six percent of the deli operators in the *Supermarket Business* study had company-operated commissaries, compared with 24 percent in 1988. Those that have commissaries use them primarily for the initial preparation of products.

Moving Beyond Traditional Fare

Many supermarkets now offer a variety of products, apart from their delicatessens, which could be included in the foodservice category. For example, 50 percent of the nation's supermarkets now offer salad and soup bars; 43 percent, hot pizza sections; 42 percent, fresh pasta sections; 19 percent, tortillerias; 17 percent, ice cream stands; 14 percent, yogurt machines; and 6 percent, sushi bars.

The salad bar has been a popular addition to the supermarket in recent years. However, studies show that its popularity has stabilized. Salad bars are part of a trend toward takeout, prepared foods preferred by hurried, health-conscious consumers. Not only are lettuce, cucumbers, tomatoes, and other traditional salad vegetables offered, but supermarkets now carry a varied selection of other items such as meat, pasta, and seafood, exotic salads, hot soup, and chili. Many supermarkets have extended the self-service concept of salad bars to include soft-serve ice cream and yogurt.

The fresh salad bar has the potential for gross profit margins of 40-60 percent.

Some retailers report weekly sales as high as \$18,000. The average retail cost per pound of items from the salad bar is around \$1.99, but because of the addition of unusual and fancy items, some salad bars are charging more than \$3 per pound for fresh salads.

Supermarkets have been edging into the fresh pizza business for the past few years. Pizza is now becoming the food of choice and is closing in on hamburgers as the most popular take-out food. An estimated 43 percent of U.S. supermarkets now offer fresh pizza. One example is Bashas' Supermarkets in Arizona that offer hot pizza using fresh crusts, pre-baked daily at each of the unit's in-store bakeries. Three pizza varieties are available: plain, sausage/pepperoni, and deluxe, which includes sausage, pepperoni, mushrooms, peppers, onions, and olives. Prices start at \$2.99 for a 12-inch hot cheese pizza. Hot pizzas are made to order from a fully exposed work station

in the deli department. Orders may also be called in to the store.

For this type of service to continue to grow, supermarkets must be able to provide more customer service by offering an option of eating in as well as installing a phone solely for the pizza department. They must also provide pick-up or delivery service.

Many supermarkets across the Nation have added various types of foodservice for the convenience of their customers. More than half of Safeway's units now offer prepared foods: lasagna, pastas, barbecued chicken, salads, and desserts, at the deli counter. Self-service salad, soup and sandwich bars, as well as yogurt and ice cream machines, are in some stores. Farmer Jack Supermarkets in Detroit, Michigan, introduced prepared food sections, "Yvonne's-To-Go," 5 years ago. The section offers a large selection of freshly prepared entrees, imported gourmet coffee and tea, ice



Shelf-stable microwavable entrees are one of the fastest selling grocery items. (Photo credit: Giant Food, Inc.)

cream, pastries, and other desserts, all prepared in-store. A sit-down restaurant called "The Cafe" serves up to 20 people. Customers have a choice of salads, soups, sauces, frozen pasta items, quiches, pates, and sausages.

In addition to its regular hot and cold barbecued chicken, ribs, and cold sandwiches, Raley's in California has expanded its take-out food program in select locations to offer complete specialty menus stressing authentic ethnic food. Some stores feature freshly made traditional Chinese appetizers and entrees such as fried won ton, spare ribs, fried rice, chow mein, or stir-fry items like beef with broccoli. Other stores also feature Mexican foods such as chili verde, tacos, enchiladas, and burritos, prepared fresh daily.

Sit-down eating areas in supermarkets have been steadily increasing. More than two-thirds of the supermarkets with service delis have some sort of eating area, ranging from a few chairs and tables to elaborate sit-down restaurants. The majority of these eating areas are quite small—nearly 8 percent are legitimate snack bars and less than 1 percent are full-scale restaurants or cafeterias. Eating areas in chain supermarkets are increasing faster than in independents. Supermarkets with sit-down eating areas increased from 7 percent in 1980 to 19 percent in 1988.

Shelf-Stable and Other Microwaveable Products Increase

Food processors are getting on the foodservice bandwagon by making their

products even more convenient in supermarkets. For years, frozen TV dinners and entrees were the main convenience products. Then came such microwaveable items as packaged fish, pancakes, waffles, and french toast. New microwaveable products, however, are quickly filling up so-called "fast food/take out" sections of supermarkets where in-store microwave ovens and eating areas are available.

The newest innovations are microwaveable fast foods—breakfast sandwiches, hamburgers, cheeseburgers, and potato products such as french fries, nuggets, patties and sticks, and soups and entrees especially for children.

Goodings Super Markets in Florida has set up microwaveable, fast food sections in their frozen food departments. The departments contain such items as hamburgers, french fries, cheese sticks, popcorn, fish or meat sandwiches, pizza, and chicken snacks that are heated and served in the store.

Microwaveable hamburgers and cheeseburgers are competing with fast food chains for the away-from-home food dollar. The microwaveable sandwich business last year totaled an estimated \$130 million in sales. Sales are expected to grow by about 20 percent annually over the next couple of years. It is predicted that sales of frozen and prepared heat-and-serve departments will double and quadruple over the next 5 years.

Frozen breakfast items such as pancakes and sausages, and scrambled eggs

and sausages, are the best selling entrees according to retailers interviewed by *Supermarket News*. The scrambled egg/Canadian bacon sandwich is the strongest item in the breakfast sandwich category.

Increased microwave ownership and new packaging technology have been largely responsible for the growth of shelf-stable foods. These items are vacuum-packed in plastic containers and cooked at very high temperatures. Shelf-stable foods are prepared without preservatives and can be kept for years without refrigeration or freezing.

According to a 1989 study by Schotland Business Research, Inc., microwaveable, shelf-stable foods accounted for \$250 million in sales in 1988 and could reach \$696 million by 1993. Shelf-stable, prepared foods are available in tub, tray, or pouch. Some familiar products are Hormel's Top Shelf line of oriental pepper steak, beef stroganoff, and beef sukiyaki. Dial Food's Lunch Bucket line is another shelf-stable product which has a 2-year or more shelf life at room temperature. Products of this type can be heated in a microwave oven in 75 to 90 seconds.

New frozen and shelf-stable microwaveable foods have been developed for children. A number of companies are currently testing meals which come packed in colorful containers and often

include activity kits such as stickers, newsletters, games, and puzzles. Con-Agra frozen foods has a line of eight dinners, such as chicken nuggets (with french-fried potato bites, applesauce, and a fudge brownie), chicken, and pizza. Tyson's Looney Tune Meals have eight entrees including a chicken sandwich, macaroni and cheese, spaghetti and meatballs, and chicken chunks.

Hormel has a line of seven "child-tested" shelf-stable entrees, including spaghetti rings in tomato sauce, chicken chow mein, and beef ravioli.

My Own Meals, Inc., offers five entrees available in 1,000 grocery stores in 10 States and is being test-marketed in 86 Toys R Us stores around the country. Entrees are available by mail order as well.

According to retailers polled at the New York State Food Merchants Association's Annual Convention in 1989, shelf-stable microwaveable products are the wave of the future. As time goes on, they say, the products will become more geared toward health concerns.

What's Ahead in Supermarket Foodservice?

Foodservice in supermarkets has come a long way, yet it represents only the beginning. A national survey of deli

directors conducted by Jonessco, a research firm in Dallas, Texas, revealed that 62 percent of prepared foods are sold from the deli service counter, but by the year 2000 this will drop to only 38 percent. Many foodservice items will be sold in other store departments. The growth areas during these years are predicted to be foods packaged in-store, foods prepackaged by manufacturers, and partly prepared foods (adding only one or two ingredients at store level). Self-service deli departments will grow as more prepared food items come on the market.

More products will be packaged for microwave preparation. According to Schotland Business Research, Inc., the value of food prepared specially for microwave heating will grow from \$5 billion in 1988 to \$7 billion by 1993. An estimated 94 percent of homes will contain microwave ovens. The number of microwaveable frozen foods will grow by 25 percent during the next 4 years.

Currently, many prepared foods can be heated in either the microwave or conventional oven. However, as microwave oven use continues to rise, many manufacturers predict prepared foods will become strictly microwaveable.

Consumers spent an estimated \$900 million on shelf-stable and frozen microwaveable food products in 1987. According to "The Microwaveable Foods

Market" report from Schotland, there is a need for expanded variety in the microwave foods categories. Popcorn and pizza snack products accounted for almost half of the sales of microwaveable foods in 1987. Shelf-stable dinners and entrees, dessert baking mixes, frozen sandwiches and frozen vegetables are the products likely to experience dramatically accelerated growth.

Educating consumers to use frozen microwaveable products properly will help sales. Some consideration is being given to telephone hotlines to instruct people on correct product usage.

Retailers are entering the catering business. Forty percent of the Nation's supermarkets offer these services. Other customer conveniences in the future will be drive-up windows and separate entrances for the deli and foodservice areas to move take-out and eat-in patrons in and out of the store more efficiently. Separate cash registers in the deli department will follow.

The success of take-out food in supermarkets depends not only on conve-

nience, but also on quality and price. Soggy frozen french fries, costing \$1.29, reheated in the microwave oven are certainly no real competition for fast food restaurants' fries.

A few supermarkets are experimenting with home delivery of groceries. Home delivery offers consumers the convenience they desire and provides retailers an opportunity to compete with the fast food market.

Retailers Will Need To Address Some Problems

Though foodservice in supermarkets is increasing, various problems are still being worked out. For example, there is a shift to fewer hot foods since the first phase of "ready-to-eat meals" because it is difficult to maintain the quality. Heat lamps and steam tables that keep foods hot also tend to dry them out and

reheating causes further moisture loss. To avoid this problem, some retailers are selling fully prepared, chilled entrees. Some stores include only those hot foods that can stand up successfully to extended heating.

Although microwave technology is fast, convenient, and provides even-tempered heat, some foods do not respond well to it. Pot pies and french fries, for example, often become soggy when heated in a microwave.

Some foods, such as meats and baked goods, are also difficult to brown. However, new packaging can shield certain fast-cooking products for more uniform cooking. Designers are producing packages that enable foods to brown better and get crispier, and that enhance uniform cooking.

In the future, manufacturers expect to see more dinners using shielding devices which reflect microwave energy away from certain components, and susceptor plates which attract energy to enhance browning and crisping. Alcon, a Cana-

dian firm, has developed an aluminum tray with a dome specially designed to promote even heating.

Producing a microwaveable dinner in which all food items are cooked properly has been a challenge for manufacturers. ConAgra in St. Louis includes a meter on the dinner container that changes color when the product is properly heated and cooking is complete.

Fresh prepared foods in the supermarket as well as shelf-stable microwaveable foods have made a significant contribution to consumers' preference for greater foodservice in supermarkets. The new foodservice products are quick, easy, and convenient to prepare, and quality and taste are improving. Although microwaveable foods appear to be the hot foods for the 1990's, they will not push other products out of the picture. One industry executive states that products are "always in a state of change and supermarkets will always want to offer options." ■

Retailers Explore Food Safety and Quality Assurance Options

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Recent headlines about food-related illnesses, the Alar controversy, and chemical residues have many consumers concerned about the foods they eat. Many food retailers have responded to demands for greater food safety and quality assurance by developing new programs such as private testing and certification services, expanding inspection efforts, and introducing new products with specific food safety attributes.

The number of food retailers offering testing and certification services grew from a single supermarket chain in 1987 to 14 retailers in 1989 operating more than 740 grocery stores. Many other food retailers are increasing consumer awareness of their food safety and quality assurance activities through advertising and other promotions. The main objectives of these promotions are to increase public confidence, enhance company image, and provide a competitive edge.

Like many other store services provided by the retailer, the costs of food safety and quality assurance (FS/QA) programs are often significant. Lab testing and certification of pesticide-free produce, for example, may exceed \$250,000 annually for larger supermarket firms. However, retailers have strong incentives to communicate their food safety-related services, both to address food safety and quality concerns, and to incorporate programs into larger marketing and merchandising strategies, such as advertising (*see box*). In this way, food retailers attempt to recoup some or all of the services' expense.

