Food Manufacturing

J. Michael Harris

U.S. food shipments continue to trend upward in a maturing domestic market. Manufacturers are seeking to increase sales, profits, and market share through reorganization, industrialization, expanding exports and foreign growth, cost controls, and new value-added product development. While food shipments reached over $495 billion in 1999, profit growth fell. In 2000, U.S. processed food exports increased to $30 billion, but food trade still experienced a trade deficit. U.S. foreign investment also increased and reached over $33 billion in 1998, while foreign investment in the United States declined. Advertising expenditures for food products increased to almost $7.3 billion in 1999.

Introduction

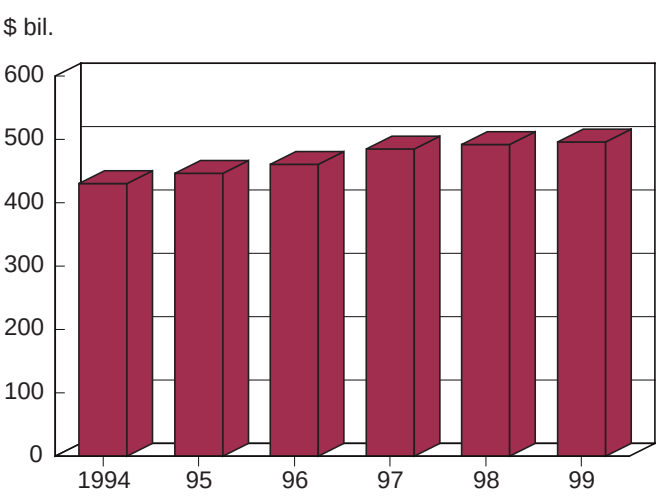
The food processing and beverage industry accounts for about one-sixth of the U.S. manufacturing sector's activity (*U.S. Industry and Trade Outlook 2000*), but has undergone significant reorganization as profits slide. Food manufacturers continue to attempt to increase income and market share through consolidation, foreign growth, and new product development (*Food Engineering*). Food manufacturing plants are growing more automated and integrated to realize economies of industrialization.

Value of Shipments and Value Added Increase

Due to a maturing domestic food market, the (nominal) value of U.S food processing shipments grew less than 3 percent annually from 1995 to 1999 (fig. 1-1). Total shipments of over $495 billion in 1999 represented less than 1 percent growth over 1998 and just over a 2-percent increase from 1997 (app. table 2). Food manufacturers continue their attempts to increase sales, profits, and market share through restructuring, expanding foreign market opportunities, reducing costs, and introducing new products (including value-added products).

Manufacturers continue to increase the value added to food products. Value added by manufacturers (the difference between most costs of production—such as labor, capital, and materials—and value of shipments) increased 23 percent from $157.2 billion in 1992 to $193.1 billion in 1997 (app. table 12) when measured as the ratio of value added relative to shipment value. Ratios across industries varied widely in 1997. Most of the meat, dairy, and fats/oils industries have ratios less than 30 percent, due to the higher cost of raw inputs (relative to the price of finished products) and to relatively modest transformation of these inputs.

Figure 1-1
Processed food shipments



Source: Annual Survey of Manufactures.

On the other hand, higher ratios are realized in highly processed, highly differentiated, packaged convenience products such as bakery goods. Bakery products showed value-added/shipment value ratios higher than 60 percent in 1997. Beverages also exhibit 50-percent-plus ratios mainly due to low material costs, intense advertising, and high marketing expenses.

The Food Processing and Beverage Industry

This industry includes firms and their establishments that manufacture or process foods and beverages for human consumption and other related products such as manufactured ice, chewing gum, vegetable and animal fats and oils, and prepared feeds for animals and fowls.

Traditionally, statistics on this industry have been reported according to the Standard Industrial Classification System (SIC) under the major industry called food and kindred products (SIC 20). Food and kindred products consists of nine industry groups (3-digit SIC groups): meat products; dairy products; canned, frozen, and preserved fruits, vegetables, and food specialties; grain mill products; bakery products; sugar and confectionery products; fats and oils; beverages; and, miscellaneous food preparations and kindred products. These 3-digit groups are made up of 4-digit industries (48 industries).

