RETAIL FOOD PRICE INDEX BASED ON M. S. U. CONSUMER PANEL

Thesis for the Degree of Ph. D.
MICHIGAN STATE UNIVERSITY
Hsin Fu Wang
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This is to certify that the

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M.S.U. CONSUMER PANEL

presented by

Hsin Fu Wang

has been accepted towards fulfillment
of the requirements for

Ph.D. degree in Agricultural Economics

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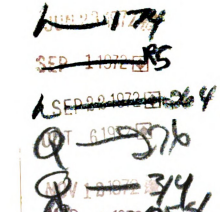

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By

HSIN FU WANG

A THESIS

Submitted to the School for Advanced Graduate Studies
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Applied Science in partial fulfillment of
the requirements for the degree of

DOCTOR OF PHILOSOPHY

Department of Agricultural Economics

March, 1960

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The author, of course, accepts full responsibility for any errors which may be present in this manuscript.

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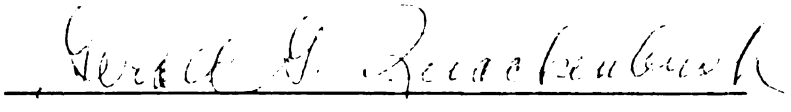
Approved 

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ABSTRACT

The principal objective of this study was to compile an M. S. U. Consumer Panel retail food price index. The index is a statistical measure of changes in the retail prices of food bought by Lansing urban families. Another objective was to compare the M. S. U. Consumer Panel index with other food price indexes.

The basic data for this study were the weekly food purchase records of the M. S. U. Consumer Panel. This panel was not specifically designed to collect data for the purpose of constructing a food price index. The price series derived from the panel data were weighted averaged prices for food items of varying sizes and qualities.

Panel prices for selected products were compared with prices for similar products which were collected from the retail food stores by the Bureau of Labor Statistics for constructing their U. S. city average index, and their index for Detroit. In general, cereal and bakery products prices were not highly correlated, but the correlation coefficients for meat items were relatively high. For most products the mean value of B. L. S. prices exceeded the panel prices.

Comparisons were made between the panel prices for Lansing and the B. L. S. prices for the U. S. city average. In order to compare both levels and changes between the B. L. S. price series for the U. S. city average and the panel series for Lansing, the

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"first index" was compiled. This index was compiled using the same weight and base as the B. L. S. used, but using the M. S. U. Consumer Panel prices in the given periods. The resulting index and the B. L. S. index provide a means of comparison of the price levels and price changes between the panel price series and the B. L. S. series.

It was found that the panel prices had similar patterns of movements with the B. L. S. prices for the U. S. city average. The B. L. S. quoted prices in general were higher than those actually paid by the panel families.

When the indexes of each group of products were used, the correlation coefficients of the two indexes were highly significant. The regression coefficients indicated that the B. L. S. prices of each group of products fluctuated more widely than those in the panel series, except the "fruits and vegetables" group.

Comparisons also were made between the panel prices for Lansing and the B. L. S. prices for Detroit. In order to compare price changes between the B. L. S. price series for Detroit and the panel price series for Lansing, a "second index" was compiled. This index was calculated using the B. L. S. "relative importance value weights" for Detroit, the panel average price (1955-57) as base, and the panel prices in the given periods. It was found that the changes in prices between the panel for Lansing and the B. L. S. for Detroit were about the same as the panel for Lansing and the B. L. S. for the U. S. city average. However, the correlation coefficients were higher

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than those between the panel series and the B. L. S. series for the U. S. city average. These results were due primarily to the fact that the panel prices moved more closely with the B. L. S. prices for Detroit than with those for the U. S. city average.

The percentage distribution of food expenditures of the 3-year (1955-57) annual average formed the "value weights" of the panel retail food price index. The actual distribution of expenditures (1955-57) indicated that the panel families spent 30. 7 percent of their total food expenditures on the "meat, poultry and fish" group; 20. 3 percent on the "other food at home" group; 20. 0 percent on the "dairy products" group; 16. 9 percent on the "fruits and vegetables" group; and 12. 0 percent on the "cereal and bakery products" group.

The panel family expenditure distribution was compared with the expenditure patterns of foods for other samples of families. The other samples were the Bureau of Labor Statistics for the U. S. city average in 1952, the National Industrial Conference Board for Lansing in 1953, and the Agricultural Marketing Service for the United States in 1955. The results showed that the expenditure distribution of each major food group for the panel was similar to those for the B. L. S. and N. I. C. B. samples of families, but differed somewhat from the A. M. S. sample of farm families.

After the panel food price index was calculated, comparisons were made with other indexes. The other indexes were the B. L. S. food price index for Detroit and the N. I. C. B. food price index for Lansing.

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These comparisons indicated that the panel food price index moved parallel to the B. L. S. and N. I. C. B. food price indexes. However, both the B. L. S. and N. I. C. B. indexes fluctuated with larger amplitude, but less frequently, than the panel food price index. Presumably the greater frequency of variations in the panel index reflected more of the effects of the prices of "specials" and, to some extent, changes in the quality of some of the items purchased by the panel families from one period to another.

In comparing the panel food price index with the B. L. S. food price index, the panel index provides a more accurate measure of the costs of food since the spending patterns represent the actual purchases of the panel families during the 3-year period 1955-57 and prices are those actually paid by the panel families from week to week. On the other hand, the panel price changes were affected by changes in qualities and quantities of food items purchased by the panel families from week to week.

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CHAPTER I

INTRODUCTION

Consumer Price Index and Retail Food Price Index

Price indexes used in demand analysis are of the type known as consumer price indexes, which serve to measure the changes in the cost for maintaining a certain standard of living. In empirical demand analysis, an important point is the distinction between nominal and real values. When representing demand as a function of prices and income, the variables may be specified either as nominal, i. e., prices and income as actually observed, or real, i. e., the nominal values divided by a consumer price index.

Among all items, foods are a very important component of the consumer price index because they account for a major part of total family spending and their prices change very frequently. A retail food price index is simply a part of a consumer price index. It is a statistical measure of changes in retail prices of the foods bought by consumers. Every index is specifically designed for a certain measurement. Consequently, it must be applied carefully when used for other purposes.

Purposes of the Study

One of the primary purposes in this study was to compile a retail food price index based on the Michigan State University Consumer

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Panel data. The index was a statistical measure of changes in the retail prices of foods bought by Lansing urban families. Emphasis was placed upon the methodology of the compilation of the index and upon the analysis of price movements for groups of products.

A second purpose of this study was to examine how Lansing families distribute their food expenditures among various items in comparison with the distribution of food expenditures observed in other expenditure studies. The comparison was mainly based on the sample families of the Michigan State University Consumer Panel, the Bureau of Labor Statistics (B. L. S.), the National Industrial Conference Board (N. I. C. B.), and the Agricultural Marketing Service (A. M. S.).

The third purpose was to compare the store sample used for the retail food price index prepared by the Bureau of Labor Statistics with the panel sample used for the retail food price index prepared by the Department of Agricultural Economics, Michigan State University. The object of this part of the work was: (1) to compare the price movements of Lansing, Detroit and the United States city average between the B. L. S. store sample and the panel sample; and (2) to evaluate the difference between the two series of indexes as a result of using different methods of collecting prices. Graphic examination and regression analysis of the data were used to determine the relationships between the two price series, as well as some of the differences present.

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2 Ibid., p. 7.

3 Ibid., p. 3.

The B. L. S., N. I. C. B. and A. M. S. Indexes

The retail food price index, as calculated on a monthly basis by the B. L. S., is the best known and most widely used statistical device for measuring the price changes of foods from the past period to any later date. A sample of 81 food items, excluding meels eaten away from home, was used in the B. L. S. revised index (1947-49 = 100) to represent the "market basket" of foods comprising the pattern of purchases of city workers' families in 1952.[1] Expenditures for items in the "market basket" were based on an "expenditure survey" of 8,000 families in 97 cities during 1950[2]. The cities for the sample were selected to represent different kinds of cities, taking account of city characteristics which affect the way families spend their money. Since the expenditure records were for the year 1950, the "market basket" representative of the year 1952 was adjusted for changes between 1950 and 1952. The average size of the families included in the index was estimated to be about 3.3 persons, and their 1952 average family income after taxes was estimated to be about $4,160.[3]

The method of calculating the B. L. S. index was essentially that of a Laspeyres' method. The index was a chain index, each link

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[1] Bureau of Labor Statistics, U. S. Department of Labor, Reprint of Chapter 7, from B. L. S. Bul. No. 1168, Techniques of Preparing Major B. L. S. Statistical Series, pp. 11-12.

[2] Ibid., p. 7.

[3] Ibid., p. 3.

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4 Ibid., pp.

calculated by the Laspeyres' formula. The food prices were obtained monthly during the first three days of the week containing the fifteenth of the month. They were collected from 2,000 chain and independent retail food stores in 46 cities. The value weight was the proportionate expenditure in the "market basket" for the subgroup which each item represents in the expenditure survey. For example, the weight assigned to the price of white bread is the proportionate expenditure in the "market basket" for all bread and plain rolls. In combining the cities into the U.S. city average index, each city was given a weight proportionate to the wage-earner and clerical-worker population. For example, the relative population weight of the urban area of New York City was 12.5 compared with 3.0 for Detroit.[4] Therefore, the average price change in New York had about four times as much weight, in the U. S. city average index, as an equal price change in Detroit.

Besides the index for the U.S. city average, the B.L.S. retail food index was also separately calculated for the 20 large cities. The index for each city was calculated monthly in terms of its own weight and price change. Detroit was one of the five largest cities in this group of 20.

The N.I.C.B. revised retail price index for food at home was composed of 78 items. The value weight of the revised index was derived from the consumer expenditure survey of 1950 made by the

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[4] Ibid., pp. 8-9.

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[6]National In

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[7]National In

[illegible] Index (New York:

[illegible], p. 304.

B. L. S.[5] The basic data from this survey were adjusted. Since Lansing was not a surveyed city in the B. L. S. expenditure survey of 1950, the N. I. C. B. expenditures for this city were interpolated from existing expenditure data for other cities.[6]

The revised index (1953 = 100) for the U. S. city average covered 40 cities. Prices were collected monthly, quarterly, and annually by the Board from a sample of stores in each of 40 cities.[7] Prices for Lansing were collected four times a year: in March, June, September and December, the months when the food price indexes were published. In general, the N. I. C. B. index was very similar to the index prepared by the B. L. S. Of particular interest was the N. I. C. B. food price index for Lansing, which was not prepared by the B. L. S.

The weighting pattern of the recently revised A. M. S. index of prices paid by farmers for food and tobacco was based on the farm expenditure survey which was conducted in the spring of 1956 jointly by the A. M. S., the A. R. S. (Agricultural Research Service), and the Bureau of the Census. The data were supplemented by a survey of food consumption made in 1955 by the A. M. S. and the

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[5] National Industrial Conference Board, Development of the New Market Basket (New York: National Industrial Conference Board, 1954), pp. 1-2.

[6] National Industrial Conference Board, The Market Basket for Unsurveyed Cities (New York: National Industrial Conference Board, Inc., 1955), pp. 1-3.

[7] National Industrial Conference Board, Revised Consumer Price Index (New York: National Industrial Conference Board, Inc., 1954), p. 304.

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The A. M. S. food and tobacco price index was composed of 52 items. The 50 food items priced represented 91 percent of total expenditure weights, and the two tobacco items accounted for 9 percent.[9] The index was specifically designed to measure the food and tobacco prices paid by all farm families.

A Critical Review of the B. L. S., N. I. C. B. and A. M. S. Indexes

The merits of the B. L. S. consumer price index have long been a controversial issue. The following brief discussion from theoretical and technical points of view touches only some of its weaknesses with respect to the food price index.

The changes in weights and the way of collecting prices are connected with most of the problems in the B. L. S. index. For example, the 1952 weights used in the revised indexes were derived from the 1950 consumption patterns. Food expenditures between 1950 and 1952 were adjusted solely for changes in price. This, of course, ignored the fact that the food consumption for "pricing families" in 1952 was greater than in 1950, both in money and in real terms.[10]

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[8] B. R. Stauber, R. F. Hale and B. S. Peterson, "The January 1959 Revision of the Price Index," Agricultural Economic Research, Vol. XI, Nos. 2 and 3 (Washington: U. S. Government Printing Office, 1959), p. 35.

[9] Ibid., p. 52.

[10] Willard W. Cochrane and Carolyn Shaw Bell, The Economics of Consumption (New York: McGraw-Hill Book Company, Inc., 1956), p. 72.

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The latter was due to the increase in quantities consumed without taking into account the influence of changing prices. When changing the expenditure weights in the revision, the population weights among different cities were held constant. This could destroy the significance of the U. S. city average index in representing the changes in the cost of maintaining the same level of living. If expenditure weights are changed without taking into account the shifts in population, the index does not reflect its real meaning because the weighted average price of a commodity for the U. S. city average depends not only on the price quotation in each city but also on the weight of each city in terms of its population relative to the nation as a whole. Even if the prices remain constant, the U. S. city average prices do change if the city weights change.

In comparing the panel series and the B. L. S. series, the B. L. S. quoted prices are usually for food higher in quality than those actually purchased by the M. S. U. Consumer Panel families. It is doubtful that the sample of food items actually selected is truly representative of all food bought by city wage-earners and clerical-worker families with "moderate income." As we know, food prices change very frequently. The B. L. S. food prices are collected only once a month, about the middle of the month. It is conceivable that the collected prices could fall in an extremely high or low period of the month. Thus, the changes in food price indexes from one month to another may not represent the monthly average price changes. In

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addition, the B. L. S. food prices are obtained during the first three days of the week when few of the food items are bought. The B. L. S. index might be more accurate if weekly average prices were used in calculating it.

The N. I. C. B. index weights were derived from the B. L. S. weighting patterns, so some of criticisms of the B. L. S. index weights also apply the N. I. C. B. index weights. The food prices for the N. I. C. B. index were also collected from chain and independent stores. In addition, the N. I. C. B. index is based on less information than the B. L. S. index. Of the 40 cities covered in the N. I. C. B. for U. S. city average index. only four were priced monthly between 1951 and 1958. Prices for cities other than the four cities were obtained only four times a year. The three-month period index can not reflect the frequent changes in prices of foods.

Comparing the A. M. S. index with the B. L. S. and N. I. C. B indexes, the living component of the A. M. S. index spreads over a much wider geographic area, with the entire state serving as a basic unit for original price estimating. Moreover, as for food coverage, only one item of frozen food, the frozen haddock, is included in the A. M. S. 1959 revised index. The use of such food is growing fast, and doubtless will be increasingly important in the rural areas. This will probably create a larger error in the food and tobacco index as farmers' use of frozen foods continues to increase.

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Sources and Preparation of Data

Besides the M. S. U. Consumer Panel retail food price indes using panel data, two different indexes were calculated in order to compare the price movements of Lansing, Detroit and the U. S. city average and to check the difference in the data between the panel series and the B. L. S. series. One index was calculated by using the B. L. S. value weights and price base (in the retail food price index for the U. S. city average), and the M. S. U. Consumer Panel prices in the given period. Another was calculated by using the B. L. S. "relative importance of value weights" (in the retail food price index for Detroit), the M. S. U. Consumer Panel Prices in the given period, and the M. S. U. Consumer Panel 1955-1957 average price as the price base.

The B. L. S. "relative importance of value weights" in the retail food price index for Detroit. --The "relative importance of value weights" of an index represents the value weight multiplied by relative price changes from the weight date to a later period and the result expressed as a percentage of the total for all items.[11] For a detailed description of the "relative importance of value weights," see Chapter II, Deriving the B. L. S. Value Weights. Because of the fact that neither the price of each item in the base period nor the index of each item in

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[11] Bureau of Labor Statistics, U. S. Department of Labor, "Relative Importance of C. P. I. Components, 1957," Monthly Labor Review (July, 1958), pp. 767-770.

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any later date is available, the value weights for Detroit cannot be derived. Thus, the relative importance of value weights for Detroit of December, 1950 and 1952 were used as weights in the index calculations to correspond with the B. L. S. adjusted index and revised index.

The value weights and price base of the B. L. S. retail food price index. --Through December of 1952 the B. L. S. index was calculated by using the average price of the five years, 1935-1939, as a base. The value weights were based on the 1934-1936 family expenditure pattern and adjusted in 1950 to reflect postwar changes. The B. L. S. index was then changed to the base, 1947-1949 = 100, and the value weights then represented the 1951-1952 family expenditure pattern. The B. L. S. value weights used in this study for index calculations were derived from "the relative importance of value weights" of each item in the all-items index of January, 1950 and December, 1952, respectively. The price base was derived from the index of each food item published in the Monthly Labor Review.

The M. S. U. Consumer Panel data. --The M. S. U. Consumer Panel was started in February of 1951 and was discontinued in December, 1958. From February, 1951 through December, 1958, about 250 families reported their food purchases each week. The representative sample was drawn from Lansing, Michigan, with a population of approximately 100,000 people. This sample was selected to account for the characteristics of size of family, education of homemaker, age of homemaker,

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and the amount of income received.[12] For obtaining a representative sample of families, three sample census of the Lansing population were conducted to determine its characteristics. The sample techniques and the characteristics of the sample families are discussed in greater detail by Shaffer and Moss.[13]

Purchases of food reported by all families were approximately 900 items. This includes all food items that can be purchased for use at home. The information received from the panel diaries was edited, coded, and punched on I. B. M. cards. The price, quantity, expenditure, income and other data were derived by using I. B. M. equipment before this dissertation was started. The prices were the weighted averages for the week, i. e., total expenditure divided by total quantity bought for each week. The prices used in this study were the 4-week averages and thirteen periods a year.

Limitations of the panel data. Until 1953 the panel price series were only available for the items of meats, poultry and fish, dairy products, eggs, fats and oils.

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[12] Gerald G. Quackenbush, "Demand Analysis of the M. S. C. Consumer Panel," Journal of Farm Economics, XXXIV, No. 3 (August, 1954), p. 417.

[13] James D. Shaffer, "A Plan for Sampling a Changing Population over Time," Journal of Farm Economics, XXXIV, No. 1 (February, 1954), pp. 153-163; and Thomas N. Moss, "Some Relationships of Selected Socio-Economic Factors to Food Consumption and Expenditures, Lansing, Spring, 1950" (unpublished Ph. D. dissertation, Michigan State College, 1952).

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The fruit and vegetable prices were tabulated starting in 1953. From 1955 through 1958, the panel data included a complete price series for every item in the diary.

Some errors on the panel data could possibly be caused by reporting and processing. Errors in price caused by omission or by entering the purchase under the wrong heading are unlikely, since only major items were used in this study. Failure to report the actual expenditures for each item could cause the errors in weighting. Since the prices were derived from expenditure divided by quantity, any error in expenditure and quantity would affect the index. In addition to the errors from family reports, the errors caused by data processing and I. B. M. computing must also be recognized.

The nonhomogeneity of products purchased by the panel families from week to week probably leads to some "false" changes in the prices of these items due to the panel method of getting the average price series. That is, total expenditures for a product were divided by the total quantity (including various qualities) for each week. Nevertheless, when a four-week average of the weighted average prices is used, it provides a fairly reliable measure of the prices actually paid for a product by the panel families in that period.

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CHAPTER II

PROCEDURES AND METHODS

Adjusting the Data

Because of the limitations mentioned above, certain data from the panel used in this study were adjusted and corrected before they were used for calculating the indexes. In checking the expenditure data to be used for weighting, two comparisons were made. They were: (1) comparing the expenditures for each item between the years of 1955, 1956, and 1957, and (2) adding the expenditure for ach individual item to compare it with the expenditure for each group of those items as computed by the I. B. M. equipment. If they were not comparable, checking and correcting of mistakes in the weekly observations were made.

In checking the prices of each item used in calculating the indexes, four methods were used: (1) the 4-week average prices of each item, which was selected to represent the price movements, were plotted graphically for a double check of these prices, so as to compare the regular price changes of each item from period to period within the year and to compare the prices in the same period in different years; (2) the price changes between the similar products in the same group were compared; (3) the prices of each individual item which were observed from the panel and the B. L. S. series were compared; (4) the correlation coefficients between the prices of the same product in

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both panel series and B. L. S. series were calculated (only cereal, bakery products, and meats were calculated). If they were not comparable, a detailed check on the original data was made for the individual products.

According to the type of errors and omissions, several methods were used to correct an observation. They were: (1) To recompute if the errors were caused by miscalculation. (2) To derive an observation by using the same rate of price change in either the previous year or the year following if the prices were mistaken or were omitted in only one or two periods. (3) To derive the observations by using the same rate of price change between the two previous years chained forward, or the two following years chained backward, if the prices were mistaken or omitted in more than two periods. (4) To derive observations by estimating the prices based on the price movement of similar products, if the prices were not tabulated or not available in the diary. For the products which were not consistent in qualities over time or not close to the B. L. S. specifications, some were combined and some were separated in order to facilitate comparisons between the panel series and the B. L. S. series.

Compilation of the Indexes

Three different indexes were calculated in order to serve the various purposes. Two of them were based on the B. L. S. data and the panel data. One index was based on only the panel data. The

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purpose of using the panel data and B. L. S. data to compile the index was twofold: (1) to facilitate comparison of the price movement between Lansing, Detroit, and the U. S. city average; (2) to facilitate evaluation of the differences between store sample and panel sample as sources of data for constructing a food price index. The procedures and methods of constructing each of these three different indexes are described below.

The first index. --This index, which was compiled by using the B. L. S. weights and base (in the retail food price index for the U. S. city average) and the M. S. U. Consumer Panel prices in the given periods, was designed to compare both levels and changes of prices between Lansing in the panel series and the U. S. city average in the B. L. S. series. Thus, the procedures and methods used in calculating the index followed those used by the B. L. S. as closely as possible. The component indexes such as dairy products, fruits, and vegetables, etc., which measured the price changes for selected groups of food were classified in exactly the same manner as the B. L. S. index. The procedures and methods of calculating this index (using same weights and base as B. L. S. used, but using the different prices in the given periods) are summarized as follows:

1. Selecting food items. The food items used in this index calculation were based on the items priced by the B. L. S. for its retail food price index. Until the 13th period, 1952, 59 food items were selected to represent the Lansing food price movement in order to

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compare with those B. L. S. adjusted index. From the first period, 1953 through the 13th period, 1958, 81 food items were priced to compare with the B. L. S. revised index. However, the complete index for all food groups was not started until 1955 since data on some food groups were not available in the panel. In order to keep the panel food items as close to the B. L. S. specifications as possible, some necessary adjustments were made in the panel basic data. For example, the panel data for broilers and fryers combined were substituted for the B. L. S. data for fryers only. For a comparison of different tiems between the B. L. S. and the panel series, see Chapter V, Table 9.

2. Deriving the B. L. S. price base. The price base was derived from the B. L. S. index. The index of each food item is simply a price relative which represents the relative price change from the base period to a later date. Symbolically,

$$I_a = \frac{p_{t_a}}{p_{o_a}} \cdot 100$$

Where "I_a" represents index of item "a," "p_{t_a}" is the price of item "a" in the given period, and "p_{o_a}" refers to price of item "a" in the base period. Thus,

$$p_{o_a} = \frac{p_{t_a}}{I_a} \cdot 100$$

p_{t_a} and I_a were published in the B. L. S. Monthly Labor Review.

3. Deriving the B. L. S. Value Weights. The value weights

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were derived from the B. L. S. "relative importance of value weights" in the food price index. According to the definition, the B. L. S. "relative importance of value weights" can be written

$$RI_a = \frac{w_a \cdot \frac{p_{t_a}}{p_{o_a}} \cdot 100}{CPI}$$

Where CPI represents the consumer price index for all items, "RI_a" means the relative importance of value weight of item "a" in the CPI, the subscript "w_a" refers to the value weight of item "a" in the CPI, p_{o_a} and p_{t_a}, as before, stand for the price of item "a" in the base period and given period.

Transposing the above equation, we obtain

$$w_a \cdot \frac{p_{t_a}}{p_{o_a}} \cdot 100 = RI_a \cdot CPI$$

Thus,

$$w_a = RI_a \cdot CPI \cdot \frac{p_{o_a}}{p_{t_a} \cdot 100}$$

The value weight of each item was derived by using this equation, i. e., its relative importance times the "all item index" and times the reciprocal of its price relative divided by 100.

4. The index formula. The basis of the index was Laspeyres' formula,

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$$I_t = \frac{\sum q_o p_t}{\sum q_o p_o} \qquad \text{or,}$$

$$I_t = \frac{\sum q_o p_o \ \frac{p_t}{p_o}}{\sum q_o p_o}$$

Where I_t means price index for a given period, "p" refers to the price of an individual product, the subscript "o" refers to the base period from which price changes are measured, and the subscript "t" refers to given period which, in this study, refers to M. S. U. consumer panel price (4-week average) which is being compared with the B. L. S. base price.

In actual practice, however, a variation of this formula is used, namely,

$$I_t = I_{t-1} \frac{\sum q_o p_t}{\sum q_o p_{t-1}} \qquad \text{or,}$$

$$I_t = I_{t-1} \frac{\sum ex_t}{\sum ex_{t-1}}$$

The last formula is the one used, where "ex" represents the individual item expenditures with base period quantities, "t" for the given period, and t - 1 for the last previous period. The summations are performed over all the items in the group under consideration.

The first step of the computing procedure is to get the current item price relatives "R_t". The current item expenditures are

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$$R_t = \frac{p_t}{p_{t-1}} \cdot 100$$

Symbolically,

$$ex_t = \frac{ex_{t-1} \cdot R_t}{100}$$

The current item expenditures are totaled at the categories, subgroups, groups and total, and indexes are computed at each level by using the index formula. That is, multiply the expenditure ratio between the current period and the last previous period by the index of the last previous period.

5. The linking procedure. The linking procedure was based on the standard linking procedure, i. e., price changes from the 13th period, 1952 forward were weighted with revised weights and chained to the index of the 13th period, 1952 computed with old weights to obtain the indexes for subsequent periods. The first step of chaining was to get the link period index (in this case, the 13th period, 1952) with the old value weights; the second step was to set up a second set of revised weights for the link period; and the third step was to compute the period price relative from the link period based on revised weights and to multiply the previous period's index (the "lead on" period, in this case, is the 13th period, 1952) to obtain the subsequent index numbers. For example, let $I_{t-1} = 105$, where I_{t-1} is the same index

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of the 13th period, 1952, calculated by using old weights.

Let $q_1, q_2, q_3, \ldots q_n$, be a set of new quantity weights for items 1, 2, 3, . . . n; $p_1, p_2, p_3, \ldots p_n$, be the prices for item 1, 2, 3, . . . n in the 13th period, 1952. The price times the quantity, $q_1p_1 + q_2p_2 + q_3p_3 + \ldots + q_np_n = ex_{t-1}$, which is the sum of the expenditures for all items in the 13th period of 1952. The sum of the expenditures for all items in the 1st period, 1953, is $q_1p'_1 + q_2p'_2 + q_3p'_3 + \ldots + q'_np'_n = ex_t$, where p'_1, p'_2, p'_3 are the prices for items 1, 2, 3, . . . n in the 1st period, 1953.

Suppose $ex_{t-1} = \$200,000$ and $ex_t = \$220,000$. Then, the weighted price relative from the link period to the 1st period of 1953 is

$$R_t = \frac{ex_t}{ex_{t-1}} = \frac{220,000}{200,000} = 1.10.$$

The index (I_t) of the 1st period, 1953 is 105 x 1.1 = 115.5. If the sum of expenditures of the 2nd period of 1953 (ex_{t+1}) is 224,400, then, the weighted price relatives of $R_{t+1} = \frac{224,400}{220,000} = 1.02$. The index of the 2nd period, 1953 (I_{t+1}) is 115.5 x 1.02 = 117.81. The subsequent indexes $I_{t+2}, I_{t+3} \ldots I_{t+n}$ are obtained by the same procedure. Only two group indexes--"dairy products," "meat, poultry and fish"--were linked. The other groups, which were started either in 1953 or 1955, did not require any linking.

6. Seasonal food. Items of seasonal food were priced in the same manner as the M. S. U. Consumer Panel retail food price index,

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The second index. --This index, which was compiled by using the B. L. S. "relative importance of value weights" (in the retail food price index for Detroit) and the M. S. U. Consumer Panel average 1955-57 price as base and the M. S. U. Consumer Panel prices in the given periods, was designed to compare the price changes between Lansing in the panel series and Detroit in the B. L. S. series. In this index calculation, the food items, index formula, and the linking procedures were the same as those used in the index based on the U. S. city average which were described above. The methods of "linking," "conversion of base," and "twelve months compared with 13 periods" used in this index are summarized as follows:

1. The linking procedure. From the fourth period of 1951 to the 13th period, 1952, the indexes were weighted according to the B. L. S. "relative importance of value weights" of December, 1950. From the first period of 1953 through the 13th period, 1958, the index weights were based on the "relative importance of value weights" of December, 1952. As in the case of the U. S. city average, the 13th period of 1952 was used as the link between the indexes which were calculated in different weights. Since the B. L. S. base price for Detroit was not available, the M. S. U. Consumer Panel average 1955-57 price was used in order to compare it with the M. S. U. Consumer Panel retail food price index.