Despite their growing importance, little information is available to characterize food retailer FS/QA programs, such

Marketing and Merchandising Strategies: Reaching the Consumer

Marketing and merchandising strategies consist largely of activities by food retailers to select food products, identify their salable attributes, determine price and other conditions of sale, and present the product, based on knowledge of consumer tastes and preferences. These strategies are the primary means by which food retailers influence purchasing behavior. Marketing and merchandising activities include: conducting store trading area analysis, identifying consumer trends, new product review, media advertising, point-of-purchase advertising, item pricing, assigning item shelf space and location, end-isle displays, and in-store product demonstration.

as the types of products included, specific tests or other assurance methods used, or advertising and any promotion activities employed. Better cost data for FS/QA-related programs and their benefits as perceived by the retailer are also desirable. To learn more about the programs and services, USDA Economic Research Service analysts surveyed nine supermarket firms, each of which operates 100 or more stores in various regions of the United States. The survey's objectives were to identify the types of FS/QA programs that were used, product coverage, costs, promotion, if any, and the programs' contribution to larger marketing and merchandising strategies.

Benefits of FS/QA Are Difficult To Measure

Depending on the program type, retailers cited differing objectives and benefits for their FS/QA activities. Objectives ranged from complying with Federal, State, and local government health and safety regulations, to providing credible response to consumer demands for greater safety and quality assurance, as well as providing greater competitive advantage.

Products covered under FS/QA programs varied as well. Internally operated programs had the broadest coverage with all store departments and food categories included. More highly advertised and promoted programs offered food safety and quality assurance services for a more limited number of perishable foods such as dairy, produce, and meat items.

Results of the survey showed that participating retailers were able to estimate the costs of FS/QA programs more often than the tangible benefits. Retailers were often unable to estimate the value of tangible benefits, such as increased sales volume, greater profit margins, or premium prices due to FS/QA services. Many supermarket operators cited their inability to distinguish among similar tangible benefits generated by other marketing and merchandising activities. Some of the respondents noted that potential tangible benefits were often not realized. For example, one retailer stated that, due to competitors' pricing, his firm was unable to charge premium prices for "tested and certified" produce items. Many of the intangible benefits mentioned by retailers supported more general firm objectives, such as building company image, enhancing consumer confidence, and increasing overall store and firm sales volume or market share.

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



Part of the internal food safety, quality assurance program of the mid-Atlantic Giant supermarket chain includes bacterial swabs of their meat tenderizer pinning machine.

Food Safety and Quality Programs Vary Among Stores

ERS classified the FS/QA programs of the survey participants into three categories: internal (unpromoted), generic (promoted without mention of specific products), and focused (specific to products or FS/QA concerns). The survey questions were specific for each category:

- *Internal (unpromoted).* Internal FS/QA programs, which retailers did not communicate to consumers, included developing and verifying the quality standards of their suppliers, such as food processors, wholesalers, and growers. Retailers were most likely to establish

food safety and quality standards for their store brand/private label product line, sometimes using lab tests to verify that products met standards. Internal programs included standards for store sanitation and hygiene. Cold storage environment was monitored and inspected. Retailers also complied with State and local health regulations.

The internal program served mainly as a quality control measure, ensuring against potential loss of consumer confidence and enhancing company image. It also provided a credible response to customer inquiries about specific food safety concerns. In the event of a food

safety crisis, strictly internal programs could help to restore consumer confidence if the relevant provisions of the program were made public.

- *Generic Promotion.* Programs in this category functioned similarly to the internal programs except that retailers communicated the basic features of their FS/QA programs through a variety of channels such as media advertising and in-store literature distribution. Promotions, however, did not identify the specific products involved or the tests used to ensure safety and quality standards. Generic promotions emphasized inspection, monitoring, and verification of product standards without mentioning specific food products or tests. Sometimes a "customer hotline" was advertised as an information source for questions about food safety and quality.

Generically promoted FS/QA programs demonstrated an awareness of consumer attitudes and communicated the retailers' responses. As a marketing and merchandising strategy, the generic promotions of FS/QA activities served to develop a positive company image, contributing to customer loyalty. It also provided retailers with means to differentiate their products and services from competitors that relied on internal FS/QA programs. Generic promotions also provided greater protection against potential loss of consumer confidence compared with unpromoted FS/QA programs in the event of a food safety crisis.

- *Focused Promotion.* These programs also included many of the features of generic FS/QA programs, although many of the quality control functions were not externally promoted. Instead, promotion efforts focused on the retailers' specific FS/QA activities, including tests and certification of produce, fresh meat, fresh seafood, and dairy products for the

absence of potentially harmful chemicals and microbiological contaminants. Some retailers also conducted tests to certify organically grown produce. Under these programs, retailers promoted and advertised specific products that were tested and certified to meet certain safety and quality standards.

Focused promotions communicated retailers' specific responses to food safety concerns and integrated food safety promotion into marketing and merchandising strategies. Focused promotion strategies include: 1) attracting new customers by differentiating products and services from those of competitors, including generic promotion retailers; 2) contributing to a positive consumer image through high visibility and awareness of FS/QA programs; 3) increasing sales volumes of food categories subject to food safety promotions; and 4) minimizing the loss of consumer confidence and sales volume in the event of a food safety crisis.

Although focused promotion programs provided the greatest potential return to merchandising and marketing activities, they also contained greater elements of risk to the retailer. Private testing and certification programs may be supplanted by new government standards and regulations in the future. Advertising regulations may preclude the use of unverified claims made by focused promotion retailers stating certain foods are "pesticide free" or "residue free." Because focused promotion programs heighten consumer awareness about the potential health risks of certain foods, sales of individual products and their broader classes, such as fresh apples and all fresh and processed apple products, could be reduced.

Both internal and generic promotion FS/QA programs contain fewer elements of risk to the retailer, but their potential application to marketing and merchandising strategies is also low. Given the potential risks and limited tangible benefits cited by focused promotion retailers, the generic promotion approach may represent a middle ground for most retailers. ■

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The mid-Atlantic Giant supermarket chain checks the temperature of prepared food entrees in the salad bar as part of their internal food safety/quality assurance program.

ERS Supermarket Survey and Responses

Internal

Generic Promotion

Focused Promotion

Q1. What food categories do the FS/QA programs address?

All food departments and categories are included.

FS/QA programs are specific for private/store label products.

Fresh meat, seafood, and produce departments have specific FS/QA programs, as well as basic programs applicable to all food categories.

Specific food categories and products are addressed, such as fresh meat and seafood, produce items, and dairy products.

A separate lab testing and certification program is used for specific food products.

Q2. What methods are used to ensure food safety and quality?

Standards are set for all private label products.

Safety and quality are verified using random lab testing.

Standards of other food manufacturers are reviewed and critiqued.

Sanitation and hygiene standards are verified through in-store inspection.

Shipments to stores receive visual inspection.

Includes features of the internal FS/QA program.

Lab testing of processed and fresh foods is done more frequently.

Unannounced store inspections are used to verify company FS/QA standards including temperature checks for chilled and frozen foods.

Produce quality may be verified by random field/crop inspection.

Includes most features of generic promotion programs.

Specific certification methods include:

1) visual inspection and species verification (fresh seafood);

2) third-party lab testing for most other food products, both fresh and processed.

Q3. Does the company have a lab testing program? How is it used?

Lab testing is used infrequently.

Testing is used to verify ingredient labeling for private label food products.

Lab testing may also be directed by product returns or customer inquiries.

Both instore and private (third-party) lab testing are used on a random basis.

Inspections are often directed by consumer inquiries and product returns.

Produce items are often tested for sulfite and alar residues.

Fresh seafood, meat, poultry, and prepared foods (including deli items) are subject to random checks for microbiological contaminants.

Private (third-party) lab testing is conducted on a routine basis for selected foods, including produce items.

Multi-residue testing is used to detect the presence of fungicides and pesticides for many high-volume produce items including tomatoes, lettuce, apples, and oranges.

Internal**Generic Promotion****Focused Promotion****Q4. How is the FS/QA program communicated to consumers?**

The FS/QA program is not promoted or advertised to the public.

Some internal programs may incorporate a "consumer hotline" to respond to questions about food safety and quality.

In-store literature may be used to inform consumers about Federal and State Government FS/QA regulations, standards, and enforcement practices.

General information about the FS/QA program is communicated through in-store literature distribution, newspaper advertising, and radio and television commercials.

Focused promotion targets specific food products that have undergone testing and certification, or uses other means to verify food safety and quality.

Focused promotion makes use of in-store literature, point-of-purchase and newspaper advertising, and radio and television commercials.

Q5. What factors influenced the initiation of the FS/QA program?

Factors include the need to verify private label product specifications; and

the need to comply with Federal, State, and local government health and safety regulations.

In addition to those of internal programs, factors include:

maintaining a positive consumer image about food safety and quality;

maintaining consumer confidence in the event of a food safety crisis; and

addressing concerns or interest expressed by customers.

Includes reasons given for generic promotion.

Addresses concerns of consumers about chemical residues contained in specific food groups.

Q6. What are the significant expense items and costs associated with the FS/QA program?

FS/QA staffing.

Lab testing.

Literature distribution.

Total costs: \$125,000 to \$250,000 per year.

FS/QA staffing.

Lab testing

Advertising and literature distribution.

Consumer hotline services.

Total costs: \$250,000 to \$750,000 per year.

FS/QA staffing.

Lab testing and certification services.

Promotion and advertising.

Total cost: \$375,000 to \$750,000 per year.

Q7. What are the significant tangible and intangible benefits resulting from the FS/QA program?

No tangible benefits were identified.

Intangible benefits include:

potential avoidance of lost revenue or lawsuits arising from a food safety crisis;

quality verification of private label products essential to building customer loyalty.

No tangible benefits were identified.

Intangible benefits include:

those of the internal program;

greater visibility of the FS/QA program among consumers;

enhanced company image and customer loyalty;

contribution to store sales volume.

Tangible benefits include:

greater potential sales volume possible among targeted food products, compared to supermarkets without these specific food safety programs, all else being equal;

potential "spillover effect" may contribute to greater sales volume in other store departments.

Intangible benefits include those of the Generic Promotion program.

Trends in Grocery Retailing Concentration

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A continuous restructuring of corporate America and the food sector over the last 25 years has caused some industry watchers to speculate about the effect of this trend. Mergers and divestitures have played a significant part in the changing organization and structure of the food retailing industry. For example, there were 367 mergers of food retailers between 1982 and 1988. Also, private takeovers of publicly owned firms have quickened the pace of industry change. Greater store variety and services have contributed to organizational change through fewer but larger supermarkets.

But what has all this activity meant for food retailing industry competitiveness and market performance? Do fewer food retailers mean that concentration—the share of sales by the top firms—has increased? How do national trends differ from local market changes?

When USDA's Economic Research Service analysts studied these questions, they found that despite a flurry of mergers and acquisitions, concentration among the largest food retailers rose only slightly in the past 30 years. However, concentration trends varied among cities, with small cities showing a greater increase in the share of sales by the top firms than large cities.

Concentration: How Has It Changed Nationally?

National concentration measures sales of the 4, 8, and 20 largest food retailers in relation to the Nation's total grocery store sales. Because none of the top retailers operate in all regions of the country, measures of national concentration in food retailing are less comparable than for industries with nationwide markets, such as many of the food process-

ing industries. National concentration measures are, however, useful indicators of the importance of the largest firms among all food retailers.

The 20 largest grocery retailers accounted for 35.8 percent of total U.S. grocery store sales in 1988, up from 34.1 percent 30 years earlier (*table 1*). The smaller, regionalized 9th- through 20th-ranked firms accounted for most of the gain. The share for the largest eight grocery retailers declined from 27.5 percent in 1958 to 24.5 percent in 1988, although concentration has increased since 1982. The four largest grocery chains' share of industry sales also fell from 21.7 percent to 15.8 percent.

Considerable turnover took place among these largest grocery retailers during the 30-year period. In addition to mergers, leveraged buyouts (LBO's), and financial restructuring (*see box*), divestitures among the largest food retailers and internal growth among others have contributed to changes in national concentration. The \$4.3-billion leveraged buyout of Safeway Stores, Inc., in 1986, for example, began an unprecedented down-

Table 1. The Share of Grocery Sales By Top 20 Chains Has Grown

Year	4 largest chains	8 largest chains	20 largest chains
Percent			
1958	21.7	27.5	34.1
1963	20.0	26.6	34.0
1967	19.0	25.7	34.4
1972	17.5	24.4	34.8
1977	17.4	24.4	34.5
1982	16.1	23.6	34.9
1985	18.4	26.6	36.7
1986	18.2	26.8	37.6
1987	17.6	27.1	38.6
1988	15.8	24.5	35.8

Source: *Census of Retail Trade*, selected issues, Bureau of Census, U.S. Department of Commerce, and ERS estimates.

