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## METHODOLOGY

The basic method used to estimate food expenditures for this series was based on current estimates of sales or receipts. This type of estimate accounted for 88 percent of food for off-premise use in 1970, 68 percent of meals and snacks, and over 90 percent of alcoholic beverages. This method utilizes current reports of retail sales (or receipts for organizations such as hotels and motels) and estimates of the proportion of sales accounted for by each of the categories in census years. The current sales data is adjusted to equal sales for each category of business as reported by the Census of Business each 5 years.

The proportion of sales accounted for by food for off-premise use, meals and snacks, packaged alcoholic beverages, and alcoholic drinks is used as reported in the 5-year censuses in most cases and intercensal years interpolated. The direction of movement in the last intercensal period is projected beyond the last census year. Other sources of data have been used occasionally, as for grocery stores, where better data appeared to be available.

For some minor types of businesses, current sales are not reported and sales have been interpolated for intercensal years. These accounted for from 2 to 6 percent of the estimates in the various categories.

A small portion is based on reported data, as for railroad dining cars (reported by the Interstate Commerce Commission) and airline food service (reported by the Civil Aeronautics Board).

Rough estimates of various types are used where no other method is available. These accounted for 5 percent of food for off-premise use, 3 percent of alcoholic drinks, and 2 percent of meals and snacks.

For some categories, most notably hospital and institutional food use, no data on food purchases are available on a current or periodic basis. In these cases, base year data (mostly for 1969 from an ESCS survey) were moved

## Methods of estimation for total food expenditures, 1970

Method	Percent of 1970 expenditures			
	Food for off-premise use	Meals and snacks	Packaged alcoholic beverages	Alcoholic drinks
Current sales or receipts . . . .	88.1	68.1	97.9	92.6
Estimated sales . . . . .	6.4	4.2	1.6	3.6
Reported . . . . .	.3	.9	.5	--
Rough estimates . . . . .	5.2	1.9	--	2.9
Base year/mover . . . . .	-1.0	12.2	--	.9
PCE . . . . .	<sup>1</sup> 1.0	<sup>2</sup> 5.4	--	--
Schools . . . . .	--	7.3	--	--
Total . . . . .	100.0	100.0	100.0	100.0

<sup>1</sup> Farm home-produced food. <sup>2</sup> Food furnished employees and military.

by other series. Hospital and institutional use was moved by an index incorporating number of residents and the wholesale price index for food. For a few other categories, other movers were used.

Farm home-produced food and food furnished employees and military are taken directly from personal consumption expenditures as reported by the U.S. Department of Commerce.

The estimates for elementary and secondary schools are based on Food and Nutrition Service data on the National School Lunch, School Breakfast, and Special Milk Programs inflated to totals for all school food service. The major category of school food service not included in the Federal programs is a la carte service. This is especially important in secondary schools. Estimates of total school food service were obtained from national surveys made periodically by USDA.

ground up and fed into special deboning machines that act like a sieve. The bone bits are screened out while the meat passes through. The result is a paste-like product called mechanically deboned meat (MDM).

### Proposed Regulations

The mechanical deboning process is not new. It was developed for the Japanese seafood industry about 20 years ago and has been used in the U.S. poultry industry since 1965. More recent developments have established the technological feasibility of mechanically deboning red meats, primarily beef and pork. Red meats are being mechanically deboned in at least 29 foreign countries, including Australia, New Zealand, and Argentina. Mechanical deboning techniques have not been widely adopted by U.S. red meat processors because USDA has never clearly defined the term "meat" to include MDM.

In April 1976, USDA formally proposed regulations to expand the definition of meat and allow MDM to be used as an ingredient in processed meat products. At the same time, USDA issued interim regulations providing for immediate production and distribution of MDM in processed meat for human consumption. However, several consumer groups filed suit in the U.S. District Court contending that USDA had failed to follow proper administrative procedures in issuing the interim regulations. When the Court con-

## ECONOMIC IMPACT OF MECHANICALLY DEBONING RED MEATS

By Douglas W. McNiel

Mechanical deboning is a technology for recovering the fragments of meat that remain on the bones of a carcass after hand trimming. In the mechanical deboning process, the bones and attached fragments of meat are

curred with the position of the consumer groups, USDA ordered that the official mark of Federal inspection could no longer be placed on MDM. This stopped domestic manufacture and distribution of mechanically deboned red meat.

