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## PRICES OF INTERMEDIATE GOODS AND SERVICES USED IN MARKETING FARM FOODS 1/

To perform the multitude of services required in marketing domestic farm food products, assemblers, processors, wholesalers, retailers, and away-from-home eating places buy a wide array of goods and services from nonfarm businesses not directly engaged in marketing food products. These intermediate goods and services, which include fuel, power, light, packaging materials, office and restaurant supplies, telephones, car repairs, rents, vitamins, and a host of other such inputs, accounted for about 20 percent of the total bill for marketing farm foods in 1961.

This article presents a newly constructed index showing changes in prices of intermediate goods and services purchased by marketing firms during the postwar years. This index will be published annually in The Marketing and Transportation Situation. As in the case of other inputs, increases in prices of

intermediate goods and services that are not offset by increases in productivity result in higher unit costs of performing marketing services and, consequently, in higher farm-retail spreads. During the postwar years, increases in prices of intermediate goods and services bought by marketing firms paralleled the rise in farm-retail spreads. Information on prices of nonfarm inputs and on the physical relations between nonfarm inputs and output of marketing services provides insight into supply conditions for these services. This, in turn, gives us a better understanding of the relation between consumer demand for food at retail and the marketing system's demand for farm products at the farm level. Construction of the index of prices of intermediate goods and services purchased by food marketing agencies is another step in the direction of linking these two levels of demand.

### Prices of Intermediate Goods and Services

According to preliminary estimates, the price index of intermediate goods and services purchased by agencies engaged in marketing domestic farm food products rose about 40 percent from 1947-49 to 1961 (fig. 1). The index was the same in 1961 as in 1960 (table 6). In 1961, the price of services rose slightly, but the price of goods remained the same; because of the greater weight of goods, the total index did not go up. In the four postwar recession periods, the index remained unchanged during the 1948-49 recession but rose during each of the other three. It is evident that if cost of intermediate goods and services per unit of output decreased, the decline resulted from increased productivity.

Intermediate goods weigh heavily in the index (partly because of the exclusion of advertising); in 1947 they accounted for about 65 percent of the total value of both goods and services. In the postwar period, 1947-49 to 1961, the price index for intermediate goods rose 30 percent and because of its greater relative importance served to moderate the rise in the overall index resulting from the greater rise in prices of services. Prices of intermediate goods dropped slightly in 1949 and 1952 and leveled off in 1961, but otherwise showed year-to-year increases in the postwar period. Prices of packaging materials, particularly those made from metal, rose substantially faster than the index for goods. These rises

1/ Prepared by William H. Waldorf, economist, and Jeannette Findlay, statistical assistant, Marketing Economics Division, Economic Research Service.  
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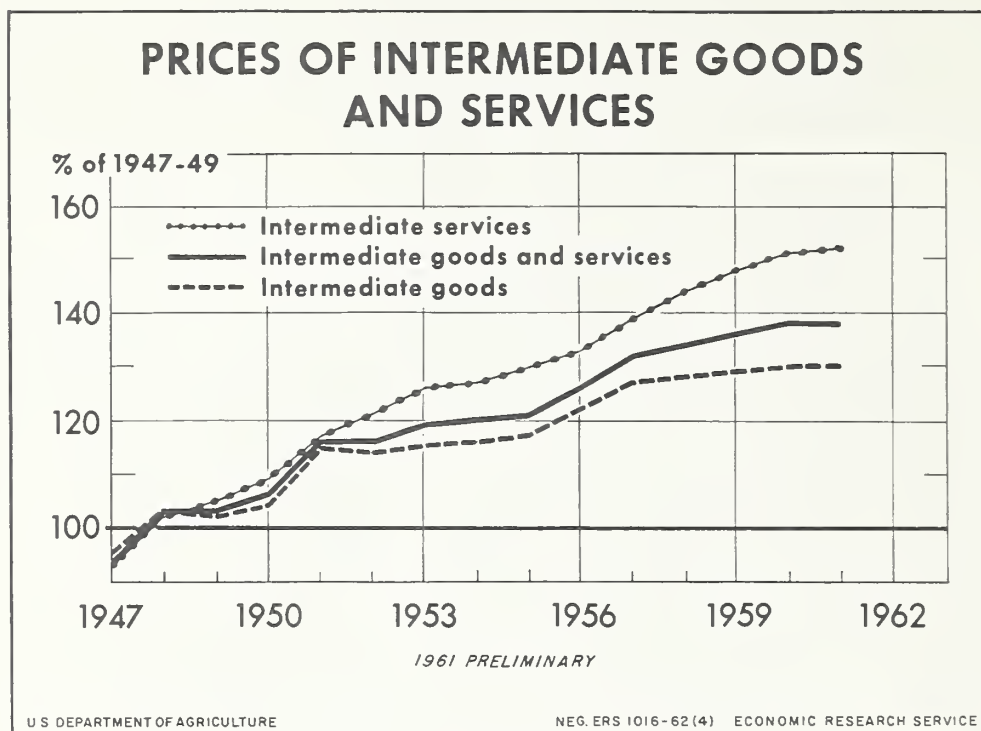


