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## COST OF PACKAGING MATERIALS FOR FARM FOODS

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**ABSTRACT:** Packaging material costs for U.S. produced farm foods were \$8.8 billion for 1970. This was nearly 9 percent of the money consumers paid for these foods. Average annual growth rate in packaging material costs has been over 5 percent since 1958 versus about 4½ percent for all food marketing costs. Price increases for packaging materials were relatively steady from 1958 to 1969, averaging about 1 percent annually, but they increased dramatically from 1969 to 1970, some as much as 8½ percent. Paper products account for 42 percent of food packaging material costs; metal containers, 22 percent and glass containers 9 percent.

**KEY WORDS:** Food, packaging materials, costs, prices, marketing costs.

Firms processing and distributing foods are major users of containers and packaging materials, purchasing just under half of all packaging products. In 1970, food marketing firms spent \$8.8 billion for containers and packaging materials, about 5 percent more than in 1969, and 86 percent more than in 1958 (table 9).

Packaging material costs represent about 9 percent of the \$101.6 billion expenditures for farm foods, and 13 percent of the \$68½ billion marketing bill (total cost of transporting, processing, and distributing farm foods). Packaging material costs are the second largest component of the marketing bill, exceeded only by labor costs.

Packaging material costs increased at an average annual rate of over 5 percent per year between 1958 and 1970, compared with an average annual increase of about 4½ percent in the marketing bill for farm foods.

### Prices of Packaging Materials

Wholesale prices for packaging materials rose substantially more in 1970 than other recent years. A combined index of prices of all packaging materials rose about 4 percent. Some packaging materials rose far more; for instance, paper bags and shipping sacks increased 8½ percent and grocery bags increased 8 percent (table 10). Prices of most packaging materials increased very little between 1958 and 1969, averaging about 1 percent annually. Prices of paper products increased less than glass or metal containers. Nearly all the increase in containers and packaging value of shipments between 1958 and 1969 was due to increases in the quantity used. In 1970, most of the increase in value of shipments was due to price increases.

Prices of both metal and glass containers are expected to rise further in the next few years. Labor contracts recently signed in both industries provide for increases in wages and fringe benefits. Mechanization may not increase labor productivity enough to prevent higher unit labor costs and higher prices.

Prices of tinplate, the major material used in manufacturing metal cans, has increased substantially in

recent years. However, the recent development of tin-free cans is expected to slow can price increases.

### Annual Estimates of Packaging Material Costs

The estimates of container and packaging costs presented in this article are the result of research to develop separate estimates of the packaging material cost component of the marketing bill. The estimates represent complete coverage of packaging materials used for selected years since 1958. Additional research is underway to estimate packaging costs for other years.

The development of estimates of packaging material costs reduces the other or residual element from 24 percent to 11 percent of the total bill.

### Derivation of Estimates<sup>1</sup>

Value of shipments of various types of packaging materials are compiled by the Department of Commerce from the Census and Annual Survey of Manufactures. Estimates of the proportion of all containers and packaging materials used for food were obtained from *Modern Packaging Encyclopedia* and other sources. These end use data were applied to the value of shipments data to compute the cost of food containers and packaging materials. For example, the value of shipments of folding paper boxes amounted to about \$1.3 billion in 1970. Of this amount about half, or \$663 million, went into the marketing of farm foods.

For some types of packaging material, all of the value of shipments was allocated to food on the basis of the description of the material which indicated its probable use. On this basis, all of the output of the following materials is assumed to be used in processing and distributing foods: (1) Glassine, waxed parchment bags, (2) molded pulp egg cartons, (3) die-cut fillers for eggs, and (4) sanitary food containers. In other cases where end use data were not available, the same

<sup>1</sup> Appreciation is extended to Richard Blassey, Department of Commerce for his ideas and suggestions on sources of data and end uses of packaging materials.

Table 9.--Value of containers and packaging materials used in marketing farm foods

Item	Value				
	1958	1963	1967	1969	1970 <sup>1/</sup>
	-----Million dollars-----				
Paper products .....	2,010	2,732	3,215	3,610	3,726
Metal containers and components (including aerosols) ...	1,131	1,245	1,592	1,800	1,912
Glass containers .....	382	434	571	779	826
Plastic containers and wraps .....	327	535	694	760	812
Wooden containers .....	229	258	300	308	343
Textiles .....	110	122	142	158	165
Other <sup>2/</sup> .....	570	812	830	972	1,059
Total .....	4,759	6,138	7,344	8,387	8,843

<sup>1/</sup> Projected estimates.

<sup>2/</sup> Includes adhesives, labels, tags, tapes, cargo or bulk containers, and in-plant containers made by food processing firms.

percentage was used to allocate total industry output as for similar materials for which end use data were available. For instance, the same percentage was used for steel strapping as for fiber and corrugated materials for which end use data were available. For metal caps, the same percentage was used as for glass containers used in foods. Food uses of adhesives, labels, tags, and twines were estimated to account for approximately half of the total use of these materials.

Packaging material used in alcoholic beverages, imported foods, foods consumed by the military, seafoods, and the proportion of soft drinks manufactured from imported sugar were excluded from the estimates to make them comparable with the marketing bill statistics.

Packaging materials are divided into seven general classes according to type of raw material. Each class includes more specific types of packaging or materials.

*Paper products* are used the most in packaging food products. In 1970, the value of paper products used in marketing food products amounted to \$3.7 billion (table 9). Paper products represented over 42 percent of food packaging material costs in both 1958 and 1970 (table 11). Sanitary food containers, solid fibre and corrugated boxes, and folding paper boxes accounted for three-fourths of the value of paper products used in food

marketing. Other types of paper products used in food marketing include: (1) grocery-variety and miscellaneous bags; (2) waxed wraps (bread, candy, etc); (3) rigid paper boxes (set-up); (4) molded pulp egg cartons; and (5) paper shipping sacks.

