AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search
http://ageconsearch.umn.edu
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

Cost Components of Farm-Retail Price Spreads for Selected Foods

ECONOMIC RESEARCH SERVICE
UNITED STATES DEPARTMENT OF AGRICULTURE

AGRICULTURAL ECONOMIC REPORT NO. 343

COST COMPONENTS OF FARM-RETAIL PRICE SPREADS FOR SELECTED FOODS, by the National Economic Analysis Division and Commodity Economics Division, Economic Research Service, U. S. Department of Agriculture. July 1976. Agricultural Economic Report No. 343.

ABSTRACT

The farm-retail price spread accounts for over half of each dollar consumers pay for most food products in retail stores. The farm-retail spread measures the marketing charges for assembling, transporting, processing, and distributing food products. Cost of these functions and of various inputs, such as labor and packaging, varied widely in 1974 for 16 products studied. Costs of assembling products from farmers averaged only 2 to 3 percent of the retail price of most products. Processing costs were about a third of the retail price of canned tomatoes, margarine and bread, but less than 15 percent of the price of beef, pork, broilers, eggs, and milk which are changed relatively little after they leave the farm. Estimated labor and packaging costs accounted for half or more of the processing costs for most products. Food transportation costs were highest for fresh fruits and vegetables, accounting for 10 to 15 percent of the retail price of potatoes and California lettuce and oranges. Costs of wholesaling, consisting of warehousing and local delivery, ranged between 5 and 8 percent of the retail price. Retailing margins were less than 25 percent of the retail price for all items except fresh oranges, potatoes, and lettuce. Labor costs made up about half of the store margin, while rent averaged around 7 percent.

Keywords: Food, marketing, costs, price spreads.

Washington, D. C. 20250 July 1976

PREFACE

The Economic Research Service (ERS) computes farm-retail price spreads monthly for a market basket of foods and 65 individual items from U. S. average retail prices and prices received by farmers for commodities. For the past 3 years, ERS has estimated the cost and profit components of farm-retail price spreads for selected foods. This report presents estimates of how price spreads for 16 foods were divided among marketing functions (processing, retailing, etc.) and among cost items (labor, packaging, and rent, etc.) and profits in 1974. Basic data underlying the breakdown of price spreads were generally less complete and less representative of costs than were the prices used to compute total farm-retail price spreads. The estimates often represent combinations of data from various sources that have been adjusted to fit the farm-retail spread. Despite these limitations, we believe the estimates provide valuable insights to those interested in more detailed information about costs of food marketing.

Commodity specialists in the Commodity Economics Division of ERS had responsibility for developing the estimates of margins and costs from the farm through the wholesale level:

Beef and Pork - Lawrence Duewer
Broilers and Eggs - George Rogers
Fluid Milk - Charles Shaw
Butter - William Jones
Fruits and Vegetables - N. A. Wynn, Edward Jesse, Glenn Zepp, Stanley Johnson, John Baritelle.
Bread - James Driscoll
Vegetable Oil Products - Harry Doty

Terry Crawford and Gerald Feaster of the National Economic Analysis Division derived the estimates of retailing costs. Denis Dunham, of the same division, coordinated preparation of the report.

CONTENTS

	Page
Summary	iii
Calculation and Interpretation of Price Spreads	1
Trends in Price Spreads	2
Costs and Profit Components of Price Spreads: Estimating Procedures and Problems	2
Beef and Pork	7
Broilers and Eggs	13
Fluid Milk	17
Butter	20
Fruits and Vegetables	25
Fresh Oranges	27
Canned Tomatoes and Tomato Catsup	30
Frozen Concentrated Orange Juice	35
California Lettuce	37
Potatoes	41
White Pan Bread	45
Vegetable Oil Products	51
Retailing Margins and Costs	58

SUMMARY

About three-fifths of each food dollar spent by U. S. consumers in retail foodstores in recent years has gone to pay the costs of marketing. Farmers have received the remaining two-fifths for producing the food items. A breakdown of the marketing spread for 16 food items studied shows wide variation in costs of marketing functions such as retailing and expense items such as labor.

Costs of marketing largely reflect the complexity of the processing that is performed and the characteristics of products, such as their perishability and bulkiness. For most food commodities, the marketing process begins with the gathering or assembly of products from farmers at some local collection point such as a grain elevator, livestock auction, packing shed, or processing plant. The assembly function, which usually consist of buying, transporting, and storing the products, costs the least of the principal marketing functions, averaging 2-3 percent of the retail price.

The more a commodity is changed from the time it leaves the farm until it reaches the consumer, the higher the processing function costs and, usually, the smaller the farmer's share. For instance, processing costs make up about one-half of the retail store price of catsup and canned tomatoes, and one-third of the price of margarine and other vegetable oil products. Similarly, charges for bread processing, which involves milling wheat and making, baking, slicing, and wrapping the bread, represent nearly a third of the retail price per loaf. In contrast, processing cost less than 15 percent of the retail price of beef and pork, broilers and eggs, and fluid milk -- all items changed relatively little after they leave the farm. Although fresh fruits and vegetables also are not altered very much after leaving the farm, costs for grading, containers, packing, and related activities run between 15 and 20 percent of the retail price. Transportation costs also are relatively high because of the items' perishability, and the long distances they must be shipped to market. Shipping costs for potatoes and California lettuce and oranges, for example, reached 10-15 percent of the retail price in 1974. In contrast, shipping costs for meats, broilers, eggs, and butter, all items relatively high in value, accounted for only 2 percent of the retail price.

Labor and packaging materials, the largest cost items in processing, together represent half or more of this function's costs. Labor was the major cost for beef, pork, and broilers. Packaging materials were a greater expense item than labor for several products, including eggs, canned tomatoes, catsup, and frozen orange juice. Most other costs, such as business taxes, depreciation, repairs, and energy, usually make up less than 5 percent each of the total processing margin.

Charges for the wholesaling function range between 5 and 8 percent of the retail selling price of most food products. Middle link in the marketing process, wholesaling involves warehousing and local delivery to retail stores. Such costs for bread, normally delivered to stores by driver salespeople instead of moving through retailers' warehouses, made up one-fourth of the retail price in 1974. This relatively high cost stems from the fact that several bakeries may deliver to a store, often more than once a day, to maintain adequate shelf supplies. Wholesaling costs for milk are relatively high because of high labor costs connected with the route driver method of delivery.

Costs of production, processing, transportation, and wholesaling account for about four-fifths of the consumer's food dollar. The remaining fifth represents retailing costs for a typical supermarket operation. Costs vary widely among the thousands of foods stocked, reflecting the amount of store handling and processing of products, shelf space occupied, special equipment needs such as refrigeration, and rate of sales. Among the 16 products studied, the instore retailing margin ranged from 5 to 43 percent of the retail selling price. But such margins made up less than 25 percent of the retail price for all items except fresh oranges, potatoes, and lettuce. Supermarket margins for these three perishable products average about 40 percent of the retail price mainly because of relatively large spoilage losses and selling space required.

Although most departments of a typical chain supermarket are self-service, many people are needed to operate a store, including checkers, meat cutters, produce clerks, and store managers. Labor costs represent about half of the store's margin and anywhere from 40 to 60 percent of the margin for individual items, depending on the amount of direct labor required in handling and the allocation of indirect store labor cost. All other retailing costs are relatively small. Rent, one of the largest of these, represents around 7 percent of the store margin. Most supermarkets lease the building and land because of the high cost of buying property and the difficulty of acquiring capital. Both electricity and other energy costs and packaging costs accounted for about 5 percent of the margin in 1974, a slightly larger proportion than in 1973. In contrast, advertising costs dropped sharply from 9 percent in 1973 to 6 percent in 1974. Most other expenses, such as repairs, depreciation, and business taxes, made up from 2 to 4 percent of the store margin. Profits before taxes of the typical supermarket also are relatively small, accounting for around 7 percent of the instore margin, or about 1.2 cents out of each sales dollar in 1974.

The farmer's share--two-fifths of the food dollar--basically reflects the amount of resources used in producing the products in relation to the marketing functions that are performed after commodities leave the farm. Thus, the farmer's share has been generally greater for animal products than for crop-based foods.

Cost Components of Farm-Retail Price Spreads For Selected Foods

By the National Economic Analysis Division
and the Commodity Economics Division,
Economic Research Service

The difference between the price paid for a food product by consumers and the farm value of an equivalent quantity of farm product is the farm-retail price spread received by the food industry for processing and distribution. In recent years, the farm-retail spread has accounted for around 60 cents of each dollar consumers spend for food in retail foodstores. This report presents data on price spreads and detailed estimates of costs and profits comprising such spreads for 16 individual foods in 1974.

CALCULATION AND INTERPRETATION OF PRICE SPREADS

Farm-retail spreads are calculated from average retail food prices and from farm values derived from average prices received by farmers. Retail prices come mainly from prices collected by the Bureau of Labor Statistics of the U. S. Department of Commerce for use in preparing the Consumer Price Index. Farm values are calculated from average prices received by farmers published by the U. S. Department of Agriculture's Statistical Reporting Service and spot market prices reported by Market News.

Before the farm value can be calculated, it is necessary to estimate the quantity of a farm product that must be purchased from the farmer to sell a unit of the product at retail. This quantity, the farm product equivalent, is larger than the quantity sold at retail for most foods because part of the farm product is removed in processing or lost from waste and spoilage in marketing. For example, 1.18 pounds of fresh tomatoes must be sold by the grower for each 1 pound sold to consumers. Here, the price spread is the difference between the retail price of 1 pound and the farm value of 1.18 pounds. Similarly, an average of 2.28 pounds of live Choice steer is required to sell 1 pound of Choice beef in retail foodstores. For some products, byproducts having commercial value are obtained in processing. With beef, the value of the hide, tallow, and other byproducts is deducted from the gross farm value to obtain a farm value of live animal from which the food product only is derived. The farm-retail spread for beef becomes the difference between the retail value of 1 pound of Choice beef and the farm value of 2.28 pounds of live animal less the value of byproducts.

The spread between the retail price and the farm value measures variations over time in charges made by agencies moving products from the farmer to the consumer. Changes in price spreads during short periods of time are largely caused by price changes at the farm and retail levels. Longer term spread changes mainly result from changes in costs of labor and other inputs used by marketing agencies. Long-term trends in spreads tend to parallel rather closely movements in the general price level since price spreads reflect the costs of goods and services provided by nonfarm industries.

ERS computes farm-retail spreads monthly for 65 individual products, and for a market basket of all farm foods. For our analysis, we selected 16 leading items from these 65 products.

TRENDS IN PRICE SPREADS

The farm to retail price spread has widened nearly every year for many years. Increases have been largest in the past several years (table 1). In 1974, the increase was 20 percent, nearly three times greater than any previous year-to-year change. For the most part, larger price spreads realized by food firms have mainly gone to pay for higher costs rather than to add materially to profits. Substantial cost increases have occurred in the past few years for nearly every input used by the food industry (table 2). This has been especially true for energy related goods and services, such as packaging materials, transportation services, and utility rates. However, since about half the costs of food marketing firms are for direct labor, much of the increase in price spreads has reflected higher labor costs.

Price spreads vary widely from product to product (table 3). For most grain products and fruits and vegetables, they represent more than half of the retail price, as most of these items require considerable processing and packaging. Price spreads are more nearly equal to the farm value for meat, poultry, and dairy products.

COSTS AND PROFIT COMPONENTS OF PRICE SPREADS: ESTIMATING PROCEDURES AND PROBLEMS

Costs and profits comprising price spreads were estimated for 16 leading farm food items: beef, pork, fluid milk, butter, eggs, broilers, oranges, lettuce, potatoes, bread, canned tomatoes, catsup, frozen orange juice, cooking and salad oil, shortening, and margarine. For each item, estimates were made for 1974 of how the price spread was divided among marketing functions, such as retailing and processing; and among cost items, such as labor and packaging. Cost estimates for most of these foods also have been made for 1972 and 1973. 1/ These estimates for some items are not suitable for comparison because of differences in procedures and data used each year.

1/ Estimates are published in Developments in Marketing Spreads for Agricultural Products in 1973, ERS-14, Econ. Res. Serv., U. S. Dept. of Agr., 1974 and the Marketing and Transportation Situation, Econ. Res. Serv., U. S. Dept. of Agr., November 1974.

Table 1 .--The market basket of farm foods: Retail cost, farm value, farm-retail spread, and farmer's share of the retail cost 1/

Year and quarter	Retail cost	Farm value	Farm-retail spread	Farmer's share
	1967 = 100			Percent
1965	96.0	99.2	93.9	40
1966	101.0	106.3	97.8	41
1967	100.0	100.0	100.0	39
1968	103.6	105.3	102.5	39
1969	109.1	114.8	105.5	41
1970	113.7	114.1	113.4	39
1971	115.7	114.4	116.5	38
1972	121.3	125.1	118.9	40
1973	142.3	167.2	126.5	46
1974	161.9	178.4	151.4	43
1975 2/	173.6	186.8	165.3	42
1973				
I	130.8	149.3	119.1	44
II	138.5	160.5	124.6	45
III	148.4	186.2	124.4	49
IV	151.3	172.7	137.7	44
1974				
I	159.2	185.9	142.2	45
II	160.2	169.0	154.6	41
III	162.0	177.3	152.3	42
IV	166.3	181.4	156.7	42
1975				
I	168.8	172.9	166.3	40
II	170.1	182.5	162.2	42
III	177.6	199.9	163.5	44
IV	177.9	191.8	169.2	42

1/ The market basket contains the average quantities of domestic, farm-originated food products purchased annually per household in 1960 and 1961 by wage earners, clerical worker families, and workers living alone. Its retail cost is calculated from retail prices published by the Bureau of Labor Statistics. The farm value is the gross return to farmers for the farm products equivalent to foods in the market basket. The farm-retail spread--difference between the retail cost and farm value--is an estimate of the total gross margin received by marketing firms for assembling, processing, transporting, and distributing the products in the market basket. Indexes may be converted to dollar totals by multiplying by the following amounts for 1967; retail cost, $1,080.64; farm value, $419.07; and farm-retail spread, $661.57. Quarterly data are annual rates. 2/ Preliminary.

Table 2 .--Prices of inputs bought by food marketing firms, annual 1970-75, quarterly 1975

Year and quarter	Intermediate goods and services 1/				
	Total	Goods			Services 2/
		Total	Containers and packaging materials	Fuel, power, and light	
	1967 = 100				
1970	113	108	108	108	120
1971	120	113	113	120	129
1972	126	118	117	126	138
1973	134	125	123	138	145
1974	159	161	151	202	157
1975 3/	180	188	174	237	172
1975					
I	176	182	173	231	167
II	178	184	174	237	170
III	181	186	174	238	174
IV	184	190	176	241	176

Year and quarter	Hourly 4/ earnings of employees	Railroad freight rates 5/	New plant and equipment 6/	Interest rates 7/	Bond yields 8/
	Dollars	1969=100	1972=100	Percent	Percent
1970	3.03	109	91	8.48	8.04
1971	3.24	122	96	6.32	7.39
1972	3.45	126	100	5.82	7.21
1973	3.66	129	104	8.30	7.44
1974	3.99	149	116	11.28	8.57
1975 3/	4.40	169	132	8.65	8.83
1975					
I	4.27	157	130	9.94	8.71
II	4.34	163	132	8.16	8.87
III	4.43	175	133	8.22	8.91
IV	4.55	179	135	8.29	8.81

1/ Represents all goods except raw materials and plant and equipment, and all services except those performed by employees, calculated from wholesale price relatives. 2/ Rent, property insurance and maintenance, telephone, and so on. 3/ Preliminary. 4/ Weighted composite of production employees in food manufacturing and non-supervisory employees in wholesale and retail trade, calculated from data of the Dept. of Labor. 5/ For food products compiled from data of the U.S. Department of Labor. 6/ GNP implicit price deflator for investment in non-residential structures and producer's durable equiment. U.S. Department of Commerce. 7/ Bank rates on short-term business loans in 35 centers, U.S. Department of Commerce. 8/ Aaa corporate bonds; Moody's Investor Service. These yields indicate the cost of current long-term borrowings.

Table 3.--Farm-retail price spreads for selected foods, 1974-75 1/

Item and retail unit	Retail price		Farm value		Farm-retail spread		Farmer's share	
	1974	1975	1974	1975	1974	1975	1974	1975
	Cents						Percent	
Beef, Choice (1lb.)	138.8	146.0	86.1	92.9	52.7	53.1	62	64
Pork, (1lb.)	108.2	135.0	60.8	86.8	47.4	48.2	56	64
Butter (1lb.)	94.3	102.5	57.0	67.4	37.3	35.1	60	66
Cheese, Am. process (½ 1b)	73.1	76.8	34.0	36.5	39.1	40.3	47	48
Ice cream (½ gal.)	107.4	122.2	40.2	42.4	67.2	79.8	37	35
Milk, fresh (½ gal.)	78.4	78.5	40.8	41.2	37.6	37.3	52	52
Chicken, frying (1lb.)	56.0	63.3	31.6	37.3	24.4	26.0	56	59
Eggs, large grade A(doz.)	78.3	77.0	53.2	50.8	25.1	26.2	68	66
Bread, white:								
All ingredients (1lb.)..	34.5	36.0	8.0	6.8	26.5	29.2	23	19
Wheat (1lb.)	-	-	5.4	4.5	-	-	16	12
Corn flakes (12 oz.)	41.7	51.9	4.8	4.5	36.9	47.4	12	9
Flour, white (5 1b.)	103.0	99.4	44.0	36.0	59.0	63.4	43	36
Rice, long grain (1lb.)	51.6	47.0	19.7	14.3	31.9	32.7	38	30
Apples (1lb.)	34.1	34.0	11.8	11.8	22.3	22.2	35	35
Grapefruit (each)	19.7	21.7	4.3	4.7	15.4	17.0	22	22
Oranges (doz.)	110.9	114.7	25.9	24.9	85.0	89.8	23	22
Cabbage (1lb.)	16.0	16.7	4.9	6.0	11.1	10.7	31	36
Celery (1lb.)	23.9	26.6	6.4	8.4	17.5	18.2	27	32
Lettuce (head)	42.3	41.5	13.2	13.8	29.1	27.7	31	33
Potatoes (10 1b.)	166.4	134.4	59.4	45.4	107.0	89.0	36	34
Tomatoes (1lb.)	54.8	57.8	21.0	23.8	33.8	34.0	38	41
	52.2	60.1	12.5	17.0	39.7	43.1	24	28
Peaches, (no. 2½ can)	52.2	60.1	12.5	17.0	39.7	43.1	24	28
Corn, (no. 303 can)	29.5	38.4	4.0	5.5	25.5	32.9	14	14
Tomatoes, (no. 303 can)	30.0	35.3	3.7	4.9	26.3	30.4	12	14
Orange juice, frozen 6-oz. can	25.9	28.2	9.2	8.6	16.7	19.6	36	30
Potatoes, frozen, french fried (9 oz. package)	22.5	25.6	6.6	4.8	15.9	20.8	29	19
Peas, frozen (10-oz.pkg)	29.0	34.7	5.2	7.1	23.8	27.6	18	20
Margarine (1lb.)	57.4	62.9	27.8	21.0	29.6	41.9	48	33
Salad and cooking oil (24 oz. bottle)	107.4	116.3	44.6	33.5	62.8	82.8	42	29
Vegetable shortening (3 1b. can)	179.0	190.7	98.1	73.7	80.9	117.0	55	39

1/ Data for some items may differ from the breakdown into cost components shown elsewhere in this report because of slight differences in procedures and basic data used.