Why Be Concerned About Concentration?

The concentration level is one measure used to determine the degree of competitiveness in an industry or market. It measures the combined sales of the leading firms—typically the four largest—as a share of total market or industry sales. As concentration rises, fewer firms account for an increasing share of total industry or market sales. The potential for interfirm coordination of production and marketing decisions, such as quantity supplied and prices charged, increases as a result.

Concentration measures are used in antitrust law to determine the competitive impact of mergers and acquisitions involving firms in the same industry or market. Recent empirical research questions the usefulness of concentration as a gauge of competitiveness when other factors are considered (*see "Supermarket Prices and Price Differences" elsewhere in this issue*).

sizing through divestiture of store divisions across the country and overseas. Safeway supermarkets were sold both as entire divisions operating in a State or region, and as store groups operating in a single city or metropolitan area. The dismantling of this leading food retailer was necessary to reduce the debt assumed by takeover investors. Safeway's market share declined both at the national level and in many local market areas as a result of the buyout.

Internal growth has also contributed to concentration increases nationally

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Food Lion (Salisbury, North Carolina) has become one of the fastest growing supermarket chains in the United States, almost completely through internal growth. (Photo Credit: Food Lion)

Table 2. Concentration Among the Four Largest Firms Rose Over 30 Years, But Not Steadily

MSA population in 1980 ¹	1954	1958	1963	1967	1972	1977	1982
	Percent						
All MSA's	45.4	49.3	50.0	50.9	52.4	56.3	58.3
1 million and over	45.7	48.0	48.4	48.0	51.2	54.3	54.9
300,000-999,999	45.3	48.7	48.5	48.6	48.7	52.3	54.1
150,000-299,999	43.9	50.3	50.8	53.2	53.5	56.5	57.5
Under 150,000	47.0	50.3	52.9	54.1	57.3	62.6	63.6
173 MSA's	NA	48.7	49.1	50.2	52.2	56.4	58.7

NA = Not Available.

¹ MSA's are integrated economic and social units with population centers of at least 50,000 inhabitants.

Source: Special tabulations from *Census of Retail Trade*, Bureau of Census, U.S. Department of Commerce, 1987.

among the 20 largest firms. Food Lion (Salisbury, North Carolina) has become one of the fastest growing supermarket chains in the United States, almost completely through internal growth. In 1979, the chain operated 85 stores with sales of \$416 million. Since then, it has expanded rapidly to become the 11th-

ranked grocery retailer in 1988 with sales of \$3.8 billion in 567 supermarkets. Food Lion has been responsible for much of the growth among the 9th- through 20th-largest retailers since it moved into the top 20 in 1985. Other supermarket chains, such as Albertson's, Inc. (Boise, Idaho) and Publix Super Markets, Inc.

(Lakeland, Florida), also are examples of retailers that have achieved top-20 rankings through internal growth.

Changes in Local Markets Are Greater

Because grocery retailers compete largely within cities and towns, mergers, LBO's, and internal expansion have had the greatest effect on concentration at the local market level. Concentration among the four largest chains in all Metropolitan Statistical Areas (MSA's)—a measure used to define local markets or cities—increased from 45.4 percent of grocery store sales in 1954 to 58.3 percent in 1982, the most recent Census year available (table 2). However, the rise in all-MSA average concentration has not been steady. The greatest concentration increases took place between 1954-58 and 1972-77, with only modest changes in other periods.

A much more diverse pattern of concentration change is evident when individual MSA's are grouped by population. The share of sales by the top four food retailing firms in cities of fewer than 150,000 people increased 16.6 percentage points, compared with a 9.2-percentage-point increase in MSA's of 1 million or more. ERS analysts found considerable diversity in the concentration trends of individual MSA's as well. In a study of 289 comparable cities between 1977 and 1982, four-firm concentration rose more than 5 percentage points in 79 MSA's and declined more than 5 percentage points in 55 MSA's. In the remaining cities, concentration among the top four firms changed 5 percentage points or less.

What's the Effect of Leveraged Buyouts?

While more publicity is being given to leveraged buyouts recently, they are not a financial innovation. The main impetus for the growth of leveraged buyouts during the 1980's has been the availability of acquisition capital through "high yield," or so-called junk bond financing.

Through junk bond financing, investor groups are able to make significantly large acquisitions, often of publicly owned firms, while contributing only a minimal amount of their own capital. The post-LBO company must seek ways to reduce the acquisition debt, either by increasing earnings from current operations or by selling assets, such as land, buildings, and equipment.

In addition to the investor takeover of Safeway Stores, Inc., there have been numerous other food retailer buyouts, including Supermarkets General (Pathmark and Purity-Supreme supermarkets) and Stop and Shop supermarkets in the Northeast, Southland Corporation (7-Eleven convenience stores), and Ralph's Supermarkets in southern California. The Kroger Company underwent financial restructuring in 1988 that preserved public ownership but created new debt amounting to \$4.1 billion. This action was taken to prevent an unwanted LBO takeover.

In those instances involving a food retailing firm takeover by investors already controlling supermarket assets, most did not overlap in the local market or city served. The Federal Trade Commission, charged with enforcement of antitrust laws, has required leveraged buyout investors to divest themselves of supermarket holdings where they would be in direct competition following the acquisition, especially in rural areas.

Some investors, such as Kohlberg, Kravis, and Roberts (KKR), who have frequently invested in food retailing through leveraged buyouts, may technically be contributing to rising concentration at the national level. This result occurs due to "buy and hold" strategies in which investor-acquired assets are not immediately resold in order to repay acquisition debt. Acquisition of multiple supermarket firms by investor groups such as KKR is most often not followed by consolidation of operations, such as procurement and merchandising. Although KKR controls the assets of Safeway Stores, Inc., Supermarkets General/Pathmark (New Jersey), Stop and Shop, Inc. (Massachusetts), and Fred Meyer (Seattle, Washington), none of these firms has merged operations or other activities.

There's a Trend to Fewer But Larger Supermarkets

The trend to fewer but larger supermarkets has also been cited as contributing to rising concentration. According to the Food Marketing Institute, median supermarket size increased from 23,000 square feet in 1981 to 35,000 square feet in 1989 as retailers expanded the variety of products and services offered. As a result, many smaller supermarkets became obsolete. The total number of supermarkets declined from 26,321 to 23,000 over the last decade. These developments took place across the entire

industry and among large and small food retailers. Because this transformation was not limited to a single retailer or group of retailers, the effect on both national and local market changes in concentration levels has been minimal.

Despite the decline in supermarket numbers, consumers enjoy a wide variety of grocery shopping options due to the advent of supermarket formats such as the warehouse store, the superstore, the combination food and drug store, and the hypermarket. The number of convenience stores also increased by more than 50 percent between 1980 and 1989, offsetting declines among other grocery store types. The growth of membership wholesale club stores selling food and nonfood grocery items provides consumers with yet another shopping alternative. ■

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Your Guide to Industry Structure Terms

Aggregate concentration. The share of sales in a sector (such as food retailing) made by the largest firms.

Acquisition. The purchase of a company.

Chain. A food retailer or foodservice operator owning 11 or more stores or outlets.

Divestiture. The sale of a unit (a factory, a division, or a subsidiary) of a firm, either to another firm, to management of the unit, or to independent investors.

Foodstore. A retail outlet with at least 50 percent of sales in food products intended for off-premise consumption.

● **Grocery store.** A foodstore that sells a variety of food products, including fresh meat, produce, packaged and canned foods, frozen foods, other processed foods, and nonfood products.

Supermarket. A grocery store, primarily self-service in operation, providing a full range of departments, and having at least \$2.5 million in annual sales (1985 dollars).

Combination food and drug store. A supermarket containing a pharmacy, a nonprescrip-

tion drug department, and a greater variety of health and beauty aids than that carried by conventional supermarkets. **Hypermarket.** The largest supermarket format, with general merchandise items accounting for up to 40 percent of sales.

Superstore. A supermarket distinguished by its greater size and variety of products than conventional supermarkets, including specialty and service departments, and a considerable inventory of general merchandise products.

Warehouse store. A supermarket with limited product variety and fewer services provided, incorporating case lot stocking and shelving practices. Superwarehouse stores are larger and offer expanded product variety and often service meat, delicatessen, or fresh seafood departments.

● **Convenience store.** A small grocery store selling a limited variety of food and nonfood products, typically open extended hours.

● **Superette.** A grocery store, primarily self-service in operation, selling a wide variety of food and

nonfood products with annual sales below \$2.5 million (1985 dollars).

● **Specialized food store.** A food store primarily engaged in the retail sale of a single food category such as meat and seafood stores, dairy stores, candy and nut stores, and retail bakeries.

Foreign investment. Ownership of domestic assets by foreign persons or firms.

Independent. A food retailer or foodservice operator owning 10 or fewer stores or outlets.

Internal growth. Growth that is a result of a firm adding new stores, or increasing sales of existing stores, or both.

Leveraged buyout. Purchase of the common stock of a company through debt-financing, pledging the assets of the new company as collateral.

Merger. The combination of two or more firms into one.

● **Horizontal mergers.** A combining of two firms producing or selling the same or similar products in the same market.

Metropolitan Statistical Areas (MSA's). Integrated economic and social units with population centers of at least 50,000 inhabitants.

Supermarket Prices and Price Differences

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Supermarkets represent only about 10 percent of the number of retail food stores, but they account for 70 percent of all sales. Because of this large volume, supermarkets, rather than any other food stores, have the greatest economic impact on the retail food industry.

The economic performance of food stores is measured by comparing prices and profits. Price comparisons are used to gauge the competitiveness and efficiency of an industry or market—indicators of economic performance. In 1982, USDA's Economic Research Service (ERS) surveyed supermarkets to determine how much prices vary, both among cities and between stores and firms within cities, and the reasons for these differences.

The nationwide survey found considerable diversity. Store size, sales volume, store services, occupancy costs, market growth, and market entry contributed to price differences among supermarket firms. There was no evidence that firm market power—the ability to unilaterally raise prices—had a significant effect on supermarket prices.

The results of the ERS survey, detailed in a 1989 report, *Supermarket Prices and Price Differences: City, Firm, and Store-Level Determinants*, differ from those of some earlier studies of its kind. Furthermore, developments since 1982, including the growth of price-oriented supermarkets such as warehouse and superwarehouse stores, which have heightened competitive intensity in many cities and towns, suggest that the major findings of this study continue to be valid.

Random Sampling Selected Cities, Firms, and Grocery Items

The ERS price survey provides detailed store-level data not previously



The ERS survey showed that prices among stores within the same city were often considerably different.

available. While earlier studies made important contributions to understanding the factors influencing food retailing prices, the data were limited. The earlier investigations often relied on firm-supplied price lists, limited sample sizes, marketwide measures of operating costs, and other data to conduct price analyses. In many cases, the items selected were not representative of all food and non-food supermarket products, stores, firms, or cities. Also, detailed store and firm

characteristic data were often not available.

In contrast, the ERS supermarket price study sampled 616 supermarkets operating in 28 randomly selected cities. The selected supermarkets represented 321 firms. The more than 300,000 food and nonfood prices collected were from all supermarket departments, including fresh meat and produce. The item prices were recorded in the stores by trained enumerators during three independent sample periods. Enumerators recorded

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an average of 170 item prices per supermarket, totaling more than 100,000 price observations per collection wave.

A store characteristics survey was also conducted in each sample supermarket. Store characteristics included the type of store location (city, suburban, stand-alone, or shopping center), size of selling area, type of store (traditional supermarket, superstore, combination store, no-frills store, or other), hours of operation, and 20 different customer services.

Labor accounts for more than half of supermarket operating costs, excluding the cost of merchandise. A separate labor cost questionnaire collected information on total payroll, hours, and fringe benefits for all hourly (nonsalaried) employees in each survey supermarket.

Accurately representing the broad variety of food and nonfood items sold in supermarkets was critical to the ERS study. Product categories containing similar items were identified and selected randomly, according to their share of sales. For example, fluid milk has a larger share of sales than butter, and therefore was more likely to be chosen for the sample. This method produced a sample that was in proportion to the relative sales share of items sold in supermarkets.

To ensure that items were comparable within product categories, additional subcategories were developed. The fluid milk category, for instance, was divided into several size and percent milkfat subcategories. To avoid comparisons of unlike items, many subcategories were separated by brand type, such as national brand, private/store label brand, and generic.