Figure 1

Table 6.--Price indexes of intermediate goods and services in farm food marketing  
(1947-49 = 100)

Year	Intermediate goods and services	Intermediate goods	Intermediate services
	Percent	Percent	Percent
1947 .....	94	95	93
1948 .....	103	103	102
1949 .....	103	102	105
1947-49 .....	100	100	100
1950 .....	106	104	109
1951 .....	116	115	117
1952 .....	116	114	121
1953 .....	119	115	126
1954 .....	120	116	127
1955 .....	121	117	130
1956 .....	126	122	133
1957 .....	132	127	139
1958 .....	134	128	144
1959 .....	136	129	148
1960 .....	138	130	151
1961 <sup>1/</sup> .....	138	130	152

<sup>1/</sup> Preliminary



were partially offset by smaller increases in prices of fuel, power, and light.

The price index for intermediate services increased in each of the 14 postwar years. In 1961, the index for services was 52 percent above the 1947-49 average. This reflects sharp postwar increases in

prices for car repairs and garaging and in industrial and commercial rents. <sup>2/</sup> Property insurance showed a much smaller rise than the other services and, because of its relatively greater importance in the services index, was a moderating influence.

### Space-time Rates for Advertising <sup>3/</sup>

The index of prices of intermediate goods and services does not include -- either explicitly or implicitly -- a price series for advertising services purchased by marketing agencies. The conceptual and statistical problems of constructing a price series that would show changes in costs per unit of advertising services purchased by business firms are difficult and may, in fact, prove to be insurmountable. However, some insights into rising costs of advertising that affect farm-retail price spreads can be gleaned from a "space-time rate" index. An index specially constructed by the authors for this purpose shows average space-time rates paid by marketing firms per newspaper line, for spot television and radio commercials, for an hour of television and radio time, and for space or time purchased in other advertising media.

According to estimates made by the Economic Research Service, outlays for advertising by food marketing corporations tripled from 1947-49 to 1960. A larger part of this rise resulted from higher space-time rates. In addition, the amount of space and time purchased increased during this period. From

1950 to 1961, the space-time rate index for food marketing firms rose about 120 percent (table 7). Television rates showed the largest increase over the 11-year period -- spot TV was up about 6 times and network television programs about 4 1/2 times. By contrast, rates for daytime spot radio remained fairly constant and those for network radio program time actually declined. Line rates in newspapers rose about 60 percent from 1950 to 1961. Food processors largely advertise through television, while food distributors rely mainly on newspaper advertising. As a result, food processors experienced the largest increase in space-time rates among food marketing agencies, about 160 percent from 1950 to 1961. Space-time rates paid by food wholesalers rose about 80 percent and those for food retailers about 90 percent.

As pointed out, changes in space-time rates charged by advertising media affect the farm-retail spread -- the focal point of this article -- but the index is not a price index showing the cost per unit of advertising service paid by food marketing agencies. Firms deciding on the

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<sup>2/</sup> Statistical time series are not available for either commercial or industrial rental rates. Because of the importance of this series in the overall index, it was decided to use an estimating series rather than assume that rental rates moved the same as all other prices in the index. After experimenting with several series, the Boeckh Index of Commercial and Factory Building Costs was used. The Boeckh Index of Residential Construction Costs was found to be highly correlated with the Bur. Labor Stat. Consumer Price Index for residential rents during the postwar years. This suggests that there is also a high correlation between the Boeckh Index of Commercial and Factory Building Costs and the desired index of commercial and industrial rental rates.