2. Conversion of base. In order to facilitate comparison

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between the two price series, the B. L. S. index (1947-49 = 100), except in Chapter III, was converted to the same base as the M. S. U. Consumer Panel food price index (1955-57 = 100). The procedure of conversion is to multiply each B. L. S. index by a conversion factor. In this case, this factor is the ratio of the average of the three years 1955-57 indexes, which are calculated by using 1955-57 = 100, to the B. L. S. average of the three years 1955-57 indexes, which are calculated by using 1947-49 = 100.

3. Twelve months, compared with 13 periods. The B. L. S. indexes were calculated on a monthly basis, i. e., 12 months a year, and the indexes using panel prices were calculated on a 4-week period basis, i. e., 13 periods a year. Either adjusting the B. L. S. 12 months index to the 13 periods or adjusting the 13 periods index to the 12 months would change the values of the index. Since the comparisons were made mainly to measure the movement of two price series over time, the 12 periods of the B. L. S. monthly indexes were plotted against the 13 periods of panel 4-week indexes in each year as in Figures 1 to 14, and Figure 31. Because the prices used in the B. L. S. index are only collected once around the middle of each month, one way of comparing the indexes between each 4-week period and each month is to compare the month with that period which includes the 15th of that month. In this case, the first five periods can be compared with the first five months and the last five periods can be compared with the last five months, in each year of the eight years, since the 15th of

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The third index. --The retail food price index of the M. S. U. Consumer Panel, was designed to measure the effect of price changes on the cost of foods in the "market basket" in Lansing. The index is based on prices actually paid by the panel families. The average size in 1955-57 on the families included in the index was estimated to be about 3. 2 persons, and their average family income was estimated at about $5, 452 after taxes. The procedures and methods of calculating the M. S. U. Consumer Panel retail food price index are summarized as follows:

1. Weighting and selecting food items. The content of the "market basket"--that is, the quantities and qualities of food that represent what families bought in 1955-57--is assumed to remain the same, so that the change in cost from period to period is the result of changes in prices. Sampling assumes that a relatively small number of properly selected items will be representative of an entire group. For this purpose, the data were first arranged according to the major groups of family spending on food. The five major groups were further divided into 20 subgroups (see Table 9, Chapter V). Thus, a definite stratification was established in which each of the basic expenditure items was classified by type and assigned to a proper subgroup.

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Each subgroup was further divided into small subgroups and categories. It would be time consuming and costly to analyze the 4-week price data for all nine hundred basic expenditure items. The data, therefore, were further condensed within the structural framework and a smaller list of items was selected to represent basic expenditures.

The main criteria used in selecting the items, which were to be priced each 4-week period, were: (1) Importance of the item in the total family expenditure. The effect of the price change of any item on the total price change varies with the relative importance of the item. (2) Representativeness of the item in a group of items. Since the price change of the selected item will represent the price change in the unpriced items in the index, two factors were considered in determining expected similarities in price fluctuations. One is the pattern of the past price fluctuations, and the other is the usage of the products. The basic expenditure items were grouped according to the above considerations, and one or more products were chosen to represent each smallest group. The expenditure for the selected items was then used to represent the combined expenditure of the group it represented.

In order to clarify this procedure, let us take the fats and oils group, for an example, and follow, step by step, the method developed for this particular case.

The first step in the development of the market basket for fats and oils products is the grouping of the primary data. Assume,

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for purposes of this example, that the total amount spend of the fats and oils products group represents 100 percent of all expenditure in the food group, and this breaks down into the 11 items listed below, which are assumed to be purchased in the proportion given.[1]

Item	Percent	Item	Percent
1. Oleomargarine	37.51	6. Lard	2.57
2. Vegetable shortening	16.81	7. Other fats	.40
3. Swiftning	2.32	8. Peanut butter	17.18
4. Salad dressing (10.64), french dressing (1.90), roquefort dressing (.40), salad dressing mix (.05), diet dressing (.13), total	13.12	9. Mayonnaise	4.56
		10. Sandwich spreads	.48
		11. Whips	.32
5. Cooking oils (3.68), salad oils (.59), other oils (.46), total	4.73		

The next step is to select from this list the representative items which would priced for an index and would constitute the "market basket." According to the criterion mentioned earlier, we consider each item as follows:

(1) Oleomargarine. This item occupies by far the most important place in the fats and oils products group and should, therefore, be included according to the first criterion given above. Using the percentage

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[1] Butter was classified in the "dairy products" group instead of the fats and oils group.

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assigned to oleomargarine in the total expenditure weight (37.51), it can now be easily illustrated how a change in the price of a relatively important item affects the index as compared with a change in the price of a relatively unimportant item. Assume that the price of oleomargarine rises by 5 percent with all other prices remaining constant. This price change is reflected by the fats and oils products index as 100 + (37.53 x .05) = 101.19, or an effective increase of 1.19 percent. On the other hand, a similar price rise in Swiftning, an item of small importance (2.38%), will be reflected as 100 + (2.38 x .05) = 100.1, or an effective increase of 0.1 percent.

A comparison of these two index figures demonstrates clearly how a price change is reflected according to the relative importance of the items. In order to see their true representatives it should be noticed that fats and oils products form only a small part of the total food expenditure, of which the entire group represents only about 3.6 percent of all food expenditures (see Table 9, Chapter V).

(2) Vegetable shortening.

(3) Swiftning. The relative importance of Swiftning is not enough to warrant individual pricing. It can be combined with vegetable shortening to constitute one subgroup since their usage is a similar one. The item with the greatest relative importance is vegetable shortening in this case, and it is selected to represent this entire subgroup.

(4) Salad dressing, french dressing, roquefort dressing,

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(6) Lard.

(7) Other fat

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8) Peanut bu

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salad dressing mix, and diet dressing. They have a weight of 13.23 percent and will be priced as a group for the same reasons that oleomargarine was priced individually. The item to be priced should be one which has an established market, and the price of which can be expected to fluctuate in the same manner as the price of other dressing. For these reasons, salad dressing should be a good choice. Furthermore, salad dressing has the greatest relative importance in the total expenditure of the subgroup.

(5) Cooking oils, salad oils, and other oils. The expenditure weights of these four items again are of a magnitude which does not warrant their being priced individually. They are all items of a similar usage. When they are combined they form a sufficiently important group for pricing. The item with the greatest relative importance is cooking oils in this case, and it is selected to represent the entire subgroup.

(6) Lard.

(7) Other fats.

Lard and other fats are the items of a similar usage. They are combined to form a group for pricing. The item with greatest relative importance is lard. Therefore, lard is selected to represent the subgroup.

(8) Peanut butter. The proportion of expenditures made for peanut butter shows that it is a fairly important item. Furthermore, no other item, according to the criterion of suitability to represent a

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Vegetable shortenin
Salad dressing
Cooking oils
Lard
Peanut butter
Mayonnaise
Total

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group, can be combined with peanut butter. Therefore, peanut butter will be allowed to stand by itself.

(9) Mayonnaise. Mayonnaise with its weight of 4.56 is important enough to be considered alone.

(10) Sandwich spreads.

(11) Whips.

These items do not constitute one group as do the items from 1 through 9, but are a collection of miscellaneous fats and oils. Their expenditure weights do not warrant enough to form a group of their own. It is logical to assume that these items will fluctuate in price as all other fats and oils combined. Therefore, their expenditure weights will be ascribed proportionately to each of the above subgroups.

After combining the expenditure weights according to the above considerations, we finally arrive at the following market basket for the fats and oils group:

Item	Percent
Oleomargarine	37.81
Vegetable shortening	19.28
Salad dressing	13.23
Cooking oils	4.77
Lard	3.00
Peanut butter	17.32
Mayonnaise	4.60
Total	100.00

As was already pointed out, this example is a small and simplified model illustrating the derivation of the priced "market basket" from the panel.

It is clear that the distributions of expenditures among individual items (the price change of each item represents the price change of a small category of food items) included in the smallest subgroups of foods were based on the average ratios of item to the subgroup expenditures. Thus, the distributions of expenditures to each of the subgroups included in the major groups were based on the average ratios of subgroup expenditures to major group expenditures. Finally, the distributions of expenditures to each of the major groups included in the total food expenditures were based on the average ratios of major groups expenditures to the total food expenditures.

A concrete example may help to explain this procedure. According to the panel, the family expenditure pattern, during the period from 1955 to 1957, was determined by a detailed study. The distribution of the total food expenditures to each of the five major groups was described in Table 9, Chapter V. The expenditure for the major group of "meat, poultry and fish" was 30.7 percent of the total food expenditures. The expenditure for the subgroup of meat was 71.9 percent of the expenditures of the major group of "meat, poultry and fish." The remaining 28.1 percent was distributed to the poultry and fish subgroups. The expenditure for the small subgroup of pork was 32.3 percent of the expenditures for the meat subgroup. The remaining 67.7 percent was distributed to the small beef, other meats, veal and lamb subgroups. The expenditure for pork was 32.3 percent of the expenditures for the meat subgroup.

The remaining 67.7 percent was distributed to the small beef, other meats, veal and lamb subgroups. The expenditure for pork was distributed to each of the smallest categories which are represented by the individual items. For example, fresh pork roast is selected to represent the category of all pork roasts.

The model illustrated above is to explain, in a general way, the procedure used in developing an index "market basket" from the panel expenditure data, which represented an actual record of the expenditures for foods purchased by all Lansing urban families at a definite time. It should be clear that although every item is not individually priced, it is represented in the index.

2. The formula used in calculating the M.S.U. Consumer Panel retail food price index. The method of combining prices into a price index is basically the technique defined by the Laspeyres' formula. The simple mathematical notation for the formula was described earlier in this chapter. Since the panel index is based on the panel family expenditures of the 1955-1957 average, they represent recent spending patterns of Lansing urban families. No consideration needs necessarily to be taken of basic changes in items and weights. Therefore, the index did not require any linking. Furthermore, the price base period and the weight base period (1955-57) of the panel index are the same. Thus, the panel index adopted an aggregative index in measuring the changing value of a fixed aggregate of food items from weight date to any other period. These indexes were calculated by the Laspeyres' formula to

compare the current period with the base period rather than the B. L. S. chain index for month-to-month comparisons. In actual practice, the panel index used a different formula from the B. L. S. index. The B. L. S. indexes are the average relative chain indexes. Methods, of calculating the chain indexes used by B. L. S., are the same as they are used in calculating the other two indexes using both the B. L. S. data and the panel data, which were described above.

Now a more precise statement of how the formula can be applied to the panel index shall be described. The panel food price index used a "market basket" of average expenditures from 1955 to 1957. The fixed quantities, or q_o's of the formula, were derived from a consumer expenditure study based on the panel data (see Chapter V). The base period or time "o" was 1955 to 1957. Therefore, the index for any given period, say period "t" would be written:

$$I_t = \frac{\sum q_{1955\text{-}57} p_t}{\sum q_{1955\text{-}57} p_{1955\text{-}57}} \cdot 100$$

In words, this says: The index for period "t" equals the sum ($\sum$) of the products of the average annual quantities ($q_{1955\text{-}57}$) of the items (fixed according to the 1955-57 purchases of the panel families) and the average prices (p_t) of the items for time "t" divided by the sum ($\sum$) of the products of the same average annual quantities ($q_{1955\text{-}57}$) and the average annual prices ($p_{1955\text{-}57}$) of the same items for the base period 1955-57. Since the index is a percentage measure, the quotient of the two sums is multiplied by 100 to give an index number. This

formula is also used for the major group, the subgroup, or the small subgroup, index.

The panel index was calculated using a variation of the formula as a weighted average of price relatives for each item:

$$I_t = \frac{\sum \frac{p_t}{p_{1955-57}} \cdot p_{1955-57}q_{1955-57}}{\sum p_{1955-57}q_{1955-57}}$$

Thus, the weights used in the calculation of the index are "value weights" representing the cost of 1955-57 quantities at the current prices. The summation of value weights for groups of items in this manner makes it impossible to identify the quantity factors attached to each index item despite the price base and weight base in the same years. They are of differing kinds and quantities and cannot be described in the same quantity units. Quantity weights, therefore, are only implicit in the index structure.

3. Prices of the items used in the panel index calculation. Using the information of the expenditure data, 131 food items were selected and priced in each period. These items can be used together to estimate the average change in prices of all items of food. These items are of outstanding importance in family purchases, so that the items in themselves represent the greater part of family spending. (See Table 9, Chapter V for the number of items priced for the index.) Prices of these items were averaged weekly. And, then, these weekly averages were further averaged for every four-week period.

4. Calculation of the index. The average prices of each four-week period were compared with the prices obtained during the base period--the 1955-57 average. Thus, the percentage of the price of each item was calculated. These price relatives are expressed, not in dollars and cents, but as a percentage relative to the price in the base period. Then, these price relatives are put together to determine what happened to the prices on the average. To do this, each price relative is applied to its index weight to determine how much the price changes affect the total food expenditures. The following example illustrates how this is done for items of fats and oils.

Item	1955-57 expenditure weight	Price relatives	The first period, 1958 expenditure weight after price change
Oleomargarine	37.81	101.2	38.26 (37.81 x 1.012)
Vegetable shortening	19.28	101.0	19.47 (19.28 x 1.010)
Salad dressing	13.23	105.1	13.91 (13.23 x 1.051)
Cooking oils	4.77	101.6	4.85 (4.77 x 1.016)
Lard	3.00	115.6	3.48 (3.00 x 1.156)
Peanut butter	17.32	96.1	16.65 (17.32 x .961)
Mayonnaise	4.60	101.4	4.67 (4.60 x 1.014)
	100.00		101.29

We say, then, that fats and oils prices increased 1.29 percent, on the average, from the 1955-57 average to the first period of 1958. After similar calculations are made for all food items in the

index, the expenditure weights are added and compared, the results measure the average price change on all foods, and an index number for all foods is calculated.

5. Selection of base. The period 1955 through 1957 was used as a price base, while the 1955-57 average expenditures were used for weights in the index. According to the expenditure study based on the panel data, the family income, the pattern of consumption, and the prices of various products were all normal during this period. For the average of the three years 1955-57 price of each item, see Appendix 2.

6. Seasonal food. The weights used to measure average price change for certain items such as fruits and vegetables were the constant annual weights. Lack of prices for given items in given seasons was handled by estimation--either by holding constant until prices again became available, or by assuming the same price change for out-of season items as for year-round items. For example, fresh peaches are a seasonal item and prices are not available at the periods of out-of-season. In order to supply a peach price for such periods, the prices of peaches were assumed to vary in the same manner as apples, which are available at all times of the year. For a detailed description of handling seasonal foods, see Appendix 3.

7. Relative importance of items. "Relative importance" of the panel index refers to the percentage distrubution of the "value weights" which enter into the index calculation. The relative importance

figures for the base period of the index represent the distribution of family expenditures for the period of 1955 to 1957. To exemplify, if 20 percent of consumers' expenditures were allocated to dairy products and 10 percent to bakery products, 20 percent and 10 percent would represent relative importances of these groups. In subsequent periods, the relative importances do not reflect the distribution of actual expenditures. Instead, they are the percentage distribution of the costs necessary to purchase in the current period, the same quantity and quality of foods purchased in 1955 to 1957. They are, therefore, affected by the size of the base period expenditure, as well as by the differences in the rates of changes for prices for different items: e. g., relative importance will increase for those items which rise in price faster than average and decline for those items which increase less than average. For example, assume an index made up of only two items, for which the expenditures initially were $60 and $40, and which consequently had a relative importance of 60 and 40 percent, respectively. If the price of the first item doubled and the second advanced 50 percent by some later date, the index value weights would become $120 and $60, and their relative importance 67 (120/180) and 33(60/180) percent. The relative importance of each of the items was calculated for the 13th period of each year from 1955 to 1958. The formula used in calculating the relative importances is the same as the B. L. S. used. That is,

$$RI_a = \frac{w_a \cdot \frac{p_{t_a}}{p_{o_a}}}{R_t} \cdot 100, \quad RI_b = \frac{w_b \cdot \frac{p_{t_b}}{p_{o_b}}}{R_t} \cdot 100, \ldots, RI_n = \frac{w_n \cdot \frac{p_{t_n}}{p_{o_n}}}{R_t} \cdot 100$$

Where w_a, w_b, . . . w_n are the value weights for each item in the index; p_{t_a}, p_{t_b}, . . . p_{t_n} are the average price for these items in the 13th period of each year; p_{o_a}, p_{o_b}, . . . p_{o_n} are the average prices for these items in the base period (1955-57); R_t is the index of all items of foods in the current period, the 13th period of each year; and RI_a, RI_b, . . . RI_n are the relative importance for each individual item in the index of all items of foods. (See Table 9, Chapter V for the relative importance for each item.) The method for calculating the relative importance of each major group and subgroup of food is to multiply the base period (1955-57) group relative importance by the corresponding index of the group for the period desired, in this case the 13th period of each year from 1955 to 1958.

CHAPTER III

COMPARISONS BETWEEN THE M. S. U. CONSUMER PANEL SERIES AND THE B. L. S. SERIES FOR U. S. CITY AVERAGE

The difference in the food price level between Lansing and the U. S. city average was measured by the index calculated by using the same weights and price base as the B. L. S. used, but using the panel prices in the given periods. If each item included in the index is specified as the same quality and quantity, i. e., the variations of the indexes show only price differences and do not vary due to other factors, the two indexes would provide a direct comparison of the price levels between Lansing and the United States. However, the prices used for the indexes prepared by the B. L. S. are collected by direct pricing in the various food outlets included in its sample and are for particular specifications of each food item. They are not directly comparable with the M. S. U. Consumer Panel prices which are paid by the panel families for items of varying sizes and qualities. For example, the price of pork chops can vary considerably, depending upon how near the center of the loin they are cut. The B. L. S. specification for pork chops priced:[1]

> Description: Pork chops, cut from center of loins
> Grade: No. 1 grade
> Unit: One pound
> Exclude: Rib end or shoulder end cut chops, soft or oily pork.

The prices of pork chops of the M. S. U. Consumer Panel are the weighted average prices paid by the panel families during the week for all pork chops. A comparison of the B. L. S. food price indexes for the U. S. city average with the indexes calculated by using M. S. U. Consumer Panel prices in the given periods (the same value weights and price base as B. L. S. being used) does not show exactly whether prices are higher or lower in Lansing than the U. S. city average since, in fact, the variations between these two indexes are not only caused by the differences in prices but also reflect the differences in quality. Thus, the following comparison of the two price levels was made in order to compare the differences between the B. L. S. store sample and the panel sample. However, the indexes provide a direct comparison of the average price changes between Lansing and the U. S. city average from one period to another.

The Levels and Changes of the Two Price Series

The panel price index in the "meats, poultry and fish group" was lower than the B. L. S. index in every 4-week period over eight years. The B. L. S. index among the time periods varied from 11. 3 to 19. 3 points higher than the panel index (Figure 1). The differences between the two indexes indicate that the B. L. S. average price ranged from 11. 4 to 23. 3 percent higher than the panel average

[1]Bureau of Labor Statistics, U. S. Department of Labor, Food Manual (Revised February 2, 1953), p. 11.

price. Higher prices of steak, roast, and bacon in the B. L. S. series accounted for most of the differences. Comparing the annual average indexes, the B. L. S. series varied from 13. 0 to 18. 4 points above the panel series. This indicates that the B. L. S. annual average price was from 12. 5 to 19. 0 percent higher than the panel series. Over the eight-year period, the mean of panel average prices was 16. 3 percent below the B. L. S. mean.

The two price series had similar patterns of seasonal variations and trend over the eight-year period. Variations followed a rather regular seasonal pattern. Prices of both series were highest during July, August, and September, and lowest during the winter. This seasonal movement resulted chiefly from meat price variations. Both series followed a downward trend from 1951 to 1954, then leveled off during the first nine months of 1955, and went upward from February, 1956 through the end of 1958, after having dropped to a seasonal low in the winter of 1955 (Figure 1).

The panel price index in the dairy products group was lower than the B. L. S. index in every 4-week period over eight years. The B. L. S. index varied from 1. 5 to 15. 5 points above the panel index on a monthly basis (Figure 2), and 2. 7 to 13. 1 points according to their annual average basis (Figure 7). The differences between the two indexes indicate that the B. L. S. average price was from 1. 4 to 15. 6 percent higher than the panel average price on a monthly basis,

B.L.S. Index for Retail Prices of Meats, Poultry,

Fig. 1. Comparison of the changes in retail prices of meats, poultry, and fish between M.S.U. Consumer Panel for Lansing, Michigan and B.L.S. for U.S. city average

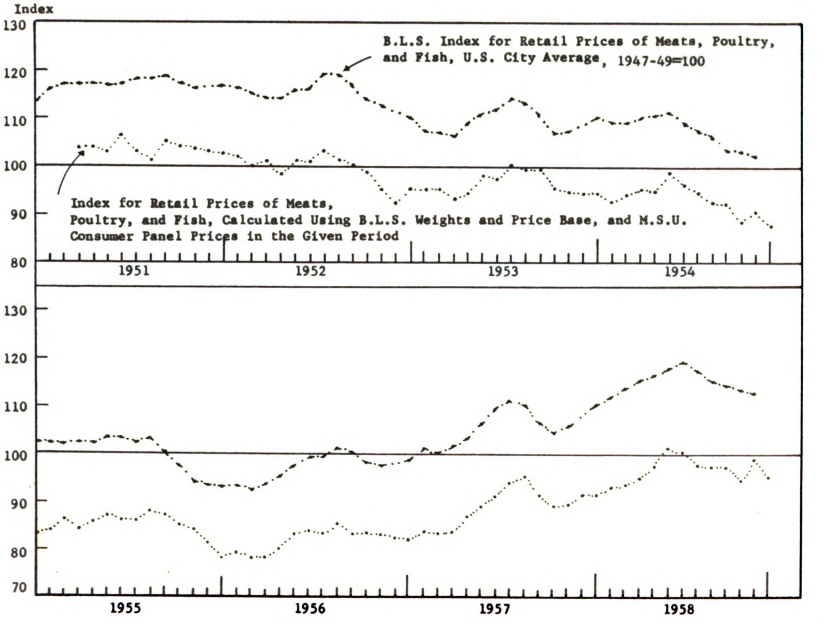
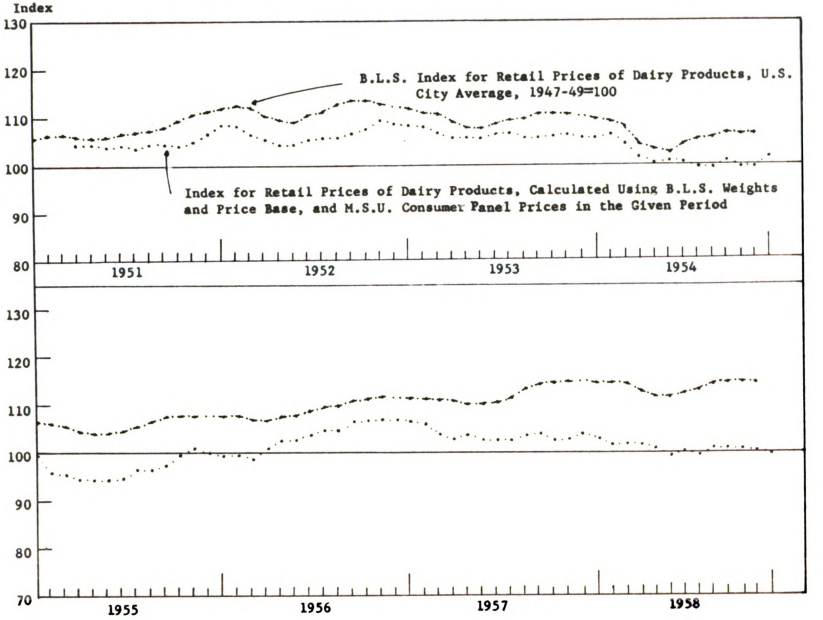


Fig. 2. Comparison of the changes in retail prices of dairy products between M.S.U. Consumer Panel for Lansing, Michigan and B.L.S. for U.S. City Average

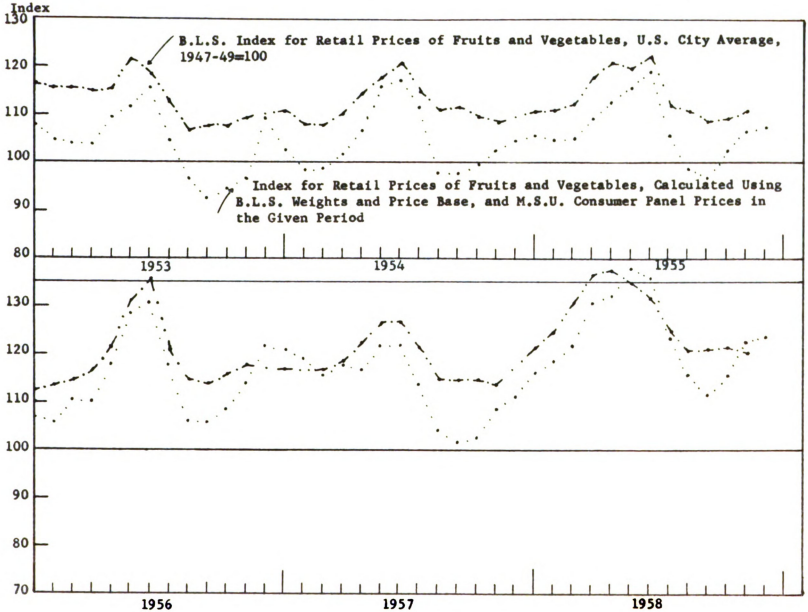


and 2.6 to 13.0 percent on the annual average basis. Over the eight-year period, the mean of the panel prices was 8.3 percent below the B. L. S. mean.

The difference between the two indexes was shown to be greater from the latter part of 1957 through December, 1958. The variation was mainly due to a slight decrease in prices of fresh milk and ice cream in the panel series relative to an increase in the same products in the B. L. S. series (Figure 2). The two indexes moved up and down together. Both B. L. S. and panel indexes remained rather stable during the first four years except for some intra-year fluctuations due to seasonal variations. A slightly upward trend during the last four years resulted from a small increase in prices of the items such as fresh milk, ice cream, and butter. Butter and ice cream prices followed a seasonal pattern which was similar to that of milk. The milk prices were lowest in the months of high milk production and highest in the months of low milk production. The seasonal pattern of this entire group apparently followed the price movements of milk, butter, and ice cream. These prices were lowest in early summer and rose to a seasonal peak during the winter.