The U.S. Census Bureau has initiated a new classification system called the North American Industry Classification System (NAICS). The structure of NAICS is similar to SIC at high levels of aggregation. However, under NAICS, food manufacturing (now classified as NAICS code 311) excludes beverages, which are reported under beverage and tobacco manufacturing (NAICS code 312). The two systems are not directly comparable due to differences within major groups (i.e., at the SIC 3 and 4 digit level).

Employment Increases Slightly

The food processing industry employed almost 1.7 million production workers in 2000 (table 1-1), a slight increase compared with 1999 (app. table 11). Meat processing was the largest employer, accounting for 30 percent of workers. Fruit and vegetable processing was second (13 percent), followed by bakery products (12 percent).

Cost of Inputs Down

Food manufacturers paid about 12 percent less for crude foodstuffs and 4 percent less for intermediate materials (such as packaging, ingredients, etc.) in 2000 compared with 1997 (app. table 36). Total purchases of inputs and intermediate materials for the 49 food manufacturing industries totaled over $123 billion in 2000 (app. table 25).

In 1996 (the most recent year with detailed data), about 10 percent of all farm output was purchased through production contracts (entered before production begins), and another 8 percent came from farms owned by food processing firms (vertical integration) (table 1-2). Another 27 percent of farm output was purchased through marketing contracts (agreements to market output after production has already begun) (table 1-3).

Establishments Increase in Select Industries

The number of food processing plants rose 5 percent from 20,805 in 1992 to 21,835 in 1997, according to the last available census (table 1-4). However, this recent gain reflects increases in a few selected industries where the number of small food processors has been increasing (e.g., over 500 small salsa makers started operation in 1992-97). Over the last two or three decades, nearly every food processing industry has seen declines in the number of establishments (Connor and Schick, 1997). Still, the prepared foods industry added 800 establishments from 1992 to 1997, followed by bakery products (232) and beverages (179). Dairy lost the most establishments—190.

New plants are concentrated in industries with growing markets and large numbers of new product introductions (Connor and Schick, 1997). Examples include dairy substitutes, frozen convenience foods, corn-based snacks, refrigerated pasta entrees, and other refrigerated food products. Small-scale entry into growing niche markets has also grown significantly.

Mergers and Acquisitions

Mergers and acquisitions in food manufacturing reached 269 in 1999, but fell to 198 in 2000 (table 1-5). Despite the decline, the industry remains in a period of consolidation, and more transactions are pending (see box, p. 7).

In 1998, H.J. Heinz led transaction activity with acquisitions or controlling interest of food processors in four countries, plus acquisitions of co-packer Thermo-Pac, soup maker Quality Chef, and a minority interest in Hain Food Group. Smithfield has also risen to fourth largest beef packer through a series of smaller packer acquisitions.

Table 1-1—Employment and earnings in food processing, 2000

Industry	Number of employees	Number of workers	Avg. hourly earnings	Avg. weekly earnings	Avg. weekly hours
	---------- *1,000* ----------		---------- *Dollars* ----------		
Meat	504.5	428.5	10.24	424.96	41.5
Dairy	144.6	101.6	14.43	606.06	42.0
Preserved fruits/vegetables	222.5	185.9	12.11	489.24	40.4
Grain mill products	123.4	87.2	15.26	685.17	44.9
Bakery products	201.6	141.3	13.10	534.48	40.8
Sugar and confections	89.4	70.7	14.42	594.10	41.2
Fats and oils	28.6	19.7	13.68	574.56	42.0
Beverages	184.9	91.7	16.39	708.05	43.2
Miscellaneous food	172.4	123.2	11.25	438.75	39.0
All food processing	1,671.9	1,249.2	12.41	513.77	41.4

Source: Employment and Earnings.