Comparing Supermarket Prices

To compare foodstore prices across stores, firms, and cities, ERS researchers used a price-relative index that measured a store's price for a particular product compared with the average price charged by all survey stores. For example, Campbell's tomato soup in a 10.75-

ounce can costs 32 cents (3 cents per ounce) in supermarket A. If the average price of a national brand tomato soup in 10- to 12-ounce cans was 3.3 cents per ounce for all stores in the survey, then the price-relative index for Campbell's tomato soup in supermarket A on a per-ounce basis equals 3 divided by 3.3 multiplied by 100, or 90.9. In other words, the price in supermarket A was 9.1 percent (100-90.9) below the average for all stores in the survey. Price-relative indexes were similarly computed for all item prices recorded.

Item price-relative indexes were averaged together by brand type (national, private/store label, and generic) for each subcategory, such as iceberg lettuce, whole wheat breads, and pre-sweetened cereal to compare prices between stores, firms, and cities. Averaging the respective subcategories yielded index values for each category, including lettuce, breads, and cereals. In the next step, category index averages were combined into major store departments (produce, dairy, fresh meat, other foods, and nonfoods). Finally, department indexes were combined to obtain store, firm, and city-average price indexes.

Price-relative indexes offer a number of advantages over other price comparison methods such as direct measurement and the market basket approach. Comparisons within product categories containing different package sizes were possible, for example, because "per unit" price-relative indexes were used. In the above example, there could be a number of different item sizes contained in the product category "Canned Tomato Soup, 10-12 oz." Many direct and market basket price studies do not convert to a per unit basis, thus limiting comparisons to identical items or similar items of the same package size or weight. This results in a greater number of stores with "missing items" than otherwise. The price-relative index method also greatly simplifies item price comparisons within a store, or between stores, firms, and cities, since all

indexes are relative to the sample average.

Supermarket Price Differences

To determine how much and why supermarket prices vary between firms and cities, ERS researchers considered several possible sources of price differences—among stores within the same firm, among firms, and among cities. *Within Firms.* Differences in demographic, competitive, and cost conditions between stores are likely to produce some price variation within a firm. However, excessive store price variation may not occur because of uniform pricing policies. Uniform pricing by multistore firms in a city aids marketwide advertising of weekly specials, fosters brand image and firm identity when combined with services and products, and makes possible greater pricing control at the store level.

Of the 321 firms in the ERS survey, 120 had more than one sample store in a Metropolitan Statistical Area (MSA). An MSA is a county or group of contiguous counties that contain at least one city of 50,000 inhabitants or more, or twin cities with a combination of at least 50,000.

Store average prices were within 2 percentage points of each other in only 57 percent of the firms with more than one store in an MSA. Prices in 18 percent of the multistore firms differed by more than 4 percentage points. These results indicate greater price flexibility within firms than anticipated. Individual supermarkets may be reacting to differences in store-level operating costs and competitive conditions.

Between Firms and Cities. Comparing the firm average of their individual store prices in a city revealed considerable differences. Firm price indexes ranged from a 34.3-percentage-point difference in Boston, MA, to only 4.8 percentage-points in Akron, OH (table 1). The 28-city average price range was 16 percentage points. Characteristics that

Table 1. Boston Had Greatest Variation in Supermarket Prices; Akron the Least

MSA ¹	City-average price index ²	Firm price index range		
		Minimum	Maximum	Difference
Akron, OH	98.1	95.9	100.7	4.8
Albuquerque, NM	101.0	93.1	113.1	20.0
Atlanta, GA	103.0	93.1	113.6	20.5
Baton Rouge, LA	102.3	94.3	107.9	13.6
Boston, MA	99.5	87.2	121.5	34.3
Denver, CO	99.2	97.7	107.1	9.4
Detroit, MI	101.6	97.0	107.2	10.2
Evansville, IN	98.3	89.6	104.6	15.0
Fort Lauderdale, FL	99.9	95.1	112.2	17.1
Houston, TX	101.0	96.5	106.0	9.5
Huntington, WV-Ashland, KY	100.2	97.1	103.0	5.9
Jackson, MS	101.1	99.4	105.7	6.3
Jersey City, NJ	100.4	97.0	104.4	7.4
Las Vegas, NV	99.8	93.7	121.2	27.5
Los Angeles-Long Beach, CA	99.1	90.3	118.8	28.5
Madison, WI	96.1	88.3	102.3	14.0
Miami, FL	101.3	95.3	116.4	21.1
New York, NY	104.8	96.6	108.2	11.6
Paterson-Clifton-Passaic, NJ	99.8	95.4	103.6	8.2
Philadelphia, PA	98.9	76.0	102.7	26.7
Pittsburg, PA	99.3	89.1	103.4	14.3
Portland, ME	94.2	84.6	101.9	17.3
St. Louis, MO	97.2	73.0	108.0	35.0
San Diego, CA	97.1	91.0	110.9	19.9
Santa Cruz, CA	103.5	94.7	107.8	13.1
Springfield, MO	96.4	86.0	100.7	14.7
Tulsa, OK	103.9	99.0	112.8	13.8
Youngstown, OH	99.5	95.7	101.9	6.2

¹A county or group of contiguous counties that contain at least one city of 50,000 inhabitants or more, or twin cities with a combination of at least 50,000. ²Weighted by firm market share.

Source: Kaufman, Phillip R. and Charles R. Handy. *Supermarket Prices and Price Differences: City, Firm, and Store-level Determinants*, TB-1776, ERS, USDA. Dec. 1989.

may contribute to these within-city differences include firm market share, differences in store format (conventional versus warehouse store, for example), store size (floor space) and sales volume, the extent and variety of store services offered, store location, and labor compensation (wages and benefits).

Among cities, the highest city-average price index was New York City at 104.8. The lowest city-average price index was Portland, ME, at 94.2. There was no strong pattern of regional differences in city average prices. Prices also did not vary to any significant extent with differences in city size, measured by either population or total annual grocery store sales.

Examining the Causes of Price Differences

With an understanding of how and where supermarket prices vary, ERS researchers determined what city, firm, and store-level characteristics affected firm prices and price differences.

• *City characteristics.* Several characteristics of cities were considered: (1) four-firm market concentration: the combined sales share of the leading supermarket retailers as a percent of the total grocery store sales in a city; (2) market growth: the rate of growth in city total grocery store sales prior to the survey; (3) market entry: the rate of prior new supermarket firm entry in a city; (4) market rivalry: the extent of changes in the market shares (either up or down) of the largest supermarket retailers in a city; and (5) market turbulence: price wars, seasonal shortages, and other unusual but short-lived conditions that may affect firm prices in a city.

Of these citywide characteristics, all but four-firm market concentration and market turbulence were statistically associated with firm price differences. A 10-percent increase in the rate of market growth, for example, boosted firm prices an estimated 0.03 percent, all else being equal (*table 2*). Prices rise with market growth because the increased demand for supermarket products is not matched by corresponding gains in supermarket volume in the short term, all else being equal.

A 10-percent rise in the market shares of firms entering over the 5-year period prior to the survey led to a 0.04-percent increase in average city prices. In contrast, firm-level prices fell 0.16 percent for each 10-percent increase in market

Table 2. Firm Market Power Did Not Significantly Affect Supermarket Prices

Price determinant	Percentage change in price for a 10-percent increase in price determinant
Market share	-0.03
Market concentration	-.08
Sales per store size	-.15 ¹
Firm integration	NA
Occupancy cost	.55 ¹
Store services	.45 ¹
Labor compensation	-.02
Warehouse store(s)	NA
Market rivalry	-.16 ¹
Market turbulence	NA
Market growth	.03 ¹
Market entry	.04 ¹

NA = Not applicable.

¹Significant at the 95 percent confidence level.

Source: Kaufman, Phillip R. and Charles R. Handy. *Supermarket Prices and Price Differences: City, Firm, and Store-level Determinants*. ERS, USDA, TB-1776. Dec. 1989.

rivalry. Four-firm market concentration—a measure of market power—was used to capture the effect of higher prices due to fewer but larger firms. As the number of firms in a market declines, the possibility of price collusion and coordination among firms rises. In the ERS study, however, differences in four-firm market

concentration did not significantly affect a supermarket firm's price index. Greater market turbulence also did not contribute to higher firm prices. In the survey, only four of the 28 survey cities reported unusual competitive activity during the price collection period.

☉ *Supermarket firm characteristics.*

Firm market share—the share of total grocery store sales in a city—was used to determine whether greater share confers market power that allows firms to charge higher prices, independent of other firms' prices. The four largest supermarket firms had the highest price index in only two of the 28 cities. Firm market share was not statistically associated with firm price differences.

Prices of firms operating warehouse format supermarkets averaged 6 percent less than other firms. Although fewer total labor hours was a primary source of cost savings, lower occupancy costs, fewer items, greater inventory turnover, and reduced merchandise costs also made lower prices possible. The extent to which foodstore operators support their retailing activities through warehousing, wholesaling, purchasing and distribution (technically known as the degree of firm integration) did not influence firm pricing when nonintegrated firms were compared with all other firms. The size economies available to many nonintegrated supermarkets through full-service food wholesalers likely provide cost savings comparable to those of inte-

grated supermarket operators. Full-service food wholesalers supply independent and small chains with both merchandise and business services, such as computer support, site selection, management training, accounting, and financial needs.

☉ *Store characteristics.* A firm's individual store characteristics had varied effects on prices and price differences. Greater store sales for a given store size (a measure of capacity utilization) were associated with lower firm prices, all else being equal. A 10-percent increase in store sales resulted in a 0.15-percent decrease in supermarket firm prices. Higher store occupancy costs, such as rental rates and utilities, resulted in higher prices. All else being equal, prices were higher among firms with more store services, but the greater cost of services may account for only part of the increase. Differences in labor compensation, or average hourly employee wages and fringe benefits, did not significantly affect firm prices, despite considerable disparities in firm labor costs both within and among cities. Competitive pressures within cities may prevent food retailers with higher labor costs from passing on these differences by raising store prices. ■



Consumer Data: What's Available and Where

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Information is critical in today's fast moving food industry. Several sources offer information on consumption, prices, and expenditures, with similar data but with differences in how the data are presented. Analysts need to know where the data are available, which topics are represented, how the series are constructed, and how the information can be adapted to their particular needs. Analysts seeking data on food expenditures, for example, can find the information from USDA, personal consumption expenditures from the U.S. Department of Commerce, and the continuing consumer expenditures survey from the U.S. Department of Labor. These three sources publish similar data but there are substantial differences in methods, concepts, and results.

Three Series on Food Expenditures

The USDA series on total food expenditures provide the broadest and longest coverage. These data, from the Economic Research Service (ERS), include all expenditures for food in the United States since 1889. The data are for food purchased (including food stamps) and in-kind (donated, home-produced, and sport fish and game).

Purchases include food paid for by families and individuals, food in travel and entertainment paid for by businesses, and food furnished to employees, prisoners, and hospital patients. The series is available in two ERS publications—annually in *Food Consumption, Prices, and Expenditures*, and monthly in *Agricultural Outlook* (see box).

Two ERS series measure food expenditures from personal income and personal money income. Personal income includes items which are not paid

Up-to-Date Information Is Just a Phone Call Away...

For further discussion of the data available, see *Data for Food Demand Analysis: Availability, Characteristics, and Options* by Alden C. Manchester. USDA, ERS. AER-613, April 1990. To order a copy of this report, call toll free 1-800-999-6779 (8:30-5:00 ET).

Current figures on ERS' total food expenditures series are available monthly in *Agricultural Outlook* and annually in *Food Consumption, Prices, and Expenditures*. To order these publications, call toll free 1-800-999-6779 (8:30-5:00 ET).

ERS' consumption data are also available in *Food Consumption, Prices, and Expenditures*.

Personal consumption expenditures are published monthly in the

Survey of Current Business, U.S. Department of Commerce, Bureau of Economic Analysis. Order from Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402 or call (202) 783-3238.

The results of the *Continuing Consumer Expenditure Survey* are available from the U.S. Department of Labor, Bureau of Labor Statistics in press releases and bulletins. To order, call (202) 523-1913.

Food price indexes are published monthly by the Bureau of Labor Statistics in the *CPI Detailed Report*. Order from Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402 or call (202) 783-3238.

directly to workers, including fringe benefits such as employer contributions for health insurance. Personal income also includes transfer payments, such as food stamps. These items are excluded in personal money income.