Both the panel index and the B. L. S. index of the fruits and vegetables group followed a pronounced seasonal pattern from a low in September and October to a peak in June and July, throughout the entire six-year period (Figure 3). The B. L. S. index was above the panel index in every 4-week period except in January, February

Fig. 3. Comparison of the changes in retail prices of fruits and vegetables between M.S.U. Consumer Panel for Lansing, Michigan and B.L.S. for U.S. city average



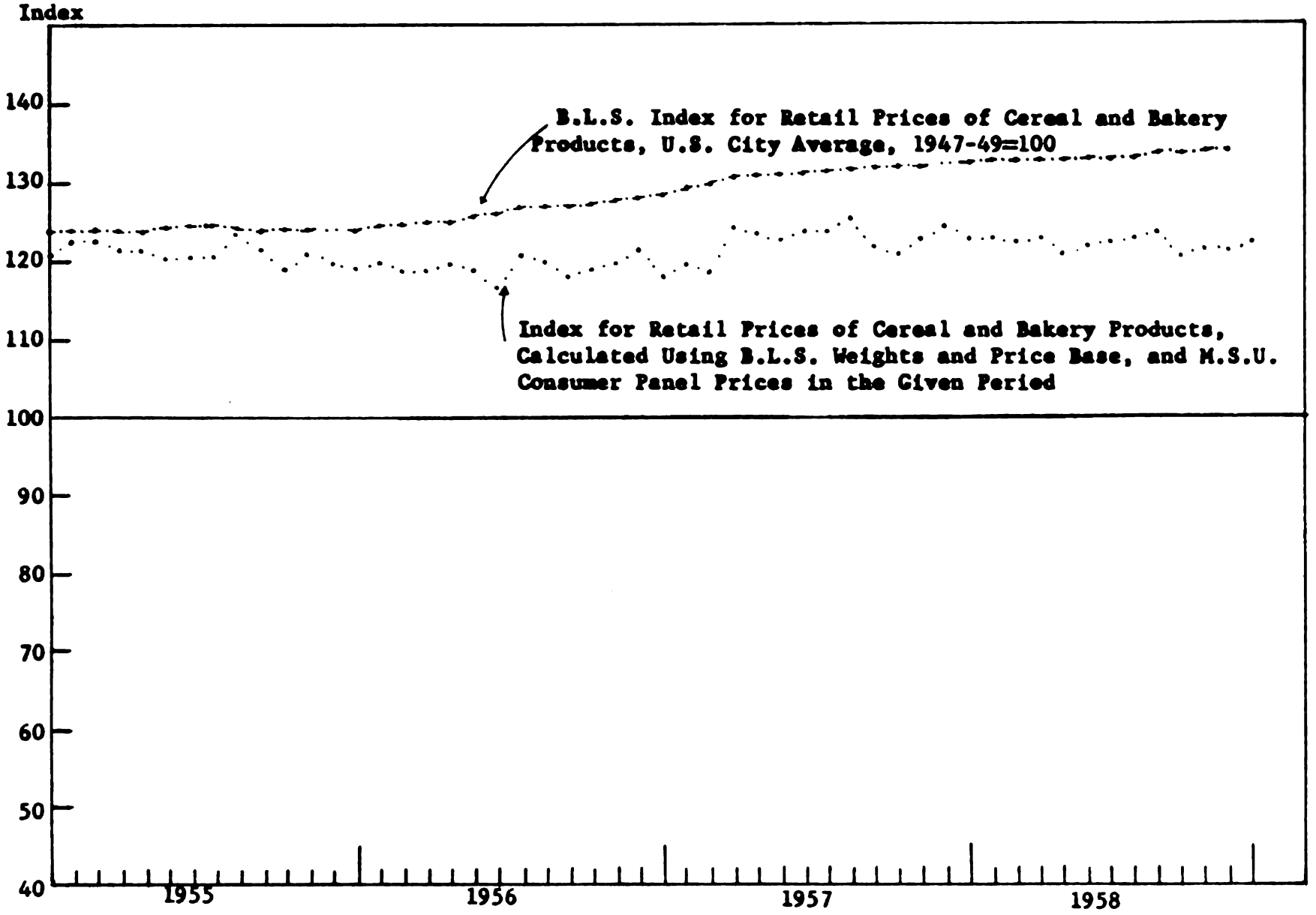
1957 and June, July 1958, over the six-year period. The mean of the panel average prices was 5.9 percent below the B. L. S. mean. Comparing the annual average indexes, the B. L. S. series was from 3.8 to 9.7 points higher than the panel series, i. e., the B. L. S. average price was from 3.1 to 9.3 percent higher than the panel average price (Figure 7).

The two indexes conformed more closely at seasonal peak periods than at their troughs, i. e., the panel price fell further when these products were in season. The B. L. S. index fell off only moderately in season, mainly because the average prices were collected from 46 cities throughout the country, and these cities covered different climates and consumption patterns.

The indexes, both B. L. S. and panel, for cereal and bakery products were comparatively stable during the four-year period except for the more irregular intra-year fluctuations in the panel series (Figure 4). These slightly irregular fluctuations were probably due to changes in qualities of some items which were purchased by the panel families from week to week.

Because of the nature of the products in this group, neither series showed a pronounced seasonal variation. The two indexes did not follow each other very closely except that both had a slightly upward trend over the four-year period. The greater increase in the B. L. S. index was mainly due to the rising price of bread in the B. L. S. series compared with the panel series.

Fig. 4. Comparison of the changes in retail prices of cereal and bakery products between M.S.U. Consumer Panel for Lansing, Michigan and B.L.S. for U.S. city average

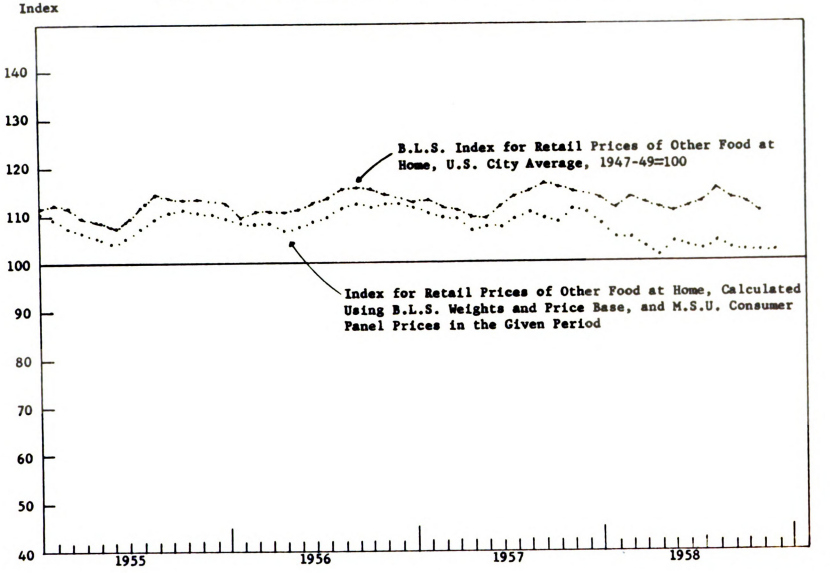


The B. L. S. index was higher than the panel index in every 4-week period. Over the four-year period, the mean of the panel average prices was 5. 9 percent below the B. L. S. mean. The B. L. S. index was from 2. 8 to 11. 2 points higher than the panel index. This indicates that the B. L. S. average price was from 2. 3 to 9. 2 percent higher than the panel average price. In comparing the annual average indexes, the B. L. S. index ranged from . 9 to 13. 7 points higher than the panel index, i. e., the B. L. S. annual average price was from . 7 to 11. 4 percent higher than the panel annual average price.

From the appearance of Figure 5, it is quite clear that both the B. L. S. and the panel indexes in the "other food at home group" followed a similar pattern. The difference between the two indexes became greater during 1957 and 1958. This difference was due to a successive increase in the prices of eggs, sugar and sweets in the B. L. S. series relative to the slightly lower prices of the same products in the panel series during this period.

The seasonal price movement apparently resulted from the seasonal variation of egg prices. Both indexes were lowest in the spring and summer, during the months of high egg production, and highest in the winter, during the months of low egg production. Comparison of the two indexes indicates that the B. L. S. index varied from . 6 to 10. 9 points on a monthly basis, and 2. 9 to 9. 4 points on the annual average basis. According to the average price, the B. L. S. series was from . 5 to 10. 4 percent higher than the panel series on

Fig. 5. Comparison of the changes in retail prices of other food at home between M.S.U. Consumer Panel for Lansing, Michigan and B.L.S. for U.S. city average



the monthly basis, and 2.6 to 9.4 percent on the annual average basis. In comparing the two means, over the four-year period, the panel series was 4.2 percent below the B.L.S. series.

As indicated in Figure 6, the panel index for "all food at home" moved almost parallel to the B.L.S. index. The price movements were rather stable and only a slightly upward trend was shown from January, 1955 to December, 1958. The B.L.S. index was above the panel index in every 4-week period over the four years. Among the time periods, the B.L.S. index was from 5 to 11.6 points higher than the panel index on a monthly basis, and 6.8 to 10.3 points on the annual average. The indexes indicate that the B.L.S. average price was from 4.9 to 10.7 percent higher than the panel average price on the monthly basis, and 6.5 to 9.5 percent on the annual average basis (Figure 7). Over the four-year period, the mean of panel average prices was 7.8 below the B.L.S. mean.

In summary, it appears that the changes in prices of the panel series relative to the prices in the B.L.S. series for the U.S. city average and Detroit (see Chapter IV) varied by groups of products. This is mainly due to the fact that the price change rate of each food item in the panel series was not exactly the same as it was in the B.L.S. series. If the price of each item changed at the same rate in both series, the two price series would move parallel to each other all the time.

The comparison between the two series shows that the

Fig. 6. Comparison of the changes in retail prices of all food at home between M.S.U. Consumer Panel for Lansing, Michigan and B.L.S. for U.S. city average

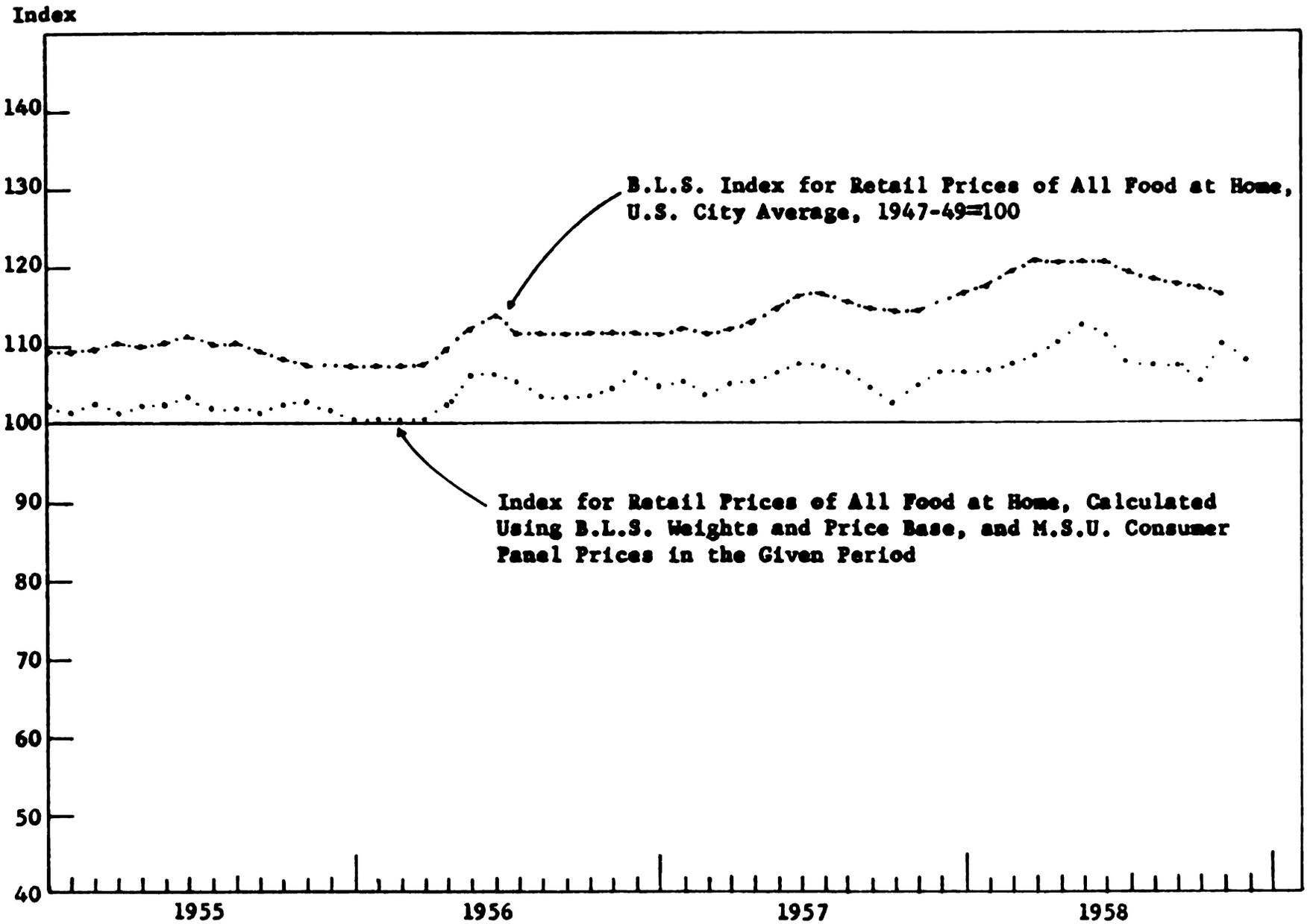
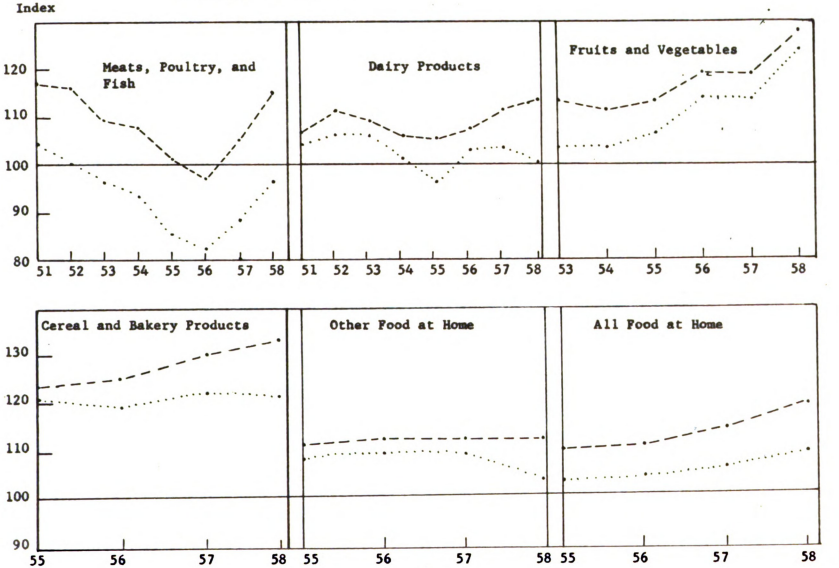


Fig. 7. Comparison of the annual averages of the changes in retail prices of food groups between M.S.U. Consumer Panel for Lansing, Michigan and B.L.S. for U.S. city average
..... 13-period averages of the indexes for the specified food groups, calculated using B.L.S. weights and price base, and M.S.U. Consumer Panel prices in the given period
---- 12-month averages of B.L.S. indexes for the specified food groups, U.S. city average, 1947-49=100



B. L. S. quoted prices from the specified products were usually higher than the panel prices. This is mainly due to the fact that the B. L. S. specified qualities were usually above those qualities actually purchased by the bulk of consumers. Moreover, some of the panel families might buy some cheaper food items in the farmers' market or other sources. Nevertheless, the parallel price movement provides quite satisfactory results in comparing the two series, even though there are some differences of qualities between the two samples.

The Relationships between the Two Price Series

It has been noted in the preceding paragraphs that the price series of the B. L. S. and the M. S. U. Consumer Panel moved up and down together over time. However, the differences between the two series are widely divergent as shown in the accompanying graphs. The variations between the two series may not be exactly correlated with each other if they are based on each observation from one period to another, even though they have similar patterns of price movement. Thus, it would be of practical value to measure the interrelationship between two price series as measured by the coefficient of correlation, i. e., to measure of the closeness between two series in which the prices were originally expressed, either by an individual product or an average of a group of products.

The correlation and regression coefficients between the two series using original prices. --The actual prices of the two groups,

"cereal and bakery products," and "meats," were used. The reasons for choosing these two groups is that the prices of cereal and bakery products did not follow the B. L. S. movement very closely, while meats followed each other very closely, as shown in the graphs. These two groups of products represented the extremes, and, therefore, were selected for correction analysis. The estimating equation was:

$$y = a + bx$$

where x = prices of B. L. S. products for the U. S. city average

y = prices of the M. S. U. Consumer Panel products

A series of simple correlation coefficients "r" and regression coefficients "b" were calculated along with the "t_b values," and standard error of correlation coefficients "σ_r," which are summarized in the following tables.

It has been shown that the two price series, for cereal and bakery products, did not move very closely with each other (Figure 4). Because of the nature of the products in this group, the correlations between the two series were not as highly significant as they were in other groups. As they are shown in Table 1, only four of the nine products were found to be significantly correlated with each other in price movement between the two series.

When dealing with the meats, there is obviously a high correlation between the two series, for each product in the group (Table 2). Their correlation coefficients are consistent with what is

TABLE 1. --Summary of regression and correlation results for cereal and bakery products, using B. L. S. prices for U. S. city average and M. S. U. Consumer Panel prices, 1955 to 1958

Products	r	σ_r	b	t_b value	Level of significance (r)**	Level of significance (t_b)**
Rice	-.08	.14	.68	1.42	n. s. *	n. s. *
Rolled oats	.67	.11	.71	2.61	1%	5%
Corn flakes	.85	.08	1.39	3.14	1	1
Flour, wheat	.14	.14	-.06	16.87	n. s.	1
Biscuit mix	-.01	.14	.05	1.53	n. s.	n. s.
Corn meal	.04	.14	-.08	3.88	n. s.	1
Bread	.47	.12	.22	13.13	1	1
Soda crackers	.52	.12	.30	10.00	1	1
Vanilla cookies	.03	.14	.09	2.14	n. s.	5

*Not significant at 5% level with 50 degrees of freedom.

**George W. Snedecor, Statistical Methods (Iowa State College Press: Ames, Iowa, 4th ed., 1946), Table 3.8, value of t, page 65, and Table 7.3, test of null hypothesis, $\rho = 0$, page 149.

The significance of the regression coefficient is tested by the calculation of t from

$$t_i = \frac{b_i - 1}{s_{b_i}}$$

where t_i is the t value of ith regression coefficient being tested s_{b_i} is the standard error of b_i.

shown in their price patterns as they move up and down together over time (Figure 1).

The regression coefficients indicate that the changes in magnitudes in the prices of B. L. S. series were associated with the changes in the prices of the panel series. When applying regression analysis to market statistics for the purpose of making estimates of

TABLE 2.--Summary of regression and correlation results for meats, using B. L. S. prices for U. S. city average and M. S. U. Consumer Panel prices, 1955 to 1958

Products*	r	σ_r	b	t_b value	Level of significance (r)**	Level of significance (b)**
Round steak	.95	.03	.89	3.54	1%	1%
Chuck roast	.93	.04	.88	5.99	1	1
Rib roast	.91	.04	1.11	2.11	1	5
Hamburger	.95	.03	.97	1.01	1	n. s.
Veal cutlet	.71	.07	.63	5.84	1	1
Pork chops	.83	.06	.88	7.07	1	1
Bacon	.96	.03	.86	5.78	1	1
Ham	.76	.07	.89	4.81	1	1
Frankfurters	.95	.03	.93	2.17	1	5
Lamb, leg	.47	.09	.82	1.13	1	n. s.
Lunch meat	.92	.04	1.30	4.74	1	1

*With 99 degrees of freedom.

**Snedecor, op. cit.

TABLE 3.--Comparison between the mean of Panel prices and the mean of B. L. S. prices for U. S. city averages**

Products*	B. L. S.	Panel	Products	B. L. S.	Panel
Rice	17.67	26.54	Corn meal	12.78	11.72
Rolled oats	20.18	15.21	Bread	18.46	18.12
Corn flakes	23.18	31.06	Soda crackers	28.20	28.71
Flour, wheat	10.80	9.34	Vanilla cookies	55.43	43.38
Biscuit mix	26.92	17.76	Round steak	97.11	80.22(1)
Chuck roast	57.98	63.09	Ham	65.10	62.67
Rib roast	75.50	63.09(2)	Frankfurter	58.37	55.50
Hamburger	47.50	47.64	Bacon	70.86	58.37
Veal cutlet	118.28	74.02	Lamb, leg	73.86	68.81
Pork chops	82.83	73.78	Lunch meat	46.67	57.30

*The eight-year mean of meat prices, and the four-year mean of the prices of cereal and bakery products.

**M. S. U. Consumer Panel and the B. L. S. Monthly Labor Review.

1All steak.

2All roast.

two price changes, the question arises whether or not the variables dealt with should be removed of their trends before the regression analysis is commenced. We note that if a trend is present in the price movement this may dominate the short-term fluctuations. Trends may give rise to spurious regression. However, if the trends were removed before the analysis, this would throw away some of the statistical information that is available on the relationships studied.

Trends are the long run variation of the variable considered, whereas the short-term variations are the frequencies of fluctuations. The short-term fluctuations include cycles, seasonals, and irregular variations. Hence, if we work on trend-removed data, the resulting regression coefficients should be regarded rather as reflecting short-term changes. With regard to the regression coefficients based on data with trends included, these appear to reflect something intermediate between short-term and long-term fluctuations. Since our primary interest was to compare the amplitude of price fluctuations between the B. L. S. and panel series rather than the frequencies of price changes from period to period, the trends were not removed before estimating the price changes of the two series.

If there is a trend, the effect of the trend tends to bias the regression coefficients "b" toward 1. The greater frequencies of fluctuations will bias "b" downward. The regression coefficients may either be biased by the trends or by the frequency of fluctuations.

As shown in Figures 1 through 7 (also Figures 8-14 in

Chapter IV), there was not any food group showing a clear trend except the "cereal and bakery products" group which showed a slightly upward trend in the B. L. S. series. It has been noted that there were greater frequencies of fluctuation in the panel series. Therefore, the regression coefficients may be biased by the greater frequency of fluctuations in the panel. The smaller "b" coefficient in the "cereal and bakery products" group was possibly biased by the slightly upward trend in B. L. S. series and greater frequency of fluctuations in the panel series.

The least squares regression of the panel series on the B. L. S. series (for the U. S. city average), using the actual prices, produced a series of regression coefficients "b" (see Tables 1 and 2). In the tests of the regression coefficient of each food item in the "cereal and bakery products" group, all the items in this group were significantly different from 1 except rice and biscuit mix, which were not significantly different from 1 at the 5 percent level. Among these items, only the prices of corn flakes in the panel changed wider than in the B. L. S. series. The negative regression coefficients show that the prices of wheat flour and corn meal between the B. L. S. and panel series changed in the opposite directions. This indicated that the panel prices went up while the B. L. S. prices went down and the panel prices went down while the B. L. S. prices went up. This was due possibly to the effect of the greater frequency of the price fluctuations in the panel series. The B. L. S. prices increased while the panel

prices fluctuated up and down from one period to another.

When dealing with the "meats" group, the regression coefficients of the items were all significantly different from 1 except hamburger and lamb. Among these meat items, only the prices of rib roast and lunch meat in the panel series fluctuated wider than in the B. L. S. series. The panel prices for other meat items fluctuated less than B. L. S. series. (See Table 2.)

In comparing the average prices between the two series, the means of the B. L. S. prices are not all higher than the panel means. The high prices of rice in the panel were due possibly to errors in reporting of purchases by the panel families. The higher panel for corn flakes were due mainly to the fact that the B. L. S. series on corn flakes was based on the prices of the large size packages but the purchases of corn flakes by the panel families were in both large and small packages. The panel purchases were not adjusted to exclude the effect of the greater cost per ounce of corn flakes in small packages. However, most of the B. L. S. products which are highly weighted in the index have higher means of prices than those in the panel series. Since the price index is computed according to the weight of each product in the group, the B. L. S. indexes are always higher than the panel series (Figures 1-7).

The correlation and regression coefficients between the two series using their index.--The correlation coefficients were calculated by using indexes for each group between the two series. The

estimating equation was:

$$y = a + bx$$

where x = index of B. L. S. groups of products for U. S. city average,

y = index calculated by using B. L. S. weights and price base but M. S. U. Consumer Panel prices in the given periods.

The results of the regression analysis are summarized in Table 4.

TABLE 4. --Summary of regression and correlation results for groups of products, using the index for U. S. city average and the index calculated with the B. L. S. weights and base, and M. S. U. Consumer Panel prices in the given periods

Products*	r	σ_r	b	t_b value	Level of significance (r)**	(b)**
Meats, poultry and fish	.95	.03	.95	1.57	1%	n. s.
Dairy products	.43	.09	.50	4.76	1	1%
Fruits and vegetables	.91	.05	1.25	3.89	1	1
Cereal & bakery products	.48	.12	.24	12.37	1	1
Other food at home	.48	.12	.74	1.36	1	n. s.
All food at home	.91	.06	.66	7.71	1	1

*Meats, poultry and fish and dairy products are tested with 99 degrees of freedom, fruits and vegetables with 76 degrees of freedom, and the other groups all with 50 degrees of freedom.

**Snedecor, op. cit.

The correlation coefficients between the two price series, as measured by the index of each group, are all highly significant. When measuring with the original prices of cereal and bakery products, the correlation coefficients are not all significant in terms of each individual product (Table 1). The high correlation coefficients, as measured by using the indexes, are mainly due to the significant products with higher weights in both indexes such as bread and soda crackers.

The apparent relationship between B. L. S. series and panel series can be explained by the results of regression analysis as well as the graphs. Obviously, the groups of products move closely with each other between the two series when their correlation coefficients are highly significant.

The least squares regression of the panel series on the B. L. S. series (for the U. S. city average), using the index of each food group, produced a series of regression coefficients "b," as shown in Table 4. The tests of regression coefficients of each food group indicate that the "dairy products" group, "fruits and vegetables" group, "cereal and bakery products" group, and "all food at home" group were significantly different from 1 at the 1 percent level. The "meats, poultry and fish" group and the "other food at home" group were not significantly different from 1 at the 5 percent level. Among these food groups, the prices of the "fruits and vegetables" group in the panel series changed more widely than in the B. L. S. series. The

prices of other groups changed less in the panel series than in the B. L. S. series.

As shown in Figure 3, the panel prices of the "fruits and vegetables" group changed more widely than the B. L. S. prices. The panel prices of the "fruits and vegetables" group went up further when they were out-of-season, and fell further when they were in season. The "b" coefficient of this group calculated by using the indexes of the panel series and the B. L. S. series was 1.25. This indicated that a 1 point change in the prices of "fruits and vegetables" group in the B. L. S. series was associated with a change in the same direction of 1.25 points in the prices of "fruits and vegetables" group in the panel series. This result was consistently related to the comparison of the price movements between the B. L. S. and panel series as shown in the graph. (See the analysis of Figure 3.)

The regression coefficient of the dairy products group was .50. This indicated that a 1 point change in the prices of "dairy products" group in the B. L. S. series was associated with a change in the same direction of .5 points in the panel series. As shown in Figure 2, the amplitudes of the price changes in the B. L. S. series were greater than the panel series. The panel prices of the "dairy products" group changed more frequently from period to period. This resulted mainly from the qualities of the dairy products purchased by the panel families from one period to another.

When dealing with the "cereal and bakery products" group,

the regression coefficient was .24, which was significantly different from 1 at the 5 percent level. This indicated that a 1 point change in the "cereal and bakery products" group in the B. L. S. series was associated with a change in the same direction of .24 points in prices of "cereal and bakery products" group in the panel series. As shown in Figure 4, the panel prices of "cereal and bakery products" group showed little changes over the four-year period except some short-term irregular variations. However, the B. L. S. prices of the "cereal and bakery products" group showed a rather clear upward trend from 1955 to 1958. The irregular variations in the panel series were probably due to the changes in qualities of the food items in this group which were purchased by the panel families from week to week. For the comparisons of "cereal and bakery products" groups between the B. L. S. and panel series, see the analysis of Figure 4.

The regression coefficient, calculated by using the indexes of "all food at home" groups of the B. L. S. series and the panel series, was .66. This indicated that a 1 point change in the prices of "all food at home" group in the B. L. S. series was associated with a change in the same direction of .66 points in the prices of "all food at home" group in the panel series. As shown in Figure 6, the B. L. S. prices of the "all food at home" group changed with greater amplitudes than the panel series. This was due primarily to the fact that the panel had smaller amplitudes of the price changes than the B. L. S. series in each food group except the "fruits and vegetables" group. The wider

changes of the "fruits and vegetables" group in the panel less than offset the smaller changes of prices in each of other food groups.

When dealing with the "meats, poultry and fish" group, the regression coefficient was .95. This indicated that a 1 point change in the prices of "meats, poultry and fish" group in the B. L. S. series was associated with a change in the same direction of .95 points in the prices of the "meats, poultry and fish" group in the panel series. As shown in Figure 1, the price changes of the "meats, poultry and fish" group in the B. L. S. and panel series were about the same. If the changes of the two price series were in the same proportion, the regression coefficient would be equal to 1. The regression coefficient would not be significantly different from 1 at any level. In this case, if we know the price changes in the panel we also know the price changes in the B. L. S. series. This relationship can be applied to each food group as well as to each food item.

As shown in Figure 5, the prices of the "other food at home" group in the panel series and the B. L. S. series moved up and down together very closely. However, there were no appreciable differences of the price fluctuations between the two price series, as indicated by the movements of the two indexes in the graph. This relationship between the panel and B. L. S. series (for U. S. city average) produced a regression coefficient .74, which was not significantly different from 1. The regression coefficient indicated that a 1 point change in the prices of "other food at home" group in the B. L. S. series was

associated with a change in the same direction of .74 point in the prices of "other food at home" group in the panel series.