Table 1-2—Production contracts and ownership integration

	Production Contracts[1]			Ownership Integration[2]		
Product	1980	1990	1996	1980	1990	1996
			Percent			
Crops:						
Feed grains	1	1	<1	1	1	1
Hay	<1	1	<1	0	0	0
Food grains	1	<1	<1	1	1	1
Vegetables for fresh market	18	21	22	35	40	40
Vegetables for processing	94	95	97	4	4	2
Dry beans and peas	2	1	<1	1	1	1
Potatoes	50	48	44	35	40	44
Citrus fruits	0	0	0	11	8	7
Other fruits and nuts	0	0	0	25	25	25
Sugar beets	99	99	99	1	1	1
Sugar cane	38	42	48	62	58	52
Cotton	1	<1	<1	1	1	1
Tobacco	1	9	9	2	2	2
Soybeans	1	<1	0	<1	<1	<1
Livestock:						
Fed cattle[3]	0	0	0	4	5	3
Calves, slaughter[3]	0	0	0	2	7	12
Other cattle and calves	3	2	2	0	0	0
Sheep and lambs[3]	0	0	0	9	29	14
Market hogs	2	9	30	2	6	11
Fluid-grade milk	<1	0	<1	0	0	0
Manufacturing-grade milk	0	0	0	1	1	<1
Market eggs	45	40	37	43	54	58
Hatching eggs	70	70	74	30	30	26
Broilers	87	86	85	12	13	14
Market turkeys	52	55	56	28	28	32
Total farm output[4]	10	10	10	6	7	8

[1] Contracts entered into before production begins, excludes marketing contracts.

[2] The same firm owns farms and other vertically related operations such as a hatchery, feed mill, processing plant, or packer-shipper. Excludes direct marketing to consumers such as producer-dealers of milk, roadside stands, or pick-your-own operations.

[3] Feeding of livestock by the meatpacker, some of which is under contract in feedlots owned by others.

[4] The percent of total farm output under production contracts and ownership integration includes only the products listed in the tables and calculated using the same weights in each year so that changes in the share of, say, broilers do not affect the figure. The weights are the average share of cash receipts of each product in 1980, 1990, and 1996.

Source: Alden Manchester, Economic Research Service.

Table 1-3—Marketing contracts, including forward contractors[1]

Product	1980	1990	1996
		Percent	
Crops			
Feed grains	6	6	18
Hay	0	0	0
Food grains	7	7	14
Vegetables for fresh market	0	0	0
Vegetables for processing	0	0	0
Dry beans and peas	23	26	26
Potatoes	0	0	0
Citrus fruits	84	70	88
Other fruits and nuts	35	40	43
Sugar beets	0	0	0
Sugarcane	0	0	0
Cotton	16	12	35
Tobacco	1	1	<1
Soybeans	9	6	17
Livestock			
Fed cattle	10	12	18
Sheep and lambs	7	7	7
Market hogs	2	<1	<1
Fluid-grade milk	92	93	94
Manufacturing-grade milk	60	82	89
Market eggs	5	2	2
Hatching eggs	0	0	0
Broilers	0	0	0
Market turkeys	10	5	5
Total output[2]	21	21	27

[1] A contract to market output that is already committed, such as an annual crop already planted, output from perennials (as trees), or continuously produced products such as milk and eggs. Includes most contracts with marketing cooperatives (for milk and eggs), but not those for broilers and hogs, which are resource providing production contracts. Forward contracts are contracts entered into after production has begun (for example, the corn has been planted), specifying where the product is to be marketed and the price or the method of determining price.
[2] The percent of total farm output under production contracts and ownership integration includes only the products listed in the table and is calculated using the same weights in each year so that changes in the share of, say, broilers do not affect the figure. The weights are the share of cash receipts of each product in 1980, 1990, and 1996.

Source: Alden Manchester, Economic Research Service, USDA.

Table 1-4—Number of food processing establishments

Industry	1992	1997	Change
Food	20,805	21,835	1,030
Meat	3,242	3,164	-78
Dairy	2,024	1,834	-190
Fruits and vegetables	2,052	2,117	65
Grain mill products	2,618	2,531	-87
Bakery products	3,152	3,384	232
Sugar	1,129	1,259	130
Fats and oils	540	519	-21
Beverages	2,064	2,243	179
Other prepared foods	3,984	4,784	800

Source: Census of Manufactures.

There are several possible reasons for the most recent wave of mergers and consolidation in food manufacturing. First, consolidation is continuing in the processed food and beverage markets as less efficient plants close or merge with more efficient plants (*U.S. Industry and Trade Outlook 2000*). Second, consolidation can be a fast route to broadening a firm's product lines and acquiring additional market share in a mature domestic market. Third, food manufacturers may engage in defensive mergers to counter the purchasing clout provided by merger and acquisition activity in food retailing. Supermarket chains have been consolidating to improve operating efficiencies and economies of scale in the face of increasing competition from mass merchandisers and club stores (see "Food Retailing").