Breaking down price spreads into component costs and profits is only one step toward appraising them. The main value of the data is largely to indicate the broad functions performed, and the approximate cost of each. These data help identify the cost functions where increased efficiency might have the largest impact on reducing marketing costs and retail prices. However, the feasibility or equity of reducing costs or profits cannot be determined from these data. The cost of processing milk, for example, would have to be appraised in terms of the job to be done, costs of inputs, trends in productivity, and the degree to which firms have adopted the most efficient ways of performing the function.

The procedures and sources of data for the estimates vary widely among the food items and marketing functions because of differences in the availability of data. Margins for the assembly and procurement functions and the processing function were mainly derived using (1) f.o.b. selling prices at wholesale, or some other intermediate pricing point in the marketing channel, and (2) the farm value. For most products, the price spread had to be further allocated--based on estimates of transportation costs, cost studies, or typical markups--to separate assembly and procurement costs from processing costs. Retailing margins were derived from data on gross percentage margins obtained from trade journals and studies of operating results of foodstores. Wholesaling margins could not be estimated directly because of the lack of either adequate data on prices paid by foodstores for food items or cost studies of wholesaling functions. Wholesaling margins for most items are a residual derived by subtracting the total margins for other marketing functions and farm value from the retail price.

Cost and profit components of margins for processing and other functions are based upon firm accounting and operating data obtained from industry surveys and cost studies. Data for most products were obtained from a small nonprobability sample of firms. Most cost estimates for 1974 were derived by updating previous benchmark estimates by price indices for packaging, wages and salaries, and other items representing costs. Cost and profit components of retailing margins are based on 1974 operating results of foodstores.

Estimates of costs and profits cannot be made with precision. They must be treated as approximations because of the limited availability of data. Commonly, more than one product is processed or distributed through the same facilities, and firms often do not have information in the detail needed for cost allocations to specific products. This problem particularly arises for allocating retailing costs because supermarket operators usually only know gross margins and labor costs for major departments. Because most costs are not directly identified with particular products, they must be allocated. For the processing function, minor amounts of costs have not been specifically identified, and they appear under "other costs" in tables. Wholesaling costs were not estimated by cost components for most foods because of lack of data. The total of these costs appears in the tables in the "unallocated" category under wholesaling.

The following sections of the report discuss in more detail how price spreads for the 16 foods were divided among marketing functions and cost items. For the interpretation and use of the data, a description is given of each marketing function. Retail costs are discussed in a separate section since the method and sources of data for these estimates were similar for all products.

BEEF AND PORK

Farmers receive around three-fifths of each dollar the consumer spends for beef and pork, considerably more than for most other farm food products (table 4). Normally, farmers get a little higher proportion for beef than for pork. The farmer's share reflects the amount of resources used to produce beef and pork, relative to the marketing functions performed after these commodities leave the farm. For meat, the marketing spread is fairly large in cents per retail unit, but the relatively high cost of producing beef and pork results in a larger farmer's share than for most products. From 1973 to 1974, the farmer's share declined from 66 to 62 percent for beef, and from 65 to 56 percent for pork. Marketing spreads for beef and pork increased substantially in 1974 as live animal prices fell.

Cost and profit components of the spread between what the farmer receives and the consumer pays for beef and pork are presented in tables 5 and 6. Although the beef industry has been moving rapidly to the breaking of carcasses earlier in the beef marketing channel, the cost component estimating procedures basically reflect movement of carcasses from packer to retail store, rather than a proportional mix of carcass and other forms.

The farm-retail spread for beef amounted to 52.7 cents per pound in 1974, 7.1 cents larger than in 1973. The largest percentage increase in costs occurred in the slaughtering function, which averaged 8.3 cents in 1974, compared with 5.8 cents in 1973. Most of the increase resulted from higher labor costs. Packaging increased the most on a percentage basis. Retailing costs of 33.2 cents include costs for ordering and receiving beef at the retail store, cutting and wrapping, pricing, stocking the meat counter, as well as a proportionate share of store overhead costs, such as advertising and wages and salaries of checkers and managers. For many retail stores, some breaking and cutting of beef is done at the warehouse and could be considered part of the cost of the wholesaling function. In other cases, the retailer buys beef already broken into primals and subprimals.

While both farm and retail prices for pork dropped from 1973 to 1974, the farm value dropped further than the retail price, increasing the farm-retail spread 9.1 cents per pound sold at retail. The slaughtering, cutting, and processing function rose only slightly from 1973. Most of the increase appears to have been in the retailing function. However, the 1974 data for retailing and wholesaling costs are not comparable with 1973 data because of a change in the method used to estimate these costs. Essentially, this change moved part of the retailing cost back into wholesaling.

Table 4 .--Distribution of retail price according to farm value and marketing function, 16 farm food products, 1974

Food item and retail unit	Farm value 1/	Marketing functions					Retail price
		Assembly and procurement	Processing	Intercity transportation	Wholesaling	Retailing 2/	
	Cents						
Beef, Choice (pound)	86.1	1.7	8.3	1.3	8.2	33.2	138.8
Pork (pound)	60.8	1.9	13.3	1.4	6.4	24.4	108.2
Broilers (pound)	31.5	1.4	7.2	1.4	3.3	11.2	56.0
Eggs, grade A or AA large (dozen)	53.2	1.2	8.9	1.5	3.2	10.3	78.3
Milk, sold in stores (½ gallon) ..	40.9	2.7	10.7	3/	13.6	10.5	78.4
Butter (pound)	58.6	3.3	8.9	1.5	5.4	16.8	94.5
Oranges, Calif. (dozen)	34.6	1.7	17.2	13.9	9.0	50.7	127.1
Lettuce, Calif. (head)	6.3	.3	8.3	6.3	3.0	18.2	42.4
Potatoes (10 pound bag)	67.5	4/	24.7	15.5	3.7	63.4	174.8
Orange juice, frozen (6-oz. can)	8.5	.6	6.5	1.3	3.1	5.8	25.8
Tomatoes, Calif.(whole,no. 303 can)	3.8	.5	15.2	2.7	1.6	6.0	29.8
Tomato catsup, Calif. (14-oz. bot.)	5.6	.8	19.9	3.4	3.2	5.5	38.4
Bread, white (pound)	8.0	.6	5/ 9.9	6/.4	9.8	5.8	34.5
Margarine (pound)	27.7	1.6	7/ 16.5	.4	1.6	9.6	57.4
Salad and cooking oil(24-oz. bottle)	44.6	2.9	7/ 45.5	1.8	.7	11.3	106.8
Vegetable shortening (3 pounds)	97.5	6.1	7/ 64.8	1.9	8/	8.7	179.0

1/ The farm value is the gross return to farmers for the quantity of farm products equivalent to the unit sold at retail minus imputed value of byproducts. Because of losses from processing, waste, and spoilage the farm value represents larger quantities than the retail unit. 2/ Instore costs only. Headquarters and warehousing expenses are included in wholesaling. 3/ Included in wholesaling. 4/ Included in farm value. 5/ Flour milling and bread baking. 6/ Flour only. 7/ Includes oilseed crushing, crude oil refining, and manufacturing of finished product. 8/ Implicitly included in costs of other functions.

Retailing costs for pork increased for all components except advertising, which declined. Labor (about half of the retail margin), energy, and "other" costs increased the most. Retailing costs include all cutting and wrapping of fresh pork items, and stocking, as well as a portion of store overhead costs.

Farm Values

Farm values for beef in 1974 were computed from the weighted average price received by farmers for Choice steers in seven leading midwestern markets and in California. Farmer transportation and marketing costs were deducted from the market price to obtain an estimated price at the farm gate. This weighted average price was multiplied by 2.28 pounds, the quantity of live animal required to sell 1 pound of Choice beef at retail, to obtain a gross farm value. A byproduct value for the hide and offal was subtracted from the gross farm value to obtain a net farm value of the live animal from which the meat was derived. In 1974, the net farm value for beef was 86.1 cents.

Prices for barrows and gilts at seven midwestern markets were used for computing the farm price of pork. Farmer marketing costs were subtracted to arrive at a farm gate price. The gross farm value was obtained by multiplying this value by 1.97 pounds, the quantity of live animal needed to sell 1 pound of pork at retail. A value for lard and other byproducts was subtracted from the gross farm value to get the net farm value, which amounted to 60.8 cents in 1974.

Retail Prices

The retail price of Choice beef in 1974 was an estimated weighted average price of all salable cuts obtained from a Choice carcass. It was estimated from U. S. average prices reported by the BLS and meat prices reported each week to the Economic Research Service by 40 retail food chain divisions. The 40-chain data were used to provide prices for cuts not included by BLS, to adjust the BLS data from the first week of the month to an average for the month, and to adjust for the effect of price specials on the average price.

The weighted average retail price for pork also was estimated from BLS prices and prices reported by 40 food chain divisions. It includes prices for fresh, smoked, and cured products, but excludes canned products.

In 1974, the average retail price was nearly $1.39 per pound for beef and $1.08 for pork.

Carcass and Wholesale Values

A carcass value for beef was estimated from average wholesale prices. In 1974, Chicago carlot prices of Choice 600-700 pound steer carcasses were used to represent all but wholesale prices on the West Coast. A transportation differential of $1.05 per 100 pounds of carcass was added to the Chicago price to reflect the value delivered to the cities where the meat was consumed. The adjusted Chicago price was weighted (85.6 percent) with an average of carlot and less-than-carlot prices at Los Angeles, San Francisco, and Seattle-Portland to obtain a U. S. carcass price. The carcass value was obtained by multiplying the average carcass price by 1.41 pounds, the weight of Choice carcass beef

Table 5.--Beef (Choice): Components of price spreads per pound at retail, 1974

Costs and profit	Farm value	Marketing functions: Assembly of live animal	Slaughtering	Wholesaling	Retailing	Retail price
Labor	-	-	2.2	-	18.7	-
Packaging	-	-	0.3	-	4.1	-
Transportation	-	0.9	0.8	1/ 1.3	--	-
Business taxes	-	-	0.1	-	1.1	-
Depreciation	-	-	0.4	-	0.3	-
Rent	-	-	0.2	-	0.5	-
Repairs	-	-	0.2	-	0.2	-
Advertising	-	-	0.1	-	1.5	-
Interest	-	-	0.4	-	0.5	-
Energy	-	-	2/ 0.3	-	0.5	-
Other	-	-	3/ 2.5	-	2.9	-
Profit	-	-	4/ 0.8	-	2.9	-
Unallocated	-	0.8	-	8.2	-	-
Total	86.1	1.7	8.3	9.5	33.2	138.8

1/ Intercity only. 2/ Includes water. 3/ Includes 0.8 cent for administrative expenses such as wages and salaries, insurance, payroll taxes, office supplies, data processing, and travel; 0.1 cent for inspection and grading; 0.5 cent for shipping and selling; 0.3 cent for procurement; and miscellaneous items.
4/ Before income taxes. Note: Dashes mean not estimated.

Table 6.--Pork: Components of price spreads per pound at retail, 1974

Costs and profit	Farm value	Marketing functions: Assembly of live animal	Slaughtering and processing	Wholesaling	Retailing	Retail price
Labor	-	-	5.5	-	11.7	-
Packaging	-	-	0.9	-	1.3	-
Transportation	-	0.8	0.6	1/ 1.4	---	-
Business taxes	-	-	0.1	-	1.0	-
Depreciation	-	-	0.3	-	1.2	-
Rent	-	-	2/---	-	1.8	-
Repairs	-	-	0.4	-	0.9	-
Advertising	-	-	0.2	-	1.2	-
Interest	-	-	0.3	-	0.3	-
Energy	-	-	3/ 0.4	-	2.1	-
Other	-	-	4/ 3.4	-	1.5	-
Profit	-	-	5/ 1.2	-	1.4	-
Unallocated	-	1.1	-	6.4	-	-
Total	60.8	1.9	13.3	7.8	24.4	108.2

1/ Intercity only. 2/ Less than 0.1 cent. 3/ Includes water. 4/ Includes 0.8 cent for administrative expenses such as wages and salaries, insurance, payroll taxes, office supplies, data processing, and travel; 0.5 cent shipping and selling; 0.6 cent for procurement, and miscellaneous items.
5/ Before income taxes. Note: Dashes mean not estimated.

equivalent to 1 pound of retail cuts. In 1974, the carcass value amounted to 97.4 cents. Although it does not appear in table 5, carcass value was used to derive a carcass-retail spread and farm-carcass spread which were used to estimate costs of the processing, wholesaling, and retailing functions.

A composite wholesale price of pork was computed by weighting the prices of pork cuts by their percentage of the pork carcass. Chicago prices were increased by a transportation differential of $1.35 per 100 pounds, to make the Chicago price more nearly representative of the United States. This average wholesale price was adjusted to a retail weight basis by multiplying it by 1.07 pounds, representing the quantity needed at wholesale to sell 1 pound at retail. In 1974, the wholesale value of pork was 77.4 cents. As with beef, this value was used to determine further breakdowns of the spread.

Slaughtering and Processing

Slaughtering costs for beef amounted to 11.3 cents of the farm-carcass spread in 1974. To obtain the slaughtering margin, farmer marketing costs and costs of transporting meat were subtracted from the farm-carcass spread. The deduction for marketing costs of 1.7 cents per retail pound in 1974 appears in table 5 as assembly of live animal. This assembly cost includes both the transportation of live animals from farm to market paid by the farmer (estimated at 0.9 cent) and also all other marketing costs incurred, such as yardage and selling fees. Transportation of the meat from the packing plant to the city where the items were consumed was estimated at 1.3 cents, which is listed under wholesaling transportation. Subtracting thest two costs from the farm-carcass spread leaves a slaughtering margin of 8.3 cents. It includes the cost from the time the packer-slaughterer purchases the cattle until the carcasses are ready to be shipped from the packing plant as sides or quarters.

For pork, the farm-wholesale spread was 16.6 cents. Farmer marketing costs were estimated at 1.9 cents per retail pound of pork sold. The cost of transporting meat from the processing plant to the city where consumed was estimated at 1.4 cents, leaving a slaughtering and processing margin of 13.3 cents. This margin includes the cost from the time the meatpacker purchases the hogs until the carcasses are cut or processed into primals, smoked hams, cured bacon, and other products ready to leave the plant. Because pork is processed more than beef at the packing plant, the slaughtering and processing margin is about 50 percent greater.

There has been a fairly rapid trend in recent years to cutting the beef carcass into primals, subprimals, and, occasionally, to retail cuts before delivery to the local store but, as stated, data presented here essentially represent the movement of beef from packers to retailers in carcass form. However, some cutting occurs before the beef leaves the packing plant, and some is being done at the chain warehouse.

Cost Components: Cost of slaughtering (processing) beef and pork were obtained from a survey of meatpacking plants by Food Management Inc., made for ERS in 1974. The survey provided detailed information on manhours of labor used and accounting costs for about 30 beef and 30 pork slaughter plants throughout the country. Plants surveyed, all sizes except the very smallest, slaughtered 16 percent of the cattle and 24 percent of the hogs in 1974. Plant data were obtained for both variable costs of the slaughtering operation and fixed costs of the plant, direct manhours of labor used, and labor fringe benefits. Other data obtained included livestock procurement, shipping, delivery, and related costs.

Efficiency and costs and profits vary greatly among plants due to their size, age, and location. To obtain a U. S. average of costs, Food Management Inc., data were weighted by the numbers of plants by size and region obtained from data collected by USDA's Animal and Plant Health Inspection Service. Survey data for pork were for slaughtering and cutting functions only; therefore, they had to be adjusted to include the processing activities, such as smoking hams and curing bacon. Cost data for meatpacking and meat processing firms, reported by the American Meat Institute (AMI) in 1974 Financial Facts About the Meat Packing Industry, were used to adjust the cost estimates for pork to include the processing activities.

Profit estimates were based mainly on (1) profits of meatpacking firms as a percentage of sales reported in AMI's Financial Facts and (2) profit rates for meatpackers published in Moody's Industrial Manual. Profits are estimated before income taxes. Profits after taxes would be about 55 percent as large.

Transportation in the slaughtering-processing margins is the cost of moving the animals to the plant from the point of purchase.

The labor component of meat slaughtering includes direct line operations, sanitation labor, and some other labor. Repair labor is included in the repair component. Administrative salaries, shipping and selling department salaries, and other indirect salary expenses are included in "other" costs. Wage rates of employees in meatpacking plants and meat processing (sausage and other prepared meats) in 1974, obtained from the U. S. Department of Labor, were applied to coefficients of labor use to derive direct labor costs of the slaughtering function. These rates included allowance for vacation and sick leave. In addition, a fringe benefit cost of about 31 percent of the direct wage cost for pork and 25 percent for beef was included in computing the total labor cost of processing. The difference in fringe benefit cost is probably due to the location of plants and terms of labor contracts.

Cost component data have been estimated annually beginning with 1972. Estimates of the components of the slaughtering margin for 1974 are essentially comparable to 1973 data, but not to 1972 data.

Wholesaling

The cost of wholesaling includes buying meat from the packer, transportation from the packer to the city where the meat will be sold, warehousing, and local transportation to the retail store. The costs of intercity transportation were discussed earlier. Estimates of wholesaling and retailing costs assume that beef is sold by the packer in carcass form, and that pork is sold as cuts and processed products.

Data on wholesaling expenses reported in the 1972 Census of Wholesale Trade were used in estimating the costs of the wholesaling function. These data, released in August 1975, indicate that meat wholesaling costs were about 7.5 percent of sales at wholesale. Chain Store Age, a retail trade publication, indicates that the margin for the meat department of retail stores in 1974 was 21.5 percent. Thus the purchase cost of the meat entering the store was about 78.5 percent of the retail price, or $1.09 for beef and 85 cents for pork. Applying the 7.5 percent to these wholesale prices results in a wholesaling cost of 8.2 cents for beef and 6.4 cents for pork. Data were not available to divide these wholesaling costs into individual cost components. Thus, the total of these costs is shown in tables 5 and 6 under the "unallocated" category.