CHAPTER IV

COMPARISONS BETWEEN THE M. S. U. CONSUMER PANEL SERIES AND THE B. L. S. SERIES FOR DETROIT

The Changes in Prices between the Two Series

Because the indexes, one based on B. L. S. data and the other on panel data, are calculated by using different price bases, a comparison shows only how much prices have changed in Detroit compared with Lansing from one period to another. After the B. L. S. indexes are converted from 1947-49 = 100 to 1955-57 = 100, comparisons do not show absolute differences in price levels, since the average 1955-57 prices in Detroit were not exactly the same as in Lansing. Nevertheless, comparisons of the two indexes can be facilitated by this conversion since they are measured from the same period of time as a base.

An examination of Figures 8 to 14 and 1 to 7, respectively, shows that the B. L. S. index of each group of products for Detroit appears very similar to its index for the U. S. city average. It is also noted that the panel index calculated by using B. L. S. weights for Detroit (Figures 8 to 14) appears very similar to the panel index calculated by using B. L. S. weights for U. S. city average (Figures 1 to 7). The changes of the two price series between the B. L. S. for Detroit and the panel for Lansing are the same as the B. L. S. for the U. S. city average and panel for Lansing, which have already been

presented in Chapter III. The following figures, 8 to 14, are the graphic presentations of each group of products between the two series. In addition to the comparisons of the price movements which have already been stated in Chapter III, a brief analysis of each group, accompanying its graphic presentation, is concerned with the main differences between the two series.

Apparently, the long-time trends of the B. L. S. index and the panel index in the "meats, poultry and fish" group followed each other fairly closely. Both series followed a downward trend in the first four years and an upward trend in the last four years. However, the price fluctuation in the panel series was less in degree than the B. L. S. series for Detroit. Over the first four years, the panel price was relatively stable.

Figure 8 indicates that the B. L. S. series for Detroit experienced relatively greater price declines during the period from the latter part of 1952 to the end of 1954. This mainly reflected the fact that the meat price in the B. L. S. series for Detroit dropped further when meat prices were decreasing and went up only moderately when they were increasing. In comparing the annual average prices, the B. L. S. series for Detroit was 17. 4 percent higher in 1953 and 9. 0 percent higher in 1954 than the 1955-57 average, while the panel series was 13. 5 percent higher in 1953 and 12. 5 percent higher in 1954 than the 1955-57 average. The annual average prices in other years were about the same in both series (Figure 14). It should be noted

Fig. 8. Comparison of the changes in retail prices of meats, poultry, and fish between M.S.U. Consumer Panel for Lansing, Michigan and B.L.S. for Detroit, Michigan

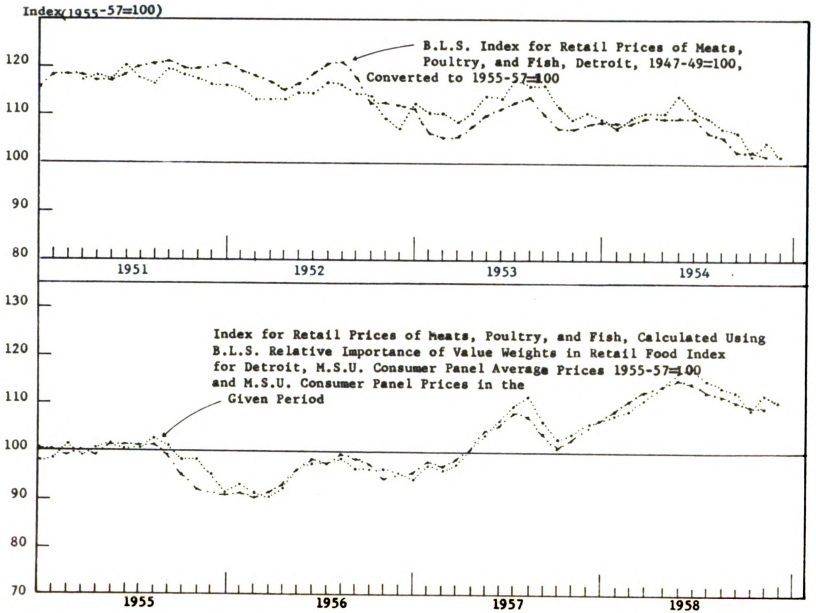
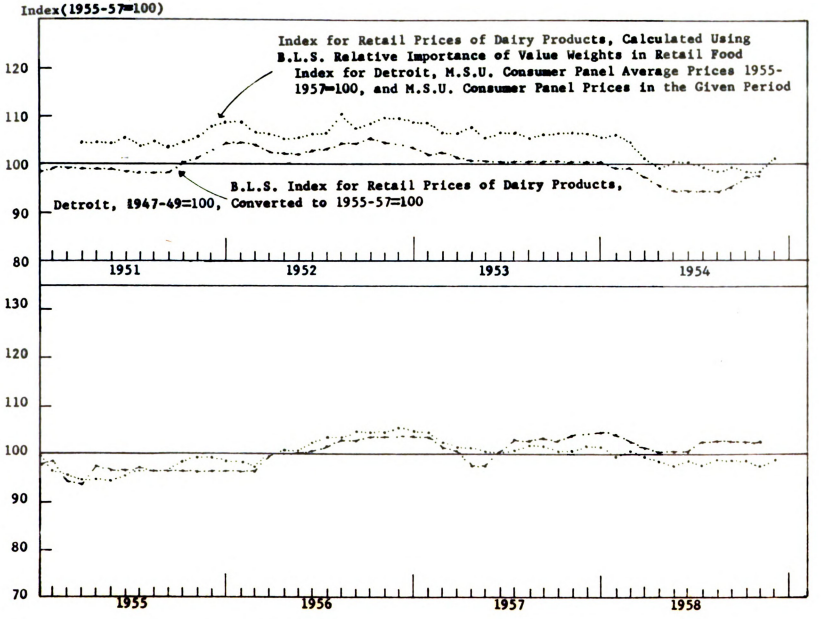


Fig. 9. Comparison of the changes in retail prices of dairy products between M.S.U. Consumer Panel for Lansing, Michigan and B.L.S. for Detroit, Michigan



that despite the wider fluctuations of Detroit prices, the B. L. S. series for the U. S. city average (Figure 1) fluctuated less in degree than both the panel series and the B. L. S. series for Detroit. This moderate fluctuation resulted chiefly because Detroit was averaged in with 45 other cities.

It is evident from the foregoing presentation (Figures 1-7) that dairy product prices are more stable than the prices of most other agricultural products. Figure 9 shows that the eight-year trend of both the B. L. S. series and the panel series in dairy products has been stable and that they followed each other fairly closely. During the period 1951-1954, the panel index moved above the B. L. S. index for Detroit. This difference is mainly due to the fact that the 1955-57 average price of the B. L. S. series for Detroit was higher than the panel 1955-57 average price for Lansing. After the conversion, the B. L. S. indexes became lower when their base prices were higher.

From the latter part of 1957 to the end of 1958, the B. L. S. index for Detroit moved above the panel series. This corresponded with the same period in Figure 2, in which the B. L. S. series for the U. S. city average diverged widely from the panel series. On the annual average, the B. L. S. index varied from a low of 99. 3 to a high of 103. 3, compared with the panel series which varied from 101. 2 to 107. 7 in the first four-year period; and then in the last four years the B. L. S. index varied from 96. 6 to 102. 2, while the panel series varied from 96. 6 to 101. 7 (Figure 14).

It is evident from Figures 9 and 14 that from the latter part of 1957 the panel index declined slightly as the B. L. S. index continued to rise. This was the same result as was indicated in Figure 2, i. e., that there was a slight decrease in prices of fresh milk and ice cream in the panel series relative to an increase in prices of the same products in the B. L. S. series for Detroit.

The indexes of the B. L. S. and panel series in the fruit and vegetable group moved closely with each other during both the seasonal peaks and troughs. As shown in Figure 10, the panel series rose further when fresh fruits and vegetables were out of season and fell further when they were in season. That is, the B. L. S. series for Detroit fluctuated less in degree than the panel series. As shown in Figures 10 and 3, it is evident that the four indexes moved very closely with each other. It has been noted in Figure 3 that the mean of panel average prices was 5. 9 percent below the B. L. S. mean of average prices for the U. S. Since the B. L. S. prices for Detroit were about the same level as for the U. S., the difference between Figures 10 and 3 occurred chiefly because the B. L. S. 1955-57 average price for Detroit was higher than the panel average price in the same period.

On the annual average, the B. L. S. index varied from a low of 91. 4 to a high of 102. 3, compared with the panel movement from 92. 3 to 103. 7. As shown in Figure 14, the B. L. S. annual average indexes rose steadily from 1953 to 1958, and the panel series had a slight decline in price during 1957, after three years of successive

increases, and then went up again in 1958.

The prices of cereal and bakery products remained relatively stable largely as a result of two circumstances. In general, (1) the products in this group were less seasonal in nature, and (2) their demand and supply were relatively stable. As shown in Figure 11, the panel index experienced greater intra-year fluctuations than the B. L. S. index. These fluctuations were mainly due to the fact that panel families purchased different varieties of products from week to week. The B. L. S. series moved above the panel series from the latter part of 1957. This difference corresponded with the same period in Figure 4, in which the B. L. S. series for the U. S. city average showed an increasing divergence from the panel series. On the annual average, the B. L. S. indexes varied from a low of 98. 8 to a high of 103. 7 compared with a variation from 99. 4 to 101. 1 in the panel series. As shown in Figure 14, the panel annual average prices of 1957 and 1958 were about the same as the average prices of 1955-57. However, the B. L. S. annual average prices for Detroit in 1957 and 1958 were about three percent above the 1955-57 average price.

The price movements of both the B. L. S. and the panel series "other food at home" group are shown in Figure 12. If this chart is compared with Figure 5, it will be observed that the four different indexes moved very closely with each other. From the latter part of 1957, the panel index declined more sharply than the B. L. S. index for Detroit. This was the same result as was seen in Figure 5, chiefly

Fig. 10. Comparison of the changes in retail prices of fruits and vegetables between M.S.U. Consumer Panep for Lansing, Michigan and B.L.S. for Detroit, Michigan

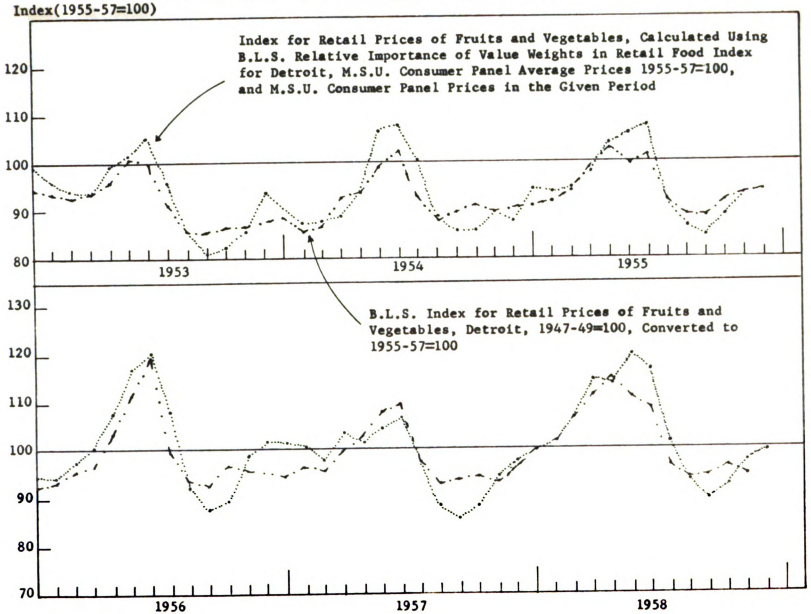


Fig. 11. Comparison of the changes in retail prices of cereal and bakery products between M.S.U. Consumer Panel for Lansing, Michigan and B.L.S. for Detroit, Michigan

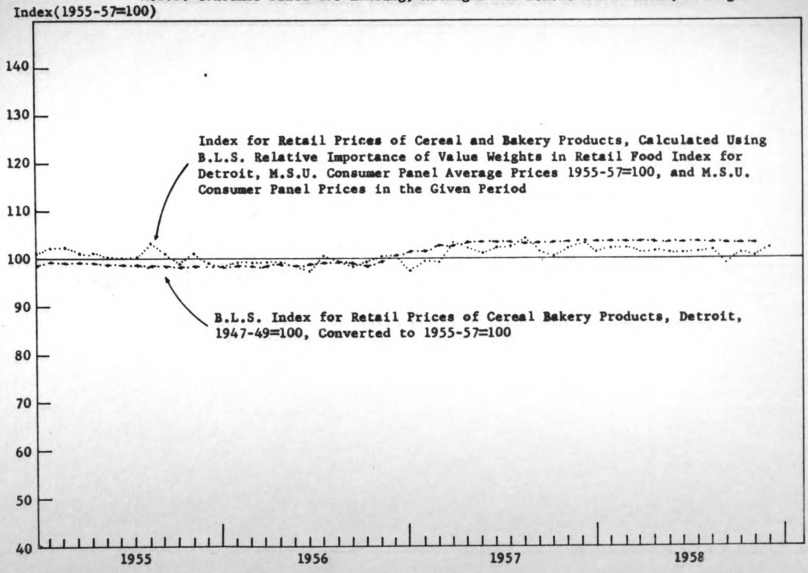
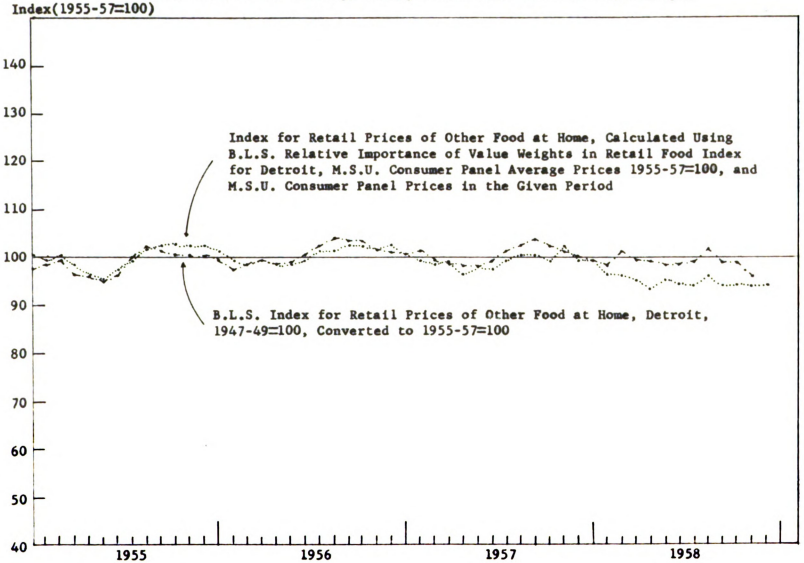


Fig. 12. Comparison of the changes in retail prices of other food at home between M.S.U. Consumer Panel for Lansing, Michigan and B.L.S. for Detroit, Michigan



because the panel prices in eggs, and sugar and sweets were lower than the B. L. S. series of the same products. On the annual average, the B. L. S. index varied from a low of 98. 7 to a high of 100. 6, compared with a variation from 95. 5 to 100. 5 in the panel series.

Figure 13 indicates that the panel index in the "all food at home" group fell much lower than the B. L. S. series from 1957 to 1958. This difference resulted mainly from the fact that the prices of most of the products in the panel series increased at a relatively small rate in comparison with the B. L. S. series. The panel index moved above the B. L. S. index from the beginning of 1955 to the middle part of 1956 and then dropped below it from the latter part of 1956 to the end of 1958 (Figure 13).

In comparing Figures 13 and 6, it is evident that the lower prices of 1957 and 1958 in the panel series corresponded with the higher prices of 1957 and 1958 in the B. L. S. series for Detroit as well as for the U. S. city average. An examination of the B. L. S. index for Detroit and the index for the U. S. city average indicates that these two indexes were about the same throughout the entire period. Since the B. L. S. prices were higher than the panel prices (Figures 1-7) and the B. L. S. prices for Detroit were about the same as for the U. S., it is quite obvious that the B. L. S. prices for Detroit were also higher than the panel series. As shown in Figure 13, the lower level of the B. L. S. series was mainly the result of its higher price base compared with the panel series. On the annual average, the B. L. S. index varied from a

low of 96.9 to a high of 103.4 compared with a variation from 97.6 to 100.2 in the panel series.

In summary, comparisons between the panel series for Lansing and the B. L. S. series for Detroit were very similar to the comparisons between the panel series for Lansing and the B. L. S. series for the U. S. city average. The magnitude of the price fluctuations might have been somewhat different, but the patterns of movement were about the same. The conversion of the index to the 1955-57 base only shifts the level of the index. Nevertheless, the percentage change from one period to another remained the same.

The Relationships between the Two Price Series

The correlation and regression coefficients between the two series using original prices. --Only cereal and bakery products and meats were calculated by using original prices between the two series. The estimating equation was:

$$y = a + bx$$

where x = prices of B. L. S. products for Detroit

and y = prices of M. S. U. Consumer Panel products.

A series of simple correlation coefficients "r" were calculated along with their regression coefficients "b," "t_b values," and standard error of correlation coefficients "σ_r," which are summarized in the following tables. The correlation coefficients in Tables 5 and 6

Fig. 13. Comparison of the changes in retail prices of all food at home between M.S.U. Consumer Panel for Lansing, Michigan and B.L.S. for Detroit, Michigan

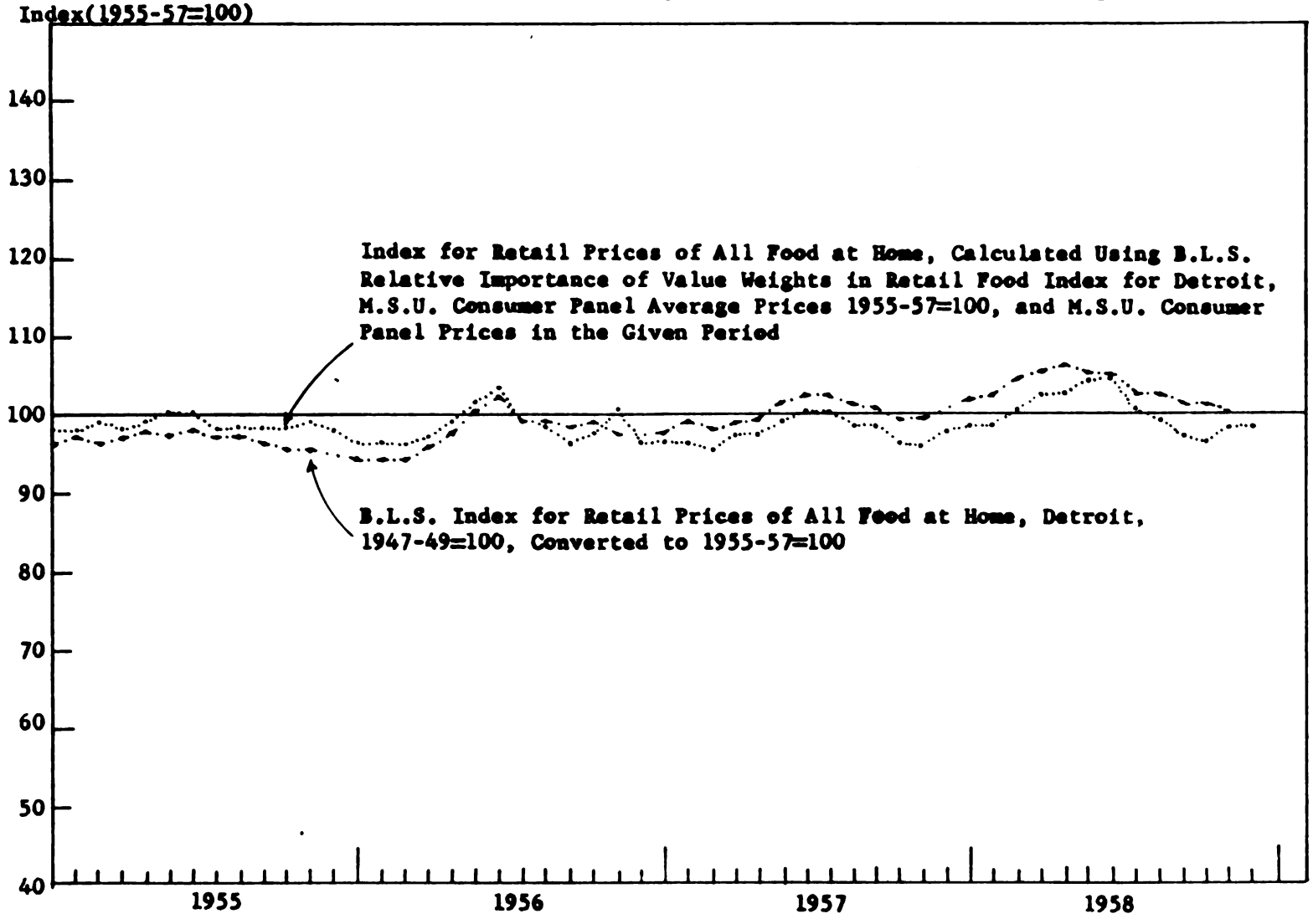
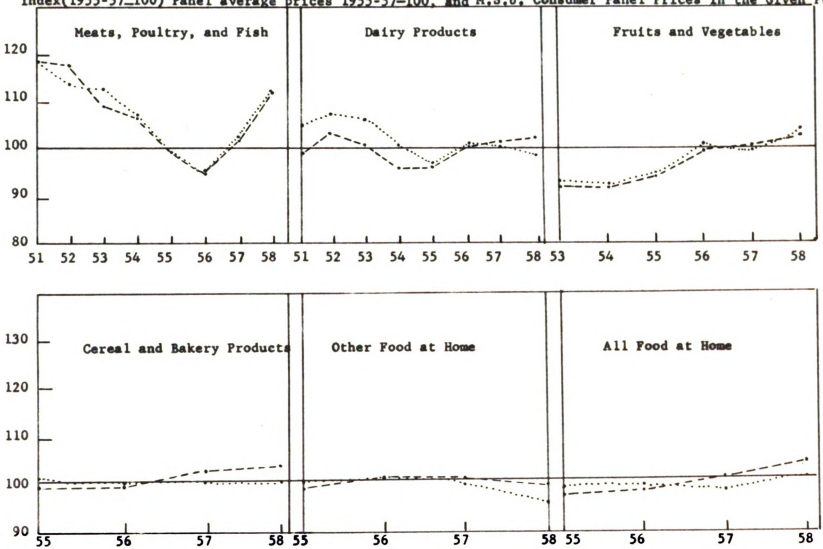


Fig. 14. Comparison of the annual averages of the changes in retail prices of food groups between M.S.U. Consumer Panel for Lansing, Michigan and B.L.S. for Detroit, Michigan
12-month averages of B.L.S. indexes for specified food groups, Detroit, 1947-47=100,
---- converted to 1955-57=100
..... 13-period averages of the indexes for specified food groups, calculated using B.L.S. relative importance of value weights in retail food index for Detroit, M.S.U. Consumer Panel average prices 1955-57=100, and M.S.U. Consumer Panel Prices in the Given Period



show that the relationship between the panel prices for Lansing and the B. L. S. prices for Detroit was about the same as the relationship between the panel prices for Lansing and the B. L. S. prices for the U. S. city average (Tables 1 and 2).

The least squares regression of the panel series on the B. L. S. series (for Detroit), using the actual prices, produced a series of regression coefficients "b" as shown in Tables 5 and 6. In the tests of the regression coefficients of the food items in the "cereal and bakery products" group, the items of corn flakes, wheat flour, bread, soda crackers, and vanilla cookies were significantly different from 1 at the 1 percent level. The items of rice, rolled oats, biscuit mix, and corn meal were not significantly different from 1 at the 5 percent level. Among these items, only the prices of corn flakes in the panel changed wider than in the B. L. S. series. The prices of other food items in this group changed less than the B. L. S. series during the four-year period. The relationships between the panel and the B. L. S. for Detroit were thus similar to the relationships between the panel and the B. L. S. for U. S. city average (see Table 1, Chapter III).

When dealing with the "meats" subgroup, the regression coefficients of the items were all significantly different from 1 except hamburger, veal cutlet, and lamb. Among the meat items, the prices of rib roast, ham, lamb, and lunch meat changed more widely in the panel series than the B. L. S. series. The regression coefficient of lamb was not significantly different from 1. The prices of other meat

TABLE 5. --Summary of regression and correlation results for cereal and bakery products using the B. L. S prices for Detroit and M. S. U Consumer Panel prices, 1955 to 1958

Products	r	σ_r	b	t_b value	Level of significance (r)**	Level of significance (t_b)**
Rice	.06	.14	-.52	1.26	n. s. *	n. s. *
Rolled oats	.57	.11	.73	1.83	1%	n. s.
Corn flakes	.84	.08	1.41	3.24	1	1%
Flour, wheat	.10	.14	.04	18.49	n. s.	1
Biscuit mix	.09	.14	.43	.84	n. s.	n. s.
Corn meal	.14	.14	.84	.18	n. s.	n. s.
Bread	.56	.12	.36	8.49	1	1
Soda crackers	.49	.12	.34	7.84	1	1
Vanilla cookies	.23	.14	.21	6.35	n. s.	1

*Not significant at 5% level with 50 degrees of freedom.

**Snedecor, op. cit.

TABLE 6. --Summary of regression and correlation results for meats, using B. L. S. prices for Detroit and M. S. U. Consumer Panel prices, 1955 to 1958

Products*	r	σ_r	b	t_b value	Level of significance (r)**	Level of significance (b)**
Round steak	.91	.05	.88	2.59	1%	5%
Chuck roast	.91	.04	.74	7.53	1	1
Rib roast	.94	.03	1.14	3.32	1	1
Hamburger	.94	.03	.94	1.72	1	n. s.
Veal cutlet	.68	.07	.98	.15	1	n. s.
Pork chops	.83	.06	.67	7.24	1	1
Bacon	.96	.03	.89	4.39	1	1
Ham	.64	.08	1.44	2.51	1	5
Frankfurters	.94	.03	.86	4.63	1	1
Lamb, leg	.50	.09	1.09	.49	1	n. s.
Lunch meat	.92	.05	1.34	5.15	1	1

*With 99 degrees of freedom.

**Snedecor, op. cit.

TABLE 7. --Comparison between the mean of panel prices and the mean of the B. L. S. prices for Detroit

Products*	B. L. S.	Panel	Products	B. L. S.	Panel
Rice	17.52	26.54	Corn meal	12.63	11.72
Rolled oats	20.22	15.21	Bread	17.62	18.12
Corn flakes	23.39	31.06	Soda crackers	28.56	28.71
Flour, wheat	10.04	9.34	Vanilla cookies	56.84	43.38
Biscuit mix	27.96	17.76	Round steak	94.73	80.22(1)
Chuck roast	58.71	63.09	Ham	67.47	62.67
Rib roast	76.59	63.09(2)	Frankfurters	55.52	55.50
Hamburger	47.88	47.64	Bacon	71.17	58.37
Veal cutlet	115.29	74.02	Lamb, leg	76.59	68.81
Pork chops	87.78	73.78	Lunch meat	48.42	57.30

*The eight-year mean of meat prices, and four-year mean of the prices of cereal and bakery products.

**M. S. U. Consumer Panel and the B. L. S. Monthly Labor Review.

[1]All steak

[2]All roast.

TABLE 8. --Summary of regression and correlation results for the groups of products using the B. L. S. index for Detroit and index calculated with B. L. S. relative importance of value weights for Detroit, and M. S. U. Consumer Panel prices in the given periods and 1955-57 average prices as base.

Products*	r	σ_r	b	t_b value	Level of significance (r)**	(b)**
Meats, poultry and fish	.95	.03	.91	3.19	1%	1%
Dairy products	.60	.08	.82	1.64	1	n. s.
Fruits and vegetables	.91	.05	1.15	2.46	1	5
Cereal & bakery products	.49	.12	.32	8.43	1	1
Other food at home	.60	.11	.76	1.42	1	n. s.
All food at home	.91	.06	.76	3.71	1	1

*Meats, poultry and fish and dairy products are tested with 99 degrees of freedom, fruits and vegetables with 76 degrees of freedom, and all the other groups with 50 degrees of freedom.

**Snedecor, cp. cit.

items in the panel fluctuated in less amplitude than the B. L. S. series. Among these items, the regression coefficients of ham and veal cutlet were .94 and .98 respectively, which were all not significantly different from 1 (Table 6).

In comparing the means of panel series with the means of B. L. S. series for Detroit, it appears that the same pattern occurred as was revealed in the B. L. S. series for the U. S. city average. That is, when the panel means were lower (or higher) than the means of B. L. S. series for Detroit, the panel means were also lower (or higher) than the means of B. L. S. series for the U. S. city average.