Concentration Continues To Increase

Continued consolidation and industrialization in the food processing industry is increasing concentration. These structural changes are driven by economies of firm size, economies of scope, specialized production methods, more capital-intensive technology, higher productivity, and efficiencies from vertical coordination. The ultimate result is greater concentration (greater proportion of sales held by fewer firms). Aggregate concentration in food processing can be expressed as the share of the market controlled by the top food processing firms. The top 20 firms' share rose from 36 percent of industry sales in 1987 to 43.7 percent in 1992, and to 51 percent in 1997.

In red meatpacking, market share of the four largest firms rose from 47 percent in 1987 to 61-63 percent since 1993. In steer and heifer slaughter, this same measure rose from 70 percent in 1989 to 81 percent in 1999, with most concentration occurring prior to 1989. Four-firm concentration in hog slaughter also increased from 30 percent in 1989 to 57 percent in 1999.

Other processing industries have also concentrated. In pasta, the four largest processors increased share from 42 percent in 1982 to 78 percent in 1992. In malt beverages, this measure increased from 77 percent in 1982 to 90 percent in 1992. Larger dairy processing firms also account for an increasing share of dairy sales. In 1998, companies with $800 million or more in sales accounted for 69 percent of U.S. dairy sales. Large U.S. dairy cooperatives gained market share (from 17 percent in 1975 to 27 percent in 1998) relative to proprietary dairy companies (39 percent to 42 percent).

Leading Mergers and Acquisitions, 1999-2001

Transaction	Value
Unilever's acquisition of Best Foods	$20.3 billion
Philip Morris' acquisition of Nabisco holdings	$14.9 billion
General Mills acquisition of Pillsbury	$10.4 billion
Kellogg's acquisition of Keebler Food Company	$4.0 billion
Tyson's acquisition of IBP	$3.2 billion
Unilever's acquisition of Slim Fast foods	$2.3 billion
Proctor and Gamble's acquisition of Iams Company	$2.05 billion
Coca-Cola's acquisition of Orangina	$780 million
Smithfield's acquisition of hog-producer Carroll Foods	$500 million
Nabisco's acquisition of Favorite Brands	$475 million
Unilever's acquisition of Ben and Jerry's	$326 million

Table 1-5—Mergers and divestitures in food processing

Year	Acquisitions by U.S. food processing firms	Acquisitions by all other firms	Total acquisitions	Divestitures
1982	165	85	250	120
1983	174	51	225	85
1984	178	64	242	100
1985	212	79	291	103
1986	NA	NA	347	150
1987	220	81	301	116
1988	229	122	351	161
1989	188	89	277	119
1990	148	60	208	108
1991	135	46	181	78
1992	163	54	217	119
1993	207	59	266	121
1994	185	47	232	103
1995	183	61	244	101
1996	158	52	210	105
1997	112	46	158	53
1998	222	29	251	35
1999	240	29	269	45
2000	171	27	198	25

NA = Not available.

Source: Compiled by ERS from *Food Business Mergers* and *Acquisitions*, Food Institute.

Mergers and acquisitions have driven concentration in the food processing industries. Company failures accounted for little of the trend. From 1993 to the first half of 1998, dairy processors accounted for 69 mergers and acquisitions, meat processors for 60, soft drink bottlers for 53, snack food processors for 44, and poultry processors for 32. In 2000, mergers and acquisitions took place in 18 of the 27 food or food-related categories tracked by the Food Institute.

Market Competition

U.S. consumers had about 40,000 food products to choose from in the typical supermarket in 2000, as more than 16,000 food processing firms competed vigorously for a greater share of the consumer food dollar. Food processors use both price and nonprice strategies to gain consumer acceptance and retail shelf space in the branded product market. Over 80 percent of U.S. grocery

products are nationally or regionally branded; the remaining products are unbranded, private label, or generic products. In produce, nearly 19 percent of U.S. sales were nationally branded in 1997, and this figure is rising. Branding of cut meats, especially poultry, has been increasing. Differentiation through new product introductions and advertising is being applied even for traditionally undifferentiated products such as red meats, poultry, fish, and some dairy products.

Advertising is typically used to differentiate food product brands and create brand loyalty. In 1999, brand food processors spent almost $7.3 billion in direct consumer media advertising (app. table 30). Prepared and convenience food processors advertised most with expenditures at $1.3 billion, followed by alcoholic beverages ($1.25 billion) and confectionery and snacks ($1.2 billion).