Use of these wholesaling cost data to represent the wholesaling function assumes that retailers who perform their own wholesaling function have similar costs to independent wholesalers. Retailers to a large and expanding extent are buying their meat directly from the packer-processor, taking delivery at their central warehouse, and delivering the meat to the store themselves. Many retailers also do some breaking and cutting of beef at their central warehouses. But movement of carcass beef is assumed in our cost component procedures; therefore, the wholesale margin does not include cutting costs.

BROILERS AND EGGS

Retail prices for ready-to-cook broilers averaged 56 cents per pound in 1974. The farm-level equivalent value averaged 31.5 cents, or about 56 percent of the retail selling price. Thus, the farm to retail price spread was 24.5 cents per pound of broiler sold at retail. About 45 percent, or 11.2 cents, of this spread may be allocated to the cost of retailing after the product is delivered to the store. The cost of processing (slaughtering, dressing, and packing for market distribution) amounted to 7.2 cents, or less than a third of total marketing costs. Long distance hauling costs, local market delivery, and wholesaling amounted to 4.7 cents. The remaining 1.4 cents of the price spread went for the transportation cost of assembling live broilers from producers.

Marketing costs are a smaller proportion of the retail selling price for eggs than for many other foods. In 1974, retail prices of Grade A or AA large eggs averaged 78.3 cents per dozen. The farm value averaged 53.2 cents, leaving 25.1 cents as the marketing spread or less than a third of the retail price. Retailing costs after they are delivered to the store accounted for 10.3 cents of the spread. Packing eggs for market (sizing, grading, and packing into cartons) amounted to 8.9 cents per dozen. Long distance hauling to markets, wholesaling, and local store delivery cost an estimated 4.7 cents

per dozen in 1974. Assembling eggs from producers amounted to 1.2 cents.

The margins for packing eggs and processing broilers were 8 to 10 percent larger in 1974 than in 1973, reflecting higher costs of virtually all inputs used in these poultry and egg operations. Packaging materials, a relatively large cost of marketing eggs, and energy costs led these increases but wage rates, repair costs, and interest rates also were higher. Building and equipment costs and taxes were also up but these are not as quickly reflected in average current depreciation because of the large base of old investment in facilities and equipment, and lags in property reassessments and tax collections.

Price increases for inputs were partly offset in 1974 by continued gains in operating efficiency. These gains encompass greater economies of scale, such as:

Investment in larger plants.
Increased density of supply areas where broilers and eggs are produced.
Higher labor productivity because of minimum levels of turnover and gradually increasing mechanization.
Continued movement of processing and packing functions to plants in producing areas.

Data and Procedures

Data from cost surveys of plants in all regions of the country being conducted under cooperative agreements between ERS and the Georgia, Missouri, and Pennsylvania agricultural experiment stations provided much of the accounting and physical units of inputs data used to develop cost estimates for assembly, processing, and wholesaling operations. This information was supplemented by previous studies, and from cost data supplied by firms to trade groups and public agencies. Special studies conducted in ERS on productivity in marketing and on energy use, and price indices of input costs were also used to adjust certain cost categories from estimates made in previous years. 2/ An unpublished ERS study on interregional shipments of poultry and eggs was also used, together with recent trade association and Market News estimates of point-to-point truck costs, to develop weighted average estimates of long-distance hauling costs. Estimates of farm-to-city receiver, city receiver to retailer, and retail price spreads maintained monthly by ERS for 12 major cities were also used as indicators of changes in price spreads between various levels of trading. However, these series do not contain as detailed a breakdown as do tables 7 and 8.

2/ G. B. Rogers. Price Spreads Costs and Productivity in Poultry and Egg Marketing, 1955-74. U. S. Dept. of Agr., Econ. Res. Serv., Agr. Econ. Rpt. No. 326. Feb. 1976.
G. B. Rogers, V. W. Benson, and D. L. Van Dyne. Energy Use and Conservation in the Poultry Industries. U.S. Dept. of Agr., Econ. Res. Serv., Agr. Econ. Rpt. (in process).

Table 7.--Broilers: Components of price spreads per pound at retail, 1974

Costs and profit	Farm value 1/	Marketing functions				Retail price
		Assembly	Processing	Hauling, distributing 2/	Retailing	
			Cents			
Labor	-	0.9	3.2	2.2	6.2	-
Packaging	-	-	1.0	0.1	.6	-
Transportation 3/	-	-	-	-	-	-
Business taxes	-	-	0.2	-	0.4	-
Depreciation	-	-	0.4	-	0.3	-
Rent	-	-	4/	-	0.5	-
Repairs	-	-	0.3	-	0.2	-
Advertising	-	-	0.1	-	0.6	-
Interest	-	-	0.1	-	0.2	-
Energy	-	0.4	0.6	0.8	0.6	-
Other	-	-	0.8	-	0.8	-
Profit	-	-	0.5	-	0.8	-
Unallocated	-	5/ 0.1	-	5/ 1.6	-	-
Total	31.5	1.4	7.2	4.7	11.2	56.0

1/ Farm value is computed from estimated U.S. average prices of live broilers, published by the Statistical Reporting Service. However, few sales of live broilers actually occur because most production is under contract to integrated firms. Prices are converted to a ready-to-cook equivalent by multiplying by 1.41 pounds, the quantity of live broiler needed to sell 1 pound at retail. This equivalent allows for a 2-percent loss during marketing.
2/ Includes long distance hauling plus wholesaling and local delivery.
3/ Includes 1.4 cents for assembly, 1.4 cents for long distance hauling, and 1.3 for local delivery.
4/ Less than 0.1 cent.
5/ Overhead and profit on assembly; overhead, miscellaneous, and profit on hauling and distributing.
Note: Dashes mean not estimated.

Table 8.--Eggs, Grade A or AA large: Components of price spreads per dozen at retail, 1974

Costs and profit	Farm value 1/	Marketing functions				Retail price
		Assembly	Packing	Hauling, distributing 2/	Retailing	
		Cents				
Labor	-	0.6	2.3	2.3	4.9	-
Packaging	-	-	3.7	0.1	.2	-
Transportation 3/	-	-	-	-	-	-
Business taxes	-	-	0.4	-	.3	-
Depreciation	-	-	4/ 0.4	-	.1	-
Rent	-	-	-	-	.1	-
Repairs	-	-	0.1	-	.1	-
Advertising	-	-	0.1	-	.9	-
Interest	-	-	0.1	-	.3	-
Energy	-	0.4	0.5	0.9	.2	-
Other	-	-	0.8	-	1.7	-
Profit	-	-	0.5	-	1.5	-
Unallocated	-	5/ 0.2	-	5/ 1.4	-	-
Total	53.2	1.2	8.9	4.7	10.3	78.3

1/ Farm value is calculated from averages of prices received by producers compiled from market news releases by the Agricultural Marketing Service. The average price is multiplied by 1.03 dozen, assuming an average loss of 3 percent during marketing.
2/ Includes long distance hauling plus wholesaling and local deliveries.
3/ Includes 1.2 cents for assembly, 1.5 cents for long distance hauling, and 1.2 for local delivery.
4/ Includes rent.
5/ Overhead and profit on assembly; overhead, miscellaneous, and profit on hauling and distributing.
Note: Dashes mean not estimated.

Industry Practices

The estimates of price spreads and costs are not necessarily indicative of the functions which may be performed by individual firms. Processing plants, for example, often carry out their own assembly operations and frequently distribute directly to local wholesaling and retailing firms and stores. Some may own trucks which haul to distant markets. Much of the poultry and egg volume moving long distances travels via exempted truck carriers, which the cost estimates reflect. Some retailers are integrated backward to the processing level, as are some wholesalers. Independent wholesalers play an important but reduced role in poultry and egg marketing. Thus, poultry and egg marketing represents a mixture of handling practices performed by one or more firms, such as processor to wholesaler to retail warehouses or stores, processor to retail warehouses, and processor to retail stores.

FLUID MILK

Adjustment to changing economic conditions proved to be a major concern of producers, processors, and distributors in the dairy industry in 1974. General inflation, higher energy costs, and energy shortages reportedly forced changes in inputs used in production and processing, as well as changes in distribution patterns and frequencies.

The farm value of a half-gallon of milk increased 7.7 cents to 40.9 cents, while the retail price increased almost 13 cents to 78.4 cents in 1974. Therefore, the farm-retail price spread amounted to 37.5 cents per half-gallon of milk, or 5.3 cents larger than in 1973. This spread, on a functional basis, consists of: wholesaling, 36 percent; processing, 29 percent; retailing, 28 percent; and procurement, 7 percent (table 9).

Most of the increase in the farm-retail spread occurred at the retailing level. Retail margins, squeezed during the previous year, nearly doubled in 1974 and represented a larger percentage of the retail price than in other recent years. Processors and wholesalers made significant adjustments in operations, which improved efficiency and lowered margins in this sector of the marketing channel to below the level for the preceding year.

Farm Value

SRS reports the f.o.b. plant price for milk eligible for fluid use. This price was adjusted by subtracting the value of that portion of fluid eligible milk used for manufacturing. Farm to plant hauling charges were subtracted to obtain the farm price of milk used as fluid. The resulting prices were comparable with those reported by the sample plants which provided data used to determine processing and distribution costs.

Procurement and Assembly

Transportation of milk from farms to processing plants accounts for the largest share of procurement costs. In 1974, these costs rose 9 percent, largely because of higher transportation costs and smaller increases in labor, energy, and interest costs. Transportation costs were determined by adjusting 1973 hauling rates obtained from cooperatives and from Federal Order Administrators according to reported changes in hauling rates from 1973 to 1974 in Federal order markets. Other cost components were updated by using appropriate price indexes of goods and services and adjusting for changes in volume handled. The cost of a minor portion of assembly and procurement services performed by the processor is included in the processing margin.

Processing and Wholesaling

Processing and wholesaling functions in the fluid milk industry are usually both performed by the same milk dealer. Thus, it is often difficult to separate and allocate costs of individual components into either function. Processing covers operations from receiving through pasteurizing, packaging, and handling of the product on the loading platform. Wholesaling covers all wholesale expenses including those for route salespeople and supervisors and all other aspects of delivery to wholesale customers.

By contracting with a private accounting and consulting firm, we obtained costs and margins from accounting records of processors and distributors. The costs and margins were prorated to processing and wholesaling based on average costs of 30 firms. Administrative costs, reported separately from the processing and wholesaling functions, were allocated 35 percent to processing and 65 percent to selling and distribution.

The total processing-wholesaling margin decreased slightly in 1974; declines in processing costs more than offset increases in the cost of wholesaling. This finding emerged partly because a more detailed breakdown of the data resulted in the allocation of a somewhat greater portion of costs to wholesaling.

Labor is the largest cost component of both the milk processing and distribution functions. Increased efficiency of operations led to lower per unit labor costs for both functions, resulting in a slight decrease in the total processing and wholesaling margin. Increased labor efficiency in processing resulted primarily from increased volumes processed at plants. A tightening up of executive and other administrative costs was also evident. This latter factor also contributed to improved labor efficiency in wholesaling, although the major improvement came from changes in operations through adjustments to the energy shortage. Route consolidation and less frequent, but larger volume deliveries, resulted in more units delivered per route and per driver. The improved labor efficiency in processing and wholesaling helped to offset cost increases in packaging, transportation, and energy, increases also attributed partly to the energy crises.

Despite the overall decrease in the processing-wholesaling margin, profits rose substantially, suggesting that improved efficiency in some cost areas more than offset increases in other areas. Profit data for processing-wholesaling were obtained directly from the records of milk dealers, but the "other" cost category is a residual. The "other" cost component was smaller in 1974, as we were better able than in other years to allocate administrative costs to the individual components. Profit was allocated to processing and to wholesaling in the same proportion as average dealer costs were allocated to these two functions.

Retailing

Adding procurement, assembly, processing, and wholesaling costs to the farm value yielded a "wholesale transfer price" of 67.9 cents per half-gallon. Subtracting this from the BLS retail price gave a retail margin of 10.5 cents per half-gallon, 13.4 percent of the retail price.

Table 9.--Grade A whole milk sold through retail stores: Components of price spreads per half-gallon, 1974

Costs and profit	Farm value	Marketing functions				
		Procurement and assembly 1/	Processing	Wholesaling 2/	Retailing	Retail price
			Cents			
Labor	-	0.38	3.2	6.3	5.4	-
Packaging	-	-	3.2	-	0.3	-
Transportation	-	1.96	-	2.1	-	-
Business taxes	-	.03	.3	.6	0.3	-
Depreciation	-	.06	.6	.6	0.1	-
Rent	-	.02	.3	.6	0.1	-
Repairs	-	.03	.4	.6	0.1	-
Advertising	-	.01	-	3/.7	0.9	-
Interest	-	.05	.1	.1	0.2	-
Energy	-	.03	.6	.4	0.2	-
Other	-	.16	.8	.1	1.5	-
Profit	-	-	1.2	1.5	1.4	-
Total	40.9	2.73	10.7	13.6	10.5	78.4

Note: Dashes mean not estimated.
1/ Includes laboratory and on the farm field service to assure quality pickup at the farms, transportation, receiving and reloading as necessary, and final delivery to the processor.
2/ Performed by the processor.
3/ Dairy products, especially milk, are also advertised through cooperative ventures. This cost is not included in this estimate.

Economic conditions in the butter industry improved somewhat in 1974, and output rebounded by 4.7 percent over the low volume in 1973. This increase in output apparently slowed the rate of exit of plants from production. In 1974, 33 plants (8 percent) dropped out--less than two-thirds of the 53 that quit in 1973. The combined effects of increased production and fewer plants resulted in a 13-percent rise in production per plant. This increase helped plants offset higher wage rates for labor and partially offset higher prices for materials, energy, and other inputs.

Butter prices were much more stable in 1974 than a year earlier. There was only an 8.4-cent range in monthly average wholesale butter prices, as contrasted with the 24.9-cent range in 1973. The retail price for butter averaged 94.5 cents per pound in 1974, 2.9 cents over 1973. The farm to retail spread for 1 pound of butter was 35.9 cents, or 38 percent of the retail price. This spread, on a functional basis, consisted of: retailing, 47 percent; transportation and warehousing, 19 percent; manufacturing, including butter printing by specialized butter wholesalers, 25 percent; and procurement of milk from farms, 9 percent (table 10). Data and procedures used to estimate the farm value and costs and margins for manufacturing and distributing butter are discussed below.

Farm Value of Butterfat

Butterfat used in manufacturing butter comes from two grades of milk, fluid and manufacturing. In 1974, 56.3 percent of the butterfat came from fluid milk priced under Federal milk orders and the State of California. 3/ Manufacturing grade milk was the source of most of the remaining butterfat.

To calculate the farm value of butterfat in butter, it is necessary to derive values for the butterfat and skim milk portions of these two grades of milk. Market values for butterfat and skim milk in fluid grade milk priced under Federal orders were computed from price data in Federal order markets in 21 States. These States produced slightly over 82 percent of all butter in 1974. The method used to compute the butterfat and skim milk values in 3.5-percent milk follows:

Milk price + (butterfat differential x 965) = value of 100 lbs. butterfat

$6.69 per cwt. + ($0.076 x 965) = $80.03 per 100 lbs. or $0.80 per lb. of butterfat

Milk price - (butterfat differential x 35) = value of 100 lbs. of skim milk

3/ California is handled separately because it is the third largest butter-producing State and its pricing system differs from other butter-producing areas.

Table 10.--Butter: Components of price spreads per pound of butter at retail, 1974 1/

Costs and profit	Farm value 2/	Procurement		Manufacturing	Wholesaling		Retailing	Retail price
		Contract hauling 3/	Other 4/		Printing	Hauling and warehousing		
	Cents							
Labor	-	-	0.29	1.75	0.42	-	5.9	-
Packaging	-	-	-	1.84	.82	-	0.4	-
Transportation	-	2.71	-	.08	-	1.52	-	-
Business taxes	-	-	.02	.08	.07	-	0.3	-
Depreciation	-	-	.05	.26	.07	-	0.2	-
Rent/lease	-	-	.01	.07	.07	-	0.2	-
Repairs	-	-	.03	6/.17	.04	-	0.1	-
Advertising	-	-	-	7/.04	.04	-	1.0	-
Interest	-	-	-	.13	.06	-	0.6	-
Energy	-	-	.03	.43	.04	-	0.3	-
Other	-	-	.12	8/.78	.08	-	4.3	-
Profit	-	-	-	9/.90	9/.68	-	3.5	-
Unallocated	-	-	-	-	-	5.39	-	-
Total	58.6	2.71	.55	6.53	2.40	6.91	16.8	94.5

1/ One-pound carton of quarter-pound wraps. 2/ Value of butterfat in cream at the plant less the producer hauling charge and 4.02 cents byproduct credit for value of buttermilk obtained in the manufacturing process. 3/ Of contract hauling costs, 2.28 cents was paid by producers and 0.43 cent by manufacturers. 4/ Costs to plants for hauling milk from farms in plant-owned trucks, laboratory and field service to producers, and operating receiving and reload stations. 5/ Represents costs incurred by specialized butter wholesalers in printing and packaging butter, assuming 35 percent of the printed butter was hard printed by wholesalers and 65 percent was soft printed by manufacturers. 6/ Excludes plant labor used to repair buildings and equipment, which is included under labor. 7/ Dairy products are also advertised through cooperative ventures of manufacturers and producers. This cost is not included. 8/ Salt and color used in manufacturing, general supplies, office supplies, insurance, water and sewage, professional and other services, travel and related expenses, and other expenses. Cost of seasonal storage is not included. 9/ Residual, before taxes.

Note: Dashes mean not estimated.

$6.69 per cwt. - ($0.076 x 35) = $4.03 per 100 lbs. or $0.04 per lb.

The basic price quoted is for milk with 3.5-percent butterfat. For each additional tenth of 1 percent butterfat content, the price is raised by the amount of the butterfat differential (7.6 cents). To find the total value of pure butterfat, the basic price is increased by 96.5 percentage points, or 965 butterfat points times the differential.

The value of skim milk is obtained by subtracting the value of 35 points of butterfat from the value of whole milk, in effect replacing 3.5 pounds of butterfat with skim milk.

The market values for butterfat and skim milk (on a solids not fat basis) in California milk are available from California published reports. The 1974 values per pound for butterfat and skim milk were $0.6789 and $0.0462, respectively.

Market values for butterfat and skim in manufacturing grade milk are not published. Therefore, the U. S. price for manufacturing milk used in butter was divided into separate values for butterfat and skim milk based on the proportionate shares that each represents of milk priced under Federal orders that was used in butter. This method of determining values assumes that similar factors determine the price of both grades of milk for this use. The estimated values per pound were $0.8283 for butterfat and $0.0416 for skim milk.