At the Court's bidding, USDA organized a Select Panel with representatives from the Food and Drug Administration, the Veterans Administration, and the National Institutes of Health to study the health and safety aspects of the use of MDM. The Select Panel's recommendations were incorporated in a revised proposal issued in October 1977. Meanwhile, the additional meat that could be recovered via mechanical deboning is either being thrown away or sent, along with the bones, for inedible rendering—3-4 pounds per pork carcass and 12-16 pounds per beef carcass.

#### Health and Safety Issues

The wholesomeness and nutritional value of MDM are two points of disagreement in the debate over MDM. Labeling of products containing MDM is a third issue.

The wholesomeness of MDM has been questioned because it contains small amounts of pulverized bone powder and because of concerns that the heat generated in the process of producing MDM could create bacterial problems. Nutritional questions about MDM concern its calcium content (indication of bone content), the amount of fat, the amount of protein, and the quality of protein. The labeling issue concerns specification of the ingredient statement, and whether the terms "beef" and "pork" (which are designations for hand-deboned meat) are appropriate for products containing MDM, or whether labeling terminology more descriptive of the processing technique is more appropriate.

After an intensive analytical program conducted in the laboratories of the USDA's Food Safety and Quality Service and other Government agencies, the Select Panel concluded that:

- Bone particle size obtained with mechanical deboners currently available presents no hazards to health.

- No public health problem is posed by the presence or absence in the bone of trace elements, chemical or pesticide residues.

- A slight nutritional benefit is to be expected for most people from the calcium in MDM.

- The lipid spectrum of MDM is comparable to the lipid pattern found in hand-deboned meats.

- The microbiology of MDM presents no unique hazards and should not be a problem if good manufacturing practices and quality control programs are employed.

- The MDM contained in food products should be so labeled in the ingredients statement, so that persons who must stringently restrict calcium intake can avoid these products.

#### Economic Impacts

Since MDM would reach consumers as an ingredient in processed meat products, adoption of the technology would have different impacts on the markets for table and processed meats. The potential impacts of mechanical deboning were assessed under the assumption that inclusion of MDM as an ingredient in processed meat products would result in pound-for-pound increases in the retail supply of processed meats.

A model describing the supply and demand for table and processed beef and pork was used to simulate the consequences, in terms of prices and quantities, of several alternative regulations regarding the use of MDM in processed meat products. Policies simulated range from a continuation of the present restrictions to a free market approach which allows packers and processors to produce and distribute all the MDM which existing technology will allow them to economically recover.

More specifically, the prices and quantities associated with continuation of the present restrictions were compared with

prices and quantities associated with three other alternative policies:

- Allowing a maximum of 20 percent MDM as an ingredient in all processed meat products, including ground beef and pork;

- Allowing a maximum of 20 percent MDM as an ingredient in all processed meat products, excluding ground beef and pork;

- Allowing all MDM economically recoverable by existing technology to be used in processed meat products.

The first two policy alternatives simulated are variations of USDA's latest proposed regulations under which meat products such as bologna, hot dogs, and sausage would be permitted to contain up to 20 percent MDM. The third policy simulates a free market approach.

The state of the arts in mechanical deboning will not allow the recovery of MDM in sufficient quantities to provide 20 percent of the ingredients for all processed meat products including ground beef and pork. While recovery of MDM in sufficient quantities to meet the requirements of this policy is not technologically feasible at the present time, the simulation is presented to illustrate an upper bound to potential future impacts of utilizing up to 20 percent MDM in all processed meat products including ground meats.

The use of MDM in processed meat products would mean that more processed meat products would be traded at lower prices and slightly fewer table cuts would be traded at slightly lower prices. In the short run, the demand for beef cattle might be expected to decrease and the demand for hogs to increase, accompanied by a decrease in the price of slaughter cattle and an increase in the price of slaughter hogs. The magnitude of these changes would depend on the particular MDM regulation adopted.