<sup>3/</sup> Data used in constructing the series analyzed in this section are mainly from statistics published in *Printers' Ink*. See the technical appendix for further details on constructing the series discussed in the text.

Table 7.--Indexes of space-time rates and rates per unit "use" in advertising, 1950-61  
(1950=100)

Year	Space-time rate	Space-time rate per unit "use"
	Percent	Percent
1950 .....	100	100
1951 .....	118	100
1952 .....	133	104
1953 .....	141	103
1954 .....	151	106
1955 .....	162	106
1956 .....	173	110
1957 .....	187	112
1958 .....	197	116
1959 .....	201	118
1960 .....	210	121
1961 .....	221	125

kinds of media to use in advertising their products also obviously consider size and type of audience reached by different media, impact of different media on audiences and a host of other factors that affect consumers' response to food sales. Perhaps the simplest adjustment that can be made to the space-time rate

index is to allow for changes in circulation of newspapers and magazines and in "home hours use" of television and radio. When we do this, the space-time rate index on a per "use" basis shows an increase of only 25 percent from 1950 to 1961 compared with about 120 percent without adjustment.

#### Comparison With Other Series

Changes in farm-retail spreads result from a combination of changes in "implicit" prices of services performed by food marketing agencies and of changes in non-processing <sup>4/</sup> services per unit of farm products moving through the system. Changes in these implicit prices for services, in turn, reflect changes in prices of non-farm inputs employed by food marketing agencies and changes in the productivity of these inputs.

Figure 2 brings together available information on input costs in food marketing and compares these with the farm-retail spread (all expressed in index numbers). The price index for intermediate goods and services paralleled the farm-retail spread index during the postwar years; both series were about 40 percent greater in 1961 than in the base period, 1947-49. Judging from an index of prices of producers' new durable

<sup>4/</sup> The farm-retail spread is an estimate of charges for marketing a fixed quantity of farm foods ("The Farm-Food Market Basket") bought per family by urban moderate income families in 1952. Because of limited specifications used when collecting price data, BLS reported changes in prices may actually reflect changes in processing services per physical unit of the commodity; to this extent, the farm-retail spread will reflect changes in processing services.