The average market values for butterfat and skim milk were determined from the above market values as follows:

Value of butterfat per pound

Source	Value		Market share		Weighted value
Federal order	$0.8003	x	0.459	=	0.3673
California	.6832	x	.104	=	.0711
Manufacturing	.8283	x	.437	=	.3620
			1.000		$0.8004

Value of skim milk per pound

Source	Value		Market share		Weighted value
Federal order	$0.0403	x	0.459	=	0.0185
California	.0462	x	.104	=	.0048
Manufacturing	.0416	x	.437	=	.0182
			1.000		0.0415

The U. S. farm value of butterfat in 1 pound of butter is computed below:

Farm value
of butterfat = (butterfat value x lbs. butterfat in butter) - hauling costs and buttermilk credit

= ($0.8004 x 0.81103) - ($0.0228 + $0.0402)
= $0.6491 - $0.0630
= $0.5861

Procurement

Transportation of milk from farms to manufacturing plants accounts for the largest share of procurement costs. Transporting costs were computed from 1973 hauling rates obtained from the Minnesota and Wisconsin Statistical Reporting Services, milk producer cooperatives, and administrators of Federal order markets for more than 30 billion pounds of milk. Costs were allocated to butterfat based on the relative value of butterfat and skim milk in the milk. Interplant transfer costs of shipping cream used in butter were all charged to butter.

Transportation costs for 1973 were updated for 1974 by recomputing the proportionate value of butterfat and skim milk in the milk, and by adjusting the hauling rates according to changes in such rates from 1973 to 1974 in Federal order markets.

Manufacturing

The functions classified as manufacturing include receiving and separating milk; receiving cream separated in other plants; cooling, storing and pasteurizing cream; churning and packing butter in 68-pound bulk containers for shipping or storage; printing and packaging about two-thirds of the printed butter (forming and packaging for consumers); and temporarily storing and shipping the butter. Skim milk from separation and buttermilk from churning may be temporarily stored before further processing, pumped directly to the condensing department, or shipped to another plant for drying. Condensing and drying were excluded from butter costs and charged to skim milk and buttermilk. Administrative costs were included in butter costs.

Cost data for 1973 were obtained for 23 plants located in seven States. They are believed typical of plants producing most of the butter sold in retail foodstores. Among these plants, butter production varied from less than 5 million to over 40 million pounds and averaged 15.7 million pounds.

Plant records were used, after some adjustments for labor and packaging materials, to determine costs of manufacturing and packing 64- to 68-pound containers of butter. If plants also printed butter (cut and package it into units sized for consumer use), costs were adjusted to get the costs for a 1-pound (quarters) carton. In soft printing (65 percent of all butter printed), the freshly churned, soft butter is pumped directly to the printer and packaged immediately. Hard-printed butter is first packed in bulk containers, stored, and later printed as a separate process.

Various methods were used to update the cost items from 1973 to 1974. Labor cost was updated by an index of hourly earnings in the dairy products industry, adjusted for the increase in productivity arising from increased volume per plant. Data obtained by ERS from milk manufacturing plants for 1972-74 indicate that a plant tends to increase labor use by only 0.3 percent for a 1-percent increase in volume. Thus, the 13-percent increase from 1973 to 1974 in volume of butter produced per plant required 3.9 percent more total labor. Labor input per unit was thereby reduced to 92 percent of the 1973 figure (103.9 divided by 113.0), more than offsetting the higher wage rates, and resulting in a lower average labor cost to manufacture a pound of butter. Packaging cost was updated by a BLS wholesale price index of cartons and wrapping materials used for packaging. Transportation cost was updated by a composite wholesale price index for motor transport supplies.

Business taxes per unit were not changed, assuming that the increase in plant volume offset the rise in such taxes. Depreciation also was not changed on a per unit basis. Census of Manufactures data show that new capital investments by the dairy industry tend to approximate 7 percent of the gross value of the industry's fixed assets. The increase in volume per plant was assumed to offset the greater cost of this proportion of the plant facilities. Rent/lease costs were updated by the percentage change for rent in the consumer price index and adjusted for change in plant volume. Repair costs were updated by a BLS wholesale price index of automotive repairs, adjusted for change in productivity. Advertising cost was updated by a McCann-Erickson, Inc. all-media cost index per 1,000 exposures, adjusted for plant volume. Interest was updated by a Federal Reserve index of interest rates charged by banks for short-term loans, adjusted for change in plant volume. Energy cost was updated by an ERS price index for fuel, power, and electricity, adjusted for a decline in energy use per unit of output based on the increased output per plant.

Wholesaling

The wholesaling function includes all transportation costs of butter from the manufacturing plant to the retail warehouse, and the additional costs of printing the 35 percent of all printed butter that is hard printed. Most of this hard-printed butter is printed by specialized butter wholesalers. Seven wholesalers located in Oklahoma, Iowa, Wisconsin, and California furnished data used to estimate these costs. The annual volume of butter they printed varied from 1.8 million to 28.1 million pounds. The average per wholesaler was 12.6 million.

The estimated cost of printing, packaging, storing, and selling butter in 1-pound (quarters) cartons came from the wholesaler's operating statements. Some adjustments were made in labor and packaging materials so as to more accurately reflect the cost for a 1-pound package. These additional costs of printing butter by specialized butter wholesalers were prorated to all printed butter so that cost estimates are a weighted average of handling methods rather than the average for a typical method of distributing a 1-pound quarter pack at a given location. The final packaging material costs about 2.6 cents per pound. Since two-thirds of the printing and packaging is done during churning, 1.8 cents of packaging cost is allocated to manufacturing and 0.8 cent to wholesaling.

FRUITS AND VEGETABLES

The fruit and vegetable industry consists of farm production, processing or packing, wholesaling, and retailing. The major areas of fresh fruit and vegetable production are California and Florida.

Farm value for fruits and vegetables is a computed farm gate-grower return. The farm value is computed by deducting hauling costs from the weighted average price received by farmers if the item price is a delivered price. For lettuce, it is an unharvested price since harvesting and packing are both done under one contract. For processed items, the farm value reflects 1973 value for the proportion of the crop making up 1974 sales until the new crop (1974) replaces old crop (1973) f.o.b. sales.

Processing and packing firms are assemblers or first handlers of these products. Located near the producing areas, their functions are to collect crops, prepare or process them for market, and perform the first distributing (shipping point) function. Some of these firms not only harvest, grade, pack or process, and sell the crop, but also produce a portion of supplies.

Packing costs for fresh items are estimates of actual costs incurred in assembly, grading, packing, selling, and other activities involved in preparing the fresh item for shipment to wholesalers or retailers. Processing costs are estimates of actual costs incurred in processing, warehousing, and selling the product. Total processing cost is the difference between farm value and published processor selling price. Packing and processing cost component estimates are based primarily on survey data for the 1972/73 crop year, updated and adjusted to a calendar year using published prices and cost indexes.

Wholesalers and retailers are located near metropolitan areas. Wholesalers assemble the packed or processed product in the terminal market and distribute it to individual retail stores. In some cases, large retail organizations perform these functions in addition to the retailing function. Between two-thirds and three-fourths of fruits and vegetables are bought directly from shipping point by large chains who have their own warehousing and distribution systems. The remaining produce moves through regular wholesale channels to retailers.

The wholesale margin is payment for the functions of intercity transportation from shipping point, terminal market assembly, warehousing, and distribution to retail stores. This margin is the difference between f.o.b. shipping point price and wholesale price. The retail margin is payment for functions involved in merchandising and selling the product at retail. The retail margin is the difference between retail price and wholesale price.

Prices, marketing margins, and cost components were estimated for fresh head lettuce, oranges, and potatoes, frozen concentrated orange juice, canned tomatoes, and bottled catsup. In 1974, retail prices of fresh oranges, lettuce, and concentrated orange juice rose very little but prices of canned tomatoes and tomato catsup each rose 21 percent and fresh potatoes, 43 percent. Most of the price increases reflected larger farm to retail marketing costs, which averaged two-thirds or more of the retail price for five of the six items (table 11).

Table 11.--Price spreads for selected fruits and vegetables, 1973-74

Item	Farm value	Processor or packer	Wholesaling	Retailing	Retail price
			Cents		
Orange juice, frozen, (6-oz. can)					
1973	8.17	7.00	4.36	5.57	25.1
1974	8.53	7.05	4.44	5.78	25.8
Tomatoes, Calif. (No. 303 can)					
1973	2.4	14.34	3.33	4.63	24.7
1974	3.83	15.71	4.29	5.97	29.8
Tomato catsup, Calif. (14-oz. bottle)					
1973	3.6	16.35	6.40	5.35	31.7
1974	5.62	20.63	6.62	5.53	38.4
Lettuce, Calif. (head)					
1973	7.8	8.20	9.00	16.8	41.8
1974	6.27	8.55	9.28	18.28	42.38
Oranges, Calif. (dozen)					
1973	32.91	18.34	17.21	57.00	125.46
1974	34.63	18.87	22.91	50.69	127.10
Potatoes (10-lb. bag)					
1973	49.82	22.09	16.54	34.05	122.5
1974	67.54	24.58	19.24	63.44	174.8

Table 12.--Percentage of retail price received by farmers and the marketing system, 1973 and 1974

Item	Farm level	Processor or packer	Wholesaling	Retailing
		Percent		
Orange juice, frozen (6-oz. can)				
1973	32.5	27.9	17.4	22.2
1974	33.1	27.3	17.2	22.4
Tomatoes, Calif. (No. 303 can)				
1973	9.7	58.1	13.5	18.7
1974	12.9	52.7	14.4	20.0
Tomato catsup, Calif. (14-oz. bottle)				
1973	11.3	51.6	20.2	16.9
1974	14.6	53.8	17.2	14.4
Lettuce, Calif. (head)				
1973	18.7	19.6	21.5	40.2
1974	14.8	20.2	21.9	43.1
Oranges, Calif. (doz.)				
1973	26.2	14.6	13.7	45.5
1974	27.2	14.8	18.0	40.0
Potatoes (10-lb. bag)				
1973	40.7	18.0	13.5	27.8
1974	38.6	14.1	11.0	36.3

Farm values also increased for 5 products, ranging from 4 percent for frozen concentrated orange juice to 60 percent for canned tomatoes, which were in short supply for processing. Farm value of lettuce dropped almost 20 percent.

The distribution of the retail price among the various marketing functions and farm value is shown in table 12. The farmer's share was lowest for canned tomatoes and tomato catsup, partly because tomatoes for processing are harvested and transported in bulk bins directly to the processing plant. The farm value of lettuce does not include harvesting costs.

The processing margin was about half the retail price for the processed tomato products, but only one-fourth for frozen orange juice. Part of the reason for this difference is that concentrated orange juice costs less to package than the tomato items do. Processing margins remained about the same share of the retail price between 1973 and 1974.

Packing costs for fresh potatoes, oranges, and lettuce were between 14 and 20 percent of the retail prices of these items, or less than half the importance of processing costs for canned tomatoes. However, intercity transportation was generally a larger share of the retail price for fresh produce because of its bulkiness and weight. The retail margin also was a larger share of the retail price for fresh products than for the processed items, due in part to higher handling costs and the perishability of produce.

Fresh Oranges

California and Arizona supplied over 70 percent of the oranges sold for fresh use in 1974. The retail price of California Navel and Valencia oranges averaged $1.27 per dozen in 1974, 2 cents higher than in 1973.

Since 1895, a strong farm organization has influenced orange supplies from the California-Arizona area. Formed mainly as a marketing cooperative, the organization has also been a supplier of harvesting supplies, such as field boxes; and it has coordinated the purchase of many services for its members. This cooperative currently handles about 80 percent of the oranges produced in California and Arizona and its nearly 8,000 members produce citrus fruit on the average of about 40 acres per grower. Some 100 packinghouses are utilized to pack the fruit. About one-half of these packinghouses are owned by local associations while the remainder pack for members under a licensing agreement. Oranges that do not meet standards of quality set up for the fresh market are diverted to other uses.

The farm value of California Navel and Valencia oranges averaged 34.6 cents per dozen in 1974, 1.7 cents more than in 1973. The farmer's share of the retail price was 27 percent in 1974, up from 26 percent in 1973.

Assembly and Packing

Oranges are usually assembled from farms to packinghouses in bins 48x48x24 inches, stacked four high and transported by low-bed trailer trucks. These trailers are made available to farmers by nearby packing sheds. The center section of the citrus packing building is a huge covered bay where trucks are driven in and rapidly unloaded by a fork lift.

From the trailer, the bins are stacked two high on a roller conveyor which moves the bins to an automatic destacker and dumper. After passing through washing, brushing, rinsing, and drying facilities, the oranges are graded, sized, and packed. Culls and juice fruit are removed by graders. Fruits are packed in fiberboard cartons which move along a roller conveyer to sealing equipment.

By State law, fiberboard boxes and wirebound boxes for shipping California oranges must be standard in size and contain about four-fifths' bushel. All containers holding more than 25 pounds must be labeled on the outside with the number and address of the packer, number and diameter of the fruit, and the variety.

The count or number of oranges per box (four-fifths bushel) ranges from 24 to 270 depending on the size of the fruit. The most usual count for California oranges is 88 per box.

The packing margin averaged 18.9 cents per dozen in 1974, 15 percent of the retail price (table 13). Packaging and labor were the major cost components in packing oranges, together accounting for nearly one-half of the packing margin. Advertising took 12 percent of the margin, and assembly, 9 percent.

The packing margin was only 0.6 cent per dozen higher in 1974 than in 1973, accounting for the same share of retail prices in both years.

Wholesaling

Oranges are usually shipped in heavily insulated cars or trailers with thermostatically controlled refrigeration units to assure adequate protection during transit. Over 64 percent of the California oranges shipped in 1974 went by truck. Thirty three percent of the truck shipments were instate to Los Angeles and San Francisco. Rail shipments went mainly to large eastern cities, 34 percent to New York and Boston. Altogether 26 percent of the rail shipments went to Canada.

About 90 percent of fresh fruit sales are shipped free on board (f.o.b.) from the packinghouse. The seller loads the fruit from the storage or packing house into transportation equipment, but the buyer pays transportation cost and insurance from the packingplant to delivery point. All f.o.b. transactions are regulated by the Persihable Agricultural Commodities Act, which requires a buyer to accept the specified size and quality of fruit ordered at the time of pickup at the agreed f.o.b. price. However, most sales include an arrival acceptance option, which allows the buyer the right to inspect the fruit on arrival for acceptance. Some fruit (less than 10 percent of sales) is sold at auction markets.

Table 13.--Oranges, California, Valencia, and Navel, all sizes: Components of price spreads per dozen at retail, 1974

Costs and profit	Farm value 1/	Marketing functions			Retail price 2/
		Packing	Wholesaling	Retailing	
		Cents			
Labor	-	4.58	-	24.5	-
Packaging	-	4.74	-	2.1	-
Transportation	-	3/ 1.71	4/13.90	-	-
Business taxes	-	.97	-	2.0	-
Depreciation	-	.73	-	2.0	-
Rent	-	.17	-	2.5	-
Repairs	-	.42	-	1.4	-
Advertising	-	2.20	-	1.4	-
Interest	-	.19	-	0.8	-
Energy	-	.45	-	4.0	-
Other	-	3.49	-	5.3	-
Profit	-	5/ -.78	-	4.7	-
Unallocated	-	-	6/ 9.01	-	-
Total	34.63	18.87	22.91	50.7	127.10

1/ SRS season average price for California fresh oranges.
2/ BLS monthly retail prices for calendar year 1974 for Chicago, Dallas, Los Angeles, New York City, and Seattle--weighted by unloads.
3/ Hauling charge for shipments between grower and packer where the standard pricing arrangement is a delivered price. Hauling may be performed by grower, packer, or a third party.
4/ Intercity transportation costs by most common carriers (rail or truck), weighted by California fresh unloads in 5 cities.
5/ Residual.
6/ Residual derived by subtracting farm value, other marketing charges, and retail margin from retail price.
Note: Dashes mean not estimated.

The wholesale margin averaged 22.9 cents per dozen in 1974, 18 percent of the retail price. Transportation costs from California accounted for about 14 cents, 61 percent of the wholesale margin. The total wholesale margin was 5.7 cents higher than a year earlier, with transportation costs increasing 3.6 cents.

Retailing

The retail margin averaged 50.7 cents per dozen in 1974, 40 percent of the retail price. The margin declined from 57.0 cents in 1973, 46 percent of the retail price.

Canned Tomatoes and Tomato Catsup

The retail price of California canned tomatoes averaged 29.8 cents per No. 303 can, 5.1 cents higher than in 1973. California bottled catsup averaged 38.4 cents per 14-ounce bottle, an increase of 6.7 cents.

Production

Production of tomatoes for processing into canned products and catsup is concentrated in California; over 80 percent of the U. S. crop was produced in the Golden State in the last three seasons (1973-75). Other important tomato production regions are the Midwest, primarily Ohio and Indiana, and the New Jersey-Delmarva Peninsula area.

There are roughly 800 processing tomato growers in California, averaging about 360 acres per farm. All tomatoes grown in the State are irrigated. The California crop is harvested almost entirely by machine; adoption of the mechanical tomato harvester, introduced in 1964, was nearly complete in 5 years.

Producers in other States contrast sharply with California tomato growers. Average acreage per farm is much smaller (under 50 acres), the crop is usually not irrigated, and hand picking is generally employed. In addition, yields per acre and tomato solids content are lower in the Midwest and East. These areas have been able to compete with California because of strong advantages in costs for transporting finished products. However, long-term trends show a pervasive eroding of midwestern and eastern market shares by California.

Nearly all processing tomatoes are grown under contract. Contracts typically specify acreage, price, quality tolerances, varieties, and delivery point. Tomatoes are usually purchased f.o.b. from growers after harvesting. If growers haul their own crop, they are reimbursed by the purchasing canner. The 1973/74 price used to calculate average price of processing tomatoes was $57.45 per ton before deducting for transportation cost from grower to processor. On a retail product basis and after deduction of transportation, the return to the grower, or farm value, was 3.8 cents for canned tomatoes and 5.6 cents for catsup, which amounted to around 14 percent of the retail price of these products in 1974.

Until recently, growers had little direct impact on the pricing of raw tomatoes. In California, for example, there would be no contracting activity until one of the major canners announced a price. At that time, all canners would begin contracting acreage at the announced price, and the entire State acreage would typically be signed within a few days or weeks. However, a bargaining association in the State gained sufficient strength to significantly affect price determination in 1974, and in 1975, extensive canner-grower negotiations preceded signing of the first tomato contract.

Processing

Tomato canners may process a "whole line," an array of tomato products including whole tomatoes, juice, catsup, puree, paste, sauce, and specialty products. Or they may specialize in one or two such items. The 29 tomato processing firms operating some 55 plants in California are predominantly whole-line canners. Midwestern and eastern canners (about 120 firms with some 140 plants) typically specialize in whole tomatoes, catsup, or both. In addition, California canners are more likely to process several other products in addition to tomatoes.