From the welfare analysis, which is based on the concepts of consumer and producer surplus, it is even more apparent that consumers stand to gain considerably

from policies permitting the use of MDM as an ingredient in processed meat products. Estimates of the annual welfare gain to consumers are about \$2.8 billion when the 20-percent rule is applied to all processed meats, \$224 million when ground meats are excluded from the 20-percent rule, and \$1.1 billion under a free market policy.

While producers' welfare is reduced under all of the alternative regulations simulated, increases in the annual net economic welfare of society as a whole ranged from about \$1.7 billion when 20 percent MDM is included in all processed meats, to \$157 million when ground meats are excluded from the 20-percent rule, to about \$709 million under a free market policy.

### Limitations

As with any study, these results should be applied with some caution based on an appreciation of the limitations of the underlying analysis. Theory, data, and methodology are rarely equal to the demands of the problem. This study is no exception.

Results from the analysis have greatest application in the short run. Predictions of price and quantity changes grow more inaccurate the further away from the base period such predictions are made.

## DO WORKING WIVES SHOP DIFFERENTLY FOR FOOD?

By Effie H. Hacklander

The U.S. Department of Labor reports that 46 percent of the married women in the United States hold paying jobs (2). Timesaving household appliances, smaller families, better health, inflation, higher levels of education, and rising wants for material goods are often cited as reasons wives are drawn into paid employment. (2,4,6,7).

Employment may mean a part-time job or a full career. However, level of commitment may not be a true indication of the time and energy involved on the job, the amount of time required for com-

Price, quantity and welfare effects associated with alternative MDM regulations

Change in the—	Maximum of 20 percent MDM in processed meats		Use of all MDM recoverable by existing technology
	Including ground meat	Excluding ground meat	
<i>Cents per pound</i>			
Price of:			
Processed beef . . . . .	-28.0	-2.3	-10.7
Processed pork . . . . .	-17.7	-1.7	-9.7
Table beef . . . . .	-0.6	( <sup>1</sup> )	-0.2
Table pork . . . . .	-1.2	-0.1	-0.5
<i>Million pounds</i>			
Quantity of:			
Processed beef . . . . .	61.4	4.0	12.7
Processed pork . . . . .	38.1	4.0	24.0
Table beef . . . . .	-0.2	( <sup>1</sup> )	-0.1
table pork . . . . .	-0.5	( <sup>1</sup> )	-0.2
<i>Million dollars</i>			
Welfare of:			
Consumers . . . . .	2,90	224	1,110
Producers . . . . .	-1,130	-57	-401
Consumers & Producers . . . . .	1,660	157	709

<sup>1</sup> Less than 0.05 cents/or million pounds.

Therefore, temptations to extend these results to longrun analysis should be resisted.

For the complete report of the Select Panel see: HEALTH AND SAFETY ASPECTS OF THE USE OF MECHANICALLY DEBONED

MEAT. FINAL REPORT AND RECOMMENDATIONS. SELECT PANEL, August 1977, and Volume II, Background Materials and Details of Data, Dec. 1977.

Request from USDA, FSQS, Washington, D.C. 20250.

muting, or reduced time for household tasks including food shopping and preparation. (1)

Married women have traditionally performed homemaker roles in exchange for various social rewards. However, as socioeconomic conditions increase financial pressures, more wives are going to work. It is estimated that almost half of the working wives seek jobs for financial reasons, although working wives are found at all income levels (4). Regardless of income, when a wife is working outside the home, she is exchanging part of the homemaker role for a more satisfying dual role.

Major role shifts require adjustments in all areas of life. How does the shift to paid employment affect the married woman's food

shopping behavior? What are the differences and similarities between wives who are working for pay and those who are not?

### Demographics

The ESCS national food survey provides the data base for a discussion of food shopping behavior of women who do the major food shopping for their households. The 59 percent of households in this survey with working wives is somewhat higher than the national average (6). Households containing an employed wife have a slightly lower per capita income, although the differences are not statistically significant.

Differences in educational level attained by the two groups of women show the average non-working wife to have completed