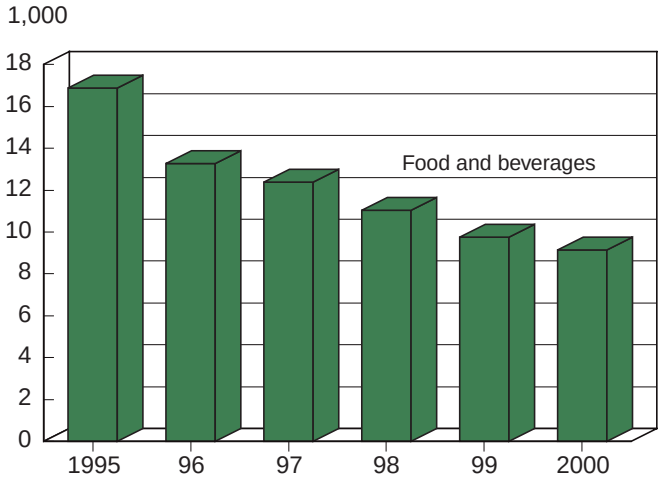
New Products Decline

The trend in new food product introductions continues to decline from its peak in 1995 (fig. 1-2). In 2000, new product introductions totaled 9,145, down nearly 46 percent from the peak level of introductions in 1995 (app. table 33).[1] The trend toward consolidations may have limited new food product introductions since redundancy may result when parallel product lines merge. Efficient consumer response (ECR) technology may have also slowed new product introductions since it allows more consumer research before introduction of new products. Finally, some food product categories may be reaching saturation. Instead of providing more value to consumers, new products may create consumer confusion over virtually identical products.

New product introductions are most prevalent in convenience food products, organic and natural foods, and functional foods (*New Product News*). New value-added convenience foods (e.g., skillet meals) reflect food processors' efforts to recapture sales lost to increased food-away-from-home expenditures. "All natural" foods have led new product introductions of foods with nutrition or health claims (table 1-6). Reduced/low-calorie, reduced/low-sugar, and reduced/low-fat products, in general, have declined since their peak in 1995-96 (despite a spike in 2000).

[1] Recently released data indicate that new product introductions increased slightly in 2001, and in the first 2 months of 2002, there have been twice as many introductions compared to the corresponding months of 2001. It remains uncertain as to whether this represents a shift in the downward trend established since 1995.

Figure 1-2
New food product introductions



Source: *New Product News*.

Coupon Promotion

Food processors vie for space on America's grocery shelves not only by paying slotting fees (fees paid to get new products on shelves), but also through trade promotion. Trade shows, discounts and allowances, coupon processing fees, special promotion incentives and prizes, advertising allowances, and instore displays are all part of processors' promotion expenditures.

Processors use couponing to promote their products (fig. 1-3). In 2000, 166 billion grocery coupons were distributed, down 4.1 percent from 1999 but up 3 percent from 1998 (Food Institute). Despite overall decline, some grocery categories garnered as much as 22 percent more coupons in 2000. U.S. shoppers redeemed 3.5 billion of the grocery coupons available (fig. 1-4). While internet coupons accounted for a minute portion (less than 0.1 percent) of coupons issued, the redemption rate is 7.5 percent compared with 1.5 to 2 percent for coupons offered through newspapers and mailing (*U.S. Industry and Trade Outlook 2000*).

Domestic Performance

The aggregate performance of the 49 food processing industries was better than that of the rest of U.S. manufacturers in 2000. Performance can be based on profitability; productivity; capacity utilization; capital expansion; investment; producer, consumer, and farm prices; and return on investment. These meas-

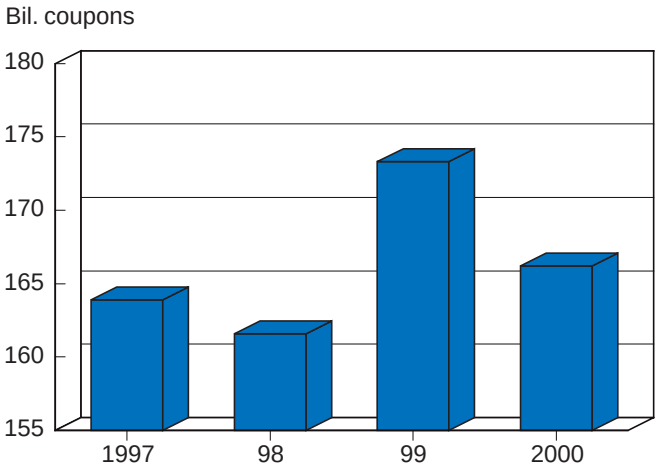
Table 1-6—New product introductions bearing nutritional claims, 1994-2000