The correlation and regression coefficients between the two series using their index. --The correlation coefficients were calculated by using indexes for each group between the two series. The estimating equation was:

$$y = a + bx$$

where y = index calculated by using the B. L. S. "relative importance of value weights" for Detroit, the M. S. U. Consumer Panel prices in the given periods, and the M. S. U. Consumer Panel average 1955-57 prices as base,

and x = index of B. L. S. groups of products for Detroit.

The results of the regression analysis summarized in Table 8 indicate that the correlation coefficients between the two price series, as measured by their indexes of each group, are all highly significant. In comparing Table 8 and Table 4, it shows that the

correlations between the panel index and the B. L. S. index for Detroit were higher than those between the panel index and the B. L. S. index for the U. S. city average. This result was mainly due to the fact that, on the average, the panel prices moved more closely with the B. L. S. prices for Detroit than with those for the U. S. city average.

The least squares regression of the panel series on the B. L. S. series (for Detroit), using the index of each food group, produced a series of regression coefficients "b," as shown in Table 8. The regression coefficients of the food groups show the relationship of the magnitude in the price changes between the panel and the B. L. S. series (for Detroit) over a period of time. According to the regression coefficients in Tables 4 and 8, the relationships of the price changes between the panel and the B. L. S. for Detroit were similar to the relationships between the panel and the B. L. S. for U. S. city average. Among the food groups, only the panel prices of "fruits and vegetables" group changed more widely than the B. L. S. series. The prices of the food groups other than the "fruits and vegetables" group changed less in the panel series than the B. L. S. series for Detroit. As shown in Figure 10, the amplitudes of the price fluctuations in the panel series were greater than in the B. L. S. series for Detroit. When the prices of the "fruits and vegetables" group increased, the panel series went up further. When the prices of the "fruits and vegetables" group dropped, the panel series fell off further. This relationship corresponded with the regression coefficient of this group. The

regression coefficient of this group of the panel on the B. L. S. for Detroit was 1.15, which was significantly different from 1. This indicated that a 1 point change in the prices of the "fruits and vegetables" group in the B. L. S. series for Detroit was associated with a change in the same direction of 1.15 points in the prices of the "fruits and vegetables" group in the panel series.

The regression coefficient of the "dairy products" group was .82, which was not significantly different from 1. This indicated that the panel prices of the "dairy products" group changed in the similar proportions with the prices of the "dairy products" group in the B. L. S. series for Detroit. As shown in Figure 9, the amplitudes of the price changes between the panel series and the B. L. S. series for Detroit were about the same over the eight-year period.

When dealing with the "cereal and bakery products" group, the regression coefficient was .32, which was significantly different from 1. Figure 11 showed a similar relationship between the panel series and the B. L. S. series for Detroit as they were in the regression analysis. The panel prices of the "cereal and bakery products" group fluctuated with greater frequency but with smaller amplitude.

As shown in Figure 12, the magnitudes of the panel price changes in the "other food at home" group were about the same as the B. L. S. for Detroit in the "other food at home" group. The regression coefficient of this group was .76, which was not significantly different from 1.

The regression coefficient for the "meat, poultry and fish" group of the panel series on the B. L. S. series for Detroit was .91. In the test of the significance of the regression coefficient, the "meat, poultry and fish" group was significantly different from 1. This shows that the relationships of the magnitude of price changes between the panel and B. L. S. for Detroit were less close than the relationship between the panel and the B. L. S. for the U. S. city average. As shown in Figure 8, the amplitudes of the panel price change were about the same as the B. L. S. for Detroit in the "meats, poultry and fish" group. But the panel series in the "meats, poultry and fish" group changed with greater frequency of fluctuations than the B. L. S. series for Detroit. These frequencies of fluctuation might bias the regression coefficient downward.

The regression coefficient of the panel on the B. L. S. for Detroit in the "all food at home" group was .76, which was significantly different from 1. This indicated that the panel prices fluctuated with an amplitude more close to the B. L. S. for Detroit than the B. L. S. for U. S. city average. (For a comparison of the price movement and the "b" coefficient, see Chapter III, Figure 6 and Table 4 and Chapter IV, Figure 13 and Table 8.

In comparing the regression coefficients of the "all food at home" group in Tables 4 and 8, a 1 point change in the prices of the "all food at home" group in the B. L. S. for Detroit was associated with a change of .76 points in the "all food at home" group in the panel,

while a 1 point change in the prices of the "all food at home" group in the B. L. S. for U. S. city average was associated with only a change of .66 points in the "all food at home" in the panel. As shown in Figure 13, the B. L. S. price series for Detroit in the "all food at home" group fluctuated with greater amplitude than the panel price series. The panel price series fluctuated more frequently but with smaller amplitude than the B. L. S. price series for Detroit. This relationship between the panel and the B. L. S. for Detroit was similar to the relationship between the panel and the B. L. S. for U. S. city average.

CHAPTER V

THE EXPENDITURE PATTERNS OF THE M. S. U. CONSUMER PANEL FAMILIES COMPARED WITH THE EXPENDITURE PATTERNS OF THE OTHER SAMPLE FAMILIES

Food consumption can be measured in terms of various characteristics such as dietary needs, family income, or the expenditure distribution among many types of food. The latter method is the one used in this study to examine the food-expenditure patterns based on what the purchaser buys at the markets. The purpose of examining the food-expenditure patterns is twofold: (1) to determine the distribution of the panel family expenditures on major groups of food and the distribution of expenditures within and among a number of subgroups, in order to establish the expenditure weight of each item in the M. S. U. Consumer Panel retail price index; and (2) to analyze the expenditure distribution among food items purchased by the panel families, in order to compare their expenditures with those of the sample families in the food price indexes prepared by other organizations.

How the Panel Families Distributed Their Expenditures among the Various Food Items

The actual distribution of the 1955-57 expenditures among the various food items. --The complete records of kinds, qualities, and amount of food that the panel families bought, from 1955 to 1957, with the amount spent on each item, were averaged together to form the

basis for the index weights. The methods of calculating the index weights and the relative importance of each period have been described in Chapter II. The relative importance of each food item, of each food subgroup, and of each major food group is shown in Table 9 (at the end of this chapter) for the base period of the average 1955-57 and for the 13th period of each year from 1955 to 1958. In the table, the relative importance of the base period (1955-57 average) was the percentage distribution of the average food expenditures in the years 1955 to 1957. This percentage distribution of food expenditures (1955-57 average) formed the "value weight" of each item in the index.

The results of the 1955-57 expenditure analysis show that the panel families spent 30.66 percent of their total food expenditures on the "meats, poultry and fish" group; 20.34 percent on the "other food at home" group; 20.03 percent on the "dairy products" group; 16.93 percent on the "fruits and vegetables" group; and 12.03 percent on the "cereal and bakery products" group. Within the "meats, poultry and fish" group, the expenditure for the meat subgroup is about seven times as much as for the poultry subgroup, and four times as much as for the fish subgroup. This also indicates that the expenditure for the meat subgroup (22.05 percent of the total food) is even larger than the expenditures for any other major group. For the "other food at home" group, the subgroups are sugar and sweets, cooking oils, condiments and sauces, partially prepared foods, beverages, fats and oils, eggs, and miscellaneous foods. The distribution of the expenditures

within this major group was as follows: About 50 percent was spent on beverages, sugar and sweets; about 35 percent was spent on eggs, fats and oils; and there was only about 15 percent spent on the other four subgroups. For the "dairy products" group, the expenditure for fresh milk is about 55 percent of the expenditures for all dairy products, while the expenditure for butter and cheese was 28 percent, and for creams 14 percent. The remaining 3 percent was distributed to other kinds of milk. Within the "fruits and vegetables" group, the panel families spent about the same amount of money for fresh fruits as for fresh vegetables. The expenditure on each of these two subgroups is about 26 percent of the expenditures for all fruits and vegetables. The expenditure for canned fruits is about the same as for canned vegetables. These two subgroups combine an expenditure of about 30 percent of all "fruits and vegetables" expenditures. The remaining 18 percent was distributed to frozen fruits, frozen vegetables, and dried fruits and vegetables. The expenditure for frozen vegetables is the smallest of these subgroup expenditures. It is less than 4 percent of the expenditure for the "fruits and vegetables" group. For the "cereal and bakery products" group, the expenditure for the bakery subgroup is about three times that for the cereal subgroup.

Changes in relative importance over time. --The relative importance of each item in the periods other than the base-period was calculated in order to compare the changes in the relative importance of each item due to changes in prices from time to time, as exemplified

at the end of Chapter II. These relative importance figures do not represent the actual distribution of expenditures on foods of that period since changes in price relationships also affect the quantities and qualities of foods bought by families. Even though this distribution of food expenditures does not change rapidly from time to time, the sums of these small shifts in expenditures represent a large amount of total foods purchased by all the families in Lansing.

Changes in relative importance of the food items in the index result from the different rates of price change among the various items. If the prices of all items changed at the same rate, their importance in the index would not change. The relative importance figures in Table 9 for the 13th period of each year, from 1955 to 1958, are useful in analyzing the effect of the changes in prices of each group and each item on the all-item food price index, as calculated for each period in the panel. Comparison of the relative importance of the 13th period in each year shows how the changes in prices in each group and each item affected the total food price index over a period of time.

The use of relative importance to analyze the effect of each item and each group on the total food index showed the following: The prices of cereal and bakery products were about the same in the 13th period of each year over the four-year period. The changes in the all-item food price indexes during these periods (the 13th period of each year) were not primarily caused by the price changes in cereal and bakery products. Comparison of the indexes in the 13th

periods between 1955 and 1956 shows that the higher total food price index of the 13th period of 1956 (101.1 in 1956 compared with 99.6 in 1955) was mainly due to the increased prices in all kinds of dairy products except ice cream. As shown in the table, the relative importance figures of the major groups of "cereal and bakery products," "meats, poultry and fish," and "other foods at home" in the 13th period of 1956 were lower than a year earlier. The relative importance of the "dairy products" group was 20.74 percent of the total food in the 13th period of 1956 compared with 19.85 percent a year earlier. Among the dairy products, the sharply higher prices for fresh milk were mainly responsible for the increase. Comparison of the indexes of the 13th periods between 1956 and 1957 shows that the increase in the total food price index in 1957 (103.1 in 1957 compared with 101.1 in 1956) resulted primarily from the increased prices of all kinds of meats. The relative importance of "meats, poultry and fish" group was 31.63 percent of the total food in the 13th period of 1957 compared with 29.59 percent of a year earlier. The relative importance figures of the major groups other than the "meats, poultry and fish" group were lower in the 13th period of 1957 than a year earlier. Within the "meats, poultry and fish" group, the relative importance figures of the "poultry" and "fish" subgroups in the 13th period of 1957 were even lower than a year earlier. Comparison of the relative importance for the "meats" subgroup between the 13th period of 1956 and the 13th period of 1957 shows that the sharply increased prices of all kinds of

meats were primarily responsible for this two points increase in the total food price index. The total food price index of the 13th period in 1958 was one point below a year earlier (102.1 in 1958 compared with 103.1 in 1957). Comparison of the relative importance figures of the 13th periods between 1957 and 1958 shows that sharply lower prices for all kinds of dairy products in 1958, accompanied by decreased prices of beverages, eggs, fats and oils in the "other foods at home" group, were primarily responsible for the lower index than a year earlier.

The relative importances can be calculated for any period of the "all-item food price index," the "major group index," and the "subgroup index." By the procedures described in Chapter II, the relative importances can be determined for any period from the base-period, and the group indexes can be combined to construct the all-item food price index. Therefore, the relative importance figures can also be used to facilitate the changing of index weights and the linking of indexes from one period to another. For the description of the method of using the relative importance figures for linking, see Chapter II, the linking procedure.

Comparisons of the Expenditure Patterns between the Sample Families of M.S.U. Consumer Panel, B.L.S., N.I.C.B., and A.M.S.

The four different samples of families, M.S.U. Consumer Panel for Lansing, B.L.S. for the U.S. city average, N.I.C.B. for

Lansing, and A. M. S. for U. S., were used in order to compare the differences between various expenditure patterns. The A. M. S. sample was used primarily for comparison of expenditure patterns between farmers' families and city workers' families. Since the B. L. S. "relative importance figures" for Detroit have not been published, and since they are confidential, they have been omitted from the following table.

The relative importance of the food items in the total food expenditures, in each of the four different samples, cannot be compared item by item because the food items used in each sample are neither exactly the same quality nor exactly equal in number. Thus, comparisons of the relative importances between the different samples can only be compared group by group. In Table 9, the percentage figures representing the relative importances of major groups to the total food expenditures are doubly underlined while the subgroups are singly underlined. The relative importance figures, other than for the base-periods, do not represent the actual expenditure distribution of the sample families. They are listed in order to facilitate comparison of changes in their importance over time relative to total food expenditures, from the base-period to other periods, due to changes in prices.

Comparisons of the expenditure distributions (the value weights of the index), between the different samples, for each group, are made only for the base-periods. These base-periods, as shown in

Table 9, are 1955-57 for the M. S. U. Consumer Panel, December, 1952 for the B. L. S. for the U. S. city average, 1953 for the N. I. C. B. for Lansing, and 1955 for the A. M. S. for the United States. The relative importance figures of the "cereal and bakery products" groups, between the different samples in the base-periods, are presented in the beginning of Table 9. These figures indicate that the relative importance of the "cereal and bakery products" group in the base-period for the M. S. U. Consumer Panel families, was the same as it was in the base-period for the B. L. S. sample families, .6 percent (percent of the total food) lower than it was in the base-period for the N. I. C. B. sample families, and 10 percent lower than it was in the base-period for the A. M. S. sample families. The high percentage for the A. M. S. sample families was due to the fact that the "meats, poultry and fish" group and the "dairy products" group was lower for the A. M. S. sample families than for other sample families.

Comparisons of the "meats, poultry and fish" groups, between the different samples, shows that the relative importance of this major group in the base-period of the M. S. U. Consumer Panel families was .1 percent (percent of the total food) lower than it was in the base-period of the B. L. S. sample families, .7 percent lower than in the base-period of the N. I. C. B. sample families, and 6.4 percent higher than for the A. M. S. sample families. For the "dairy products" groups, the relative importance of this major group in the base-period for the M. S. U. Consumer Panel families was 3.6 percent

(percent of the total food) higher than it was for the B. L. S. sample families, 1. 8 percent higher than it was for the N. I. C. B. sample families, and 4. 8 percent higher than it was for the A. M. S. sample families.

Comparison of the "fruits and vegetables" groups, between the different samples in the base-periods, indicates that the relative importance of this major group for the M. S. U. Consumer Panel families was 1. 1 percent, . 3 percent, . 9 percent (percent of the total food) lower than it was for the B. L. S., N. I. C. B., and A. M. S. sample families, respectively. The slightly lower "relative importance" to the total food in this major group for the M. S. U. Consumer Panel families was primarily due to the high percentage of expenditures in the "dairy products" group compared with other samples of families. The relative importance of the "other foods at home" group in the base-period for the M. S. U. Consumer Panel families was 2. 46 percent (percent of the total food) lower than it was for the B. L. S. sample families, . 12 percent lower than it was for the N. I. C. B. sample families, and . 3 percent lower than it was for the A. M. S. sample families.

In summary, the relative importance (the value weights of the index) of each major group for the M. S. U. Consumer Panel families was essentially the same as it was for the B. L. S. and N. I. C. B. sample families except that the B. L. S. sample was lower for the "dairy products" group and higher for the "other foods at home"

group. The relative importance of the "dairy products" group in the base period (1955-57) for the M. S. U. Consumer Panel families was higher than it was in the base-period (December, 1952) for the B. L. S. sample families. And for the "other foods at home" group, the relative importance for the M. S. U. Consumer Panel families in the base-period was lower than it was in the base-period for the B. L. S. sample families. The differences between the two samples of families could have been affected by several factors such as: income, prices, eating habits, and the relative availability of products of different kinds and qualities, etc. Comparison of the prices and the quantities consumed, of these two groups, between the 1952 annual average and the three years average of 1955-57, shows the following results: The prices for the "dairy products" group were lower in 1955-57 than in 1952, and the prices for the "other foods at home" group were higher in 1955-57 than in 1952.[1] The quantities of "dairy products" consumed were higher in 1955-57 than in 1952. And for most of the important items (items with high weight in the index) such as eggs, coffee, tea and cocoa, etc., in the "other foods at home" group, the quantities consumed were lower in 1955-57 than in 1952.[2] The above results

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[1] Bureau of Labor Statistics, U. S. Department of Labor, Monthly Labor Review, Vol. 76, No. 6 (June, 1953), p. 692; and Vol. 81, No. 3 (March, 1958), p. 355.

[2] Agricultural Marketing Service, U. S. Department of Agriculture, Consumption and Utilization of Agricultural Products, Vol. 5, pp. 65-68.

indicate that the differences between these two groups were primarily due to a shift in quantities consumed from the "other foods at home" group to the "dairy products" group, in the period 1952 to 1955-57. The shift from 1952 to 1955-57 in amount of expenditures due to quantities consumed, as described above, was affected by factors, such as income, and eating habits, etc., rather than by prices. The relative importance (in the 1953 expenditure patterns), for the N. I. C. B. families, in the "meat, poultry and fish" group, the "cereal and bakery products" group, the "fruits and vegetables" group, and "the other foods at home" group was about the same as it was for the panel sample families. But the relative importance of the "dairy products" group in the N. I. C. B. sample families was slightly lower than it was for the panel sample families. The Lansing expenditure patterns for the N. I. C. B. sample families were interpolated from the B. L. S. 1950 expenditure survey data for other cities. Presumably the reasons for the lower percentage of the "dairy products" group in the N. I. C. B. sample families were the same as these for the B. L. S. sample families--a slight shift in consumption to the "dairy products" group from the other groups during the period 1953 to 1955-57. Nevertheless, the N. I. C. B. expenditure patterns for Lansing sample families was closer to the panel sample families for Lansing than the B. L. S. sample families for the United States as a whole.

Comparison of the M. S. U. Consumer Panel sample families with the A. M. S. sample families indicates that the A. M. S. sample

families spent more of their food expenditures on "cereal and bakery products" group, and less on the "meats, poultry and fish" group and "dairy products" group, and about the same for the other groups of foods. The A. M. S. index is a measure of prices paid by farmers for family living. The farmers' spending patterns for foods differ from the city workers. The comparative level of incomes is one explanation. More of the food dollar of the low-income than that of the higher income families is customarily spent for bread and cereal foods. The share spent for meat differs from the city workers only slightly. Smaller shares are spent by the farmers for dairy products. Many farmers satisfy their own needs for some products by using home-produced food. These products would be reflected in lower purchases.

TABLE 9. [illegible] selected dates, M. S. U. Consumer Panel, Bureau of Labor Statistics, National Industrial Conference Board, and Agricultural Marketing Service

Group or item	Relative importance to total food at home (A. M. S. for U. S.) Distribution of 1955 actual expenditures	Relative importance to total food at home (M. S. U. Consumer Panel) 1955-57 average	13th period 1955	13th period 1956	13th period 1957	13th period 1958	Relative importance to total food at home (B. L. S. for U. S.) Dec. 1952	Dec. 1957	Relative importance to total food at home (N.I.C.B. for Lansing) 1953
ALL FOOD	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Cereal & bakery products	21.99	12.03	12.10	11.99	11.97	12.02	12.0	13.4	12.64
Cereals:	12.23	2.95	2.92	2.96	2.89	2.95	4.0	3.8	3.81
6001 Wheaties		.29	.27	.29	.31	.30			
6002 Corn flakes	1.61	.27	.27	.26	.27	.29	.4	.4	1.00
6005 Corn sugar frosted flakes		.25	.24	.25	.25	.26			
6016 Rolled oats		.29	.28	.30	.31	.32	.4	.4	
Oatmeal	.64								
6692 White flour	6.55	1.09	1.07	1.06	1.04	1.04	2.0	2.1	.99
6694 Corn meal	1.07	.04	.04	.04	.04	.04	*	*	.43
6611 White cake mix		.25	.26	.26	.21	.22			
Baking powder	1.29								
6911 Rice		.05	.05	.06	.06	.05	.4	.4	.21
6632 Biscuit mix		.14	.13	.14	.14	.14	.8	.4	.63
6711 Spaghetti or macaroni	1.07(1)	.28	.30	.30	.26	.28			.55(1)
Bakery products:	9.76	9.09	9.17	9.05	9.08	9.07	8.0	9.6	8.83
6101 Bread, white	8.69	5.19	5.20	5.07	5.16	5.09	5.6	6.7	5.32
6112 Diet bread		.79	.81	.79	.80	.81			

Relative importance

TABLE 9. --Continued

Group or item	Relative importance to total food at home (A. M. S. for U. S.)	Relative importance to total food at home (M. S. U. Consumer Panel)					Relative importance to total food at home (B. L. S. for U. S.)		Relative importance to total food at home (N.I.C.B. for Lansing)
	Distribution of 1955 actual expenditures	1955-57 average	13th period 1955	13th period 1956	13th period 1957	13th period 1958	Dec. 1952	Dec. 1957	1953
6211 Buns, hamburg		.54	.54	.54	.52	.54			
6280 Soda crackers	1.07	.70	.70	.70	.68	.69	.4	.8	.73
6410 Cookies-- plain, sugared		1.06	1.14	1.14	1.10	1.13	2.0(2)	2.1	.87
6423 Doughnuts, frosted, sugared		.40	.41	.40	.41	.40			1.50
6515 Cherry pies		.14	.14	.16	.13	.14			
6260 Coffe cake		.27	.23	.26	.27	.27			
Cake									.41
Meat, poultry & fish	24.34	30.66	30.21	29.59	31.63	32.99	30.8	28.6	31.40
Meat:	21.76	22.05	21.40	21.22	23.51	25.00	23.6	22.7	25.74
Beef	8.47	10.60	10.75	10.30	11.26	12.53	9.2	8.0	11.54
5130 Hamburger	2.68	3.21(4)	3.45	2.96	3.38	3.73	2.4	2.1	4.11
5160-64 All roast		3.26	3.16	3.33	3.50	4.02			
5170-73 All steak		4.13	4.13	4.00	4.38	4.78			
Round steak	5.79						3.6	3.0	3.42
Rib roast							.8	.8	1.29
Chuck roast							2.4	2.1	2.72
Pork	8.47	7.12	6.42	6.83	7.67	7.64	8.8	9.3	8.76
5330 Pork chops	1.39	1.42	1.20	1.39	1.45	1.39	2.8	3.4	1.93
5370 Pork roast		.88	.76	.79	.93	.96			2.32(6)
5340-46 Ham	2.25	2.65	2.50	2.58	2.98	2.94	2.8(5)	2.5	1.30
5311 Bacon	3.54(3)	1.54	1.39	1.46	1.64	1.62	3.2	3.4	1.56

TABLE 9. --Continued

Group or item	Relative importance to total food at home (A. M. S. for U. S.)	Relative importance to total food at home (M. S. U. Consumer Panel)					Relative importance to total food at home (B. L. S. for U. S.)		Relative importance to total food at home (N.I.C.B. for Lansing)
	Distribution of 1955 actual expenditures	1955-57 average	13th period 1955	13th period 1956	13th period 1957	13th period 1958	Dec. 1952	Dec. 1957	1953
5380-81 Sausage	1.29	.63	.57	.60	.67	.73			
Picnics									1.65
Other meats	4.82	3.62	3.62	3.43	3.81	4.11	4.0	3.7	3.80
5510 Wieners & frankfurters	1.82[7]	1.35	1.35	1.24	1.44	1.61	2.8[7]	2.9	1.35[7]
5511 Bologna	3.00	.94	.94	.89	1.03	1.11			2.45
5513 Other cold cuts		1.17	1.17	1.14	1.17	1.18			
5514 Prem, Spam, Treet		.16	.16	.16	.16	.21			
Canned luncheon meat							1.2	.8	.94
5420 Veal cutlets		.49	.42	.45	.49	.51	.8	.8	
5260 Lamb		.21	.20	.21	.27	.21	.8	.9	.70[8]
Poultry:		3.29	3.19	2.77	2.69	2.58	4.8	3.4	3.09
5611-3-1 Fryers & broilers		2.27	2.29	1.91	1.80	1.82	4.8[9]	3.4	2.32[9]
5612-3-1 Roasters		.22	.20	.20	.22	.19			
Stewing chicken									.77
5620-3-2 Turkey		.81	.70	.66	.67	.57			
Fish & sea foods:	2.58	5.33	5.62	5.61	5.43	5.40	2.4	2.5	2.57
5811-3 Tuna		3.53	3.88	3.78	3.58	3.50	.8	.8	.72
5814-2 Fish sticks		.32	.30	.33	.32	.29			
5813-2 Other fish		.89	.91	.85	.93	.99			
5820-1 Oysters		.24	.22	.27	.24	.22			
5840-2 Shrimp		.36	.31	.39	.36	.39			

TABLE 9. --Continued

Group or item	Relative importance to total food at home (A. M. S. for U. S.)	Relative importance to total food at home (M. S. U. Consumer Panel)					Relative importance to total food at home (B. L. S. for U. S.)		Relative importance to total food at home (N.I.C.B. for Lansing)
	Distribution of 1955 actual expenditures	1955-57 average	13th period 1955	13th period 1956	13th period 1957	13th period 1958	Dec. 1952	Dec. 1957	1953
Fresh fish									1.01
Quick frozen fish							1.2(10)	1.3	.26
Salmon, canned	2.58						.4	.4	.58
Dairy products	15.24	20.03	19.85	20.74	19.65	18.77	16.4	16.8	18.25
1110 Milk, fresh vit. D		8.80	8.68	9.38	8.73	8.25	4.8	5.0(11)	
1130 Milk, fresh, regular past.		2.16	2.07	2.30	2.17	2.13	5.2	5.4(12)	10.94(13)
1210 Milk (evaporated)	5.15	.42	.41	.42	.44	.44	1.2	1.3	.54
1310 Milk (powdered, skimmed)		.17	.18	.18	.16	.16			
1410 Coffee cream		.51	.49	.53	.52	.52			
1520 Ice cream, pre-packaged		2.27	2.34	2.14	1.95	1.75	1.2	1.3	1.28
1610 Cheese (natural American)		.98	.96	.96	.97	.97			
1620 Cheese (processed American)		.50	.52	.50	.48	.47	2.0	2.1	2.12
1820 Cottage cheese	2.90	1.25	1.25	1.25	1.21	1.19			
2110 Butter	2.79	2.97	2.94	3.07	3.01	2.89	2.0	1.7	3.37
Whole milk	4.40								
Fruits & vegetables	17.81	16.93	17.05	17.09	16.44	17.33	18.0	17.6	17.25
Fruits, fresh:	6.23	4.52	4.35	4.36	4.14	4.06	5.6	5.9	5.51
3150 Strawberries		.57	.62	.57	.57	.54	.4	*	
3210 Grapefruits		.59	.50	.57	.53	.52	.4	.4	
3220 Lemons		.16	.19	.17	.18	.18	.4	*	

TABLE 9. --Continued

Group or item	Relative importance to total food at home (A. M. S. for U. S.)	Relative importance to total food at home (M. S. U. Consumer Panel)					Relative importance to total food at home (B. L. S. for U. S.)		Relative importance to total food at home (N.I.C.B. for Lansing)
	Distribution of 1955 actual expenditures	1955-57 average	13th period 1955	13th period 1956	13th period 1957	13th period 1958	Dec. 1952	Dec. 1957	1953
3240 Oranges	3.65	.30	.31	.31	.28	.28	1.2	2.1	1.87
3310 Apples	.86	1.27	1.21	1.14	1.07	.96	1.2	1.3	1.02
3340 Bananas	1.72	.26	.24	.27	.19	.23	.8	.8	1.12
3380 Grapes		.29	.22	.28	.27	.28	.4	.4	
3411 Cantaloupe, muskmelon		.40	.36	.41	.32	.56			.56
3412 Watermelon		.26	.24	.27	.27	.19	.4	.4	
3340 Peaches		.43	.44	.39	.45	.32	.4	.4	.94
Vegetables, fresh:	7.51	4.40	4.25	4.52	4.53	4.50	5.6	5.0	5.26
4120 Cabbage	1.50	.20	.24	.16	.20	.17	*	*	.26
4130 Celery		.44	.42	.47	.43	.47	.4	.4	.55
4210 Lettuce	1.93	.91	.90	1.02	.87	.91	.8	.9	.99
4440 Beans, green		.05	.05	.05	.06	.05	.4	.4	.22
4470 Carrots		.31	.36	.32	.36	.33	.4	.4	.51
4480 Corn		.15	.14	.18	.16	.12			
4540 Peppers		.12	.12	.14	.14				
4560 Squash		.07	.05	.06	.06	.05			
4570 Sweet potatoes		.07	.06	.07	.08	.07	.4	*	
4720 Cauliflower		.08	.09	.09	.09	.09			
4731 Cucumbers		.16	.16	.19	.18	.17			
4811 Onions, mature		.26	.23	.20	.24	.27	.4	.4	.39
Onions, green		.08	.08	.08	.09	.08			
4871 Tomatoes	.75	.52	.52	.68	.67	.69	.8	.8	.62
4841 Potatoes, Mich.		.66	.53	.52	.61	.65			
4843 Potatoes, Idaho	3.33(14)	.21	.18	.20	.19	.17	2.0(14)	1.7	1.72(14)
4850 Radishes		.09	.10	.10	.11	.10			