Processing stages are similar for all types of tomato products. Raw tomatoes are received in pallet boxes (1,000-1,200 lbs.) or bulk containers (5-12 tons) at the plant and dumped into a washing/conveying flume. The fruit is spray-washed one or more times before being conveyed to inspection belts. There, culls are removed and, in multiproduct plants, fruit destined for whole pack is separated from that moving to crushed products. Whole-pack tomatoes pass through a caustic peeler followed by several washes to remove peel. After further inspection, the peeled fruit moves to can-filling lines where juice and salt are added.

For crushed products, including catsup, tomatoes are macerated and passed through a hot break process to facilitate separation of tomato pulp from seeds and skins. Following severing, where seeds and skins are removed, the single-strength juice is evaporated to achieve proper product consistency (25-33 percent solids for catsup) and moved to bottling or can-filling lines where other ingredients are added.

Recent innovations in tomato processing include bulk storage of tomato concentrates, asceptic drum filling, and dehydration of highly concentrated tomato juice. Bulk storage involves sterile holding of macerate at 30 percent or more solids content in tanks holding 50,000-100,000 gallons. The processing season can be thus extended, allowing for increases in plant capacity and labor use. In asceptic drum filling, 55-gallon drums replace cans as containers for concentrated products, leading to filling efficiencies for products destined for remanufacturing. Dehydration represents the ultimate in concentration, and tomato powder can be used effectively in many tomato preparations.

The processing margin took more than one-half of the retail price of both catsup and canned tomatoes in 1974. Packaging was the major cost component in processing of each product, accounting for about two-fifths of the processing margin for each.

The processing margin averaged 15.7 cents per No. 303 can of tomatoes in 1974, 53 percent of the retail price (table 14). Packaging accounted for 7.5 cents per can, or 48 percent of the processing margin. Labor, the second most important processing cost component, took 16 percent of the margin. Assembly costs represented 3 percent of the margin. Together these three costs represented two-thirds of the processing margin for canned tomatoes in 1974.

For tomato catsup, the processing margin averaged 20.6 cents per 14-ounce bottle in 1974, 54 percent of its retail price (table 15). Packaging cost 7.6 cents, or 37 percent of the processing margin. Labor costs accounted for 13 percent of the margin and assembly costs took 4 percent. Together, these three costs took slightly over one-half of the processing margin for tomato catsup.

Wholesaling

Canned tomatoes and tomato catsup move from canners' stocks to one of several different distribution outlets. These include institutional, cooperative, and private wholesalers, manufacturers, and chain store distribution warehouses. Sales may be buyer label, canner label, or unlabeled. The proportion of total pack moving along each of these distribution channels is not known. Over time, buyer label and unlabeled sales have increased relative to private brands.

Canned tomato and catsup sales are usually on an f.o.b. factory basis. Recently, long-term contracting has received extensive use in the industry, with quantities and pricing formulas established well in advance of delivery. Cooperative canneries in California have been particularly active in finished-product contracting.

The large number of firms producing canned whole tomatoes and tomato catsup, combined with a high degree of product homogeneity, results in a competitive pricing situation for these products. While list prices of major firms tend to set market tone, active discounting serves to keep prices closely in line with supply and demand conditions.

In 1974, the wholesaling margin averaged 6.6 cents per 14-ounce bottle of tomato catsup, 17 percent of its retail price. For canned tomatoes the wholesale margin averaged 4.3 cents per can, 14 percent of its retail price. Transportation costs from California plants were the single largest wholesale cost component, averaging over one-half of the margin for each product. Transportation represented about 9 percent of the retail price for both canned tomatoes and tomato catsup.

Retailing

The retailing margin averaged 6.0 cents per can of tomatoes, 20 percent of its retail price. The retailing margin for tomato catsup averaged 5.5 cents per bottle, 14 percent of the retail price.

Table 14.--Canned whole tomatoes, California: Components of price spreads per No. 303 can, 1974

Costs and profit	Farm value 1/	Marketing functions: Processing	Wholesaling	Retailing	Retail price 2/
		Cents			
Labor	-	2.55	-	3.1	-
Packaging	-	3/ 7.53	-	0.2	-
Transportation	-	4/ .53	5/ 2.68	-	-
Business taxes	-	.09	-	0.2	-
Depreciation	-	1.01	-	0.1	-
Rent	-	-	-	0.3	-
Repairs	-	-	-	0.1	-
Advertising	-	-	-	0.3	-
Interest	-	.49	-	0.1	-
Energy	-	.18	-	0.1	-
Other	-	.33	-	0.8	-
Profit	-	.55	-	0.7	-
Unallocated	-	2.45	6/ 1.61	-	-
Total	3.83	15.71	4.29	6.0	29.8

1/ Calculated from the SRS California price of processing tomatoes (quoted at processors' door), using a conversion factor of 36.36 lbs. of tomatoes per case (24 No. 303 cans) of whole tomatoes, adjusted by the transportation cost from grower to processor.
2/ Average of BLS monthly prices for Atlanta, Chicago, New York, San Francisco, and Seattle for 1974.
3/ Includes costs for cases, cans, and labels.
4/ Grower arranges field-to-plant hauling but is reimbursed by canner. An average California charge of $6.95 per ton was used in calculating cost.
5/ Intercity transportation costs for the most common carrier (rail or truck) weighted by population estimates for New York, Chicago, Atlanta, Dallas, and Los Angeles.
6/ Residual derived by subtracting farm value and other marketing charge from the retail price.
Note: Dashes mean not estimated.

Table 15.--Tomato catsup, California fancy: Components of price spreads per 14-ounce bottle, 1974

Costs and profit	Farm value 1/	Marketing functions			Retail price 2/
		Processing	Wholesaling	Retailing	
		Cents			
Labor	-	2.65	-	2.2	-
Packaging	-	3/ 7.55	-	0.1	-
Transportation	-	4/ .77	5/ 3.41	-	-
Business taxes	-	.13	-	0.2	-
Depreciation	-	1.64	-	0.2	-
Rent	-	-	-	0.9	-
Repairs	-	.05	-	0.2	-
Advertising	-	-	-	0.4	-
Interest	-	.60	-	0.1	-
Energy	-	.36	-	0.2	-
Other	-	6/ 3.43	-	0.5	-
Profit	-	.74	-	0.5	-
Unallocated	-	2.71	3.21	-	-
Total	5.62	20.63	6.62	5.5	38.4

1/ Calculated from the SRS California season average price of processing tomatoes (quoted at processors' door) using a conversion factor of 53.45 lbs. of tomatoes per case (24 14-oz. bottles of catsup), adjusted for the transportation cost from grower to processor.
2/ Average of BLS monthly prices for Atlanta, Chicago, New York, San Francisco, and Seattle.
3/ Includes costs for cases, bottles, and labels.
4/ Grower arranges field-to-plant hauling but is reimbursed by canner. An average California charge of $6.95 per ton was used in calculating cost.
5/ Intercity transportation costs for the most common carrier (rail or truck) weighted by population estimates for New York, Chicago, Atlanta, Dallas, and Los Angeles.
6/ Includes sugar, vinegar, salt, lye, and spices.
Note: Dashes mean not estimated.

Frozen Concentrated Orange Juice

Florida is the major supplier of frozen concentrated orange juice (FCOJ), producing over 90 percent of the 1974 pack. Since the 1948/49 crop year, the annual U. S. pack of FCOJ has increased from 10.2 million gallons to 171.8 million gallons in 1973/74. FCOJ prices have increased very little over these years, largely because the industry has adopted labor saving techniques and efficiencies in processing the product. Cost per box for the fruit has risen very slowly. The 1962/63 season average price was $2.58; 11 years later (1973/74) it was only $2.71 a box, or an increase of only about 1 percent a year.

The 1974 retail price of a 6-ounce can of FCOJ increased only 0.7 cent over 1973; about half of this rise went to the farmer. With retail and farm prices up slightly, processing margins increased less than 1 percent and the retail margin, less than 4 percent.

Assembly

Oranges going into FCOJ come from two sources, direct from the grove or from "eliminations" at a fresh-citrus packinghouse. Most Florida oranges are hand harvested. Fruit selected for the fresh market is generally placed in wooden pallet boxes which hold approximately 900 to 1,000 pounds of oranges. Oranges designated for processing are generally dumped into large trailers, with a capacity of about 40,000 pounds, at grove side for hauling to the processing plant.

Hauling, as used here, does not pertain to the use of field trucks as such trucks are considered a part of the picking and loading operation. Eliminations from packinghouses are transported in the same large trailers. Orange growers may sell their fruit in the cash market, through a cooperative processor, or through a "participation plan" contract with a corporate processor. Cash market sales can be directly to the processor, or to a bird dog, the intermediate handler. The bird dog usually buys fruit on the trees, harvests it with his own picking crew, and delivers the fruit to the processing plant. Purchases may be on a bulk basis, in which all the fruit in the grove is sold for an agreed-upon total price, or the fruit can be bought at a price per box or per pound of solids.

Cash market sales account for approximately 20 percent of deliveries to Florida processors. Roughly 30 percent of the fruit delivered to processors is part of a participation plan whereby the grower's price is based on the final selling price for FCOJ. Approximately 50 percent of the Florida orange crop is either owned by the packer or processor or by growers who are members of a packing or processing co-op.

Hauling costs from the orchard to the processing plant increased 6.5 percent from 14.7 cents in 1973 to 15.6 cents per box in 1974. Labor, including payroll taxes, accounted for 32 percent of total hauling costs, repairs and maintenance for 22 percent, and depreciation and administrative costs for 15 and 9 percent of the total, respectively. The average cost of this hauling was 0.55 cent per 6-ounce can of FCOJ in 1974 (table 16).

Table 16.--Orange juice, Florida, frozen concentrate: Components of price spreads per 6-ounce can, 1974

Costs and profit	Farm value 1/	Marketing functions			Retail price 2/
		Processing	Wholesaling	Retailing	
		Cents			
Labor	-	0.81	-	3.5	-
Packaging	-	2.77	-	0.3	-
Transportation	-	3/ .55	4/ 1.34	-	-
Business taxes	-	.07	-	0.2	-
Depreciation	-	.11	-	0.1	-
Rent	-	.38	-	0.1	-
Repairs	-	.30	-	0.1	-
Advertising	-	.47	-	0.3	-
Interest	-	.26	-	0.1	-
Energy	-	.23	-	0.3	-
Other	-	.90	-	0.4	-
Profit	-	5/ .20	-	0.4	-
Unallocated	-	-	6/ 3.10	-	-
Total	8.53	7.05	4.44	5.8	25.8

1/ Calculated from season average price reported by the Florida Canners Association (quoted at processors' door), using a conversion factor of 0.4224 box of oranges per case (12 6-oz. cans of juice concentrate) adjusted for transportation cost of 15.66 cents per box from grower to processor. Includes picking cost of 91.08 cents per box.
2/ Average of BLS prices (calendar year).
3/ Hauling charge from grower to processor.
4/ Intercity transportation costs.
5/ Profit is a residual estimated by deducting farm value and processing costs from the shipping point price.
6/ Residual derived by subtracting farm value and other marketing charges from the retail price.
Note: Dashes mean not estimated.

Processing

On arrival at a processing plant, oranges are dumped, inspected, and tested for solids content. Afterward they are put through an extractor which squeezes out the juice. The juice goes to an evaporator which removes water, reducing it to approximately 25 percent of the original volume. When juice is concentrated, most of the volatile essence which gives the taste and fragance evaporates but this substance is recovered from the vapors and returned to the concentrate juice. Some fresh juice, "add-back", also may be added to the concentrate to replace some of the lost flavor. Next, the mixture is cooled until partially frozen. The resulting slush is packed in containers for sale, or bulk stored, and the freezing is completed. The final product is stored at about 0°F. The frozen concentrate may be packed in small cans for retail sale or in large packs or bulk for institutional or industrial use.

Processing costs for FCOJ amounted to 7.05 cents per 6-ounce can in 1974, slightly more than a fourth of the retail selling price. The largest cost of processing was packing, which amounted to 2.77 cents. Labor use is minimized throughout the operation. In 1974, processing labor costs were reduced from 0.9 cent to 0.8 cent per can by the efficient use of automated equipment.

Selling

FCOJ sold in retail stores is usually packed in 6-, 12-, 16-, and 32-ounce cans. It is typically transported in refrigerated trucks. FCOJ must be kept refrigerated all the way to the final consumer to maintain product quality. The transporting cost to major markets was estimated to be 1.34 cents per can in 1974.

Processors may sell directly or through a cooperative of processors. Processors may sell their product directly to a retail chain (direct contracts) or to a broker. Brokers may be a buyer for a retail chain or a buyer-seller broker who, in turn, sells to a retail outlet. FCOJ sold through a central organization will flow through similar channels as FCOJ followed by direct sales--either being sold through direct contract to a retail chain or to a broker. Wholesaling costs, excluding transportation, amounted to around 3 cents per can in 1974.

California Lettuce

California is the only State producing lettuce year round although the adjoining area in Arizona produces most of the year. In 1974, California produced 70 percent of the U. S. total while Arizona produced 13 percent.

Harvesting/Packing

Roughly 90 percent of the lettuce shipped is classed as naked pack, meaning that the individual heads are not wrapped. Another 10 percent is wrapped at the source, and less than 1 percent is shredded. The hand-cut ground-pack system is the most common naked pack method of harvesting and packing in California and Arizona. In a recent survey, an average crew size was found to be 36 plus 2 truck drivers. The harvesting operation is performed by 18 of the workers who select, cut and trim the lettuce, placing the heads butt up on the

bed. In the packing operation, standard two-layer-pack corrugated cartons are assembled and distributed along the rows. Nine packers follow the selector-cutter-trimmers down the rows and pack 24 heads per carton. Others close and staple the cartons, and load 300 to 320 of them abroad trucks especially designed for lettuce field operation.

Wrapped lettuce is typically wrapped and packed on a mobile machine-aid in the field. Workers harvest the lettuce by hand ahead of or behind the machine. A typical crew of 35 will consist of 14 workers who select, cut, and trim the heads, and place them on the machine to be wrapped. Nine wrappers are stationed along the wings of the machine, with the wirings extending over 12 beds. The heads are wrapped in a sheet of plastic film, sealed on a hot plate, and placed on a belt which conveys them to the center of the station. Four packers pack the heads in cartons, and then place the cartons in the center furrow to be picked up.

Assembly

From the field, the lettuce is transported to a vacuum cooler located at a site with access to rail and truck loading. Each shipper has enough volume so that no assembly of several lettuce shippers is necessary. Field trucks are unloaded by a giant forklift to hasten truck turnaround time.

Pricing Points

The farm value of lettuce is the value per head of mature lettuce in the field (table 17). Harvesting and packing, a contract operation, appear as packing cost. Farm value decreased from 7.8 cents in 1973 to 6.3 cents in 1974. It accounted for about 15 percent of the retail price, down from 19 percent a year earlier.

Lettuce is ordinarily sold at the point of cooling and shipment. Since lettuce is produced sequentially in a number of growing areas to maintain continual output, the shipping point varies with the season. Usually before it is cooled, prospective buyers or their agents inspect the lettuce preparatory to purchase. Sales are typically conducted by phone. When sold, the f.o.b. price of the lettuce includes the packed lettuce delivered to the cooler point but prior to cooling. Less commonly, the lettuce may be cooled and stored prior to sale, or loaded on cars or trucks and sold on consignment or en route.

In 1974, the f.o.b. price of lettuce was 14.8 cents per head. Of this price, the packing sector received 8.55 cents for harvesting, packing, and packaging materials.

Cooling

For fresh quality to be substantially prolonged, the lettuce must be cooled and kept under refrigeration at about 34°F. To be cooled, the lettuce is placed in tanks, each tank holding 320 to 540 cartons equivalent to one-fourth to one-half of a rail car load. The lettuce is cooled by the rapid evaporation of moisture in the vacuum, which takes about 15 to 30 minutes. A present trend is towards use of portable cooling facilities so as to maximize use of the

Table 17.--Lettuce, California: Components of price spreads per head, 1974

Costs and profit	Farm value 1/	Marketing functions: Packing	Wholesaling	Retailing	Retail price 2/
		Cents			
Labor	-	2.65	-	12.8	-
Packaging	-	1.68	-	0.6	-
Transportation	-	3/ .31	4/ 6.30	-	-
Business taxes	-	.10	-	0.7	-
Depreciation	-	-	-	0.2	-
Rent	-	-	-	0.2	-
Repairs	-	-	-	0.1	-
Advertising	-	-	-	0.5	-
Interest	-	.04	-	0.2	-
Energy	-	-	-	0.3	-
Other	-	5/ 1.95	-	1.2	-
Profit	-	6/ .52	-	1.4	-
Unallocated	-	1.30	7/ 2.98	-	-
Total	6.27	8.55	9.28	18.2	42.38

1/ Derived by subtracting costs for harvesting and field packing plus profit from the shipping point price.
2/ Average of BLS monthly retail prices for calendar year weighted by unloads for Atlanta, Dallas, Los Angeles, Chicago, and New York.
3/ Includes rate for trucks to carry empty cartons and sticking equipment plus cost to haul packed cartons to shipping point.
4/ Includes cooling and loading cost of 1.3 cents at point of production and intercity transportation costs of 5.0 cents for the most common carrier (truck or rail) weighted by California fresh lettuce unloads in New York, Chicago, Atlanta, Dallas, and Los Angeles ("five selected cities").
5/ Includes cost for insurance (0.1 cent), telephone (0.05 cent), office salaries (0.17 cent), sales salaries (0.17 cent), brokerage fees (0.4 cent), and allowances for damaged merchandise (0.62 cent).
6/ Estimate of profit based on 3.5 percent of shipping point price.
7/ Residual derived by subtracting shipping point price and other marketing charges from retail price.
Note: Dashes mean not estimated.

coolers as the harvest moves from area to area. The average charge for cooling lettuce in 1974 was 33 cents per carton, or 1.3 cents per head.

Transportation

From the cooler, the lettuce cartons are loaded singly onto belts or rollers that move the cartons to trucks or rail cars where they are loaded. In 1974, approximately 60 percent of the lettuce was transported by truck, and 40 percent by rail. An advantage of truck transportation is in the speed of arrival. At the delivery point, the cartons are again hand loaded onto pallets and distributed or stored.

Wholesaling and Retailing

Lettuce is sold largely to buyers or their brokers representing national or regional chain stores and terminal market wholesalers.

The average terminal market (wholesale) price for lettuce was 24.1 cents per head in 1974. The wholesaling share of this was 9.3 cents per head, which includes 6.3 cents paid by the wholesaler to cool and transport the lettuce from the shipping point to the wholesale market.