The expenditures from personal income and personal money income series may be appropriate when less comprehensive information is needed. The "Expenditures Paid Out of Personal Income" series, for instance, excludes the value of donated foods, nonfarm and home-produced foods, sport fish and game, expense account meals, and meals for patients and inmates. Also excluded are food and cash donated to schools and institutions.

The U.S. Department of Commerce series on personal consumption expenditures (PCE) for food provide data from 1929 to the present. The series include

expenditures from personal income for human food, pet food, animal feed (mostly for personally owned horses), and ice. Food bought with food stamps, and food produced and consumed on the same farm are included. Data on consumer expenditures for all other goods and services, income, and savings are also included.

The PCE series from Commerce and the total expenditures series from ERS differ significantly in methods, concept, and results (table 1). Total expenditures include expenditures for businesses and for food served in hospitals and institutions. PCE excludes these items. However, food purchased for at-home use is essentially the same concept in both

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Table 1. How the Expenditures Series Compare

	1977	1980	1984	1988	1989
<i>Million dollars</i>					
Total expenditures for food	221.5	306.2	391.5	485.8	515.6
Off-premise (at home)	136.6	185.6	228.4	266.2	284.8
Meals and snacks	84.9	120.5	163.1	219.6	230.8
Expenditures paid out of personal income ¹	190.2	263.8	342.3	414.9	443.3
Off-premise	131.6	178.4	219.3	255.9	274.7
Meals and snacks	58.6	85.4	123.0	159.0	168.6
Expenditures paid out of personal money income ²	182.2	250.2	324.9	395.1	422.5
Off-premise	126.1	169.1	207.6	243.8	262.1
Meals and snacks	56.0	81.1	117.3	151.3	160.3
Personal consumption expenditures for food	216.7	297.5	387.9	490.9	520.9
Off-premise	156.8	208.3	266.2	326.3	347.5
Meals and snacks	59.9	89.2	121.7	164.6	173.4
Aggregate expenditures from Continuing Consumer Expenditure Survey	NA	222.8	296.8	355.5	NA
Off-premise	NA	146.1	177.7	202.6	NA
Meals and snacks	NA	76.7	119.1	152.9	NA

NA = Not Available.

¹Personal income includes items which are not paid to workers in money form, including fringe benefits, such as employer contributions for health insurance; and transfer payments, such as food stamps. ²Personal money income includes only income in money form, excluding fringe benefits and transfer payments.Source: Manchester, Alden C. *Data for Food Demand Analysis: Availability, Characteristics, and Options*. ERS, USDA. AER-613, April 1990, and updates.

series after (1) home food production and donations are excluded from total expenditures and (2) estimated expenditures for pet food are taken out of personal consumption expenditures. After those adjustments, the estimate from PCE exceeded total expenditures by 8 percent in 1954, 19 percent in 1977, and 22 percent in 1982.

Two consumer surveys, USDA's *Nationwide Food Consumption Survey* (NFCS) and the Bureau of Labor Statistics' *Continuing Consumer Expenditure Survey* (CCES), also provide mea-

sures of household food expenditures. Formerly, the surveys were conducted about once a decade. The CCES became a continuing survey in 1980 but it covered only urban areas in 1981-83. The NFCS may become a continuing survey, but until recently its coverage has been limited by budget problems and its emphasis has been on individual food intake rather than on household consumption and expenditures. In 1987-88, a household survey was conducted, but with limited sample size.

Survey methods differ between the NFCS and CCES. The CCES, for exam-

ple, relies on two weekly diaries each quarter for frequently purchased items and quarterly interviews for "global" items, such as the number of trips to the grocery store and average expenditures per trip. The NFCS, in contrast, uses an aided-recall interview where information on food used in surveyed households is collected.

The NFCS and CCES also differ in the categories of food spending that are included. The CCES, for instance, provides no figures for the value of donated or home-produced food. Carryout foods are also treated differently in the two surveys.

The CCES is the only source that breaks down food spending for at-home use by product groups—the same products that appear in the Consumer Price Index. There is considerable year-to-year variation in the data for individual products. The level of aggregate spending for food at home is much lower than in the other series.

What Do We Eat? Looking at the Data

In addition to information on how much is spent for food, analysts often want to know what is consumed. The main sources of data on quantities are ERS per capita consumption figures and commercial data which are based on information from retail food store sales or consumer panels. Consumer panel data indicate quantities of food purchased for use at home and the number of away-from-home occasions when the specified food was purchased.

ERS publishes per capita consumption data for over 200 foods, mostly defined at the manufacturing level. All uses of flour, for example, are included. Food donated by the Federal Government through food programs is also included. The data cover food for at-home and

away-from-home use, and as ingredients in other products. Estimates of the total available U.S. food supply are based on the sum of production, beginning inventories, and imports. These three components are either directly measurable or estimated by Government agencies using sampling and statistical methods.

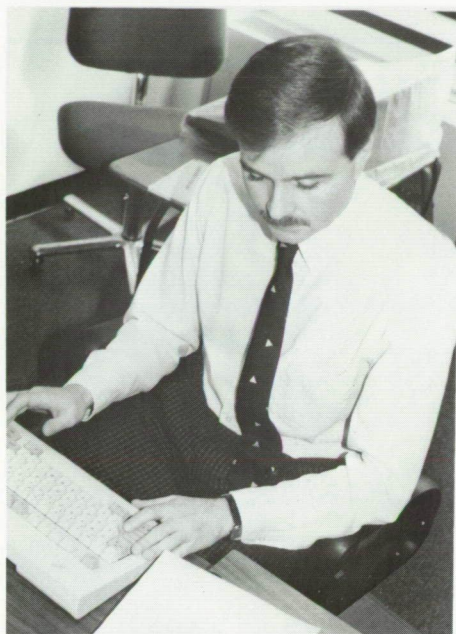
The ERS data do not directly measure or statistically estimate actual human food use. Instead, they indicate the food available for human use after deducting exports, industrial uses, farm seed and feed, and end-of-year inventories. The ERS data are often referred to as "food disappearance."

In general, food disappearance data indicate trends in consumption over a period of time rather than absolute measures of food eaten. Food disappearance estimates are greater than the amounts actually eaten because they measure the quantities purchased by the consumer and do not allow for some spoilage and waste in the marketing system and in the home.

Food Prices: The CPI and More

The Bureau of Labor Statistics (BLS) is the principal source of data on retail price movements. BLS has compiled retail price indexes and some retail prices since 1890. Until 1978, only prices paid by clerical and manual workers in cities were represented. BLS collected prices for samples of individual food products that were fairly narrowly defined using detailed specifications for each product through 1977.

Coverage was expanded to the entire urban portion of the country in 1978. The post-1978 indexes reflect a broader coverage of food products, but the component price in each store is still for a



Analysts need to know where data on food demand are available and how the information can be adapted to their particular needs.

narrowly specified product. Price collection was extended to three pricing periods, each including 6 business days. This procedure includes most of the month and ensures that a higher proportion of the prices collected will reflect specials. Prior to 1978, BLS collected prices on Tuesday, Wednesday, and Thursday of the first week of each month that included a Tuesday. This practice minimized the effects of weekend specials designed to lure shoppers into the store for the major weekly shopping trips.

Good information on price movements is available from BLS in the form of indexes. Data on actual price levels that are available are much less satisfactory because they are not designed to provide such information. Analysts must turn to other sources to determine the

average level of prices for all purchases. USDA's periodic food consumption surveys (now called the *Nationwide Food Consumption Survey*), conducted since the mid-1930's, are the primary sources of such data. Average prices can be imputed from the quantity and value data for individual products. Because of shifts among products within a group, average prices often do not rise as rapidly as the index which is designed to measure only pure price changes.

Using the Data

Data on food expenditures, prices, and quantities are used in many ways. One common type of analysis uses per capita consumption data from ERS and retail store price indexes from BLS to determine the effect of price changes on our diets. Relying on these two data sources, however, can cause problems. The per capita consumption data, for instance, include quantities used by foodservice and as ingredients, as well as those sold to consumers at the prices recorded by BLS. One way to deal with this problem is to use wholesale prices, which cover a broad range of uses.

Other problems arise if the study period is lengthy because some products change over time. Milk, for example, used to be sold in quarts and most was delivered to homes at higher prices than in retail stores. Today, milk sells mostly in gallons and very little is delivered. In addition, lowfat and skim milk now account for about half of all milk, up drastically from 20 years ago.

An average price series can be constructed for a product, for example milk, using other data such as milk sales by container size from Federal milk marketing orders. ■

Recent Trends in Domestic Food Programs

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Participation and program costs discussed in this article compare the second quarter of fiscal year 1990 (January-March) with the same period in 1989. Recent data are reported as of June 1990 and are subject to revision.

Federal expenditures for the domestic food assistance programs for the second quarter of fiscal 1990 increased 14 percent over the same period in 1989—from \$5.4 billion to \$6.1 billion (table 1). The higher outlays primarily reflect cost-of-living increases in most programs.

Participation increased in the Food Stamp and the Women, Infants, and Children programs. Food distribution costs declined from a year earlier because fewer bonus commodities were available for distribution, particularly to schools.

Food Stamp Program

Average participation in the Food Stamp Program rose 5 percent, from 18.9 million to 19.9 million persons. Benefit costs and total program expenditures climbed 19 percent over 1989, with benefits totaling \$3.5 billion and total expenditures reaching \$3.9 billion.

Average monthly per-person benefits for food stamps, to help low-income households purchase a nutritionally adequate diet, increased from \$52.09 to \$58.97. These benefits, which are adjusted annually, are the cost of the Thrifty Food Plan (TFP) for a family of four. In addition, maximum allotments in FY 1989 were 100.65 percent of the



A greater number of working mothers are using child care facilities, increasing the number of meals sold under the Child Care Food Program.

TFP, and allotments this fiscal year are 102.05 percent of TFP, as mandated by the Hunger Prevention Act of 1988.

Child Nutrition Programs

An average of 24.1 million children participated in the National School Lunch Program each school day during the second quarter of fiscal 1990, about the same level of participation as the previous year. Eligibility for free and reduced-price meals, which provide approximately one-third of the recommended dietary allowances for school age children, is determined by household size and income. Total lunches served during the quarter increased from 1.25 billion to 1.31 billion. This increase was due primarily to the greater number of school days in 1990. Meals served free

or at reduced prices increased from 47.3 percent to 48.2 percent of all lunches served.

Schools receive commodities and cash payments for every lunch served. In school year 1990, they received 13.25 cents worth of commodities per meal, compared to 12.25 cents in 1989. Schools also receive bonus commodities. During the January-March quarter of 1990, \$56.2 million worth of bonus commodities were distributed to schools, compared with \$101.1 million a year earlier. This 44-percent drop was largely due to reduced Government surplus stocks.

The School Breakfast Program provided subsidized breakfasts to an average

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Table 1. Benefit Costs of USDA Food Assistance Programs Have Increased During 1990¹

Programs	1988	1989	FY 1989 Quarters ²				FY 1990 Quarters ²	
			I	II	III	IV	I	II
Million dollars								
Family food								
Food stamps	11,149	11,676	2,902	2,954	2,925	2,895	3,488	3,527
Puerto Rico ³	883	912	228	228	228	228	235	235
Food distribution								
Indian reservations	47	52	12	14	13	13	12	13
Schools ⁴	830	771	272	298	120	82	191	249
Other ⁵	220	209	58	56	52	43	46	50
TEFAP ⁶	593	239	44	61	74	60	51	56
Cash-in-lieu of commodities ⁷	152	152	37	38	39	38	38	39
Child nutrition ⁸								
School lunch	2,908	3,006	904	932	772	398	959	1,041
School breakfast	474	512	151	155	134	72	173	189
Child care and summer food	648	744	148	157	187	252	172	187
Special milk	19	18	5	5	5	4	5	5
WIC ⁹	1,795	1,907	459	466	472	510	501	542
Total ¹⁰	19,718	20,197	5,220	5,363	5,020	4,594	5,871	6,135

¹Fiscal years, administrative costs are excluded unless noted. ²Preliminary, quarterly data may not add to annual total due to rounding. ³Puerto Rico Nutrition Assistance Program and the Northern Marianas block grant. ⁴National School Lunch, Child Care Food, and Summer Food Service Programs, and schools receiving only commodities. ⁵Commodity Supplemental Food Program and Elderly Feeding Pilot Projects, excluding bonus commodities, and donations to charitable institutions. ⁶Temporary Emergency Food Assistant Program. ⁷Child nutrition programs and 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: Food and Nutrition Service, Program Information Division.

of 4.08 million children during the second quarter of fiscal 1990, an 8-percent increase over the previous year. Total breakfasts served during the quarter increased from 201 million to 226 million. Free and reduced-price meals dropped from 86.9 percent to 86.5 percent of all breakfasts served. Total

expenditures for the program rose from \$154.9 million to \$188.6 million, a 22-percent increase.