TABLE 9. --Continued

Group or item	Relative importance to total food at home (A. M. S. for U. S.) Distribution of 1955 actual expenditures	Relative importance to total food at home (M. S. U. Consumer Panel) 1955-57 average	13th period 1955	13th period 1956	13th period 1957	13th period 1958	Relative importance to total food at home (B. L. S. for U. S.) Dec. 1952	Dec. 1957	Relative importance to total food at home (N.I.C.B. for Lansing) 1953
Canned fruits:		2.39	2.43	2.44	2.32	2.40	2.4	2.5	1.99
3311-3 Apples & applesauce		.25	.22	.27	.24	.22			
3435-3 Olives		.35	.34	.36	.35	.35			
3440 Peaches		.54	.55	.54	.47	.54	.8	.9	.66
3450-3 Pears		.30	.31	.31	.33	.31			
3450-9 Pears, baby food		.06	.06	.06	.06	.06			
3460-3 Pineapple		.54	.56	.56	.52	.57	.4	.4	
3591-3 Fruit cocktail		.35	.37	.35	.35	.35	.4	.4	
Orange juice		.	.	.	.	.	.8	.8	.72
Canned Vegetables:	4.07	2.56	2.69	2.64	2.60	2.63	2.4	2.5	2.75
4430-3 Lima beans		.07	.08	.07	.06	.07			
4440-3 Snap beans		.32	.35	.34	.32	.34			
4470-9 Carrots		.02	.02	.02	.02	.02			
4480-3 Corn	1.39	.33	.36	.34	.33	.35	.4	.4	.55
4530-3 Peas	1.50	.31	.32	.33	.33	.29	.8	.8	.67
4550-3 Pumpkin		.05	.05	.05	.05	.05			
4701-3 Beans, navy, baked, white		.23	.22	.21	.23	.24			
4703-3 Beans, kidney		.12	.12	.12	.12	.12			
4710 Beets		.09	.09	.10	.10	.10			
4732-3 Cucumber pickles		.33	.33	.36	.34	.35			
4781-3 Tomatoes		.16	.17	.17	.17	.18	.8	.9	.74
4872-3 Tomato catsup, paste		.38	.40	.39	.36	.38			
4873 Tomato juice		.16	.16	.15	.17	.15			

TABLE 9. --Continued

Group or item	Relative importance to total food at home (A. M. S. for U. S.) Distribution of 1955 actual expenditures	Relative importance to total food at home (M. S. U. Consumer Panel) 1955-57 average	13th period 1955	13th period 1956	13th period 1957	13th period 1958	Relative importance to total food at home (B. L. S. for U. S.) Dec. 1952	Dec. 1957	Relative importance to total food at home (N.I.C.B. for Lansing) 1953
Strained baby food							.4	.4	.79
Beans, navy	1.18								
Frozen fruits:		1.52	1.63	1.62	1.44	2.28	.4	.4	.83
3150-2 Strawberries		.28	.29	.30	.23	.23	*	*	.21
3248-2 Orange juice		1.24	1.34	1.32	1.21	2.05	.4	.4	.62
Frozen vegetables:		.56	.58	.55	.49	.50	.8	.4	.40
4440-2 Beans		.16	.16	.15	.16	.17	.4	*	.27
4530-2 Peas		.40	.42	.41	.34	.33	.4	.4	.13
Dried fruits & vegetables:	-----	.98	.97	.97	.93	.97	.8	.8	.50
3480-4 Prunes		.13	.13	.14	.13	.15	.4	.4	.39
3701-4 Dry beans		.10	.10	.09	.10	.10	.4	.4	.11
4867-4 Potato chips		.75	.73	.74	.71	.72			
Other foods at home:	20.60	20.34	20.79	20.63	20.21	18.89	22.8	23.5	20.46
Sugar & sweets:	6.65	2.78	2.84	2.83	2.79	2.91	3.6	3.4	3.97
7100 Sugar, white, powdered	3.76	2.11	2.17	2.14	2.12	2.17	1.6	1.7	1.72
7210 Corn syrup	1.50	.08	.08	.07	.09	.10	.4	.4	.43
7310 Fondant, mints, marshmallows		.26	.27	.28	.25	.28			
7350 Solid chocolate		.21	.21	.22	.19	.24	1.2	.8	1.00
Candy	1.39								

Relative importance to total food in home

Relative importance to total food in home

TABLE 9. --Continued

Group or item	Relative importance to total food at home (A. M. S. for U. S.)	Relative importance to total food at home (M. S. U. Consumer Panel)					Relative importance to total food at home (B. L. S. for U. S.)		Relative importance to total food at home (N.I.C.B. for Lansing)
	Distribution of 1955 actual expenditures	1955-57 average	13th period 1955	13th period 1956	13th period 1957	13th period 1958	Dec. 1952	Dec. 1957	1953
3380-5 Grape jelly		.12	.11	.12	.14	.11			.26
Gelatin dessert							.4	.4	
Cooking aids:		.62	.61	.53	.60	.62			.56
9321 Chocolate, baking		.33	.34	.31	.31	.34			
9340 Meat sauces		.10	.11	.07	.12	.12			
9350 Salt		.19	.16	.16	.17	.17			
Condiments & sauces:							1.2	1.3	
Sweet pickles							.8	.9	
Tomato catsup							.4	.4	
Partially prepared foods:		1.31	1.32	1.33	1.29	1.32	2.4	2.5	2.63
5580 Vegetable & meat soup		.20	.19	.21	.19	.20			1.53[15]
5581 Pizza pie mix		.30	.34	.33	.30	.29			
5693 Chicken soup		.33	.30	.32	.32	.34			
4874-5 Tomato soup		.25	.25	.25	.24	.23		1.7	
4991-5 Vegetable soup		.23	.23	.24	.24	.24	1.6		
Beans with pork							.8	.8	.66
Gerkins									.44
Beverages:	6.87	7.78	7.73	8.07	7.48	6.94	6.0	6.7	6.18
8110 Beer		2.06	2.01	2.04	2.11	2.04			
8420 Coffee	5.90	4.27	4.20	4.50	3.91	3.45	4.4	4.6	4.63
8430 Tea bags	.97	.30	.31	.33	.31	.32	.4	.4	.49
8610 Soft drinks (bottle)		1.16	1.21	1.22	1.14	1.13	1.2	1.7	1.06

TABLE 9. --Continued

Group or item	Relative importance to total food at home (A. M. S. for U. S.)	Relative importance to total food at home (M. S. U. Consumer Panel)					Relative importance to total food at home (B. L. S. for U. S.)		Relative importance to total food at home (N. I. C. B. for Lansing)
	Distribution of 1955 actual expenditures	1955-57 average	13th period 1955	13th period 1956	13th period 1957	13th period 1958	Dec. 1952	Dec. 1957	1953
Fats & oils:	5.58	3.61	3.55	3.74	3.53	3.42	3.6	3.8	3.35
2120 Oleomargarine	1.07	1.37	1.28	1.41	1.34	1.26	.8	.9	1.18
2140 Vegetable shortening	.86	.70	.66	.75	.69	.64	1.2	1.3	1.50
2210 Cooking oils		.17	.16	.17	.16	.16			
2220 Mayonnaise		.17	.15	.15	.16	.17			
2221 Salad dressing	1.50	.48	.52	.49	.49	.49	.8	.8	.57
7533 Peanut butter	.86	.63	.65	.64	.56	.59	.4	.4	
2130 Lard	1.29	.11	.11	.12	.13	.12	.4	.4	.10
Eggs:	1.50	3.81	4.31	3.71	4.06	3.22	5.6	5.5	4.33
Miscellaneous:		.44	.42	.42	.47	.47	.4	.4	
7415 Flavored gelatin		.26	.25	.26	.28	.28	.4	.4	
7420 Pudding or pie fillings		.18	.17	.17	.18	.19			

*Less than .05 percent in the all-items index including food.

[1]Macaroni only.

[2]Vanilla cookies.

[3]Bacon, sliced.

[4]From 1951 to 1955 included ground steak.

[5]Smoked ham.

[6]Loin roast.

[7]Frankfurters only.

[8]Lamb, and veal cutlet.

[9]Fryers only.

[10]Fresh and frozen fin fish.

[11]Milk, fresh, delivered.

[12]Milk, fresh, grocery.

[13]All fresh milk.

[14]Potatoes.

[15]Soup.

CHAPTER VI

THE M. S. U. CONSUMER PANEL RETAIL FOOD PRICE INDEX

The Usefulness of the M. S. U. Consumer Panel Retail Food Price Index

The index measures changes in prices of the foods bought by urban families in Lansing, Michigan. Since "price change" is one of the most important factors affecting the cost of foods over a short period of time, the M. S. U. Consumer Panel retail food price index provides a measurement of changes in the cost of foods purchased by Lansing urban families, from one period to another. In addition, since the index is designed specifically for measuring price change over time, it provides time-to-time comparisons in analyzing food prices.

The annual income, based on the three-year average (1955-57), for the M. S. U. Consumer Panel families was $5,452, and the average family includes 3.2 persons. Use of the index to measure price changes for families other than the Lansing urban families will be appropriate only to the degree of similarity in spending patterns to the Lansing urban families included in the index. Since Lansing is similar to many other cities in the United States, the index, derived for Lansing, can be used for measuring food costs in many urban areas.

Limitations of the Index

Limitations of measurement. --The M. S. U. Consumer Panel retail food price index is not an exact measurement. It is subject to the many kinds of limitations that are always in statistical calculations. One kind of limitation is "sampling errors." The degree of error introduced into the index through sampling depends primarily on the amount of variation in price change that exists within groups of items. To gain about the same degree of accuracy throughout the index, therefore, the number of price observations obtained for any item is conditioned by its price variability and its importance in the total index. For example, prices of fresh fruits and vegetables, which are important in the family food expenditure, change frequently and have different seasonal patterns in different items. So to measure the average change in price in all fruits and vegetables satisfactorily, a large number of them have been priced in the index. Another kind of "error" occurs in the index because housewives who give information cannot report exactly. Some probably report lower prices than they actually pay, some higher, so that these "errors of reports" may tend to cancel out. However, the expenditure data are compared and adjusted in order to keep the effect of these "errors" to a minimum. For a description of adjusting expenditures and prices, see Chapter II, Adjusting the Data.

Limitations in using the index. --The index is specifically designed to measure the average change in prices of foods bought by

Lansing urban families. The index represents all Lansing urban families, but not necessarily any one family, or small groups of families. The index "market basket" is held constant so that price change alone will be reflected by the index. Changes in the level of consumption are not measured. Also, to show changes in the total "cost of foods," the "market basket" (including quantities of foods purchased) would have to be reassessed at each period.

Analyses of Changes in Prices of Food Groups

The M. S. U. Consumer Panel retail food price index was calculated for all food at home for each food major group and subgroup. The indexes obtained are presented in Table 10, at the end of this chapter. The changes in prices of each food group from period to period are measured by each group index in the table. A graphic presentation of the index of each group is shown below. Each graph is followed by a brief description of changes in prices over a period of time.

All food at home. --The prices of "all food at home" increased slightly from 1955 to 1956 (Figure 15 and Table 10), reflecting mainly the rising prices for "dairy products," "fruits and vegetables," and "other foods at home." The index number for 1956 annual average of 100. 0 (base, 1955-57 = 100) indicates that the annual average price in 1956 was the same as it was in the average of the years 1955-57 (Figure 29 and Table 10). The percent change in

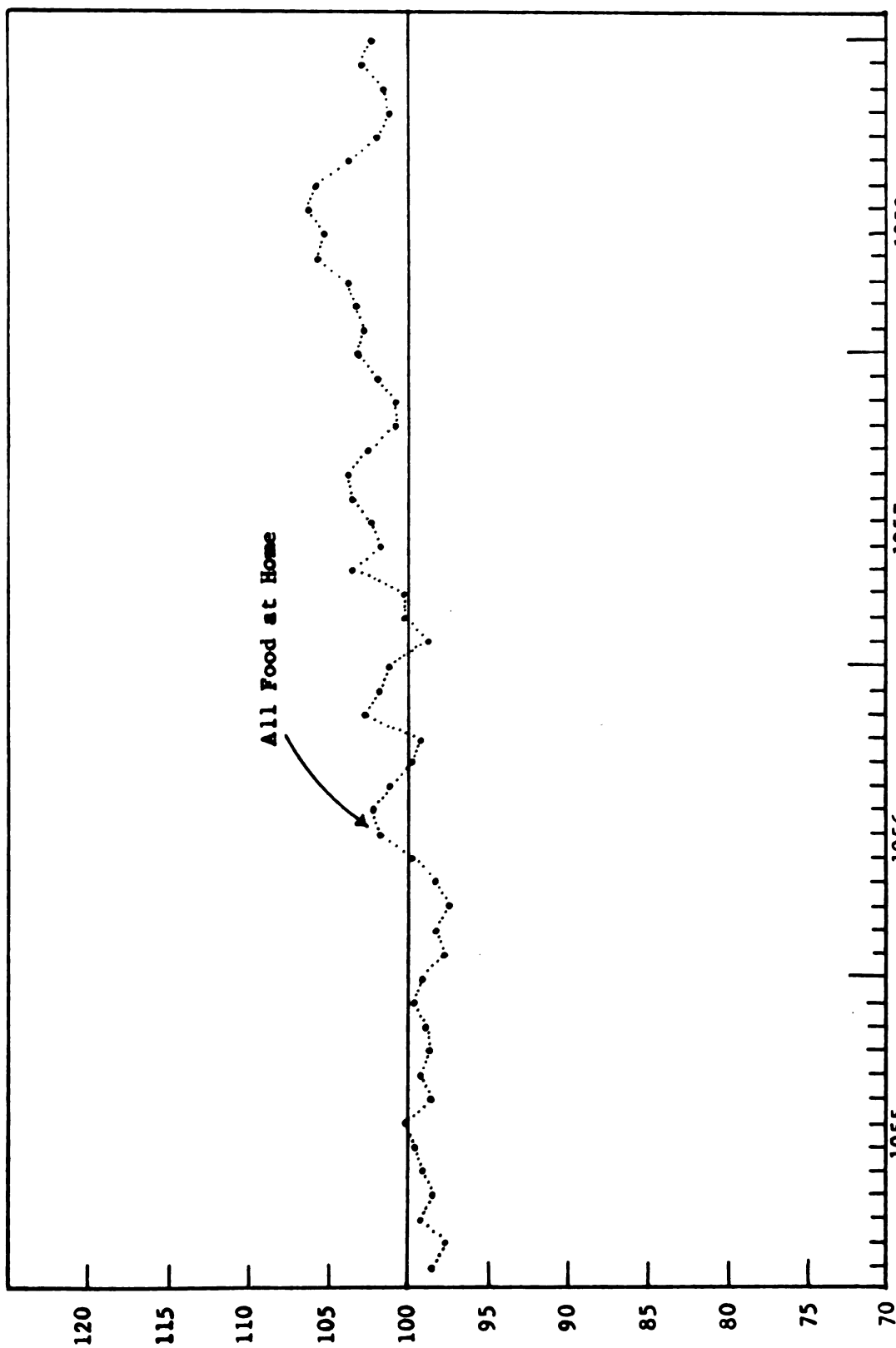


Fig. 15. Changes in the average retail prices of all food at home
M.S.U. Consumer Panel

prices from 1955 annual average (the index stood at 99.1) to 1956 annual average was 1 percent

$$\left(\frac{100.0 - 99.0}{99.0} = \frac{1.0}{99.0} = .0101 \text{ or } 1.01 \text{ percent}\right).$$

Lower prices of "meats, poultry and fish" and "cereal and bakery products" were offset by price advances for the other three groups described above. As a result of increased prices of "meats, poultry and fish," "cereal and bakery products," and "other foods at home," the annual average prices of all food at home advanced 1.7 percent from 1956 to 1957, despite lower prices of "fruits and vegetables" and unchanged prices of "dairy products." The 1958 annual average index at 103.4 was up about 1.7 percent from the 1957 annual average, and 4.4 percent higher than the 1955 annual average. Higher prices of "meats, poultry and fish," and "fruits and vegetables" more than offset substantial reductions in prices of "dairy products" and "other food at home" groups.

There were two seasonal peaks in the prices of all food at home. One occurred in the early summer and the other occurred either in the late fall or early winter. The lowest prices fell in the first and tenth periods in each year from 1955 to 1958. Apparently these seasonal patterns resulted from the prices of "meats" and "fruits and vegetables" (Figures 17 and 19).

Meats, poultry and fish. --The prices of the "meats, poultry and fish" group followed a downward trend from 1951 to 1955, leveled

off from the middle of the spring in 1956 to the early spring of 1957, and then fluctuated upward steadily through the end of 1958 (Figures 16, 29, and Table 10). The annual average index differential between the highest of 1951 (125.4) and the lowest of 1956 (96.9) was 28.5 points (down 22.7 percent), and between 1956 and 1958 (110.5) was 13.6 points (up 14.0 percent).

Seasonal variations in the prices of "meats, poultry and fish" group closely paralleled the variation of meat prices. The seasonal peak in prices occurred during the summer months in each year from 1951 to 1958, with the low coming during winter months (Figures 16, 17, and Table 10).

The prices in the "meats" subgroup apparently followed the same patterns as the prices in the "meats, poultry and fish" group. Annual average prices of meats fell 25.5 percent (down 32.8 points compared with the annual average index) from 1951 to 1956, and went up 20.9 percent (up 20.1 points) from 1956 to 1958. Higher prices for meats, from 1951 to 1956, were partially offset by lower prices of fish in the "meats, poultry and fish" group; and, from 1956 to 1958, higher prices for meats were partially offset by lower prices of both fish and poultry (Figures 16, 17, 18, 30, and Table 10). The annual average prices of poultry were highest in 1951 (the annual average index at 144.7) and lowest in 1957 (the annual average index at 90.2). The annual average prices of poultry declined 37.7 percent (54.5 points) from 1951 to 1957, 30.4 percent (44.0 points) from 1951 to 1956, fluctuated

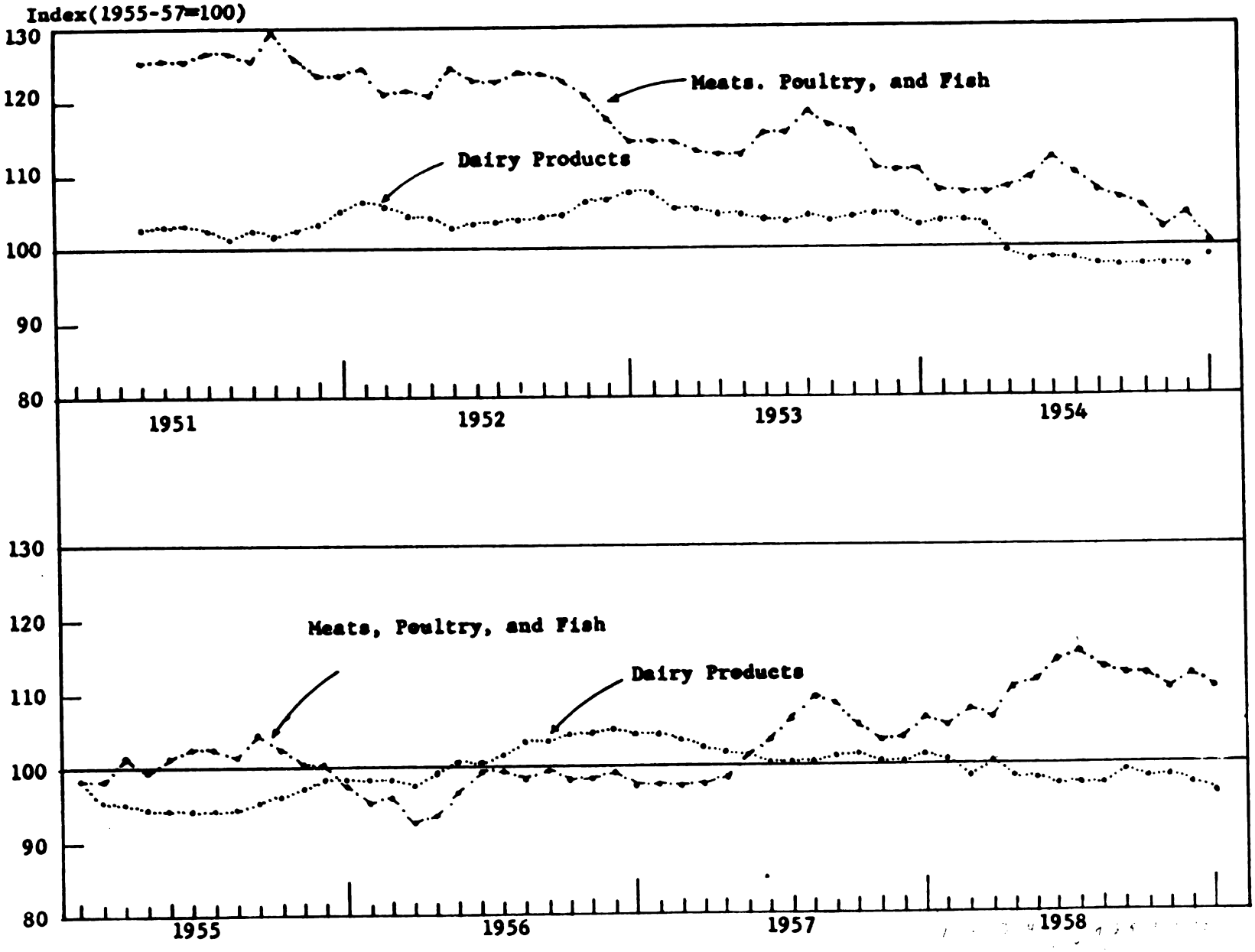
upward only .2 percent from 1957 to 1958, and went downward 10.2 percent (10.3 points) from 1956 to 1958. The annual average prices of fish were highest in 1954 (the annual average index at 105.8) and lowest in 1956 (the annual average index at 98.1). The annual average prices of fish climbed up 6.2 percent (6.2 points) from 1951 to 1954 while the meat prices dropped 18 percent in the same period. The fish prices dropped .9 percent from 1957 to 1958 while the meat prices went up 10.4 percent (10.9 points).

During the period from 1951 to 1954, the prices of meats and poultry followed the same downward trend while the fish prices fluctuated upward. The most important price decreases of meats more than offset the increase in fish prices. The prices of meats and poultry dropped only moderately during the period from 1954 to 1956 while the fish prices decreased substantially. And then the meat prices moved up again from 1957 to 1958, while the poultry prices remained unchanged after having a substantial decrease from 1955 to 1956. The fish prices declined only .9 percent from 1957 to 1958 after having a 2.7 percent increase from 1956 to 1957.

Dairy products.--The prices of dairy products were more stable than the prices of most other food items (Figures 16, 29, and Table 10). The prices of the "dairy products" group moved upward slightly from 1951 to 1952, turned downward moderately from 1952 to 1953, dropped sharply in 1954 and 1955, and then climbed up again from 1955 to 1956, and, after having a winter seasonal increase,

fluctuated downward through the end of 1958. At 105 the 1952 annual average index was the highest during the eight-year period. The annual average prices of dairy products declined 8.7 percent (9.1 points) from 1952 to 1955 (the 1955 annual average index was 95.9, the lowest of eight years), were up 6.0 percent (5.8 points) from 1955 to 1957, and followed a 3.2 percent (3.3 points) drop from 1957 to 1958. Higher prices for all kinds of dairy products in 1952, compared with their prices in 1951, were responsible for a 1.9 percent (2 points) increase from 1951 to 1952. A .4 percent drop of the annual average index in the "dairy products" group from 1952 to 1953 resulted from the price decrease of ice cream and butter. Lower prices for ice cream and butter in 1953 more than offset the slight increase in fresh milk prices. The annual average prices decreased 5.1 percent from 1953 to 1954, and 3.4 percent from 1954 to 1955. Lower prices for all kinds of dairy products were responsible for the decrease. The annual average index (101.7) of 1957 was the same as in 1956. This indicates that the annual average prices in 1956 and 1957 were 6.0 percent higher than in 1955 and 3.2 percent higher than in 1958. Higher prices for all kinds of dairy products, except a slight decrease in prices of ice cream and processed cheese, helped the 6.0 percent increase from 1955 to 1956. A 3.2 percent decrease in annual average prices from 1957 to 1958 resulted from a decrease of prices of all kinds of dairy products except evaporated milk, which showed a slight increase.