Category[1]	1994	1995	1996	1997	1998	1999	2000
				Number			
Added/high calcium	23	21	35	28	45	119	158
No additives/preservatives	251	167	143	142	149	346	269
Low/no cholesterol	372	163	223	106	124	244	189
Added/high fiber	26	40	12	33	43	67	81
Reduced/low salt	274	205	171	87	80	97	131
Organic	446	538	645	505	842	783	844
All natural	575	407	645	587	743	522	1,130
Reduced/low calorie	575	1,161	776	742	456	302	261
Reduced/low sugar	301	422	373	78	164	74	61
Reduced/low fat	1,439	1,914	2,076	1,405	1,180	481	1,057

[1] Nutritional claims categories are not additive since new products may carry more than one claim.

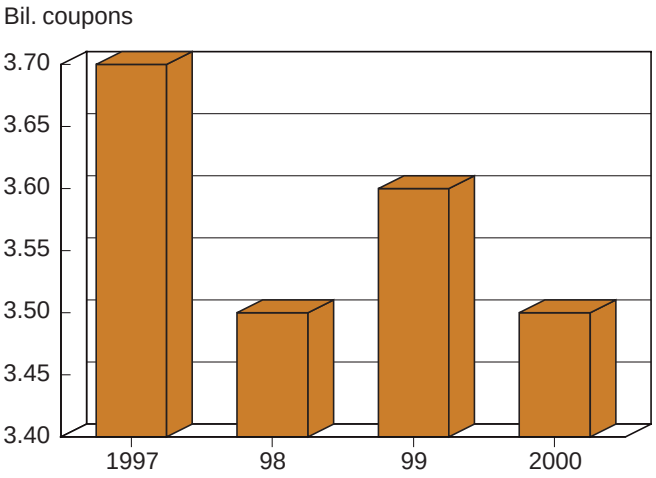
Source: ERS, USDA / *New Product News*.

Figure 1-3
Grocery coupon distribution



Source: Food Institute/NCH NuWorld Marketing Ltd.

Figure 1-4
Grocery coupon redemption



Source: Food Institute/NCH NuWorld Marketing Ltd.

ures can vary widely among individual industries, with detailed information often unavailable. However, composite indicators provide a performance reading among the food manufacturing industries.

Profits

After-tax profits (return on investment) in food manufacturing and kindred products increased in 2000 (fig. 1-5, app. table 22). Return on stockholders' equity increased 3 percentage points, from 21.1 to 24.1 percent, from 1999 to 2000. Return on equity has been increasing since 1993 when it stood at 13.5 percent. Return on assets increased from 6.6 percent to 7.3 percent from 1999 to 2000, its highest level since 1989 (8.2 percent).

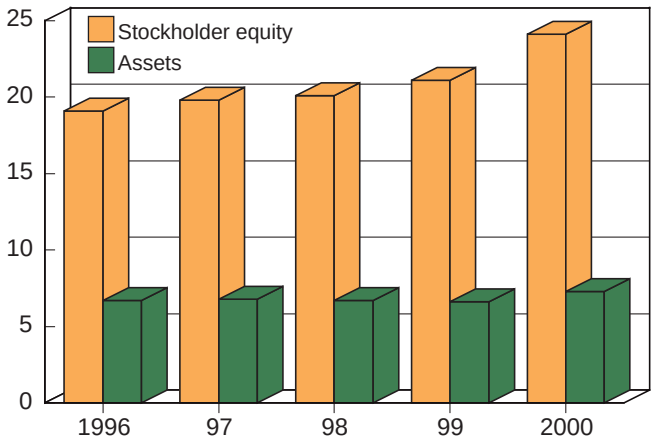
Productivity

Productivity is a measure of economic efficiency that shows how effectively economic inputs are turned into output. The multifactor (capital, labor, and raw materials) productivity index for U.S. food manufacturing increased from 101.2 in 1998 to 103.3 in 1999 (app. table 20), the largest gain since 1995. Capital services led, gaining 3.2 points, and labor productivity was up 2 points. Purchased services and materials both declined over 3 points from 1998 to 1999.