Daily attendance at facilities offering the Child Care Food Program rose from an average of 1.4 million to 1.5 million children. The number of day care homes and child care centers in the program

increased from 147,000 to 150,000. Total meals served increased from 223.3 million to 251.5 million. The recently introduced adult care component of this program has increased significantly, from 752,000 adult meals served in second fiscal quarter 1989, to 1.9 million in

the same period in 1990. Total quarterly costs for the Child and Adult Care Food Program increased 19 percent, from \$176.7 million in 1989, to \$210.8 million in 1990.

Quarterly quantities of half-pints of milk served under the Special Milk Program at schools, child care institutions, and summer camps rose to 52.3 million in 1990, compared to 51.7 million in 1989. Total quarterly program costs were \$5.5 million in 1990 and \$5.0 million in 1989.

Supplemental Food Programs

Participation in the Special Supplemental Food Program for Women, Infants and Children (WIC) reached a monthly average of 4.57 million persons in 1990, a new program high. This compares with 4.05 million a year earlier. WIC participation increased in all categories, with children having the greatest growth in average number of participants, from 1.89 million to 2.12 million.

Short Stocks Limit Distribution

Due to declining Government surplus stocks, cheese, rice, and nonfat dry milk are no longer distributed to the Temporary Emergency Food Assistance Program. Commodities available for limited distribution are flour, cornmeal, honey, and butter. In addition, canned pork, peanut butter, canned dry beans, and raisins are made available to households under the Hunger Prevention Act of 1988.

Program costs grew from \$465.9 million to \$542.2 million, a 16-percent increase.

From second fiscal quarter 1989 to second fiscal quarter 1990, costs of the Commodity Supplemental Food Program including women, infants, children, and the elderly increased 41 percent, from \$12.4 million to \$17.5 million. Like WIC, participation rose in all categories, but the greatest increase was in the num-

ber of elderly served, which increased 27 percent. Elderly participants now constitute 39 percent of the program.

Food Distribution Programs

Cost of food donations to persons on Indian Reservations and the Marshall Islands fell from \$13.6 million to \$13.1 million. Average participation dropped from 143,900 in 1989 to 142,900 in 1990.

Surplus food valued at \$27.4 million was distributed to charitable institutions in 1990, 27 percent less than the \$37.4 worth of commodities distributed in 1989.

USDA provides food and cash-in-lieu of commodities to the Nutrition Program for the Elderly, which is administered by the Department of Health and Human Services. In the second quarter of fiscal 1990, USDA provided a total of \$35.2 million worth of food and cash, including \$723,000 worth of bonus commodities. The program served an average of 922,000 meals daily in 1990, compared with 914,000 in 1989. ■

Food and Nutrition Legislation

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Numerous food and nutrition bills were introduced or became law in the 101st Congress since April 1990. Several bills are described below.

Nutrition

P.L. 101-330

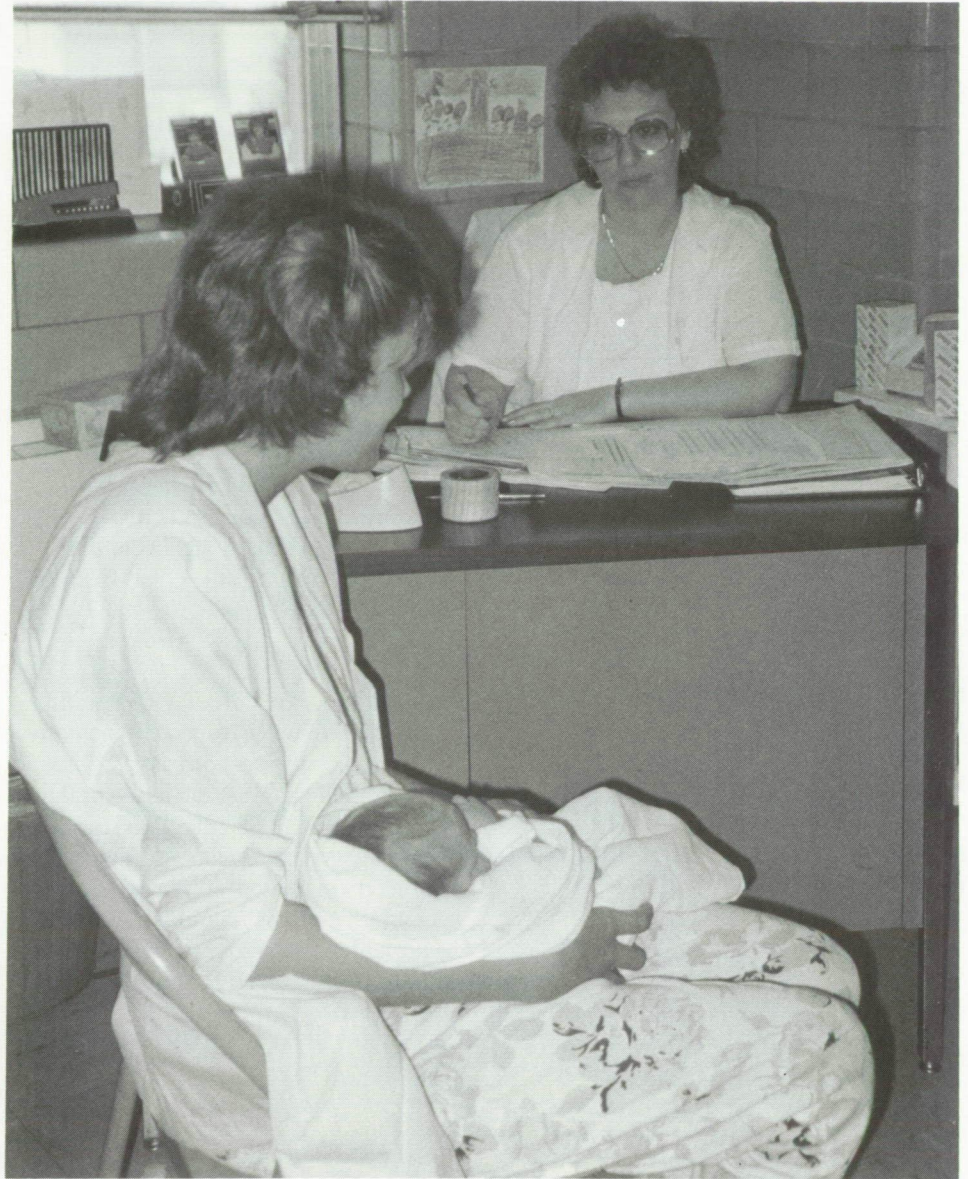
The WIC Services Restoration Act allows States with surplus WIC program funds to return them without penalty. Currently, the following year's funding level is reduced in States that return surplus funds. The Special Supplemental Food Program for Women, Infants, and Children (WIC) provides food assistance to people determined by local health professionals to be at nutritional risk due to inadequate income and nutrition.

Program funding is allocated to States based on a formula rather than on participation. Under P.L. 101-330, the returned funds will be redistributed to States experiencing shortfalls through the WIC formula. The law will also temporarily raise the spending ceiling for States with shortfalls.

H.R. 4432—Rep. Jim Moody (WI)

The Hunger Prevention and Nutrition Expansion Act of 1990 would amend the Hunger Prevention Act of 1986 to direct the Secretary of Agriculture to purchase and distribute \$10 million worth of milk to soup kitchens annually in 1991-95. This would be in addition to the current

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Many of the food bills currently before Congress would update or improve food assistance, especially in the WIC and food stamp programs.

\$32 million annual authorization for the Soup Kitchen Commodities Program.

H.R. 5126—Rep. George Miller (CA)

The Model Good Samaritan Food Donation Act would encourage States and territories to donate wholesome food or grocery products to nonprofit organizations for distribution to the needy. The

bill would allow donors to provide apparently fit grocery products and food without being liable for damage from the goods. This, however, does not exempt an injury to, or death of, a recipient that results from gross negligence or intentional misconduct by the donor. "Appar-

ently fit" means those goods that meet all quality and labeling standards imposed by Federal, State, and local laws and regulations even though the product may not be readily marketable due to its appearance, age, freshness, grade, size, surplus, or other condition.

S. 2310—Sen. Jim Sasser (TN)

The Hunger Prevention Act of 1990 would expand and reauthorize certain food programs. Funding for the WIC program would increase by \$150 million per year for the next 4 years. Changes in the Food Stamp Program would include: (1) removing the current cap on the "excess shelter" deduction for determining the amount of benefits so that all eligible households could deduct the full amount of their shelter costs (the law currently allows families with children to deduct \$177 of their monthly shelter expenses and elderly and disabled to deduct their full shelter costs); (2) allowing households to collect the first \$50 of child support per month without penalizing benefits; (3) increasing the current limit on the value of motor vehicles owned by households from \$4,500 to \$5,500 in 1991 (indexed annually thereafter, according to the Consumer Price Index); (4) increasing basic benefits 0.5 percent annually for the next 4 years from 103 percent of the Thrifty Food Plan to 105 percent; (5) reducing barriers to participation in rural areas by setting up demonstration projects and requiring mail-issue of food stamps; (6) expanding food stamps and assistance to the homeless; and (7) encouraging use of food

stamp electronic benefit transfer systems to modernize delivery and discourage fraud. The bill would reauthorize funding for the Food Stamp, Temporary Emergency Assistance, Commodity Supplemental Food, and Nutrition Assistance for Puerto Rico programs, all of which expire at the end of fiscal year 1990. It would also increase funding to pilot projects providing food assistance to homeless preschoolers who are currently left out of existing nutrition programs.

S. 2489—Sen. Patrick Leahy (VT)

The Mickey Leland Memorial Domestic Hunger Relief Act would change the Food Stamp Program (FSP) to increase the excess shelter cost deduction for 1992 and removes any limits beginning in 1993. S. 2489 would also make other changes in the FSP, including: (1) allowing households to collect the first \$50 of child support per month without penalty; (2) increasing basic benefits from 103 percent to 105 percent of the Thrifty Food Plan; (3) increasing employment and training incentives to assist getting people off food stamps; (4) raising the amount of child care reimbursement; (5) increasing the automobile deduction for participants from \$4,500 to \$5,500 and eventually to \$5,750, and indexing it to inflation; (6) simplifying the definition of a household in the program; (7) increasing the minimum benefit from \$10 per month to be indexed to inflation; (8) improving access in rural areas; and (9) allowing the homeless to use food stamps in approved restaurants.

S. 2289—Sen. Mitch McConnell (KY)

This bill would allow local community distribution agencies to convert up to

25 percent of unused slots for WIC to be made available to eligible low-income elderly. The bill still gives priority to women, infants, and children.

S. 2445—Sen. Rudy Boschwitz (MN)

The Food Stamp Trafficking Prevention and Penalty Act of 1990 would increase the penalty for traffickers from a maximum \$10,000 fine and a 5-year prison sentence, to a \$500,000 fine and 20 years in prison.

S. 2471—Sen. Wendell Ford (KY)

The bill would require the Secretary of Agriculture to assess changes in the National School Lunch Program operations over the past decade. The factors to be analyzed include the impact of decreased bonus commodities on a State-by-State basis; the indirect costs faced by school food service authorities; current costs of providing school lunches; the reasons why some schools have left the program and the impact on low-income children at those schools; and changes in responsibility during the past decade for both State officials and school food service authorities.

Food Safety and Quality

H.R. 4588—Rep. John Dingell (MI)

The bill would give the Secretary of Commerce, with the assistance of the Secretary of Health and Human Services, the authority to establish standards for harvesting and processing practices and for sanitary conditions on board fishing vessels. It would also establish standards

for grading, identifying, packaging, and labeling fish and fish products for trade. The Secretary of Commerce would also be required to establish a system to register and inspect the vessels.

H.R. 4723—Rep. Robert Torricelli (NJ) and S. 2284—Sen. Robert Kasten (WI)

Both of these bills would create a standard for light natural butter products to enable them to be marketed nationally. The present standard for butter requires 80 percent milkfat. Under H.R. 4723, light butter would have 35 to 40 percent milkfat; under S. 2284, it would have 52 percent milkfat.