When sold directly to chain stores, the lettuce is delivered to a chain distribution center, from which it is distributed to individual stores. Lettuce sold to wholesalers is delivered to terminal markets for resale to retail stores or to the food service industry.

The retail margin, the largest marketing function, accounted for 43 percent of the retail price in 1974, compared with 40 percent a year earlier. The retail price for lettuce in 1974 was 42.4 cents per head, only 1 percent higher than in 1973. The retailer received 18.3 cents of this price. For this amount, the retailer had to maintain a supply of lettuce in refrigerated rooms, provide refrigerated display, bag lettuce as sold, and withstand any losses between purchase and sale including reworking of heads as they become shopworn, and labor for daily display. The share of the retail price going to the packer and wholesaler both increased slightly in 1974.

Lettuce Handling System

The lettuce handling system as with other fresh produce marketing, is not complicated with intermediate processing stops. However, because of high perishability, careful handling and constant refrigeration are necessary.

Most of the operations in the lettuce handling system are labor intensive. Loading the packed cartons in the field onto pallets on the truck allows for less labor-intensive handling. However, the palletized cartons, loaded singly abroad trucks and cars, need to be repalletized by hand at the delivery point.

Future Trends

The prospect of mechanical harvesting of lettuce could cause considerable change in the handling system. Should mechanical harvesting introduce different carton sizes or other containers, the subsequent handling system will need to adjust, with a likely move toward labor-saving innovations.

Potatoes

Potatoes are commercially grown in every State in the United States. Since 1970 fall potatoes have accounted for approximately 80 percent of the U. S. crop. About 75 percent of the total fall crop is produced in six States: Idaho, Washington, Maine, North Dakota, Minnesota, and Oregon. Since 1970, these States have produced an increasing proportion of the fall potato crop.

Per capita consumption of fresh potatoes has declined over several decades, while that of processed potato products has gradually trended upward. In 1974 per capita fresh potato consumption was just about 48 pounds and per capita processed potato consumption was above 66 pounds. There is a definite trend toward processed potato products.

Retail potato prices increased to $1.75 in 1974, or 43 percent over the 1973 price of $1.22 for a 10-pound bag. The retailer's share of the retail price increased from 28 percent to 36 percent, which is closer to the average retailer margin for fresh vegetables. Though the farm value of potatoes increased about 36 percent, the farmer's share of the retail value decreased from 41 to 39 percent. The packer's margin rose about 2.5 cents per 10 pounds but his share of the retail price decreased from 18 to 14 percent. Wholesale prices likewise increased nearly 3 cents but the proportion of the retail price dropped from 13.5 to 11 percent.

Harvesting/Packing

Typically, potatoes are harvested with mechanical harvesters. For successful storage, potatoes should be mature before harvest. Mature potatoes have a firmer skin that resists skinning and bruising more than that of actively growing potatoes. But mature potatoes do require careful handling and padding to prevent damage. About 75 percent of the fall crop is stored, either in farm or commercial warehouses. After being put in storage, potatoes are cured for 10 to 14 days at 45 to 60°F and high relative humidity to heal any wounds (cuts and bruises). After curing, table potatoes are held at 45°F if sprout inhibitor is used or 38 to 40°F without sprout inhibitor. Most varieties will remain dormant 5 to 8 months at 40°F without sprout inhibitor.

Stored potatoes are unloaded, packed, and shipped out from October until May. Table stock potatoes are unloaded from storage by a flume if stored near the packingplant or by a four wheel-drive bulk scoop if stored elsewhere. If unloaded by flume, they go directly into the packingplant to be spray washed and dried by fans or a blast of warm air. Next, potatoes are graded and sized to meet market specifications and packed in bags sized for consumer use. Labor requirements for packing in 1974 were 6.7 cents per 10-pound bag. Labor is required in dumping the potatoes into the flume, either from a warehouse or from trucks if hauled in. Additional labor is used on the inspection lines and

with packing and packaging equipment. The 10-pound bag is "baled" into a larger bag containing 5 bags or 50 pounds. At this point, there are up to 3 pounds excess per bale to assure a full net weight at retail. The cost of the bags for bagging and bailing in 1974 was 7.3 cents per 10 pounds (table 18).

Transportation equipment requires both heat and refrigeration plus ventilation for hauling potatoes to terminal markets. The ideal temperature for table stock potatoes is 50 to 60°F. Average transportation cost for hauling a 10-pound bag of potatoes from the packing shed to the wholesale market in 1974 was 15.5 cents.

Idaho Potatoes

Idaho is the Nation's leading potato producer, although only 20 percent of the State's crop was shipped fresh in 1974. Growers in the eastern producing regions of Idaho tend to produce potatoes for fresh markets. Most of these growers store some or all of their crop on their own farms. There is little direct grower shipment to retailers or wholesalers. Most fresh potatoes are packaged by shippers who receive, store, wash, and package the crop and assume price risks. In short crop years, shippers may buy f.o.b. farm; however, shippers generally buy on an out basis, meaning they pay growers per packed product. Grower costs of hauling potatoes from storage to a shipper may vary from $3 to $5 per ton. Shippers may pack under a retailer label, thus selling directly; they may pack under their own label and sell directly to a retailer or to a broker in a major terminal market; or they may pack under their own label and ship without a confirmed sale. The most important container type is a 50-pound cardboard carton, although the 5- and 10-pound polybags are increasing in popularity. Bulk shipping is decreasing in importance.

Potatoes from Washington and North Central Oregon

Washington, since 1960, has increased its emphasis on processing potatoes; thus, only 15 to 20 percent of its present crop goes into fresh markets. There are a few growers and some shippers who deal solely in fresh potatoes; however, one major processor and several smaller processors practice skimming, the selecting of U. S. No. 1 and No. 2 potatoes from those purchased for processing. In years when late-summer potato prices are high, this practice is common.

Shipping baker potatoes in 50-pound cardboard boxes is popular, although 5- and 10-pound polybags are also popular. Shippers pack for retailers either under the retailer's label or their own label. Brokers in terminal markets are occasionally used. California is a major market for Washington potatoes. Trucks are the most popular mode of transportation. Culls can be sent to processors, dumped outright, or sent to cattle feed.

The North Central Oregon producers are closely allied with Washington producers who have similar production and marketing practices. These growers may ship a higher proportion of their crop fresh than their counterparts in Washington.

Table 18.--Potatoes, U. S. fresh: Components of price spreads per 10-pound bag, 1974

Costs and profit	Farm value 1/	Marketing functions: Packing	Wholesaling	Retailing	Retail price 2/
			Cents		
Labor	-	6.73	-	23.5	-
Packaging	-	3/ 7.27	-	1.8	-
Transportation	-	.35	15.54	-	-
Business taxes	-	.21	-	1.7	-
Depreciation	-	.92	-	1.3	-
Rent	-	4/	-	1.6	-
Repairs	-	.43	-	0.9	-
Advertising	-	.10	-	1.9	-
Interest	-	.48	-	2.1	-
Energy	-	.57	-	2.6	-
Other	-	5/ 2.87	-	14.3	-
Profit	-	1.96	-	11.7	-
Unallocated	-	2.69	6/ 3.70	-	-
Total 7/	67.5	24.7	19.2	63.4	174.8

1/ Weighted average of shipments and monthly (1974) prices from SRS, includes onfarm storage, hauling to packingplant, and shrink.
2/ BLS retail prices weighted by type of potatoes and by unloads (rail and truck) in New York, Chicago, Atlanta, Dallas, and Los Angeles.
3/ Includes cost of the bale as well as mesh or poly bags.
4/ Less than 0.05 cent.
5/ Includes administrative, brokerage, insurance, waxing, and so on.
6/ Residual derived by subtracting farm value and other marketing charges from the retail price.
7/ Totals may not add due to rounding.
Note: Dashes mean not estimated.

Maine Potatoes

Approximately 35 to 38 percent of Maine's potato crop is shipped fresh. About three-fifths are sold in the Northeast region, some go to the South and others, to the East Central States. Most growers have facilities to store, wash, and pack on their own farm. While some growers pack and sell directly to a retailer, most growers pack and sell to a dealer. The dealer buys the potatoes and sells to another dealer, a retailer, a wholesaler, or a broker in a terminal market. Dealers may provide polybags or some other service, but there is generally an implied brokerage charge of about 10 cents per hundredweight. Although not formally, the dealer takes the risk of fluctuating prices. Most potatoes are shipped by truck; less are shipped by rail. Polybags of 5 and 10 pounds are of great importance, while 20-pound polys are not as popular as a year ago. Bulk shipments by rail have decreased in importance. Prices are generally determined by New York and Boston terminal market prices, futures market prices, processors, dealers, and consumer demand.

Culls of round white potatoes from fresh packing operations are either dumped or sent to starch plants. Culled Russets are sent to processors. Skimming is not practiced in Maine.

Potatoes from Red River Valley: Minnesota and North Dakota

Since the late 1960's, the proportion of the Red River Valley's potato crop shipped fresh has declined from 40 to 30 percent. Some growers produce only fresh market potatoes while others grow both fresh and processing potatoes. The dominant fresh market variety is the red round potato, which is not as well suited to processing as is the Russets.

Although there is some farm storage, most fresh market potatoes are sent to shippers who provide storage, wash, pack, and sell potatoes to retailers, wholesalers, and brokers. These shippers may be grower cooperatives or private corporations. Few potatoes are shipped without first being sold. Polybags and 100-pound sacks are the most popular containers. Polybags have become increasingly important, especially in the 5- and 10-pound sizes. Skimming is not practiced in the Valley. Culls from packing operations are sent to dehydrators or dumped.

Prices for fresh potatoes are generally determined and established by a few sellers. Shipment of potatoes by truck has become increasingly important at the expense of rail shipments. Most of the Red River Valley fresh potatoes are sent to midwestern markets.

Increased margins at all stages of the marketing system and higher ingredient costs pushed up the average price of a 1-pound loaf of white pan bread to a record 34.5 cents during 1974, 6.9 cents (25 percent) higher than in 1973. Both the amount of the increase and the rate of increase were record large. White pan bread is the type most commonly sold in the United States.

The farm value of the wheat needed to produce a 1-pound loaf of white pan bread increased 1.3 cents (33 percent), as strong demand for wheat relative to available supplies early in 1974 resulted in record prices. The price of wheat retreated from the record high established in February, but a short crop of feed grains held prices of all grains at higher levels during 1974 compared with 1973. The prices of oilseeds, such as soybeans, also stood at high levels during 1974, contributing to the increased cost of shortening. The sharp rise in the price of sugar during 1974 also increased ingredient costs. The cost of all ingredients rose 2.75 cents per loaf, about 40 percent of the total increase in the retail price.

Table 19.--White Pan Bread: Farm value and price spreads, 1973-74.

Function	1973	1974	Change	Change
	Cents/loaf			Percent
Farm value				
Wheat	4.10	5.45	1.35	33
Other ingredients	1.30	2.50	1.20	92
Assembly of wheat	.32	.62	.30	94
Flour milling	.98	1.00	.02	2
Transportation of flour	.27	.38	.11	41
Baking-wholesaling 1/	15.20	18.70	3.50	23
Retailing	5.38	5.80	.42	8
Retail price	27.55	34.45	6.90	25

1/ Includes 1.0 cent per loaf in 1973 and 1.2 cents in 1974 paid by baker for nonfarm ingredients and for processing, handling, and transportation of farm-produced ingredients other than wheat.

The indicated cost of moving the wheat from the country elevator to major markets nearly doubled in 1974. However, this cost is small and much of the change may well be a statistical discrepancy created by independent measurements made of prices to obtain this spread. The margin for flour milling stayed essentially unchanged in 1974. The cost of transporting flour from mills to bakeries increased, but this item remains a very small part of the retail price.

The margin for baking-wholesaling increased 3.3 cents (excluding the change in the cost of nonfarm ingredients), 48 percent of the total rise in the retail price. The estimated components of the baking-wholesaling spread were revised for 1974, and a detailed comparison of the individual components of this spread with earlier years cannot be made. In general, however, higher wage rates and increased costs of packaging materials significantly increased costs, while lesser absolute increases occurred for other cost items. Profits improved during 1974, recovering from depressed levels recorded in 1973, when price controls forced bakers to absorb cost increases for part of the year. A recent staff report by the Federal Trade Commission indicates that bakers' profits began to recover during the latter part of 1973 and continued to improve in 1974. 4/ However, this report concluded that profit levels were not high relative to longer term industry averages or to averages for all manufacturing or all food manufacturing. It does caution that several large wholesale bakers which are parts of large corporations were not included in the analysis.

Data and Procedures

Prices and Margins

Margins for various marketing functions, such as baking and wholesaling, are obtained by calculating differences in prices at each stage of the marketing system. Prices and price spreads for white pan bread are estimated monthly by the Economic Research Service. The simple average of these monthly estimates provides the values and costs shown on the bottom line of table 20.

The data for the baker-wholesaler represent only one form of distribution system--the wholesale baker who distributes the product through a variety of retail outlets. Wholesale bakeries primarily bake and distribute bread under their proprietary labels, and they may have national or regional production and distribution. Distribution to consumers is accomplished through supermarkets operated by food chains, locally owned supermarkets, and convenience stores. This type of distribution system differs from those of "captive" bakeries, that is, those which bake bread solely for a supermarket chain or which are owned by a chain. Retail bakeries also are excluded from the type of distribution system represented by the data.

The estimated retail price for white pan bread is obtained by averaging monthly prices reported by the Bureau of Labor Statistics from its survey of retail prices. This price is a composite of the prices charged by a wide spectrum of retail outlets. No adjustments to this price are made.

An estimated wholesale price for bread is obtained using wholesale bread prices in four regions of the country reported by BLS. The current wholesale price is adjusted by a benchmark relationship of wholesale and retail prices and for allowances and discounts from quoted wholesale prices. This adjusted

4/ Masson, Alison and Russell G. Parker. Price and Profit Trends in Four Food Manufacturing Industries, Staff Report to the Federal Trade Commission, July 1975.

Table 20.--White Pan Bread: Components of price spreads per 1-pound loaf, 1974

Item	Farm value		Assembly of wheat 1/	Flour milling spread	
	Wheat	Other ingredients		Processing	Wholesaling
			Cents		
Labor	-	-	0.07	0.30	0.05
Packaging	-	-	2/	.03	-
Transportation	-	-	.26	-	-
Business taxes	-	-	2/	.02	-
Depreciation	-	-	.01	.04	-
Rent	-	-	2/	-	-
Repairs	-	-	.01	-	-
Advertising	-	-	-	-	.02
Interest	-	-	.01	.03	.01
Energy	-	-	.01	.04	-
Other and unallocated	5.5	2.5	.25	.18	.08
Profit	-	-	-	3/ .16	3/ .04
Total	5.5	2.5	.62	.80	.20

	Transportation 4/	Baker-wholesaler spread 5/		Retailing	Retail price
		Processing	Wholesaling		
		Cents			
Labor	-	4.02	6.29	3.28	-
Packaging	-	1.61	.10	.21	-
Transportation	-	-	.04	-	-
Business taxes	-	.13	.05	.17	-
Depreciation	-	.48	.15	.02	-
Rent	-	-	.08	.09	-
Repairs	-	.09	.07	.02	-
Advertising	-	-	.53	.38	-
Interest	-	.03	.05	.13	-
Energy	-	.25	-	.02	-
Other and unallocated	.38	3/ 6/ 1.97	3/ 1.61	.77	-
Profit	-	.52	.63	.72	-
Total	.38	9.10	9.61	5.81	34.45

1/ Handling and transportation from country elevator to major markets.
2/ Less than 0.005 cent. 3/ Residual.
4/ Transportation of flour from flour mill to bakery.
5/ Revised. Data not comparable to those for earlier years.
6/ Includes 1.2 cents paid by baker for nonfarm ingredients.
Note: Dashes mean not estimated.

wholesale price is subtracted from the retail price to obtain the retailing margin and from a cost of all ingredients to the baker to obtain a baker-wholesaling margin.

The cost of ingredients to the baker is determined by using a fixed mixture of ingredients which is priced on the basis of data obtained from industry sources or market prices. The prices of nonfarm ingredients (such as yeast, yeast food, dough conditioners, and stabilizers) are supplied monthly by a bakery cooperative. Market prices of agricultural ingredients other than flour (vegetable shortening, lard, milk solids, and sugar) are used for determining the cost of these ingredients for bread. These prices are adjusted to a benchmark value representing the relationship of implicit prices paid by bakers, derived from data reported in the 1972 Census of Manufacturers and from market prices during the census year. This adjustment is made to account for quality differences in the ingredients priced in the market and the quality that is bought by bakers, for discounts and allowances from quoted prices, and for differences in the location of bakeries relative to the markets used to obtain the average prices for these ingredients.

The price of flour is obtained from flour mills which report prices and quantities of white bread-type flour sold to wholesale and chain store bakeries. Prices are reported on a bulk basis, f.o.b. mill points and f.o.b. bakeries. The quantity sold in bags and the charge for bagging also are reported. These data are used to estimate the mill sales value of flour (price received by millers) and the cost of flour to the bakery. Moving averages are used to smooth these data because of differences in the regional coverage of reports received each month.

The cost of wheat to the miller is based upon a weighted average price of hard red winter and hard red spring wheat in major markets. This price is adjusted by a benchmark relationship of the prices in these markets and the imputed value of wheat purchased by flour millers as determined from data reported in the Census of Manufacturers. This adjustment is made to reflect the locational difference of flour mills relative to the markets where prices are observed, and to reflect any difference in the grade of wheat bought by millers relative to that of the grain priced in these markets. Prices of millfeeds in certain markets also are obtained and adjusted to a benchmark relationship determined from the Census of Manufacturers. The value of mill products (flour plus millfeeds) is calculated and the proportion of this value represented by flour is obtained. This proportion is multiplied by the cost of wheat to the miller to obtain the cost of the wheat in a loaf of bread. This cost of wheat to the miller is subtracted from the mill sales value of flour to obtain the flour milling charge, which amounted to 1 cent per loaf of bread in 1974.

The farm value of wheat is a weighted average of the prices received by farmers in major States producing hard red winter and hard red spring wheats, reported by the Statistical Reporting Service. This price is adjusted for the imputed value of millfeeds by using the relationship obtained for the adjustment of the cost of wheat to millers.

Cost Components

The components of margins shown in table 20 are estimated from base data, updated if necessary to 1974 with price indexes of wage rates, interest rates, and costs of packaging materials.

Costs of assembling wheat are estimated from data reported in Costs of Storing and Handling Grain in Commercial Elevators, a publication of the Economic Research Service. Base data for this report were obtained from a sample survey of elevators conducted by personal interviews in 1971. These data were updated by a mail survey in 1972, and price indexes thereafter.