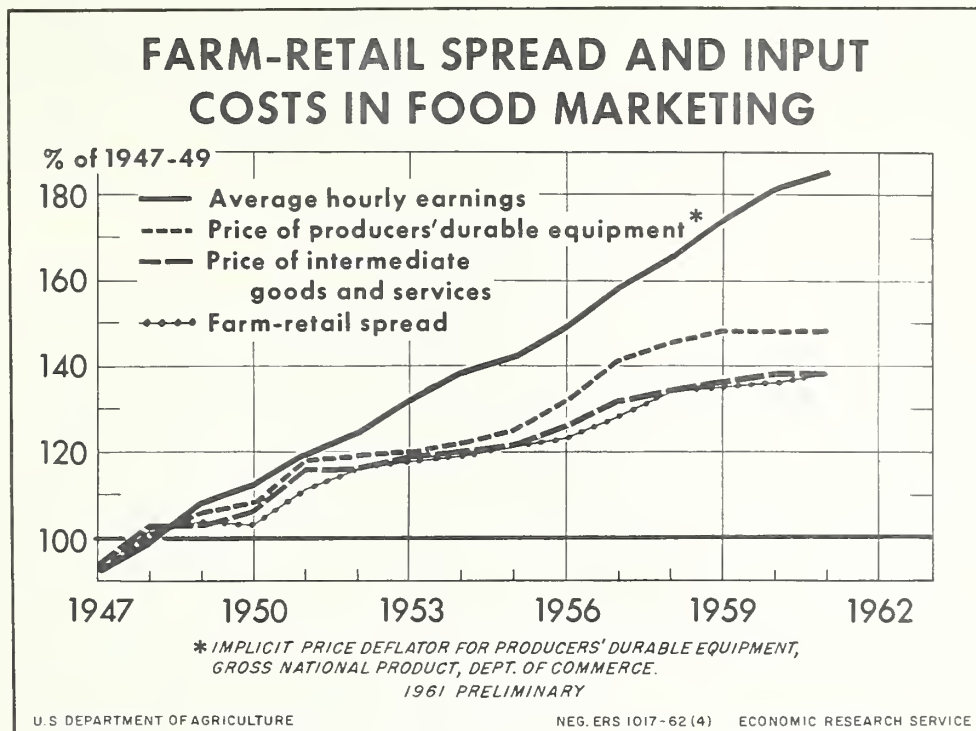


Figure 2

equipment for the economy as a whole, 5/ prices of machines and equipment purchased by food marketing agencies rose about as much or perhaps somewhat more than the index for intermediate goods and services. By comparison, average hourly earnings rose about 85

percent. This increase in average hourly earnings reflects higher wage rates; but, it also reflects increases in the "quality" of labor inputs as evidenced by a postwar shift from production line jobs to nonproduction line jobs. 6/

5/ We also attempted to construct an index of prices of new machinery and equipment purchased by food marketing firms but, because of lack of data, we found that a specially constructed series would be no better than simply using the Implicit Price Deflator for Producers' Durable Equipment published by the U. S. Dept. Commerce. The other approaches were based on (1) prices reported by the Bur. Labor Stat. in its Wholesale Price series, and (2) price data "implicitly" given in value and quantity of shipments data reported for the Food Machinery Products industry in Censuses of Manufactures. In regard to (1), the data are not specifically for the kinds of equipment used by food marketing agencies and the specially constructed series showed the same relative changes as the Commerce Dept. series; in regard to (2), the specifications are too broadly defined to make the series useful. None of the three series are, in fact, what we are ideally after -- the "price" of capital services employed in food marketing.

6/ On increases in the "quality" of labor inputs in food manufacturing, see "Changing Composition of Labor Force in the Food Manufacturing Industry," by Imogene Bright, July 1957, and "Scientific Workers in Food Manufacturing Industries," by the same author, April 1961, both in The Mktg. and Trans. Situation, U. S. Econ. Res. Ser.



Despite the many qualifications of these data, it is evident that food marketing firms have been confronted with rising prices for nonfarm inputs since the end of World War II. Judging by productivity developments in food manufacturing where average annual gains were pro-

bably larger than those for the food marketing system as a whole, prices of each of the nonfarm inputs substantially outpaced the postwar rise of productivity in food marketing. <sup>7/</sup> These developments probably account for a large part of the rise in the farm-retail spread.

## Technical Appendix

### Description of Index

The price index of intermediate goods and services presented in this article is composed of 43 series of price relatives and uses base year weights. These base year weights are purchasers' values of goods and services bought by food marketing agencies in 1947. Where specific price data were not available for goods or services which accounted for a significant proportion of the total, prices of close substitutes were used.

### Sources of Data

Thirty-eight of the price series are from the Bureau of Labor Statistics wholesale price indexes; the rest are from other sources (table 8). Data on values of goods and services purchased were obtained from the BLS Interindustry Study for 1947. <sup>8/</sup> This study estimated input-output relations in the national economy with details on kinds and values of inputs in each industry or industry group.

### Coverage

The index covers industries processing farm foods, wholesale and retail food trade, and eating and drinking places. Wholesale trade was represented in the index by the farm food marketing components of stockyards, warehouses, wholesale agents and brokers, and of merchant wholesalers. Retail trade was represented by both retail food stores and

eating places. Because the BLS Interindustry Study did not separate trade between food and nonfood outlets, input values in wholesale and retail trade had to be allocated to farm food trade by the proportion of total value added attributed to farm food operations in these trades. For eating and drinking places the proportion was that of farm food inputs to all inputs of food and drink. Similarly, proportional allocations were made for excluding nonfarm food manufacturing from the food processing sectors. Input values of each of the selected goods and services were totaled for manufacturing and trade. These were used as base year weights in order to aggregate the component price series described above into a goods and services index.

These subindexes were in turn aggregated into a total index. Their relative importance was assigned as follows: The weight given the goods index was in proportion to value of all intermediate goods inputs to food marketing. The weight given the services index excluded input value of advertising but included all other services. That is, we assumed that the prices of the missing series (except advertising) moved the same as the covered series.