Paper is a very versatile product, being relatively low in cost and until recent years, stable in price. The industry has done considerable research to find new uses and adapt its products to all packaging uses. As an example, moisture resistant fibreboard boxes were developed and are now widely used for packaging fresh vegetables, meats, and poultry products.

*Metal containers and component materials (including aerosols)* are the second largest class of materials used in packaging U.S. farm foods, accounting for 22 percent of total costs in 1970, down from 24 percent in 1958. Metal cans represented over 90 percent of this class in 1970. Other metal products include metal closures, foils, aerosols, and steel strappings.

Cans used in canning fruits, vegetables and juices account for over half of the cans used to package foods. While the use of cans for soft drinks accounts for a much smaller proportion of the cans used for farm foods, the use of cans for soft drinks has increased dramatically in recent years.

Table 10.--Wholesale price indexes for selected containers and packaging materials.

Item	1958	1969	1970	Annual change	
	Index 1967=100	Index 1967=100	Index 1967=100	Percent 1958-69	Percent 1969-70
Paper bags & shipping sacks .....	97.7	98.6	107.0	0.1	8.5
Grocery bags .....	93.6	96.9	104.7	0.3	8.0
Paper boxes & shipping containers .....	97.0	104.5	108.3	0.6	3.6
Milk cartons (½ gallon) ...	---	100.0	102.1	---	2.1
Composite cans .....	---	104.9	108.8	---	3.7
Tin cans (303 x 406) .....	88.4	107.0	113.1	1.8	5.7
Metal fruit juice cans (6 oz.) .....	---	107.0	113.1	---	5.7
Glass food containers (wide mouth) .....	100.5	115.4	120.7	1.3	4.6
All containers & packaging material .....	93.0	104.0	108.0	1.0	3.8
Consumer price index					
All foods .....	88.6	108.9	114.9	1.9	5.5
All items .....	86.6	109.8	116.1	2.2	5.7

Source: Bureau of Labor Statistics, Dept. of Labor, except for the index of all containers and packaging materials which is computed by ERS from BLS indexes.

*Glass containers*, such as jars for canning food and packers' tumblers, returnable and non-returnable beverage bottles, and other bottles, represent the third most important class of packaging materials with 9 percent of the total food packaging market in 1970, compared with less than 8 percent in 1958. Foods canned in glass, including packers' tumblers, have almost three-fourths of this class. Soft drink bottles make up most of the rest of this class. Milk bottles have dropped to less than 1 percent.

Use of non-returnable bottles for soft drinks has increased over the years. Non-returnable bottles now

account for 80 percent of the new-glass bottle shipments for soft drinks.

*Plastic containers* are the fourth largest class of materials, accounting for 9 percent of the total packaging costs. Polyethylene film is the most important of this class with over one-third of the market in 1970. Cellophane accounts for one-fourth of this class, while other films, plastic bottles, and closures make up the rest. In recent years substantial increases have occurred in the use of jars and tubs for packaging cottage cheese, sour cream, butter, margarine, and various variety foods. Plastics used in food packaging has had a faster growth

Table 11.--Distribution of farm food packaging material costs by type of material

Item	1958	1963	1967	1969	1970 <sup>1/</sup>
	Percent				
Paper products .....	42.2	44.5	43.8	43.0	42.1
Metal containers and components (including aerosols) .....	23.8	20.3	21.7	21.5	21.6
Glass containers .....	8.0	7.1	7.8	9.3	9.3
Plastic containers and wraps .....	6.9	8.7	9.4	9.1	9.2
Wooden containers .....	4.8	4.2	4.1	3.7	3.9
Textiles .....	2.3	2.0	1.9	1.9	1.9
Other <sup>2/</sup> .....	12.0	13.2	11.3	11.5	12.0
Total .....	100.0	100.0	100.0	100.0	100.0

<sup>1/</sup> Preliminary.

<sup>2/</sup> Includes adhesives, labels, tags, tapes, cargo or bulk containers and in-plant containers made by food processing firms.

rate than any of the other packaging materials, but it started from a lower base in 1958. Polyethylene film has been responsible for most of the growth in the class.

*Wooden containers* accounted for nearly 4 percent of the market in 1970. Wooden containers have declined in the share of the market since 1958 when they had close to 5 percent. This is due, in part, to the development of moisture resistant fibreboard boxes that can be used to ship fruits and vegetables and some meats and poultry. Nailed and lock corner boxes account for about two-thirds of this class; wirebound boxes and crates, 30 percent; cooperage, veneer, and plywood and excelsior account for the rest.

*Textile containers* had less than 2 percent of the market in 1970, declining nearly half a percentage point since 1958. This class is made up principally of bags, both cotton and burlap. Cheese cloth, twines, and other burlap products make up the rest of the class. Bulk handling of flour and other food products has probably been the reason for the slight decline in the share of the market.

*Other packaging materials* accounted for an estimated

12 percent of the market in both 1958 and 1970. Unreported packaging materials, such as those made by food processors from raw materials account for 70 percent of this class. Component materials such as adhesives, labels, tags, and tapes, and cargo or bulk containers make up the rest.

#### Growth of Food versus Total Packaging Costs

Since 1958, the value of food containers and packaging materials has increased slightly less than total packaging industry sales. The value of shipments of food packaging material increased at an average rate of 5.3 percent compared with 5.8 percent for total industry shipments. However, food uses for some packaging materials have increased more rapidly than for all other uses combined. For example, food uses of paper products increased slightly more than all other uses due to large increases in the use of rigid paper boxes, folding paper boxes, and sanitary food containers. This can be explained in part by an increase in the sales of convenience foods in recent years.

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