Technical Study No. 5 of the National Commission on Food Marketing provides the basis for allocating the margin attributed to flour milling. Base costs developed from these data were updated to 1974, primarily based on movements in wages and salaries and wholesale price indexes.

Data reported in Technical Study No. 5 also form the basis for determining the costs of baking and wholesaling. In this case, however, the data are supplemented with data collected by the American Baker's Association (ABA) in an annual cost survey of its members. Only two of our cost categories--labor and packaging--are specifically broken out by ABA. Profits are estimated by ABA, but data from the Federal Trade Commission also were used to estimate this component for 1974. The data from the ABA were primarily used to assess trends in costs in the baking industry and to verify the reasonableness of estimates derived from updating previous estimates with price indexes.

Processes Involved in Producing White Pan Bread

Numerous resources must be combined by a number of different firms to produce a loaf of white pan bread for sale at the retail store. The two major types of wheat--hard red winter and hard red spring--used for bread-type flours are primarily produced in the Plains States from Texas north to the Canadian border. Farmers normally deliver their wheat to a country elevator, which assembles marketable quantities of wheat for shipment to subterminal or terminal elevators. Some shipments may go direct to flour mills, but in general, grading and other quality measures must be made at a level of the marketing system higher than the country receiving point.

White flour is obtained from the endosperm portion of the wheat kernel. Endosperm accounts for about 83 percent of the kernel, but the recovery of white flours is limited to about 73 to 75 percent of the weight of the kernel. Wheat germ, accounting for about 2½ percent of a wheat kernel, normally is separated during the milling process because its fat content limits the keeping quality of flour. The remainder of the wheat kernel, mainly the exterior of the kernel, is the bran. This portion is sold as animal feed when white flour is produced.

A constant extraction rate of 73 percent of white flours from wheat is used in estimating the quantity of wheat necessary to produce a 1-pound loaf of bread. This rate is slightly lower than the averages of 74.5 to 75.0 percent reported for recent years in Current Industrial Reports (Series M20A--Bureau of the Census). On the other hand, not all white flour which is extracted is

desirable for use in commercial bread bakeries. The use of an extraction rate of 73 percent values a part of the production at a higher price than can be obtained by the miller, but it also values some part of the production at a lower price than the product is worth. The difference between the actual extraction rate and 73 percent is regarded as millfeeds by ERS, while the difference between 73 percent and the amount sold to bakers is prices as bakery type flours. These differences probably are not offsetting, but the difficulty of obtaining information on the exact mix of products sold and on prices of mill products other than baker's flour and millfeeds dictates that the value of flour sales be approximated by this procedure. The error introduced by this approximation is insignificant.

Flour mills use two main distribution systems for bakery flour. Larger bakeries receive bulk flour delivered by trucks equipped with pneumatic equipment for transfer from the truck to storage bins. Smaller bakeries receive flour in bags. Under either system, the mill normally services local bakeries directly and more distant markets through rail service. In recent years, there has been a tendency to construct mills in the major consumption areas. However, disposal of the millfeeds must be considered when evaluating locations of mills, a restrictive factor for management in its determination.

Bread processing involves making, baking, slicing, and wrapping the bread. When produced by baker-wholesalers, bread normally is distributed to retail outlets by a driver salesperson who delivers the bread, stocks the shelves, and picks up out-of-date bread. More than one trip may be made to an individual store each working day to assure that supplies on the shelf are adequate. Drivers from several bakeries may deliver to individual stores, resulting in duplication of service and a relatively high wholesaling cost.

Definition of the Components of Cost

Cost attributed to labor includes all wages, salaries, and fringe benefits paid in the marketing system. Where appropriate, direct labor costs were charged to either processing or wholesaling, while administrative labor was prorated to each function based on the share that the cost of each function represented of total costs.

Packaging cost represents all materials needed to market the product. In bread baking, the costs for wrapping individual loaves of bread are charged to processing, while the costs of crates, overwraps, boxes, and other materials used to package several loaves for delivery to stores are charged to wholesaling.

Transportation cost represents the amount paid to outside haulers to move products. The cost of delivery equipment owned by the firm is charged to the appropriate category of cost such as depreciation.

Business taxes are an estimate of the amount paid for State and local property taxes, licenses, and related fees. Taxes on income are excluded from this category.

Energy represents the costs of electricity, natural gas, other gaseous fuels, fuel oil, and other sources used for the production process and for general heating and cooling. This entire cost is charged to processing since it is very small relative to total costs, and most of the cost would be incurred in processing. Gasoline for vehicles owned by the firm is included in the category of "other and unallocated" costs.

Other and unallocated costs include garage supplies (gasoline, oil, and so on); utilities such as water, sewage, and telephone; insurance, share of home and regional offices' expenses; and miscellaneous items. Generally, this component is not estimated directly but is a residual after all other costs and profits are estimated. Thus, changes in price spreads which cannot be explained by changes in labor and other categories of costs will be added to or deducted from this category.

VEGETABLE OIL PRODUCTS

Marketing costs and margins were estimated for three fats and oils products sold in retail foodstores in 1974--cooking and salad oil, margarine, and shortening. These products are the principal food uses of vegetable oils and edible animal fats. In 1974, about 78 percent of U. S. production of soybean oil, 90 percent of the corn oil, 53 percent of the cottonseed oil, and a substantial portion of other edible vegetable oils were manufactured into these products.

Oil prices were relatively high in 1974 due to several factors, including a 20-percent drop in the soybean crop, a drought in the Philippines which restricted coconut oil imports, and reduced lard and butter production. These conditions were coupled with a strong demand to build up supplies of oil and to purchase commodities including fats and oils because of unstable world monetary conditions. Soybean farmers received an average of $5.68 a bushel for their 1973/74 soybean crop, the highest amount on record and $1.30 more than the previous year. A similar situation occurred for cottonseed. Farmers received an average price of $100 a ton for cottonseed, double the price received the previous year.

Retail prices of the three oil products were over 50 percent higher in 1974 than a year earlier, reflecting both higher oil prices and costs of manufacturing and distributing the finished products. Farm-retail price spreads increased about 30 percent, reflecting higher costs of marketing functions. These include assembling oilseeds from farmers, oilseed crushing, oil refining, manufacturing, and wholesale and retail distribution. Oilseed crushing, crude oil refining, and manufacturing of the finished product often represent an integrated operation performed at the same location but they are separate functions. Therefore, costs were estimated for each.

Although a variety of fats and oils are used in manufacturing cooking and salad oil, margarine, and shortening, the costs shown in tables 21-23, represent products manufactured mainly from soybean and cottonseed oil. The data do not represent products manufactured from safflower, sunflower, peanut, and olive oil or animal fats such as lard and edible tallow. Soybean oil is by far the

Table 21.--Margarine: Components of price spreads per 1-pound package, 1974

Costs and profit	Farm value		Marketing functions						Retail price
	Oil 1/	Dry milk solids	Assembly & storage 2/	Oilseed crushing	Oil refining	Manufacturing	Wholesaling	Retailing	
				Cents					
Labor	-	-	-	0.4	0.1	1.1	-	3.9	-
Packaging	-	-	-	0	0	3.3	-	0.3	-
Transportation	-	-	-	.6	.5	-	0.4	-	-
Business taxes	-	-	-	3/	.2	.1	-	0.3	-
Depreciation	-	-	-	.1	.8	1.5	-	0.3	-
Rent	-	-	-	0	0	-	-	0.3	-
Repairs	-	-	-	.1	3/	3/	-	0.2	-
Advertising	-	-	-	3/	3/	2.2	-	0.6	-
Interest	-	-	-	.2	.1	.2	-	0.2	-
Energy	-	-	-	.2	.1	3/	-	0.5	-
Other	-	-	-	4/ .3	4/ 1.7	.6	-	1.6	-
Profit before taxes	-	-	-	-	-	-	-	1.4	-
Unallocated	-	-	-	.2	2.4	-.5	1.6	-	-
Total	26.8	0.9	1.6	2.1	5.9	8.6	2.0	9.6	57.4

1/ Imputed from SRS monthly prices received by farmers at country elevators for soybeans and cottonseed.
2/ Based on the difference between soybean prices, No. 1 yellow, Illinois country shipping points, and farm value.
3/ Less than 0.1 cent.
4/ A large part is other raw materials costs such as caustic soda and solvent.
Note: Dashes mean not estimated.

Table 22.--Cooking and salad oil: Components of price spreads per 24-ounce bottle, 1974

Costs and profit	Farm value 1/	Marketing functions: Assembly and storage 2/	Oilseed crushing	Oil refining	Manufacturing	Wholesaling	Retailing	Retail price
				Cents				
Labor	-	-	0.6	0.3	0.6	-	5.1	-
Packaging	-	-	0	0	9.9	-	0.3	-
Transportation	-	-	1.1	1.0	-	1.8	-	-
Business taxes	-	-	3/	.5	.8	-	0.3	-
Depreciation	-	-	.2	1.4	.9	-	0.2	-
Rent	-	-	0	0	0	-	0.9	-
Repairs	-	-	.2	.1	.3	-	0.2	-
Advertising	-	-	3/	3/	3.0	-	1.2	-
Interest	-	-	.4	.1	.3	-	0.3	-
Energy	-	-	.3	.1	3/	-	0.2	-
Other	-	-	4/ .5	4/ 2.0	1.2	-	1.4	-
Profit before taxes	-	-	-	-	-	-	1.2	-
Unallocated	-	-	4.4	4.9	10.3	.7	-	-
Total	44.6	2.9	7.8	10.4	27.3	2.5	11.3	106.8

1/ Imputed from SRS monthly prices received by farmers at country elevator for soybeans, cottonseed, and corn.
2/ Based on the difference between soybean prices, No. 1 yellow, Illinois country shipping points, and farm value.
3/ Less than 0.1 cent
4/ A large part is other raw materials costs such as caustic soda and solvent.
Note: Dashes mean not estimated.

Table 23.--Vegetable shortening: Components of price spreads per 3-pound can, 1974

Costs and profit	Farm value 1/	Marketing functions: Assembly and storage 2/	Oilseed crushing	Oil refining	Manufacturing	Wholesaling	Retailing	Retail price
				Cents				
Labor	-	-	1.3	0.6	-	-	5.4	-
Packaging	-	-	0	0	17.3	-	0.1	-
Transportation	-	-	2.0	2.0	-	1.9	-	-
Business taxes	-	-	.1	1.1	-	-	0.4	-
Depreciation	-	-	.5	2.8	-	-	0.3	-
Rent	-	-	0	0	-	-	1.3	-
Repairs	-	-	.4	.1	-	-	0.2	-
Advertising	-	-	3/	3/	-	-	2.0	-
Interest	-	-	.9	.3	-	-	-.1	-
Energy	-	-	.7	.3	-	-	0.2	-
Other	-	-	4/ 1.1	4/ 4.2	-	-	-.7	-
Profit before taxes	-	-	-	-	-	-	-.4	-
Unallocated	-	-	2.6	10.3	16.2	-	-	-
Total	97.5	6.1	9.6	21.7	33.5	1.9	8.7	179.0

1/ Imputed from SRS monthly prices received by farmers at country elevators for soybeans and cottonseed.
2/ Difference between price of soybeans, No. 1 yellow, Illinois country shipping points, and farm value.
3/ Less than 0.1 cent.
4/ A large part is other raw materials costs such as caustic soda and solvent.
Note: Dashes mean not estimated.

leading oil used in the manufacture of the three products. In 1974, it accounted for about five-sixths of the fats and oils used in making margarine, three-fourths used in cooking and salad oils, and three-fifths of the fats and oils going into the manufacture of shortening.

Farm Value

As a result of the large increases in soybean and cottonseed prices received by farmers in 1974, the farm value of oil in shortening and other products made up a much larger portion of their retail cost in 1974 than in other years. For instance, the farm value of the oil in a 3-pound can of shortening was about 98 cents in 1974, or 54 percent of the retail price. In 1973, it was 44 percent of the retail price, and only 31 percent in 1972. Similar increases occurred in the proportionate share of the cost of oil in cooking and salad oil and margarine. The higher prices of fats and oils in 1974 resulted in substitutions among the fats and oils in the formulas of some oil products. Soybean oil, for example, made up 4 percent less of the fats and oils used in making margarine while lard made up the remainder.

The farm value of vegetables oils in margarine, shortening, and salad and cooking oil is imputed from prices received by farmers for soybeans, cottonseed, and corn reported by SRS each month in Agricultural Prices. Farm prices are allocated between the oil and other products, such as meal, obtained in processing the commodities. This allocation is made based on the proportion that oil is of the total wholesale value of all products obtained from the commodities. In 1974, about 54 percent of the farm price of soybeans was attributed to the crude oil based on the relative wholesale values of the oil and other products obtained from soybeans.

Farm values for the finished products are obtained by multiplying the imputed farm values of oil by the equivalent quantities of crude oil used in manufacturing the products. These quantities in 1974 were: 3.145 pounds for a 3-pound can of shortening, 1.513 pounds for a 24-ounce bottle of cooking and salad oil, and 0.849 pound for a 1-pound package of margarine. They take into account losses that occur in refining the crude oil and manufacturing the finished product and vary from year to year depending upon the amount of the various oils used.

Assembly and Storage of Oilseeds

Country elevators or shippers largely perform the function of assembling and storing soybeans for eventual sale to oilseed crushers or exporters. They also clean, dry, and transport soybeans from buying stations to the elevator. The costs of these functions are a relatively small portion (3 to 5 percent in 1974) of the retail price of margarine and the two other oil products.

The costs of assembling and storing oilseeds were derived for soybeans only from the difference between the average farm price of soybeans and the average price of soybeans at country shipping points reported in AMS' weekly "Grain Market News." This spread amounted to 44 cents per bushel in 1973-74.

The country shippers' spread was allocated between the oil and meal and the data converted to retail equivalents in the same manner described in calculating the farm value. The margin received by country shippers of soybeans was 9 percent in 1973-74, slightly larger than that received in most other recent years.

Oilseed Crushing

A high percentage of the oil used in manufacturing margarine, vegetable shortening, and cooking and salad oil is soybean oil. Thus, only costs of crushing soybeans and refining the oil were estimated. Oilseed crushing or milling consists of purchasing and storing the oilseeds, processing them to separate the oil from the meal, and storing these products until needed.

The cost components of the margin for crushing soybeans were derived from data obtained from several oil mills, equipment manufacturers, and consultants--for the 1973/74 operating season. These data were considered representative of the U. S. soybean crushing industry, both for size of mill and costs incurred. Costs of crushing a bushel of soybeans were allocated to the oil and meal in the same manner used in calculating farm value.

The crushing margin includes transportation of soybeans from country elevators to oilseed crushing mills. Transportation costs were derived from the "1973 Carlot Waybill Statistics" (latest issue available), published by the U. S. Department of Transportation. These data are based on a 1-percent sample of railraod carlot waybills. The average hauling distance for soybeans was 396 miles at an average cost of $5.47 per ton, or 16.4 cents per bushel. It was assumed that soybeans supplied all the oil and that they were shipped this average distance to processors, though some soybeans were shipped by truck and some were shipped to exporters. The cost of shipping soybeans was allocated between the oil and meal obtained in processing, based on the yield and price of the products in 1974.

Cost of crushing soybeans to obtain the crude oil used in the 3 retail products were about 3 percent of the retail price of margarine, 5 percent for shortening, and 7 percent for cooking and salad oils.

Oil Refining

Crude oil obtained from milling oilseeds is further processed or refined before it is manufactured into food products. Oil refining may consist of numerous processing functions. These include: (1) degumming, which removes the gum from soybean oil; (2) alkali or steam refining to remove free fatty acids and impurities; (3) bleaching; (4) hydrogenation; (5) deodorization; (6) winterizing to remove higher melting glycerides to prevent clouding; and (7) the blending of base oils of different degrees of saturation. Some oils may undergo only a few of these processes whereas others may go through all of them, depending upon the kind of oil and the end product that will be manufactured from it.

Using the static cost simulation model approach, cost component data were developed for soybean oil processing or refining, and for the manufacturing of two oil products--cooking and salad oil and margarine. Models were

constructed to simulate typical oil refineries and oil product manufacturing plants. Data requirements for constructing the models were substantial. The models were designed based on actual engineering and economic relationships existing in the industry, including labor requirements, operating rates, and equipment and building costs. The bulk of the information used in the models was obtained from a small, nonprobability sample of plants. Information on equipment costs came directly from equipment manufacturers.

The cost simulation approach was used because of the difficulty of obtaining and developing a consistent time series of cost data from accounting records for representative firms in the oil products industry. In addition, the cost estimates can be updated for several years without resurveying the industry, provided that suitable cost indexes and other economic indicators can be found to update the technical coefficients of the models. However, the models must also be updated periodically to reflect technological changes in the industry. Other reasons for using the modeling approach are that greater consistency can be maintained in definitions of functions, costs, and margins and the task of data manipulation and analysis is lessened.

The costs of refining the oil used in each of the three retail oil products were around 10 percent of the retail price of each product. The "other" cost component category is large primarily because it reflects costs of ingredients used in refining; such as alkali, bleaching earth, nickel catalyst, and so on. Costs of refining oil were adjusted to allow for losses that occur in processing. Both refining and manufacturing costs were adjusted to a retail product equivalent by multiplying costs per pound by the quantities of refined oil needed to manufacture each product.

Manufacturing of Oil Products

Manufacturing of fats and oils products consists mainly of mixing and blending the oils and other ingredients, and packaging them (bottling, canning, or wrapping, in the case of margarine). Other functions of manufacturing include storing the finished products and selling to food wholesalers or directly to food retailers.

The cost components for the manufacturing of margarine and cooking and salad oils were obtained by using the static cost simulation model discussed in the section on oil refining. Manufacturing costs were calculated to reflect the use of refined oil in the manufacture of each product and they also were adjusted to retail product equivalents. For further discussion of procedures and conversion factors used, see the earlier section on the farm value.

Manufacturing costs were the largest cost function for all three products, amounting to about one-fourth of the retail price of the 24-ounce bottle of cooking and salad oil and around 15 percent of the price for margarine and shortening. Packaging was by far the largest manufacturing cost. The "other" category contains the cost of raw materials, such as the dry milk solids (except farm value) used in manufacturing margarine. The advertising component, of little importance in previous processing functions, becomes an important cost with the manufacture of a finished product.

Wholesaling

The transportation component of wholesaling was based on a shipping distance of 200 miles by truck from the manufacturing plant. The shipping charge used for 1974 was 0.092 cent per mile per cubic foot of product. In calculating transportation costs, the following packaging data were used:

Item	Packages per case	Weight per case	Cubic feet per case
	Number	Pounds	Feet
Margarine 1 lb.	30	32	0.70
Cooking and salad oil 24 oz.	12	20	1.20
Shortening 3 lb.	12	38	1.25

RETAILING MARGINS AND COSTS

Retail margins are the difference between the cost of merchandise and the amount for which the merchandise is sold, usually expressed as a percentage of sales. They reflect total operating expenses and profit. In this report, margins are used as an operating measure for the firm or store as well as for major food departments and individual items.