Of the total value of all intermediate inputs, 16 percent is for goods not specified by kind in the Interindustry Study. Advertising accounts for another 10 percent. Of the 74 percent remaining, 65

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<sup>7/</sup> On productivity in food processing, see "Productivity and Food Processing Costs," by William H. Waldorf, Agr. Econ. Res., U. S. Dept. Agr., Vol. XIV, (January 1962).

<sup>8/</sup> "The Interindustry Relations for 1947," by Duane W. Evans and Marvin Hoffenberg, Rev. of Econ. and Stat., Volume 34, (1952), pp. 97-142.

Table 8.--Index of intermediate goods and services: Component statistical series, relative importance in 1947, and description of data

Series	Relative importance : 1947 : Percent	Description of data <u>1/</u>
<u>Intermediate goods</u>	<u>64.0</u>	
Fuel, power, and light	16.4	7 wholesale price indexes: Anthracite and bituminous coal, natural gas, electricity, fuel oil, lubricating oil, and gasoline
Tin cans, closures, metal barrels	11.3	2 wholesale price indexes: Tin cans and steel barrels
Paper wrap and packaging	15.7	2 wholesale price indexes: Paper excluding newsprint and paper products such as boxboard
Glass jars and bottles	4.0	3 wholesale price indexes: Wide and narrowneck jars and bottles
Crates and barrels	1.7	2 wholesale price indexes: Southern pine and white oak lumber
Cotton and burlap bagging, etc.	3.4	6 wholesale price indexes: Burlap, jute and cordage, four constructions of cotton fabric
Plastic and foil wrap	1.3	2 wholesale price indexes: Plastics and aluminum foil
Car repair parts	4.1	1 wholesale price index: Before 1961 truck prices; beginning 1961, car repair parts
Tires and tubes	.8	1 wholesale price index: Tires and tubes, all motor vehicles
Vitamins	1.6	1 wholesale price index: Vitamin B
Salt	.5	1 wholesale price index
Brooms and brushes	.2	1 wholesale price index: Household and industrial brushes
Office supplies	.4	1 wholesale price index: Office supplies
Restaurant supplies	1.7	6 wholesale price indexes: Tableware, cookingware, chinaware, cutlery
Soap and detergents	.9	1 wholesale price index: Soap and detergents
<u>Intermediate services</u>	<u>36.0</u>	
Car repairs and garaging	5.6	1 consumer price index: Car repairs
Telephone	2.3	1 consumer price index: Telephone
Property insurance	7.5	1 consumer price index: Property insurance
Construction maintenance	3.6	1 series: Average hourly earnings, production workers, general contracting
Industrial and commercial rents	17.0	1 series: E. H. Boeckh and Associates. Index of Commercial and Factory Building Costs
<u>Intermediate goods and services</u>	<u>100.0</u>	

1/ All data are from the Bureau of Labor Statistics except the E. H. Boeckh Index of Commercial and factory Building Costs, which is published by the U.S. Department of Commerce.

percent is covered by the inputs used in the index. The remaining 8 percent is specified but not used because adequate price data are not available. Major omissions of goods are artificial ice, miscellaneous chemicals, and nonfood containers. Major omissions of services are various kinds of repair and professional services.

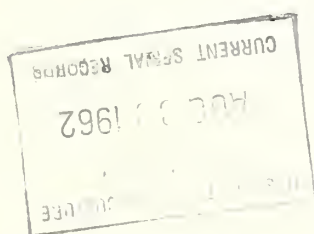
### Advertising

Printers' Ink publishes indexes for space-time rates and rates per unit use by advertising media. These are the basic series for the indexes constructed by the authors.

The following method was used for both sets of data. Allocations within

processing, within wholesaling, and within retailing were estimated for five media on the basis of advertising expenditures by food marketing firms reported by Printers' Ink. Newspapers received about 75 percent of retail advertising. About 75 percent of processors' advertising was distributed among newspapers, magazines, and network TV in roughly equal proportions. Wholesale advertising was assumed to be in business papers entirely.

The media indexes described in an earlier section were combined by these distribution weights in order to obtain an index for each marketing function. The three indexes were then aggregated with values of input weights.



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