Fig. 16. Changes in the average retail prices of food major groups of meats, poultry, and fish, and dairy products, M.S.U. Consumer Panel



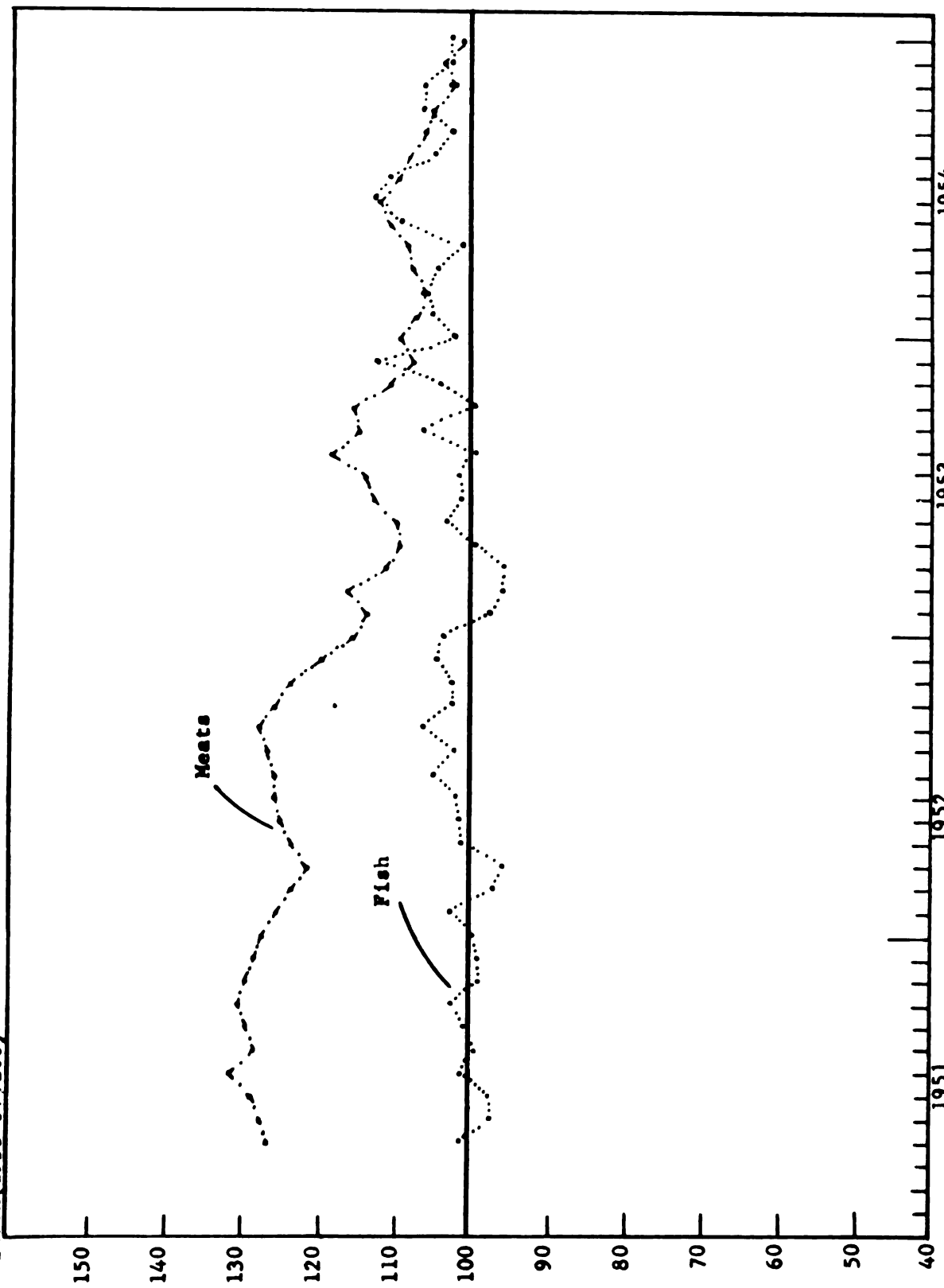


Fig. 17. Changes in the average retail prices of food subgroups of meats, and fish
M.S.U. Consumer Panel

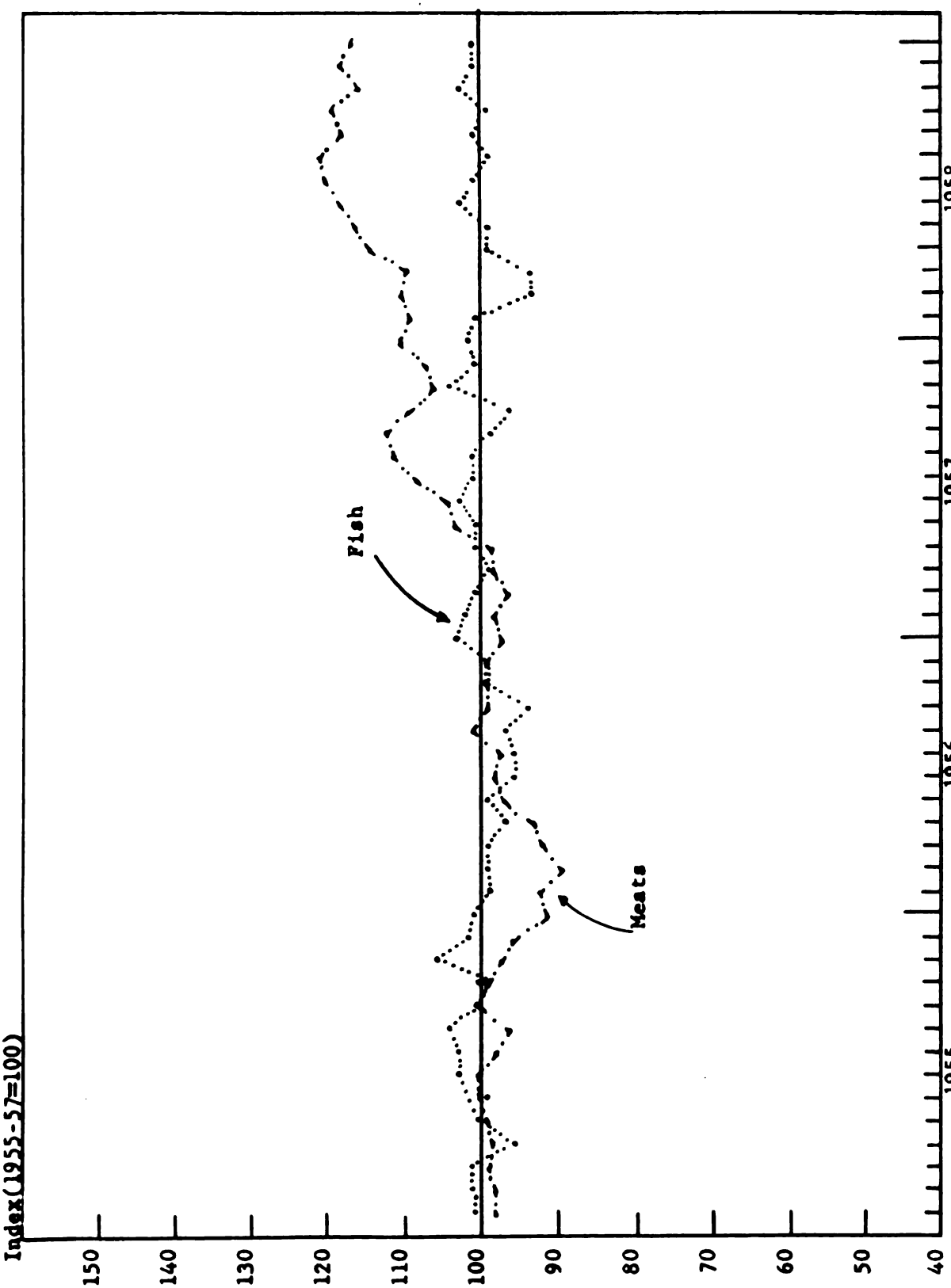
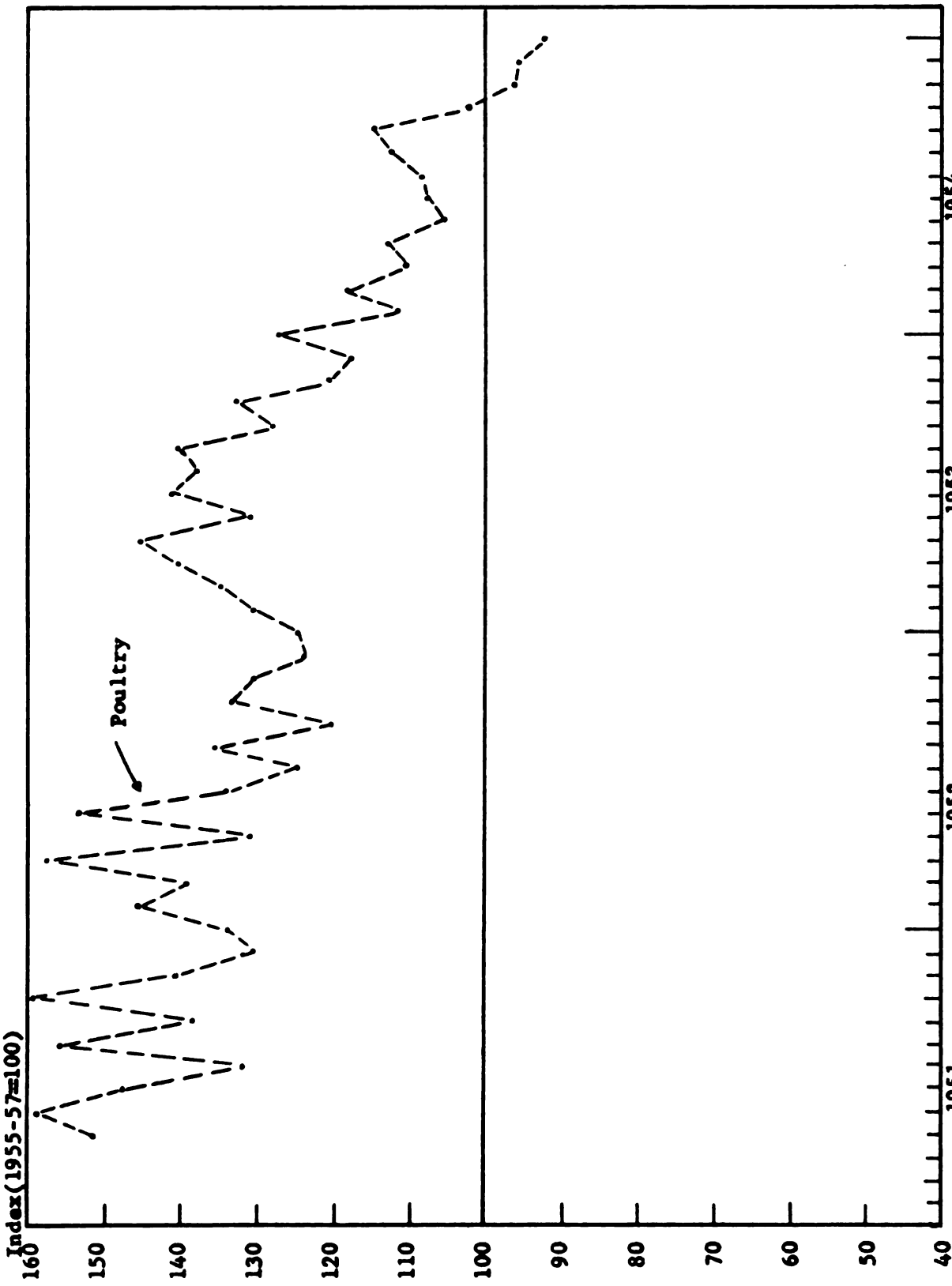


Fig. 17. Continued

Fig. 18. Changes in the average retail prices of food subgroup of poultry
M.S.U. Consumer Panel



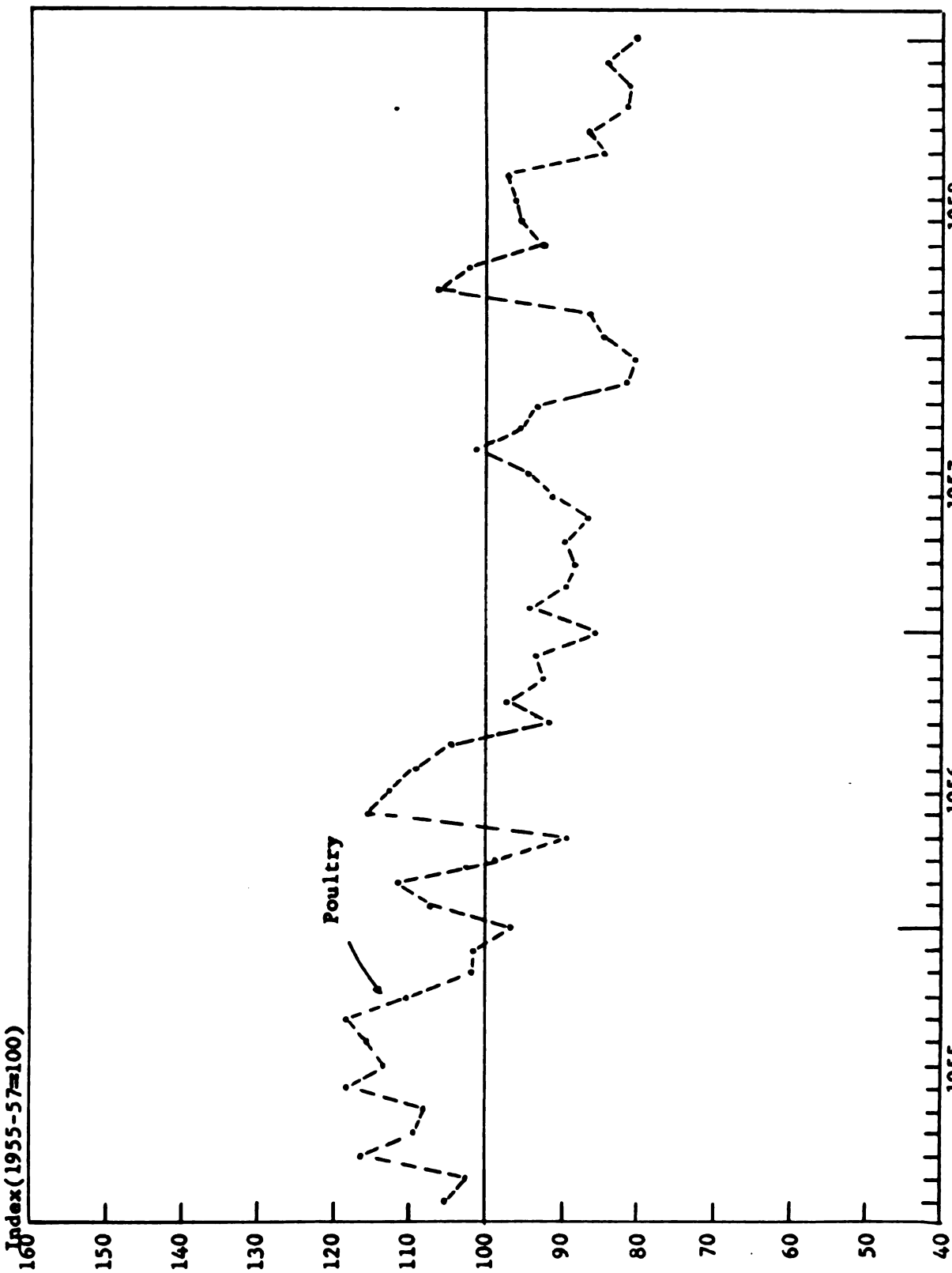


Fig. 18. Continued

Fruits and vegetables.--The prices of the fruits and vegetables had a pronounced seasonal pattern (Figure 19 and Table 10). From a low in September and October, prices rose rapidly until June and July, then dropped rather sharply to September and October. The annual average prices of the "fruits and vegetables" group declined 2 percent from 1953 to 1954. Lower prices for fresh vegetables (down 3.2 percent), canned vegetables (down 1.3 percent), frozen fruits (down 3.4 percent), frozen vegetables (down 2.3 percent), and dried fruits and vegetables (down 9.6 percent) more than offset a 3 percent increase in fresh fruit prices and a 1.7 percent increase in canned fruits (Figures 19, 20, 21, 22, 29, 30, and Table 10). The prices of "fruits and vegetables" climbed up after having a seasonal low, but did not regain the 1953 level. The increase of 1.4 percent in annual average prices of fruits and vegetables from 1954 to 1955 resulted primarily from higher prices for fresh vegetables (up 5.1 percent) and for all other kinds of fruits and vegetables, except canned fruits and canned vegetables; prices for fresh fruits rose 1.8 percent, frozen fruits rose 1.5 percent, fresh vegetables rose 8.8 percent, dried fruits and vegetables rose .2 percent, but canned fruits and canned vegetables fell 1.5 percent and 1 percent, respectively. The advance of 3.9 percent of "fruits and vegetables" from 1955 to 1956 was due to higher prices in all its component subgroups. The most important increases were fresh fruits (up 2.2 percent), fresh vegetables (up 4.3 percent), canned vegetables (up 2.1 percent), frozen fruits (up 6.2 percent), and

Fig. 19. Changes in the average retail prices of food major group of fruits and vegetables, M.S.U. Consumer Panel

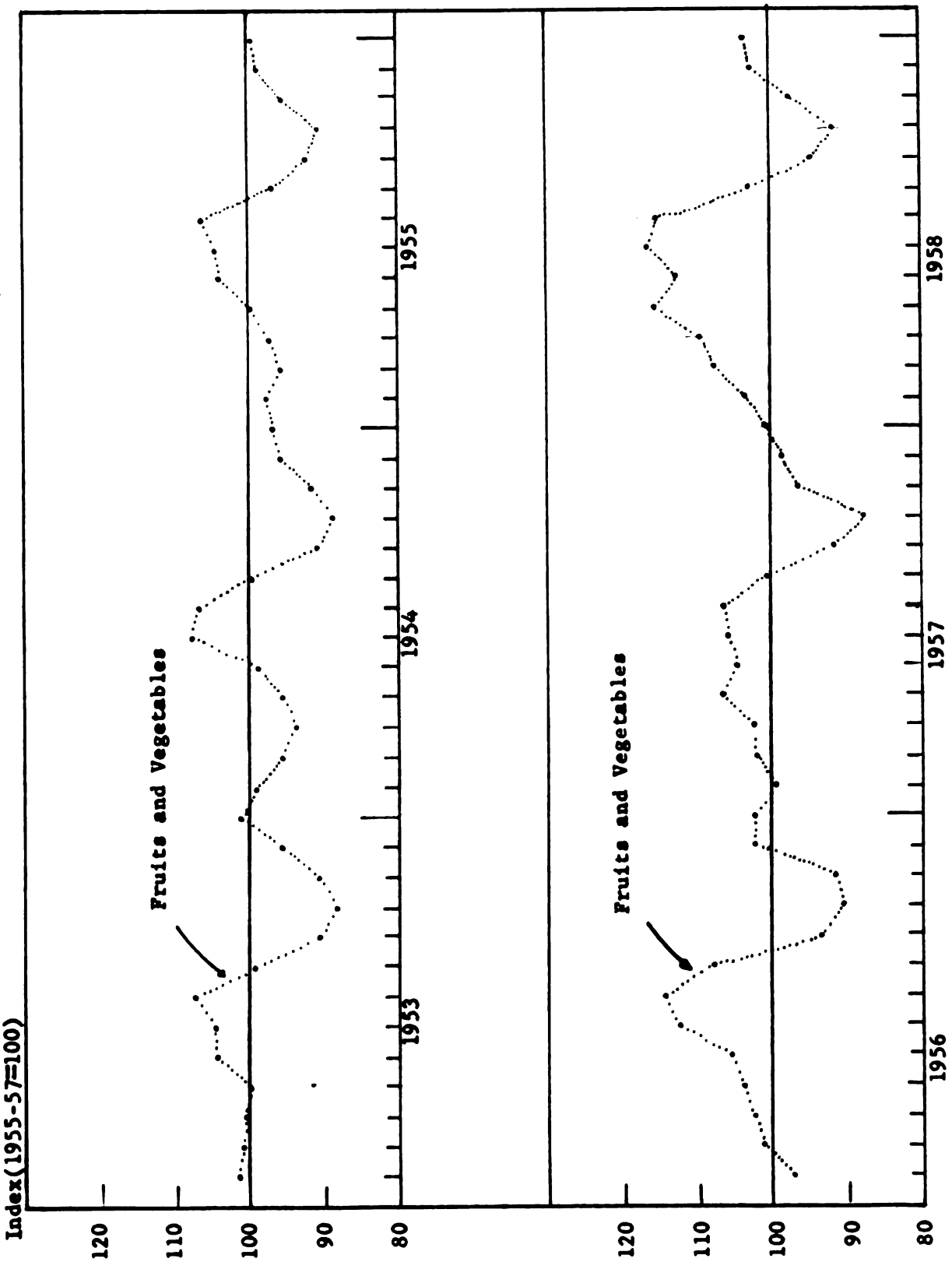


Fig. 20. Changes in the average retail prices of food subgroups of fresh fruits, and fresh vegetables, M.S.U. Consumer Panel

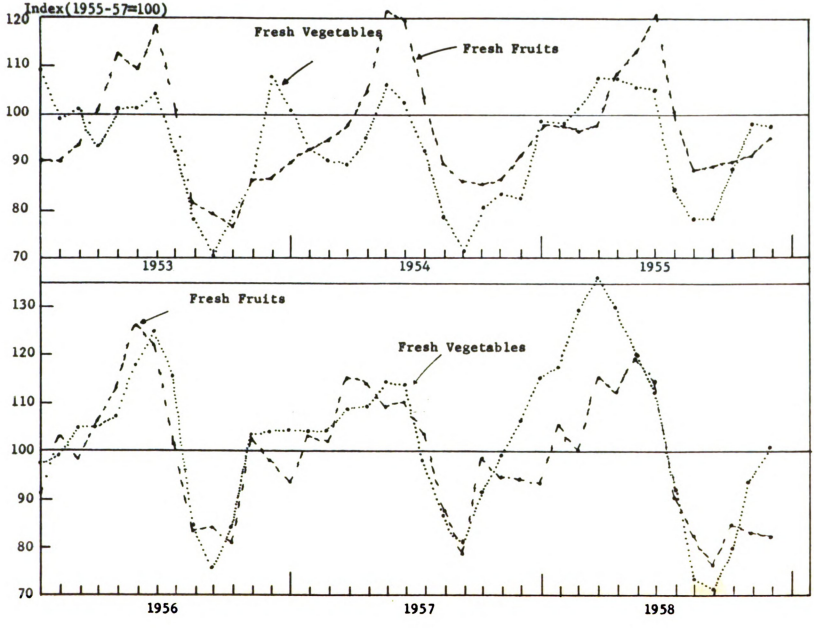


Fig. 21. Changes in the retail prices of food subgroups of canned fruits, canned vegetables, and dried fruits and vegetables, M.S.U. Consumer Panel

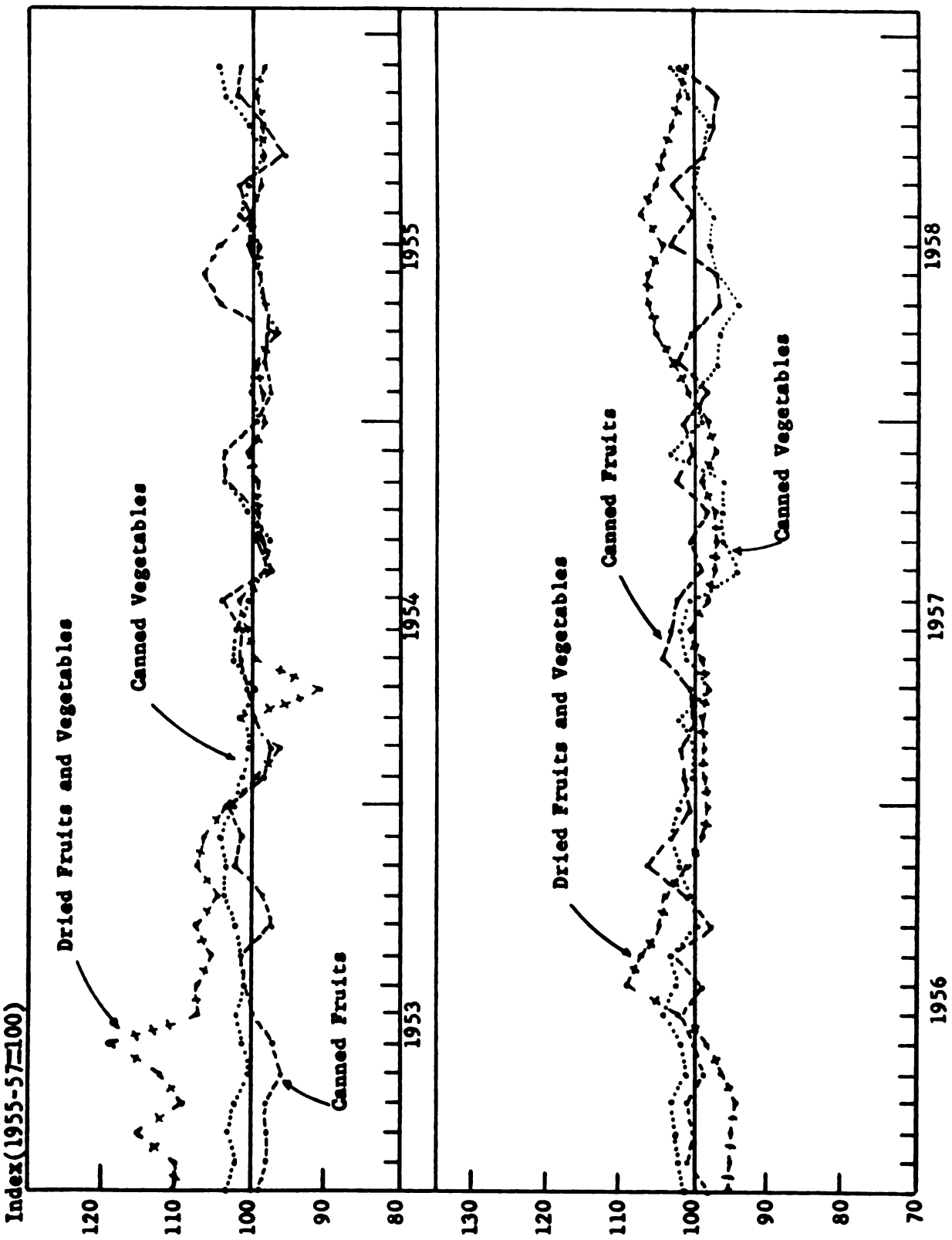
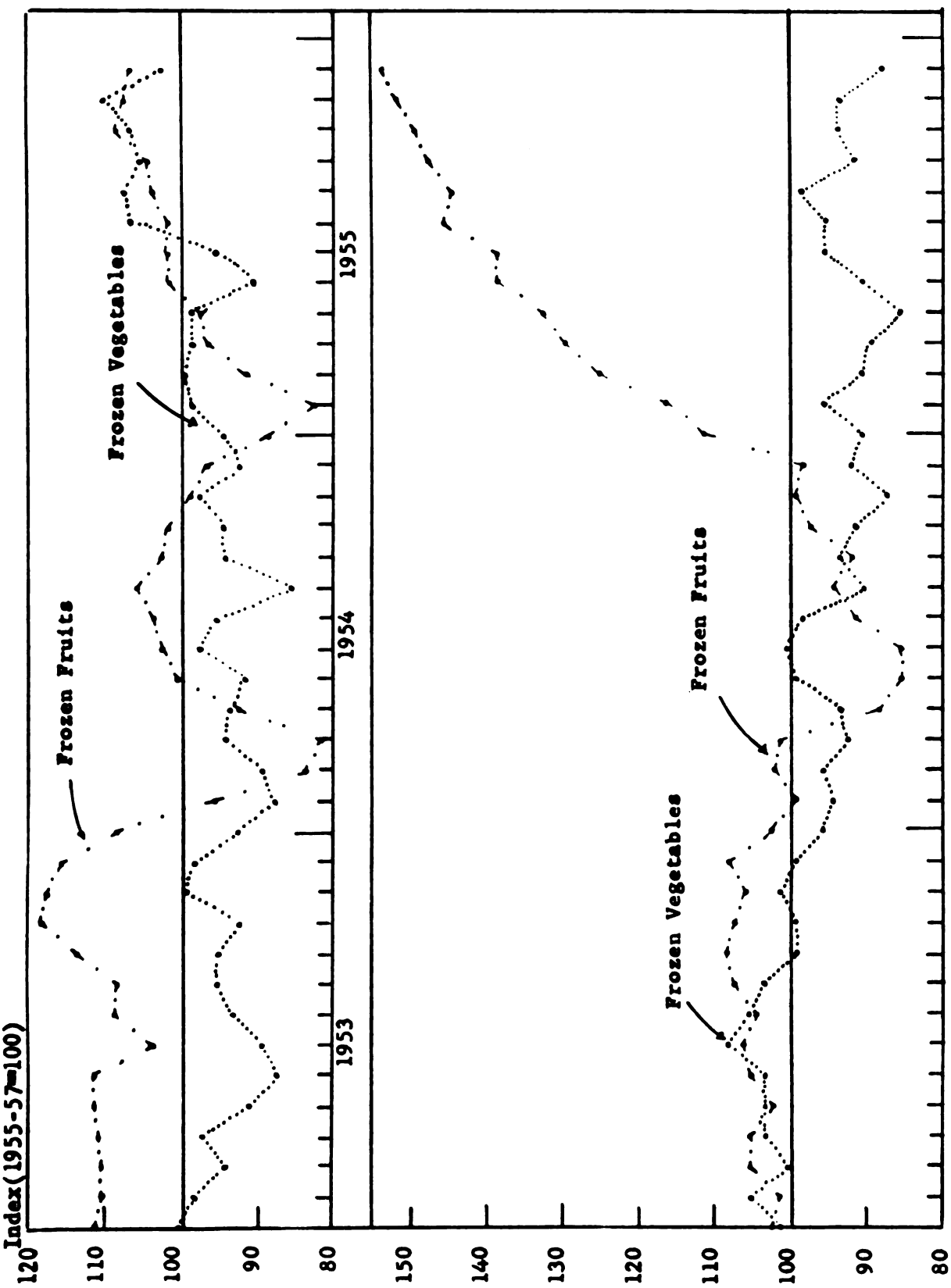


Fig. 22. Changes in the retail prices of food subgroups of frozen fruits, and vegetables, M.S.U. Consumer Panel



frozen vegetables (up 1.7 percent). The annual average prices of "fruits and vegetables" dropped 2 percent between 1956 and 1957, as a substantial reduction of all processed fruits and vegetables except canned fruits rose .2 percent. The prices for fresh fruits and vegetables between these two years showed little change on the average. The most important price decreases were for frozen fruits (down 10.9 percent) and frozen vegetables (down 9.1 percent). The annual average prices of the "fruits and vegetables" group advanced 5.6 percent between 1957 and 1958. The increase of 5.6 percent in average prices of "fruits and vegetables" was the largest annual advance of six years. The increases were due mainly to sharply higher prices of fresh vegetables (up 3.6 percent) and frozen fruits (up 44.1 percent), and dried fruits and vegetables (up 4.9 percent). The decreases in average prices of fresh fruits (down 3.5 percent), canned fruits (down .1 percent), canned vegetables (down .8 percent), and frozen vegetables (down 2.1 percent) less than offset substantial increases in prices of fresh vegetables and frozen fruits.