Store Margin

The average gross margin of food chain supermarkets was 21.99 percent of sales in 1974 (table 24). This figure was developed from a report on "Operating Results of Food Chains" published by Cornell University. The Cornell report represents the operations of about 50 companies, both large and small, located in all regions of the country. These companies account for about one-sixth of total retail food sales. Annual sales of the supermarkets operated by these firms averaged $3.7 million. Based on average sales per square foot of $5.02 by member firms of the Supermarket Institute, the average store had a selling area of 14,196 square feet.

Most of the firms represented in the Cornell report operated their own warehouses; therefore, the gross margins reflected the costs of functions in addition to that of retailing. For this study, gross margins were adjusted to obtain an instore margin for the retailing function only. Based on a breakdown of operating expenses, nonstore firm costs were estimated to be 4.36 percent of sales. Deduction of these costs from the total gross margin leaves an estimated instore retailing margin of 17.63 percent. The instore margin excludes central headquarter expenses, warehousing, and delivery expenses. All profit and interest expense were included in the instore margin. Various trade sources indicate that average margins for independent supermarkets are 17 to 18 percent of sales, or about the same as the instore retailing margin for the average chain supermarket.

Table 24.--Distribution of food chain expenses between store and nonstore activities, 1974 1/

Expense item	Firm expenses	Store expenses				Non-store 2/ expenses
		Total	Operations and occupancy expenses	Employee benefits	Advertising	
	Percentage of sales					
Payroll	11.71	9.18	3/ 8.51	0.67	3/	2.53
Supplies	1.12	.87	.85	-	.02	.25
Utilities	.94	.85	.85	-	-	.09
Communications	.09	.05	.05	-	-	.04
Travel	.09	.01	.01	-	-	.08
Services purchased	1.21	1.02	.23	-	.79	.19
Promotional activities	.51	.51	-	-	.51	-
Professional services	.08	.02	-	-	.02	.06
Donations	.01	-	-	-	-	.01
Insurance	.70	.53	.11	.42	-	.17
Taxes and licenses	.92	.67	.21	.46	-	.25
Property rental	1.37	1.22	1.22	-	-	.15
Equipment rental	.17	.03	.03	-	-	.14
Depreciation and amortization	.75	.57	.57	-	-	.18
Repairs	.64	.42	.42	-	-	.22
Unclassified, credits and allowances	.21	.21	.02	.42	-.23	0
Total expenses before interest	20.52	16.16	13.08	1.97	1.11	4.36
Net interest	.22	.22	.22	-	-	-
Total expense	20.74	16.38	-	-	-	4.36
Net earnings before taxes	1.25	1.25	-	-	-	-
Operating profits	.39	-	-	-	-	-
Cash discounts	.67	-	-	-	-	-
Other income	.19	-	-	-	-	-
Actual gross margin	21.99	17.63	-	-	-	4.36

1/ Compiled from Wendell, Earle and Willard Hunt. Operating Results of Food Chains, 1973-74, N.Y. State College of Agriculture and Life Science, SUNY, at Cornell University, Ithaca, N.Y. 2/ Includes warehousing, transportation, merchandising and other centralized functions. 3/ Advertising payroll expenses of 0.04 percent of sales was charged to store labor and deducted from advertising.
Note: Dashes mean not applicable.

Since service is the major function of grocery retailing, it is rather labor intensive. Store payroll costs account for over half of all store expenses. The second most important expense category is rent paid for leased stores and parking lots. Many chain organizations lease rather than own store property because of the high cost and difficulty of acquiring capital for buying property. The expenses of advertising and promotion, including trading stamps, follow rental expense in relative importance. The other major expense items, in order of importance, are supplies, such as grocery bags and cleaning materials; utilities; depreciation on property and equipment; insurance; repairs; and interest. Added together, total store expenses amounted to 16.4 percent of sales. The remainder of the instore margin of 1.25 percent of sales was net earnings before taxes.

Department Margins

The overall instore margin is, of course, composed of the margins of the departments in the store which are, in turn, made up of the margins of individual items.

Estimates of departments margins were developed from "Chain Store Age," a trade publication that reports on margins for food categories and departments, based on the operations of 6 chain warehouses that serve approximately 1,200 stores. Typically, most supermarket operations are divided into three departments--meat, produce, and grocery--since store handling practices and costs vary widely among these food groups. For this analysis, the CSA data were aggregated to split the grocery department into three groups--dairy and refrigerated items, frozen foods, and dry groceries including nonfoods--because of physical differences in handling dry groceries versus products requiring refrigeration. As the figures in table 25 indicate, considerable variation exists in margins among departments. Produce has the highest margin at nearly 32 percent of sales, followed by meat at 21.5 percent and frozen foods at 19.8 percent.

Product Margins

By individual items, even greater variation exists among instore margins. Estimates of margins for the 16 products studied ranged from 5 percent of sales for shortening to 43 percent for lettuce, although margins for most grocery items were between 15 and 20 percent. Margins reached about 25 percent for beef and pork and around 40 percent for produce items. Estimates of the margins, particularly for the grocery items, are based on data reported by "Chain Store Age" and other trade sources. Retail and wholesale prices in selected major markets, such as New York and Chicago, were mainly used in deriving the margins for fresh produce items and poultry and eggs. Margins for beef and pork were estimated from ERS published estimates of price spreads between wholesale or carcass meat prices and retail meat prices. These data, however, include wholesaling and transportation costs which were estimated from Census data and subtracted from the price spreads to obtain a store margin. The margin for pork represents both fresh pork and bacon, cured hams and picnics, and canned hams.

Table 25.--Estimated instore margins, costs, and profits of food chain supermarkets, by major departments, 1974 1/

Item	Meat	Produce	Dry grocery	Dairy 2/	Frozen foods	Total store
	Percent of sales					
Labor	11.97	15.67	7.26	6.49	12.61	9.18
Direct	4.70	10.01	4.97	3.70	11.51	5.53
Department	6.42	4.12	1.58	1.58	1.58	2.86
Fringe benefits, etc.	.85	1.53	.71	1.21	-.48	.79
Packaging	2.28	.75	.36	.32	.81	.85
Business taxes	.79	1.33	.51	.50	.12	.67
Depreciation	.51	1.47	.40	.48	1.32	.57
Rent	.74	1.87	1.50	.56	1.11	1.22
Repairs	.38	1.08	.30	.35	.97	.42
Advertising	1.11	1.11	1.11	1.11	1.11	1.11
Interest	.24	.43	.20	.34	-.13	.22
Energy	.87	3.04	.29	.87	2.87	.85
Other	1.27	2.72	1.17	2.27	-1.25	1.29
Profit before taxes	1.35	2.43	1.13	1.91	-.76	1.25
Total	21.50	31.90	14.23	15.20	19.77	17.63

1/ Instore margins exclude warehousing and delivery costs and headquarters expense. 2/ Includes ice cream and other refrigerated items, such as bakery products, fruit juices, and dips.

There are several reasons why different products have different margin rates. Demand conditions as influenced by consumers and competitors in the marketplace are the general forces affecting margins. Consumers are more responsive to price changes for certain products than for others. For example, consumers will increase expenditures for chicken as the price declines because demand is elastic (e = -1.16), meaning that the quantity bought will increase by a greater amount than the decline in price. 5/ But they will decrease total expenditure for fresh fruit as the price declines because demand is inelastic (e = -.6). Therefore, retailers gain more revenue from larger margins for fruits (30-40 percent) than chicken (20 percent). This factor influences why chickens are price specialed more frequently than fruits.

Generally, products requiring more extensive instore processing (meats and produce) or higher cost of storage equipment (frozen foods) will have higher margins. However, increased turnover rates can reduce the margin necessary for higher cost storage facilities. Without increasing space for buildings and equipment, the fixed cost are spread over more units as volume increases, thus lowering unit cost.

5/ George Brandow, "Interrelationships Among Demands for Farm Products and Implications for Control of Market Supply." Bul. No. 680, Pa. State University, Ag. Experiment Station, 1961.

The competition among stores does not always allow a retailer to set margins according to the costs of selling each product. Consumers may patronize another store if that retailer lowers the price of well-known products below customary levels. The fear of lost patronage may cause other competitors to join in the lowering of their prices. As long as one retailer sticks to the lower price and consumers continue to shift their patronage to lower priced retailers, a situation may develop where the margin does not reflect either cost of selling or the inherent willingness of consumers to pay more for the product relative to other commodities. Consequently, some products with high margins that require little special handling or storage needs and have high turnover rates will make a larger contribution to general store overhead expenses and profits. In contrast, products with lower turnover rates, higher handling costs and facilities needs, and lower margins will make little if any contribution to store overhead and profit. These products may incur losses for some period of time. However, because the investment in store and equipment is already incurred for the short term, the retailers need only to cover the variable expenses. But this pricing practice cannot continue indefinitely or money will not be available for replacement of the store or equipment. These low profit products are not always eliminated because their effect on sales of other products, though undetermined, is believed to exist, and customers may go elsewhere to shop because of lack of variety and choice.

Cost Components of Retail Margins

A breakdown of store expenses or costs among departments and individual items is not generally available from food retailers. This lack results partly from the fact that many costs are jointly shared by the several thousand items sold in the average supermarket. Therefore, many store expenses in table 24 were allocated to departments and individual items, using various criteria and data on retailing operations such as product handling and space utilization by products in the store. Costs were estimated for major departments to facilitate comparisons among broad groups of products, and to provide control totals for allocating costs to individual items. Cost estimates are discussed in five groups of store expense because of the differences in the sources of data and methods used to allocate costs to individual products (table 26).

Direct Labor and Packaging Costs

Direct labor includes receiving products at the store, pricing, shelf stocking, and the handling of products through checkout stands. Of all retailing costs, direct labor of handling and selling individual items could be most accurately estimated based on the amount of time required to perform these functions and hourly earnings of employees. The labor requirements for handling individual products were derived from time formulas developed from the COSMOS system (Computer Optimization and Simulation Modeling for Operating Supermarkets), a management tool developed to help retailers allocate space and maximize store profits. 6/ Different firms use various methods of handling and moving products.

6/ COSMOS was developed by Case and Company for the National Association of Food Chains.

Table 26.--Distribution of foodstore margin by type of expense, 1974

Item	Total	Direct product handling	Sales related	Building and equipment related	Overhead and profit
			Percent of sales		
Labor	9.18	-	-	-	-
Direct	5.53	5.53	-	-	-
Department	2.86	-	2.86	-	-
Fringe benefits, etc.	.79	-	-	-	.79
Packaging and supplies	.85	-	-	-	-
Packaging	.71	.71	-	-	-
Supplies	.14	-	-	-	.14
Business taxes	.67		-	-	-
Property and licenses	.21	-	-	.21	-
Payroll	.46	-	-	-	.46
Depreciation	.57	-	-	.57	-
Rent	1.22	-	-	1.22	-
Repairs	.42	-	-	.42	-
Advertising	1.11	-	1.11	-	-
Interest	.22	-	-	-	.22
Energy	.85	-	-	.85	-
Other	1.29		-	-	-
Equipment rental	.03	-	-	.03	-
Property insurance	.11	-	-	.11	-
Purchased services	.23	-	-	-	.23
Employee insurance	.42	-	-	-	.42
Miscellaneous	.50	-	-	-	.50
Profit	1.25	-	-	-	1.25
Total	17.63	6.24	3.97	3.41	4.01

Dashes mean not applicable.

For example, trucks can be unloaded at the store with a power transporter if the merchandise is on pallets or the items can be manually unloaded onto a conveyor. Case studies were made of large chains to determine the methods used and labor estimates were based on an average of these methods.

The amount of time required to move products through the store varies because of differences in characteristics of individual products. The labor time required for grocery items differs among products mainly because of the variation in the number of packages that are contained in a case of products, product weight, and physical size. For example, store labor for a 3-pound can of vegetable shortening is about 30 seconds versus 12 seconds for a 6-ounce can of frozen orange juice. Orange juice takes much less time because it is usually received and handled in the store in cases of 48 cans, whereas shortening is handled in cases of 12 cans. About half the direct labor for

most items is incurred at the checkout stands, and one-fourth involves stocking products on the shelf and disposing of the cases.

Store labor for meat and produce items is mainly influenced by the type and amount of processing and packaging. For example, direct labor use per pound of beef sold was estimated to be 2.4 minutes, of which over half went for processing and wrapping.

To obtain a labor cost for each product, the time requirements for various functions, such as stocking shelves, were multiplied by average wage rates of retail store employees obtained from Case and Company and data reported by the Bureau of Labor Statistics, Department of Commerce. For most items, direct labor is about 60 percent of the total retailing labor cost of the product.

Packaging costs also were estimated directly per unit of product based on the quantity and cost of the materials used. These materials include trays, film, bags, labels, string, and ties that are primarily used in packaging meat and produce. Packaging cost also includes grocery bags. Individual products were allocated a share of the bag cost based on the amount of space each occupied occupied in the bag.

Packaging costs, including grocery bags, averaged 5 percent of the retail store margin. They were highest for beef (13 percent), which is packaged in a tray and wrapped with plastic film.

Department Labor Cost

A portion of store labor involves work in each department of the store that is not considered direct labor because it does not involve product handling. This labor includes ordering, store cleaning and maintenance, supervision of employees, customer assistance, and various other activities. This labor cost is jointly shared by all products. These costs were estimated based on industry ratios of departmental labor costs to sales, and distributed to individual products based on how much each product contributes to department sales. Department labor costs represents an average of about 30 percent of total store labor, but it varies from about 12 percent in frozen foods to over half of the labor cost in the meat department.

Advertising

Advertising cost, including store sales promotion, accounted for 6 percent of the instore margin. This cost was allocated to individual items based on the ratio of total advertising cost to store sales. Accordingly, 1.1 percent of the retail price of each product was allocated to advertising. This procedure recognizes that trading stamps are given on the basis of sales and that much of the media advertising tends to influence sales of all products.

Building and Equipment-Related Costs

Building and equipment related costs include rent, depreciation, repairs, business taxes, utilities, and insurance. These costs amounted to about one-fifth of the instore retailing margin of the average chain supermarkets in 1974. Since these costs are not directly associated with retailing specific

products, these costs had to be allocated among departments and products. This was done based on the use of space and special equipment. Data on the use of store space were derived from model store layouts published by Chain Store Age and other trade publications.

Depreciation and Rent.--For the average chain supermarket, the cost for depreciation of buildings and equipment was about 3.0 percent of the margin, and rent was 7.0 percent of the margin in 1974. The allocation of these costs among departments varied widely because of the differing amounts of floor space used and the diverse and specialized display, store, and handling equipment necessary to operate each department. The grocery department was allocated slightly over half of building depreciation and rent based on the proportion of selling area occupied. But it was allocated only about one-sixth of the rent and depreciation of equipment, based on the proportion that the grocery department's equipment cost represented of the total store equipment cost.

Rent and depreciation for departments were further allocated among products based on the proportion of display space in each department occupied by individual products. A survey was made of 33 supermarkets to determine product display space. Data showed, for example, that beef occupied one-fourth of the meat department's space. Therefore, beef costs represented 25 percent of the depreciation and rent costs of the meat department.

Among the 16 items studied, depreciation costs ranged from 1 to 5 percent of the retailing margin and rent ranged from 1 to 16 percent. Costs were largest for the grocery items, which occupy a relatively large amount of display space, and lowest for milk and butter. Two factors largely explain differences in building and equipment costs for individual items; the minimum display space required and the sales rate for each item. For instance, beef and pork require similar equipment in a supermarket, but their unit cost for rent and depreciation is not equal per pound. Pork products are quite varied and numerous and each cut requires at least one row in the display cabinet. Thus, pork has nearly the same amount of total display space as beef, and the same total building and equipment cost. But pork has a higher unit cost than beef because pork sales reach only a third of those for beef.

Utilities.--Utility expenses for the average chain supermarket were 5 percent of the store margin in 1974. About three-fourths of the utilities are product specific; that is they are directly related to the use of display cases or storage equipment. General utilities, such as light, heating, and air conditioning, which are not product specific, were allocated on the basis of floor space occupied by the product. The produce, frozen food, and meat departments incur the largest amounts of direct utility expense because of the amount of refrigerated equipment required. The grocery department bears most of the general utility charges, which reflects the large proportion of the store occupied.

Utility costs for departments were allocated among products based on the proportion of display space occupied. Costs ranged from 1 to 9 percent of the retail margins of the items studied. They were highest for pork and oranges, reflecting the large amount of space occupied in relation to sales.

Other Occupancy Costs.--In 1974, repair costs amounted to 2 percent of the store margin ; business taxes and licenses (excluding payroll taxes), 1 percent; and property insurance, 0.6 percent of the margin. These costs were distributed to the grocery and other departments of the store based on the proportion of space occupied in the store. Costs were further allocated to products based on relative space occupied by each item.

Overhead Costs and Profit

Overhead costs consist of store expenses that are not directly related to handling products or operating specific departments of the store. These expenses include: (1) fringe benefits of employees and miscellaneous labor costs; (2) business payroll taxes; (3) supplies such as cleaning materials, register tapes, uniforms, and ice; (4) net interest, consisting of the difference between interest paid on borrowed funds and interest received; and (5) other costs, including insurance and purchased services, except advertising. Overhead costs plus store profits represented a little over one-fifth of the total store margin, or about 4 percent of sales.

To determine the amount of overhead cost and profit for individual products, all other costs (direct labor, depreciation, rent, advertising, and so on) were subtracted from the margin. This difference is referred to as the contribution margin since it represents the amount available to cover overhead costs and return a profit. All departments of the store, except frozen foods, contributed to overhead costs but the amount varied widely among products, due mainly to differences in the amount of all other costs and the total margin. The contribution margin ranged from -15 percent of the total margin for shortening to 66 percent for butter.

The contribution margins were allocated among the overhead costs and profit according to the proportion that each cost and profit was of the total contribution margin of the store. Therefore, the share allocated to profit was 31 percent (1.25 percent of sales divided by the total store contribution margin of 4.01 percent). The shares allocated to each cost were as follows: labor, 19.7 percent; business payroll taxes, 11.5 percent; interest, 5.5 percent; supplies, 3.5 percent; and other costs, 28.7 percent. The same shares were used to allocate the contribution margin of all products.

The amount of overhead labor cost was added to direct and departmental labor to obtain total labor cost for each product. Similarly, payroll taxes were added to other business taxes and supplies added to packaging costs to obtain the total of these costs.