S. 2393—Sen. J. James Exon (NE)

The Safe Food Transportation Act of 1990 would require the Secretary of Transportation, in consultation with the Secretaries of Agriculture and Health and Human Services and the Administrator of the Environmental Protection Agency to establish regulations concerning the transportation of food, food additives, drugs, devices, and cosmetics in trucks or trains which also are used to transport municipal waste or nonfood products. Such transport could make the other products unsafe for humans or animals. Drugs, devices, and cosmetics are to be considered nonfood products when transported at the same time as food and food additives.

S. 2642—Sen. J. James Exon (NE)

The Grown in the United States Food Labeling Act of 1990 would establish a program to define conditions under

which food producers, processors, and sellers may label food products as grown in the United States or as made of ingredients grown in the United States. Any product containing a significant amount of imported ingredients would not be permitted to be so labeled. The bill would also require the Secretary of Agriculture and the Commissioner of the Food and Drug Administration to conduct a comprehensive review of all existing Federal country-of-origin food labeling requirements. They would issue a report which analyzes the adequacy of these requirements and make recommendations to Congress to improve country-of-origin information available to consumers.

S. 2272—Sen. Steve Symms (ID)

The Food for Special Dietary Use Act would amend the Federal Food, Drug, and Cosmetic Act to exempt vitamins and other foods for special dietary use from being defined as a drug. The bill would change the way foods which are used for special dietary purposes, such as oat bran, are regulated. Currently, products which make therapeutic claims are defined as drugs by the Food and Drug Administration for regulatory purposes. This change would allow food producers and suppliers to be able to inform the public of the beneficial health effects of products.

S. 2422—Sen. Christopher Bond (MO)

The Food Safety Act affects food products of animal origin, such as poultry. It would authorize the Secretary of Agriculture to establish a research program which would include developing technology to rapidly identify and con-

trol or prevent microbiological or chemical contaminants on a farm or throughout the processing and distribution chain and to establish a statistical framework to measure the potential health risks posed by contamination. USDA would also assist in removing from the market food which would be unacceptable under the statistical framework developed.

H.R. 5045—Rep. Gary Condit (CA)

The Organic Foods National Standards Act would define "organically produced" to mean food produced without chemicals and which does not contain traces of chemical pesticides. It would also establish a USDA certification process for organic foods.

Other

H.R. 4342—Rep. Tom Lewis (FL) and S. 2525—Sen. Connie Mack (FL)

These bills would require the Secretary of Agriculture to conduct a study on the current state of the fruit and vegetable industry. The study would include: (1) a review of the availability of an adequate labor supply and crop insurance or disaster assistance; (2) a review of scientific and technological advances in areas including genetics, biotechnology, and other scientific developments; (3) an examination of the availability of safe and effective chemicals; (4) a review of the requirements and cost as well as the benefits of labeling; and (5) a review of Federal educational programs teaching the importance of fruits and vegetables. ■

USDA Actions

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USDA regularly implements operational and regulatory changes affecting the status of food and nutrition in the United States. Here are some recent actions.

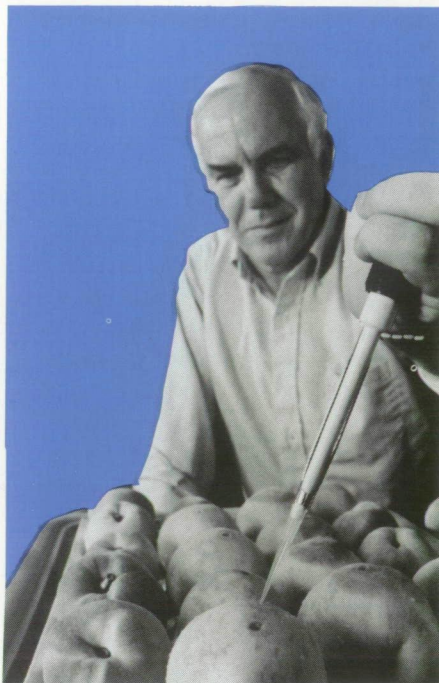
Developing a Safe Effective Fungicide

Two USDA scientists have discovered a strain of yeast that effectively and safely controls fruit rot. The yeast, called an antagonist because it fights pathogens that invade fruit wounds, is called US-7. US-7 affects pathogens on the surface of fruit by monopolizing nutrients or by making the infection site resistant to the pathogen in some unknown way.

"We found this organism in washings from the surface of lemons," says Agricultural Research Service scientist Charles L. Wilson. "We noticed that after we washed the fruit, it no longer stored as well. That led us to suspect a natural organism was involved."

About one-third of all fruits and vegetables produced in the United States are currently treated with ethylene bisdithiocarbamates (EBDC), a group of fungicides that control fungus and mildew. But recently, the Environmental Protection Agency proposed to partially ban their use. Production of some of the commodities that need these fungicides could be slowed down or stopped if alternatives are not found.

"Public concern for food free of pesticide residues has opened up new opportunities for biological control," says USDA research scientist Charles L. Wilson. "In



For after-harvest protection against *Rhizopus* rot, plant pathologists inoculate peaches with U.S.-7 strain of yeast. (Photo credit: Agricultural Research Service, USDA)

a lot of cases, biological control means finding a microorganism that produces antibiotics to control diseases. But we're doing something different. We're working with organisms that naturally occur on fruit and protect it without producing antibiotics."

US-7 is still being tested. It has proved effective against diseases on citrus, peaches, grapes, and tomatoes, as well as mold found on stored wheats. It may be applied either before or after harvest. The yeast worked on three fruit rot pathogens and against fungi responsible for green mold, blue mold, and sour rot of citrus. Wilson and his colleague, Israeli scientist Edo Chalutz, have entered into a 3-year Cooperative

Research and Development Agreement with FRM, a binational company, to mass-produce US-7 and conduct pilot tests on how to apply it. Once Wilson and Chalutz, who have the patent, and FRM have developed and successfully tested an effective preparation, they will apply for EPA approval.

Aid for Lactose-Intolerant Consumers

USDA scientists are patenting a more efficient way to break down lactose in dairy products. Lactose is a sugar in milk that 70 percent of the American adult population can't digest due to their low levels of a particular enzyme, lactase. This enzyme, which breaks down lactose into two simple sugars, exists in an altered form of the bacterium *Streptococcus thermophilus*. *S. thermophilus* is approved by the Food and Drug Administration as a natural agent to make products like cheeses and yogurt. This source of the enzyme has a food-grade nature, unlike the present additives used, and does not grow when added to milk. The altered bacterium also speeds up the action of the starter culture now used to ferment the simple sugars. This means more rapid growth and a shortened manufacturing schedule. Because the bacterium strain can tolerate the high temperatures used under industrial conditions, it can be added to milk before pasteurization, allowing additional time to break down lactose.

The addition of *S. thermophilus* could allow lactose-intolerant consumers to enjoy dairy products. Therefore it is expected to boost the dairy industry's market, increasing sales volume. The

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current technology used to isolate enzymes from yeast and fungi is costly and labor intensive, thus raising the price of lactose-reduced dairy products.

New Pseudorabies Tests Approved

USDA has amended its pseudorabies regulations to permit less restrictive interstate movement of vaccinated swine. Due to recent advances in biotechnology, products known as “gene-altered vaccines” and “differential tests” can be used to determine whether vaccinated swine are infected with pseudorabies. Thus, producers may vaccinate their swine against pseudorabies without the fear of losing interstate markets.

Pseudorabies is a contagious livestock disease that is mostly associated with swine. Although the disease does not harm humans, it can affect cattle, sheep, dogs, cats, and other animals. Vaccination increases a pig’s resistance to infection. If a pig does become infected, vaccination lessens the clinical signs of pseudorabies and enables a more rapid recovery.

USDA will approve a “differential blood test” if it can distinguish vaccinated swine from infected swine. The test must also be USDA-licensed with indications for use in cooperative State-

Federal pseudorabies eradication programs. In addition, the differential blood test must be conducted in an APHIS-approved laboratory.

Qualified pseudorabies-negative herds will be reclassified as qualified negative, gene-altered vaccinated herds once the swine, 6 months and older, are vaccinated with an official gene-altered pseudorabies vaccine. If the herd is of unknown pseudorabies status, the ruling gives producers, after test results show the herd to be pseudorabies negative, a 30-day period for vaccinating the herd. If a herd initially tests positive, it can be retested to verify the results. Any positive-tested swine must be isolated from the remainder of the herd until retesting shows them negative.

Provisions were also made for cleanup of an infected herd using gene-altered vaccines and differential tests.

Fresh Pineapple Standards Revised

USDA has revised standards for grades of pineapples to reflect the developments in pineapple production and marketing since 1953. Last revised in 1953, the standards were redone on an initiative from pineapple growers and are voluntary and paid for by the user.

The revisions permit pineapples without tops to be graded. They make straightness requirements for tops less restrictive. In addition, the new stan-

dards simplify and expand certain definitions, permit slightly more stem for “well trimmed,” and eliminate an overlapping category for judging color. Besides updating the format, these new standards also add quantitative scoring limits to judge certain defects now judged qualitatively.

Snap Bean Standards Revised

USDA has revised the standards for grades of snap beans in response to an industry initiative to reflect changes in production and harvesting practices. The use of these standards is voluntary and paid for by the user.

The revisions tighten the requirements for snap beans graded U.S. Fancy to reduce the number of broken beans. They increase slightly the amount of broken beans allowed in the standards for U.S. No. 1 and U.S. No. 2 grades. In addition, the new standards define which types of beans may be given U.S. grades and add definitions for damage and serious damage for broken beans.

Grain Tested for Diatomaceous Earth

The Federal Grain Inspection Service (FGIS) has a new testing service to determine the presence of diatomaceous earth

in grain. Diatomaceous earth occurs naturally and has been approved by the Environmental Protection Agency (EPA) for controlling insects. It can be added to grain for that purpose.

FGIS procedures require inspectors to designate grain containing unknown substances as U.S. Sample grade, the lowest quality. The new test service offers the grain industry the option of determining if the unknown substance is diatomaceous earth. If so, the grain will not be graded as U.S. Sample grade. A statement indicating the test result will be reported on the inspection certificate.

According to FGIS Administrator John C. Foltz, "Even though FGIS can neither approve nor disapprove the use of specific insecticides, we do support the development and use of natural insecticides."

Upon request, a local FGIS field office or official inspection agency office will draw a sample of grain and submit it to the Commodity Testing Laboratory in Beltsville, MD.

Determining Soft White Wheat's Protein Content

The Federal Grain Inspection Service (FGIS) installed an updated calibration in

near-infrared reflectance instruments (NIR's). The NIR's are used to officially determine the protein content of Soft White wheat. These updated calibrations enable the NIR's to determine protein levels on the basis of a 12-percent moisture content.

FGIS also issued new NIR values for the set of five National Standard Reference samples. These five samples are used as a standard of reference to detect instrument drift. This keeps the NIR's aligned with laboratory determinations of wheat protein content at the FGIS Kieldahl laboratory in Kansas City, MO.

Toward a Better Bread Dough

USDA scientists are trying to beat the heat to improve the dough-making properties of wheat's tolerance to summer stress. When summer's heat soars, some genes in wheat stop working.

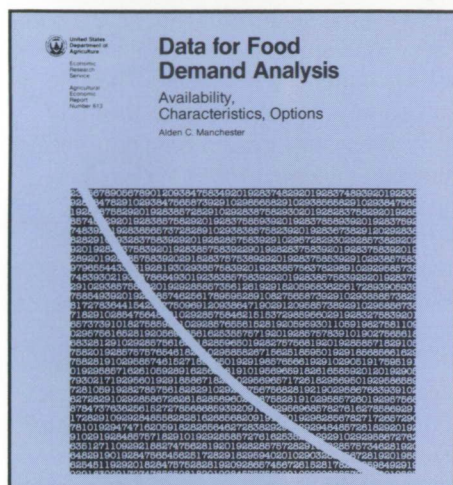
Unfortunately, those key proteins affect the quality of flour. "The highest quality wheats—the ones used to make the stretchy, highly elastic dough of the best raised breads and rolls—have a high ratio of glutenins and gliadins," explains John E. Bernardin, research chemist with the USDA Agricultural Research Service. "Hot weather works against

wheat's chances of ending up with the ideal ratio." Wheat kernels' production of the important glutenin proteins slows at 95 degrees F., and at 99 degrees—common on summer days in wheat growing States—production of these proteins stops.