Labor productivity has increased at varying rates among reported industries (app. table 24). Candy and confectionery gained almost 17 points between 1998 and 1999, bakery gained over 10 points, and red meat posted nearly a 2-point gain in labor productivity. Malt beverages declined 8 points.

Figure 1-5

Returns on food manufacturing stockholder equity and assets



Source: Quarterly Financial Reports.

Capacity Utilization

Food processing plants operated at varying rates of capacity in 1999 (app. table 21). Overall, capacity utilization (based on full production) ran at 74 percent for food manufacturing, excluding beverages (70 percent). Both food manufacturing and all manufacturing had the same capacity utilization rates (based on full production) in 1999. Rates range from 62 percent in seafood to 85 percent in meat product manufacturing. Capacity rates are mainly affected by capital expenditures, capital retirements, workforce changes, price changes, and changes in product mix (*Survey of Plant Capacity*).

Capital Expenditures

Capital expenditures for food manufacturers increased almost 13 percent from 1998 to 1999 (app. table 28). The beverage industry, bakeries and tortilla manufacturing, meat product manufacturing, and fruit and vegetable processing each had expenditures exceeding $2 billion. Renovations and plant expansions led new construction projects in 1999, accounting for 68 percent of new projects (*Food Engineering)*. In 1997 and 1998, renovations and expansions made up 64 percent of new projects by food manufacturers, with new plant construction comprising 36 percent.

International Performance

Globalization of the processed food and beverage markets (both foreign trade and investment) is increasing rapidly since most food manufacturers face mature domestic markets. Foreign markets can provide opportunities to increase sales and market share. According to *Prepared Foods*, 40 percent of the world's top 50 food processing firms in 1998 were U.S./Canadian-based companies. Europe, in total, accounted for 34 percent.[2] The Asian-Pacific area accounted for 24 percent of the top food processing firms.

U.S. Dominates Trade

The United States is the world's largest importer and exporter of processed food and beverage products, with exports over $30 billion in 2000 and imports approaching nearly $37 billion (fig. 1-6, app. table 37). Meat products was the largest export ($8.9 billion), followed by miscellaneous foods ($4.7 billion), grain mill ($4 billion), fats and oils ($3.3 billion), and fruits and vegetables ($3.3 billion). U.S. imports were led by miscellaneous processed foods ($11.9 billion), mostly fresh fish, followed by beverages ($8.1 billion), meat products ($4.2 billion), fruits and vegetables ($3.8 billion), and sugar and confectionery ($3.5 billion). The top five destinations for U.S. processed food exports were Japan, Canada, Mexico, South Korea, and Hong Kong. The top originating countries for U.S. imports were Canada, Mexico, Thailand, France, and Italy.

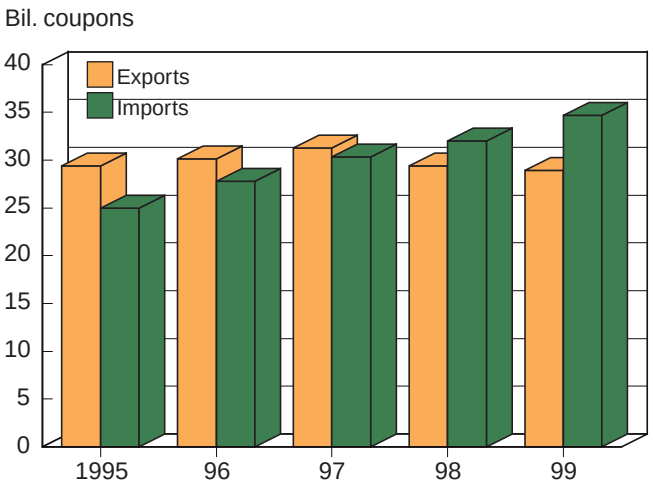
Trade Deficit Widens

In 2000, the United States had a negative trade balance for all processed foods, totaling almost $7 billion, which has existed since 1998 (fig. 1-6, app. table 38). Only three categories of processed food had a trade surplus: meat products ($4.8 billion), grain mill products ($2.7 billion), and fats and oils ($1.7 billion). Miscellaneous prepared foods was the largest contributor to the deficit ($7.3 billion), followed by beverages ($5.6 billion).

The United States has experienced a food trade deficit due to the current world economic situation and the strength of the U.S. dollar (*U.S. Industry and Trade Outlook 2000*). Exports of more price-sensitive products, such as fats and oils and wet corn milling, have declined as well. U.S. exports of higher value branded food products have increased due to their popularity abroad. While the strong U.S. dollar dampens the overall demand for U.S. processed food exports, it encourages additional imports of processed food. Increases in imports come mainly from branded, consumer-ready products, rather than lower valued products with less processing.

[2] These numbers were generated by combining *Prepared Food's* lists of top international food processing firms.

Figure 1-6
U.S. processed food imports and exports



Source: ERS, USDA.

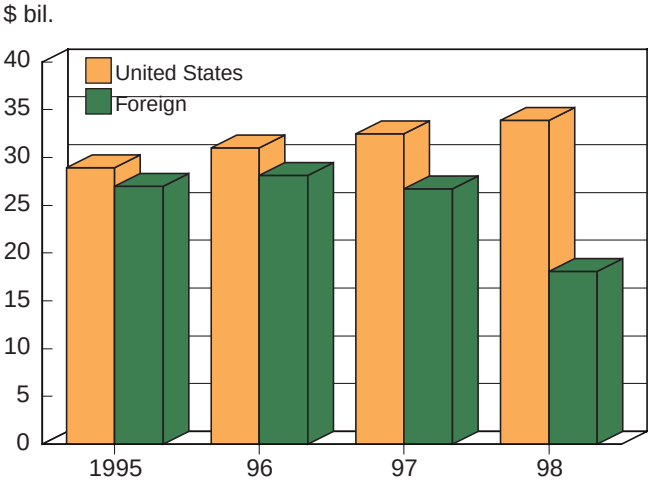
Expansion Abroad

U.S. foreign direct investment in food manufacturing abroad totaled $33.9 billion in 1998, while foreign investment in U.S. food manufacturing totaled $18.1 billion (fig. 1-7). Sales for U.S. affiliates of foreign firms totaled $49.8 billion in 1998 (app. table 43), while sales by foreign affiliates of U.S. firms totaled $133.1 billion (app. table 42).

Direct foreign investment abroad continues to increase. Investment in foreign affiliates by U.S. firms increased 17 percent from 1995 ($28.9 billion) to 1998 ($33.9 billion), while sales of these firms increased from $113.2 billion to $133.1 billion. Over the same period, the number of U.S. parent companies declined from 77 to 72, while the number of affiliates increased from 764 to 823. U.S. companies continue to invest in joint ventures with existing foreign firms rather than start from scratch in foreign markets.

Direct foreign investment in U.S. food manufacturing declined nearly 36 percent from its peak in 1996 ($28.1 billion) to 1998 ($18.1 billion). Sales by these firms were also down nearly 8 percent, from $54 billion to $49.8 billion. However, sales by U.S. affiliates in the dairy sector were up over 27 percent, and bakery sales were up nearly 252 percent. The number employed by these affiliates was down to 159,000 in 1998, compared with 229,000 in 1995 (app. table 43). The strengthening U.S. dollar may explain the declines in direct foreign investment in U.S. food manufacturing.

Figure 1-7
U.S. direct foreign investment abroad and foreign investment in the U.S., food manufacturing



Source: *U.S. Direct Investment Abroad*, Bureau of Economic Analysis.

References

Cahners Business Information, Food Engineering, Highlands Ranch, CO, various issues.

Connor, John M., and William A. Schick, *Food Processing*: *An Industrial Powerhouse in Transition*, Second edition, John Wiley and Sons, 1997.

The Food Institute, *Food Business Mergers and Acquisitions*, Elmwood Park, NJ, various issues.

The Food Institute, *Food Institute Report*, Elmwood Park, NJ, various issues.

Mintel International Group Ltd., *GNPD/New Product News*, Chicago, IL, selected issues.

U.S. Census Bureau, *Survey of Plant Capacity*, Washington, DC, March 1999.

U.S. Department of Commerce, *U.S. Industry and Trade Outlook 2000*, McGraw-Hill, NY, 2000.