To overcome the problem, he and colleague William B. Inwood, a plant geneticist, are building a new gene. They are splicing key, signal-like mechanisms of the heat-resistant gliadin gene into a heat-intolerant glutenin gene. "We're changing the glutenin gene's on-off switch," Bernardin says. "We want the gene to continue working past the 95-degree point and perhaps even until it reaches gliadin's upper limit of 113 degrees."

The scientists intend to patent the new gene and they will use several techniques of modern biotechnology in their attempt to insert the gene into wheat cells. But that may take anywhere from 6 months to 4 or 5 years, they say, since wheat, like other cereal crops, typically resists biotechnologists' efforts to give it new genes. ■

The Economic Research Service recently issued the following reports of interest to the food industry. To order copies, call toll free 1-800-999-6779 (8:30-5:00 ET).



Selecting Data for Food Demand Analysis

The author of this report notes that demand analysts often devote less attention to selecting data series than they do in researching econometric techniques, although data are equally important to the results. This publication discusses the availability, characteristics, and derivation of time series for food consumption, food prices, food expenditures, and income for use in food demand analysis. It also shows how new series, which would provide consistent measures of quantity and price, can be constructed from available data.

Data for Food Demand Analysis: Availability, Characteristics, Options. AER-613. Alden Manchester. April 1990. \$8.00.

Watermelon Sales Getting Bigger

The convenience of smaller watermelons that fit in the refrigerator, seedless

varieties, and off-season availability has given renewed vigor to a previously declining industry. Since 1980, sales have increased at a steady 3 percent per year.

Before 1980, the U.S. watermelon industry appeared locked in decline. Production and consumption were on a downtrend. Industry efforts to deal with these problems were not well coordinated. But with consumers' preference for more fresh produce in their diets and farmers' interest in diversifying into several crop enterprises, watermelon production picked up in the early 1980's.

Production statistics from 9 States, representing about 70 percent of the total, show 1987 at over 22 million hundred-weight, a 10-percent increase since 1981.

This study reviews supply and utilization trends, prices, transportation, packaging, marketing, cash receipts, and costs of producing watermelons. It also documents historical industry changes, and reviews the research and promotion program enacted by the industry in April 1989.

The U.S. Watermelon Industry, AGES 9015. Amy J. Allred and Gary Lucier. March 1990. \$11.00.

What's New with bST and The Dairy Industry

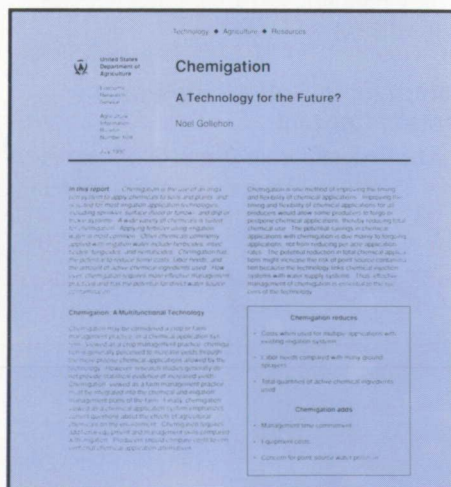
In 1987, the Economic Research Service published *bST and the Dairy Industry: A National, Regional, and Farm-level Analysis in 1987*. This year, a new publication updates and extends the 1987 study with emphasis on the effects of bST adoption, both on small- and medium-sized dairy operations and on the potential for developing export markets for U.S. milk and dairy products.

Current international dairy market conditions are different from when ERS did the first study. This report reviews the background of bST use in the U.S. dairy industry and discusses the attitudes toward it in other milk-producing coun-

tries. Liberalized agricultural trade could lead to greater participation by the United States in international dairy trade. But whether international buyers would purchase products containing milk from bST-treated animals is unknown because their acceptance of such products, so far, has been generally unfavorable.

Some findings from the earlier study remain valid. For example, the researchers found that the effects of bST on the dairy industry would not be as dramatic as originally projected, changes in the industry would be reinforced but not significantly changed with bST adoption, and industry effects of bST ultimately depend on the flexibility of the dairy price support program.

Biotechnology and Agriculture: Emergence of Bovine Somatotropin (bST), AGES 9037. Don P. Blayney and Richard F. Fallert. June 1990. \$8.00.



Combining Irrigation and Chemical Applications

Chemigation is the application of chemicals such as fertilizers, herbicides, insecticides, fungicides, and nematocides

to soils and plants through irrigation systems. It has the potential to reduce some costs, labor needs, and the amount of active chemical ingredients used. However, chemigation requires more effective management practices and has the potential for direct water-source contamination.

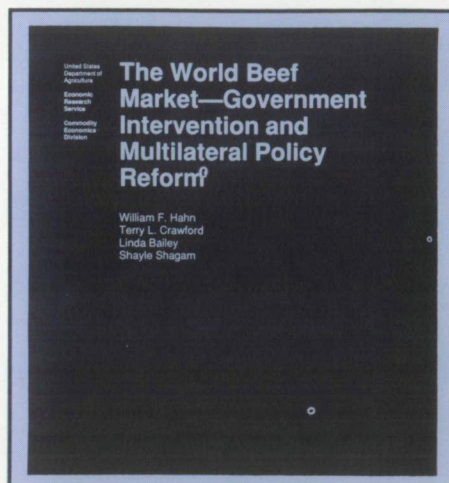
This report examines the issues related to the use of chemigation, evaluates the types of chemicals that can be adapted, its growth potential, and the tradeoffs associated with chemigation technology.

Chemigation: A Technology for the Future? AIB-608. Noel Gollehon. July 1990. \$4.00.

The Farm Program You Don't See

Marketing orders have been called "farm programs you don't see," because other than some administrative expenses, marketing orders involve no direct Federal outlays. Federal legislation authorizes marketing orders through which administrative committees, consisting of growers, handlers, and sometimes consumer representatives appointed by the Secretary of Agriculture, regulate certain marketing activities. The orders were devised to help growers collectively market their commodities. About \$4.6 billion worth (farm value) of fruit, vegetable, nut, and specialty crops are covered by Federal marketing orders annually.

Many Federal marketing orders have regulations for funding promotion and research and for establishing package,



container, grade, and size requirements. Some have regulations to control the volume of produce entering certain markets, intended to even out supplies and prices. These regulations can raise farm prices in the regulated market if shipments are restricted. However, production increases resulting from higher prices can subsequently reduce farm prices.

This bulletin describes the various types and purposes of marketing orders and discusses their effects on growers, marketers, input suppliers, food processors, and consumers.

Federal Marketing Orders for Fruits, Vegetables, Nuts, and Specialty Crops, AER-629. Nicholas J. Powers. March 1990. \$8.00.

GATT and the World Beef Market

Agricultural trade reform, as discussed in the Uruguay Round of the General Agreement on Tariffs and Trade

(GATT), would have profound implications on world beef markets. The United States and other countries have proposed that interference in agricultural trade should be substantially reduced or eliminated. In addition to diplomatic conflicts over agricultural policy, domestic costs of farm programs have increased. U.S. farm program costs rose from less than \$5 billion in the early 1980's to a peak of about \$26 billion in 1986. In the European Community (EC) they nearly doubled over the same period, reaching \$23 billion.

This report examines the world beef market, with emphasis on how agricultural policies have shaped production, consumption, and trade. It is one of 11 reports, products of the trade liberalization project of USDA's Economic Research Service. Each report, featuring an individual commodity, provides an overview of the current policies for the commodity throughout the world and evaluates the effects of a reduction in government supports and artificial barriers that hinder free competition among countries. In addition to the beef report, others feature coarse grains; dairy; fruits, vegetables, wine and tropical beverages; oilseeds; poultry; pork; rice; sugar; tobacco; and wheat.

The World Beef Market—Government Intervention and Multilateral Policy Reform, AGES 9051. William Hahn, Terry Crawford, Linda Bailey, and Shayle Shagam. August 1990. \$11.00. ■



Focus On Food Stores

Retail food store sales from all types of outlets climbed to over \$349 billion in 1989, 11 percent more than 1988. Supermarkets accounted for about 75 percent of the \$329 billion in grocery store sales in 1989. Convenience store sales (including \$15 billion from gasoline sales) reached \$41 billion.

Retail Food Store Sales Reached \$349 Billion in 1989

In billion dollars

Grocery Stores
\$329



In billion dollars

Specialized Stores
\$20

Meat and fish markets \$7
Retail bakeries \$6
Produce stores \$2
Dairy stores \$1
Candy and nut stores \$1
Miscellaneous food stores \$3

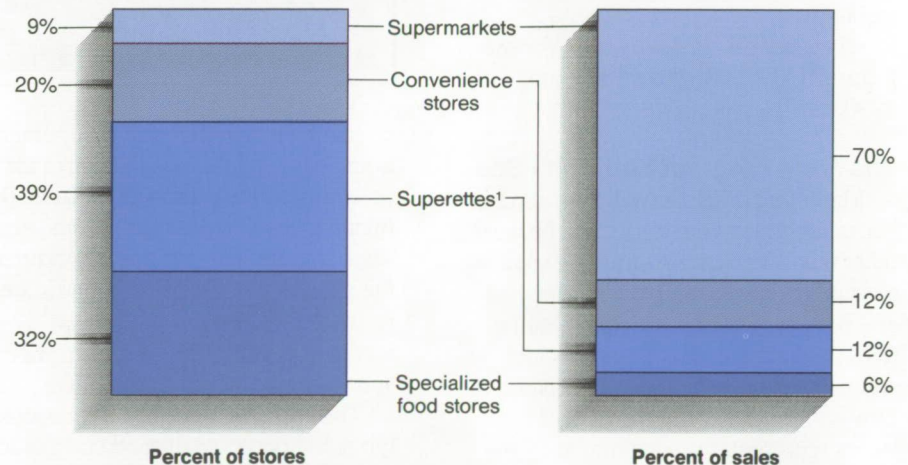
6%

¹Grocery stores with less than \$2.5 million in annual sales.

Source: Food Marketing Review, 1989, USDA, ERS, AER Forthcoming.

The number of retail food stores contrasts sharply with their relative sales. Supermarkets, for example, accounted for 70 percent of sales in 1988, but only 9 percent of retail food stores. Specialized food stores, such as bakery shops, produce markets, butcher shops, and fish and seafood markets, ranked second in number of establishments but had the smallest share of sales. Superettes represented 39 percent of all food stores in 1988. These outlets had many of the same departments found in supermarkets but lacked the minimum annual sales volume to qualify as supermarkets.

Supermarkets Account for Largest Share of Sales, but Smallest Share of Outlets



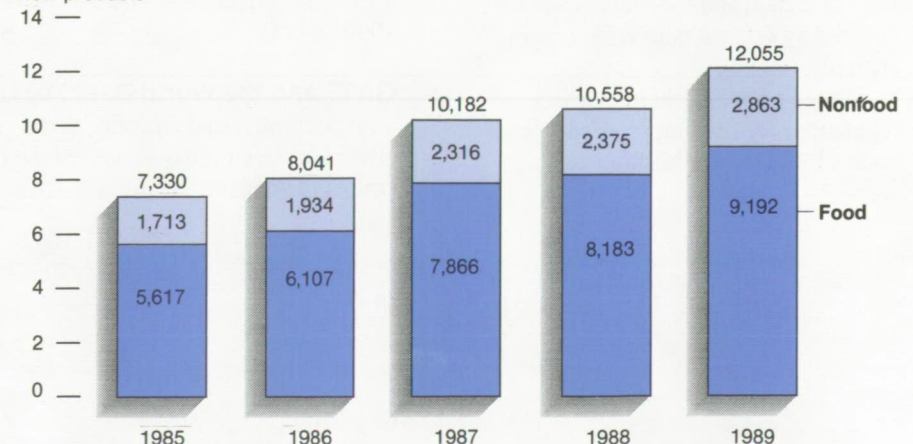
¹Grocery stores with less than \$2.5 million in annual sales.

Source: Food Marketing Review, 1989, USDA, ERS, AER Forthcoming.

Over 12,000 new food and grocery products were introduced in 1989 (excluding new size introductions), compared with about 7,300 in 1985. About 62,000 new products were introduced between 1982 and 1989. However, even a superstore can stock only about 60,000 items. According to industry estimates, 90 to 99 percent of new products fail. Introducing a new product is very expensive, but success can be extremely profitable.

New Product Introductions Rose About 14 Percent Between 1988 and 1989

Thousands of new products



Source: Gallo, Anthony E. The Food Marketing System in 1989. USDA, ERS, AIB-603, May 1990.

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