Other foods at home. --The annual average prices of the "other foods at home" group increased 1.3 percent from 1955 to 1956. The advance of 1.3 percent in the prices of this major group resulted from higher prices in all its component subgroups except "cooking oils" (Figures 23, 26, 27, 28, 29, 30, and Table 10). Higher prices in sugar and sweets (up 1.5 percent), partially prepared foods (up .8 percent), beverages (up 2.6 percent), fats and oils (up 3.0 percent),

and miscellaneous foods (up 2.6 percent) more than offset the substantial reduction of cooking oil prices. The egg prices were unchanged between 1955 and 1956. The annual average prices of the "other food at home" group showed little change between 1956 and 1957. The annual average prices of this major group rose .7 percent from 1955 to 1956. However, the prices of all its subgroups except eggs registered their annual advance. The higher prices for sugar and sweets (up 1.5 percent), cooking oils (up 4.1 percent), beverages (up 2.7 percent), fats and oils (up 2.2 percent) and miscellaneous foods (up 7.1 percent) were partially offset by a 5.2 percent decrease of egg prices. Sharp declines in prices of eggs, fats and oils, and beverages, in 1958, were only partially offset by slightly higher prices for sugar and sweets, partially prepared foods, miscellaneous foods and the substantial increase of prices in cooking oils. The annual average prices of the "other foods at home" group in 1958 were 4.1 percent lower than in 1957. Within the major group, the prices of 1958 declined 6.5 percent in beverages, 4.5 percent in fats and oils, and 5.7 percent in eggs, while the prices rose 1.5 percent in sugar and sweets, 5.1 percent in cooking oils, .3 percent in partially prepared foods, and .1 percent in miscellaneous food, compared with the 1957 average prices.

Cereal and bakery products. --The prices of cereal and bakery products were relatively stable and showed little seasonal variations (Figures 23, 29, and Table 10). Both cereal prices and

bakery products prices turned downward slightly from 1955 to 1956, and climbed up in 1957. The cereal prices were up slightly from 1957 to 1958, while the bakery products prices showed a .1 percent decrease during the same period (Figures 24, 30, and Table 10). The changes of annual average prices in the "cereal and bakery products" group were 1.3 percent decrease from 1955 to 1956, 2.4 percent up from 1956 to 1957, and rose only .2 percent in 1958. The higher prices of cereal in 1958 (up 1.1 percent) were partially offset by slightly lower prices of bakery products.

Fig. 23. Changes in the average retail prices of food major groups of cereal and bakery products, and other food at home, M.S.U. Consumer Panel

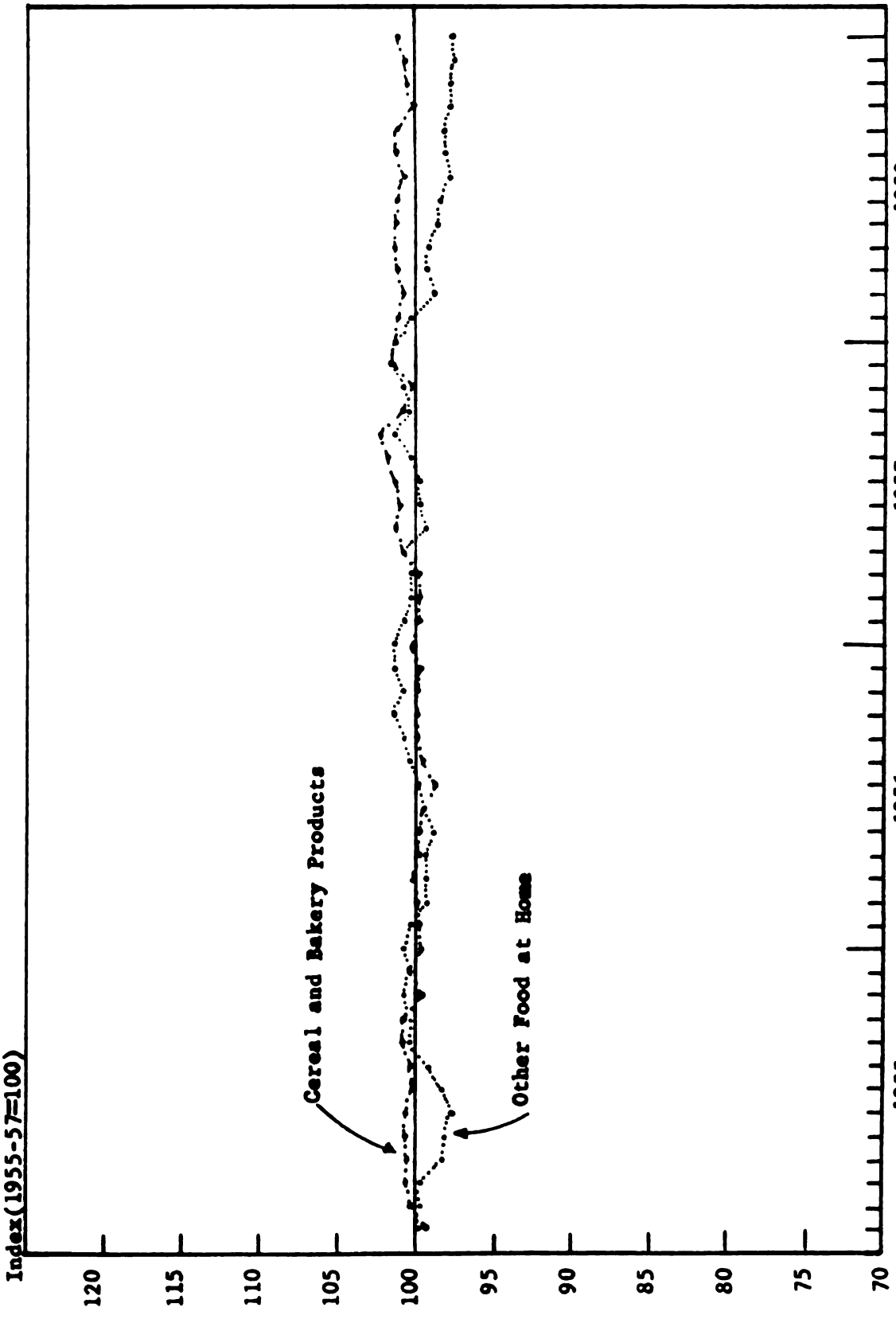


Fig. 24. Changes in the average retail prices of food subgroups of cereal and bakery products, M.S.U. Consumer Panel

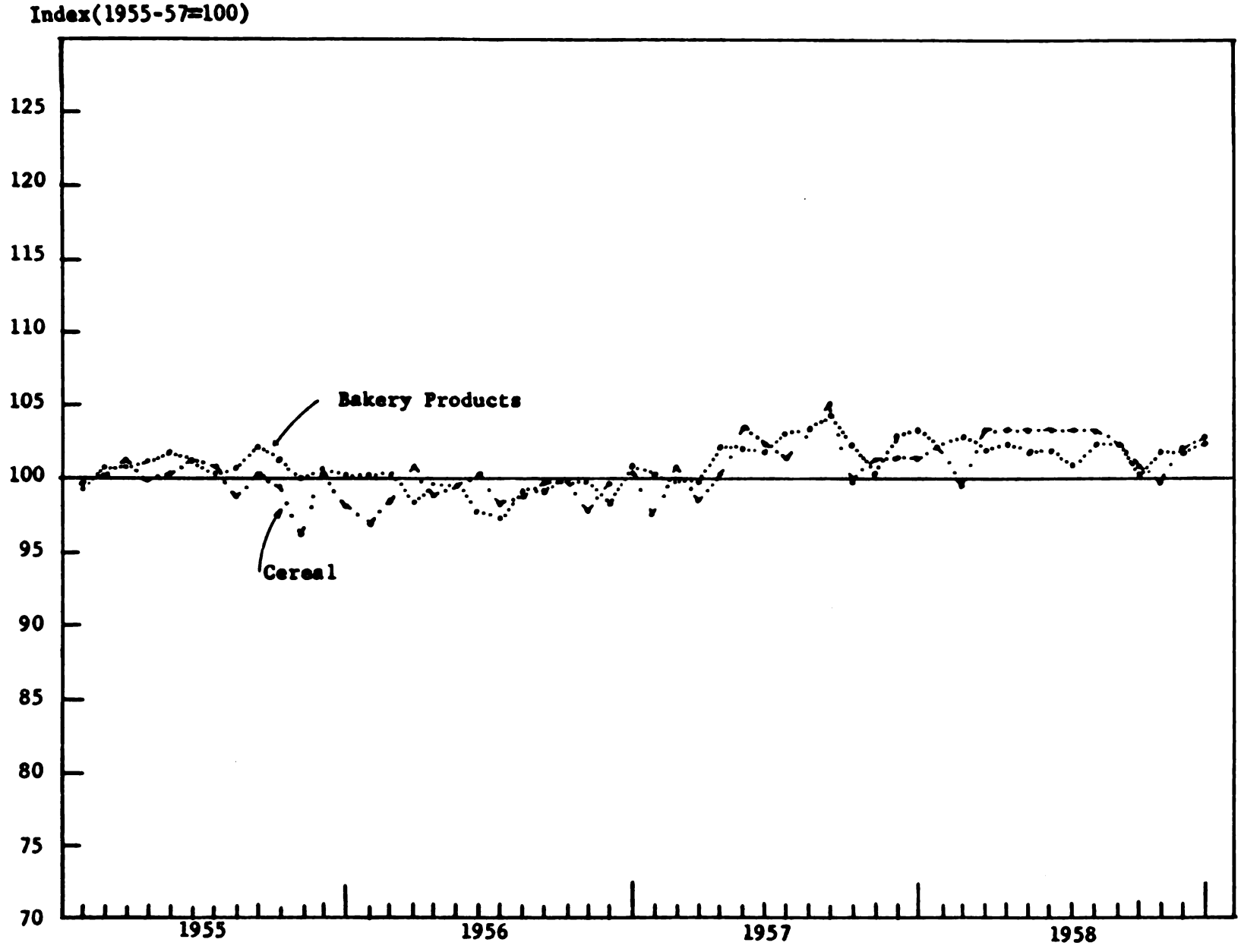
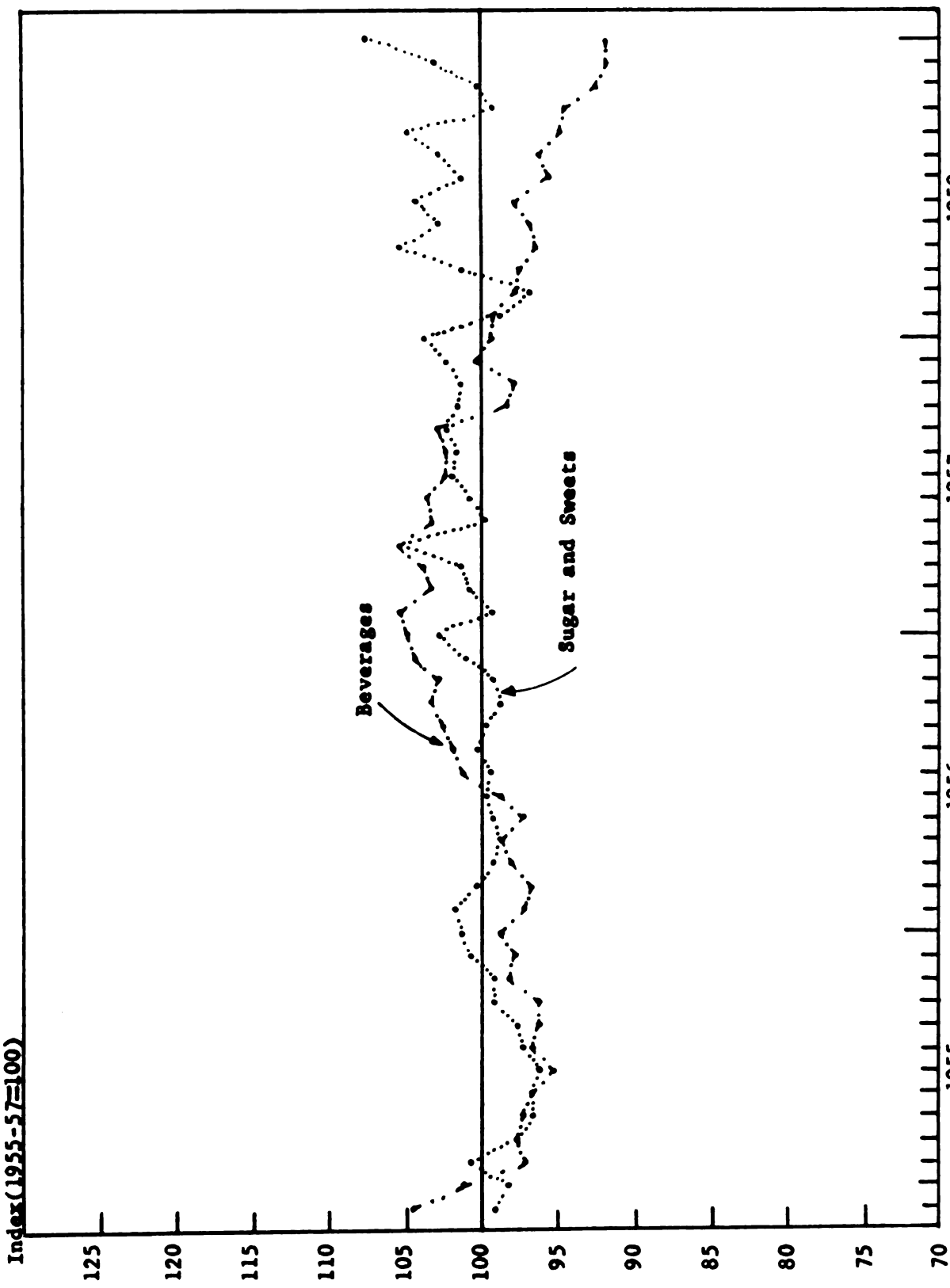


Fig. 25. Changes in the average retail prices of food subgroups of beverages, and sugar and sweets, M.S.U. Consumer Panel



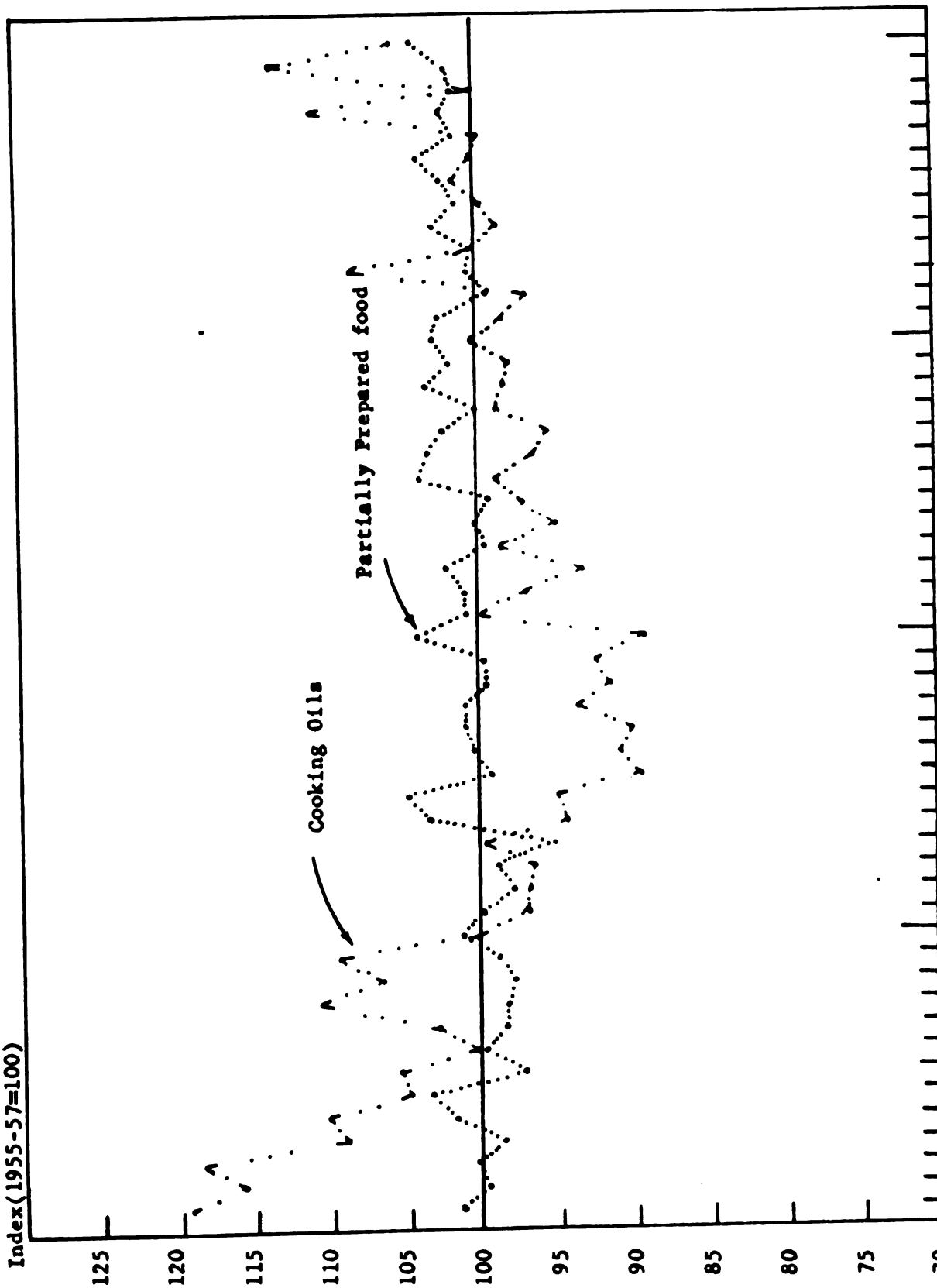


Fig. 26. Changes in the average retail prices of food subgroups of cooking oils, and partially prepared food, M.S.U. Consumer Panel

Fig. 27. Changes in the average retail prices of food subgroup of fats and oils
M.S.U. Consumer Panel

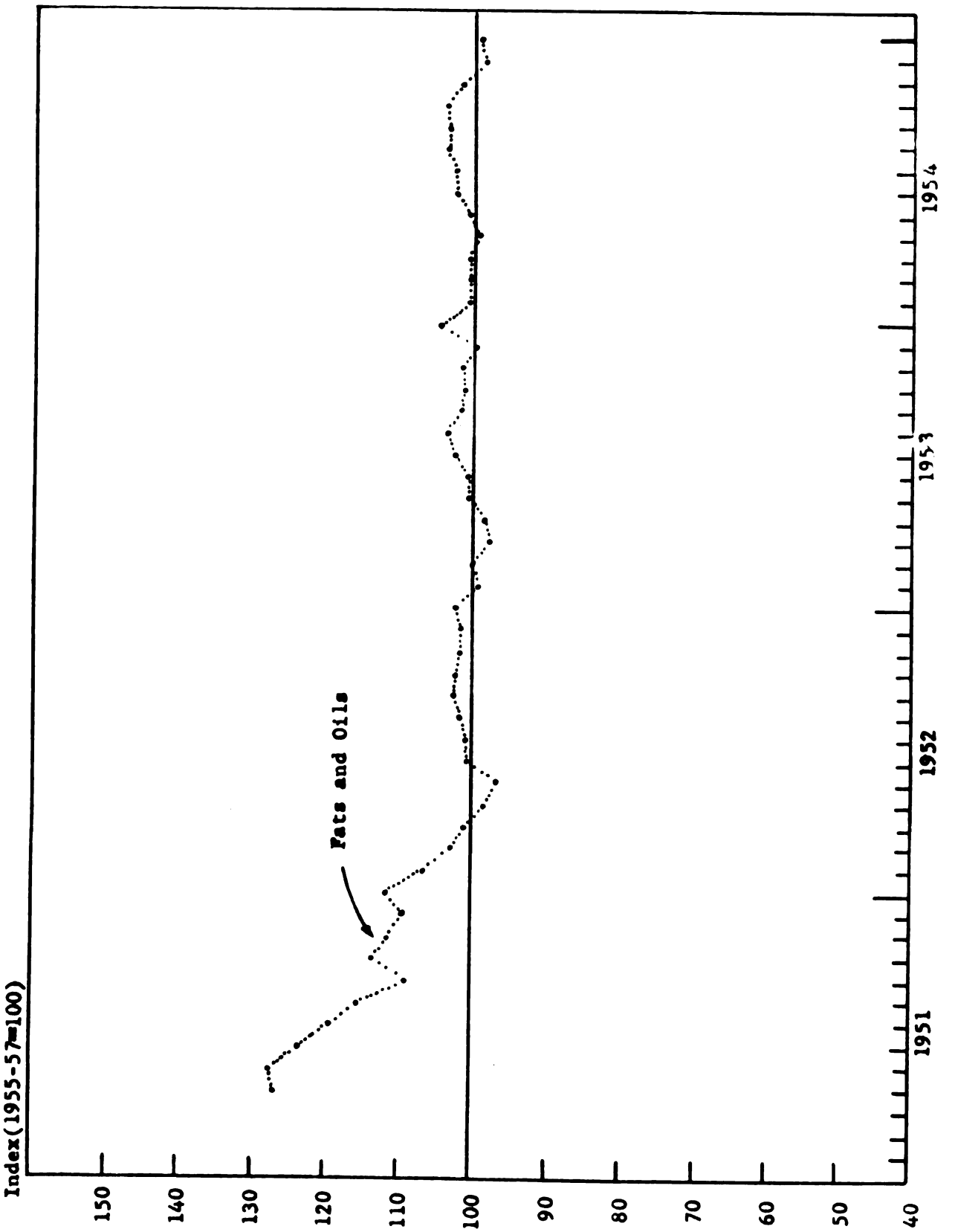


Fig. 27. Continued

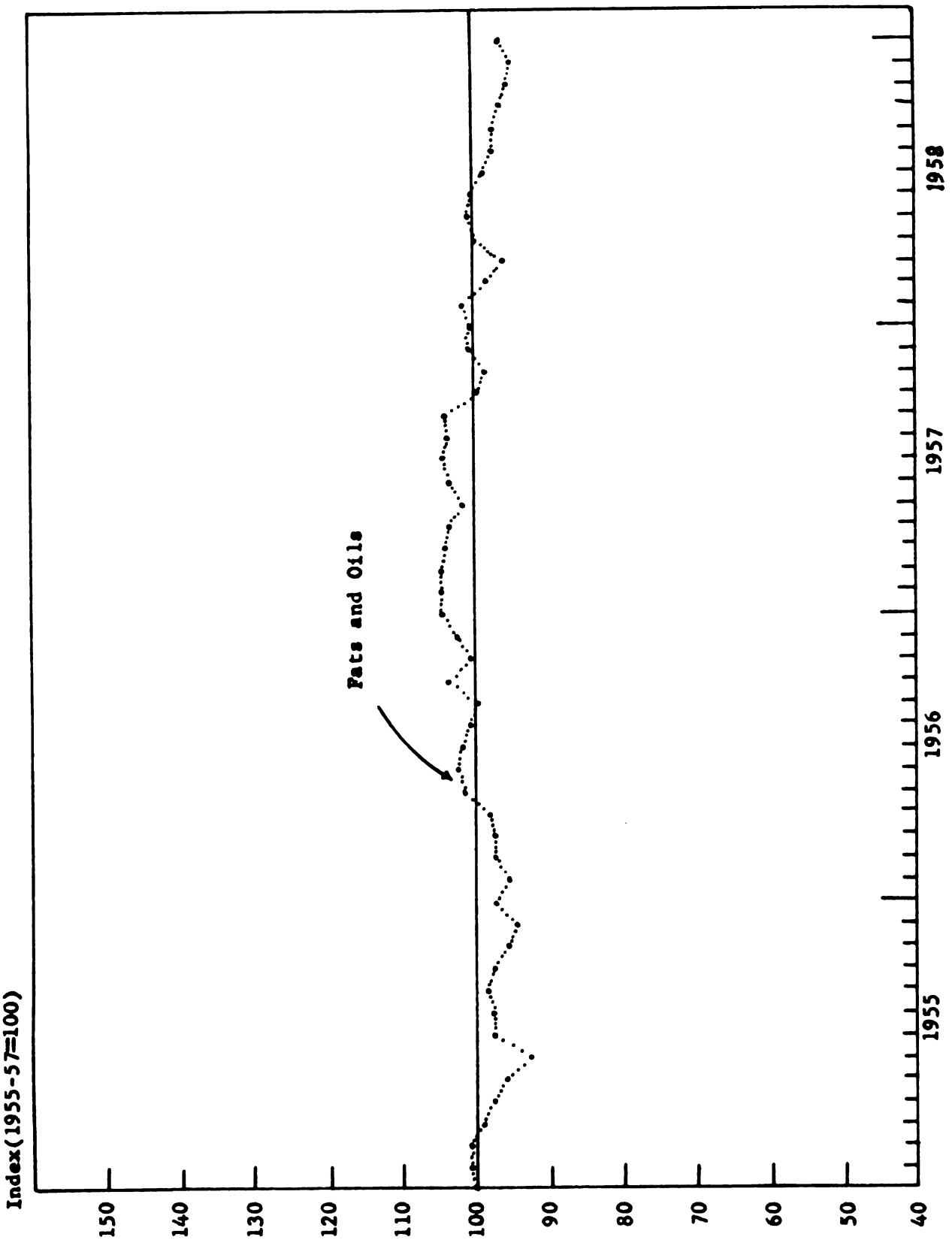
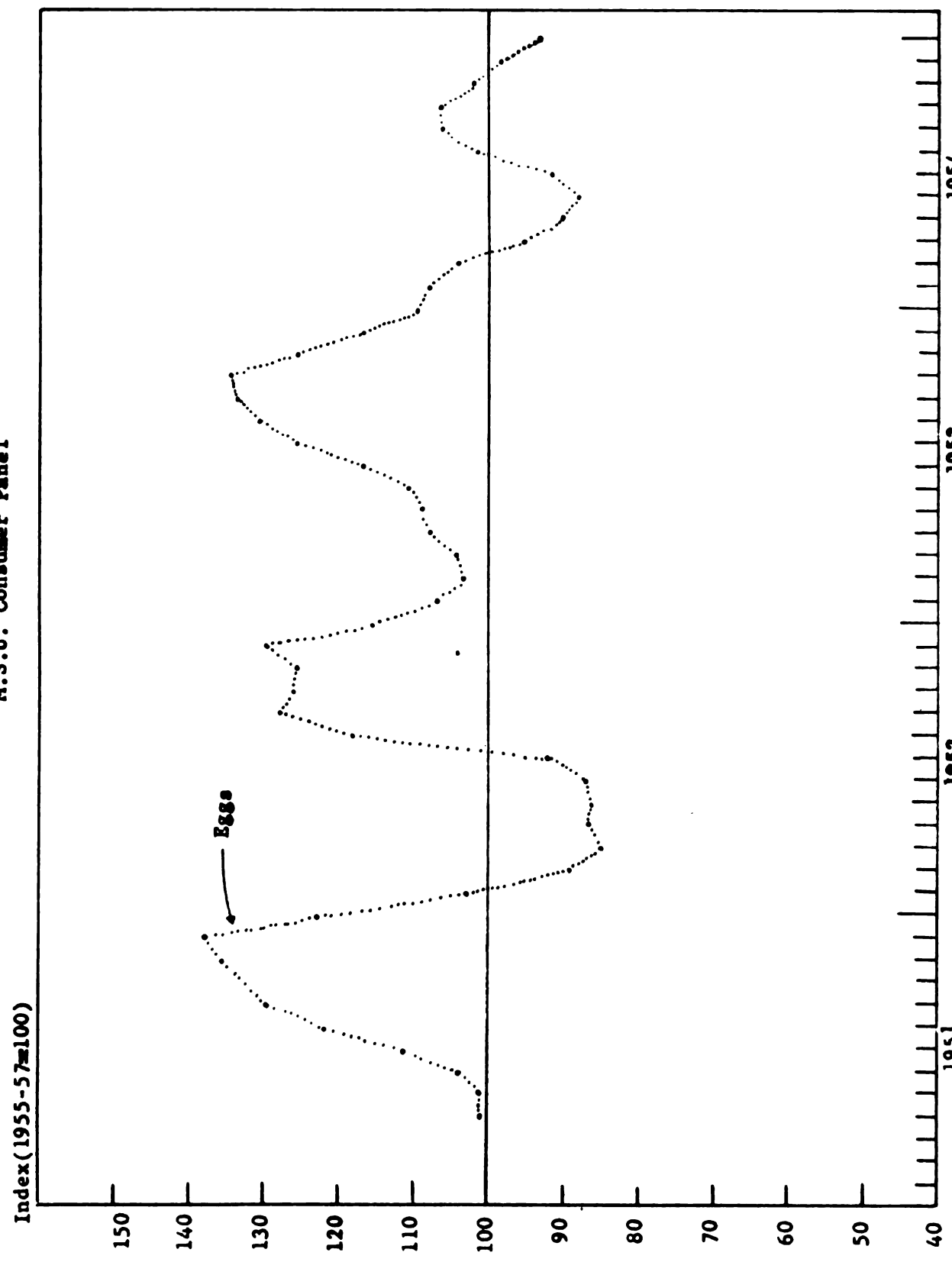


Fig. 28. Changes in the average retail prices of food subgroup of eggs
M.S.U. Consumer Panel



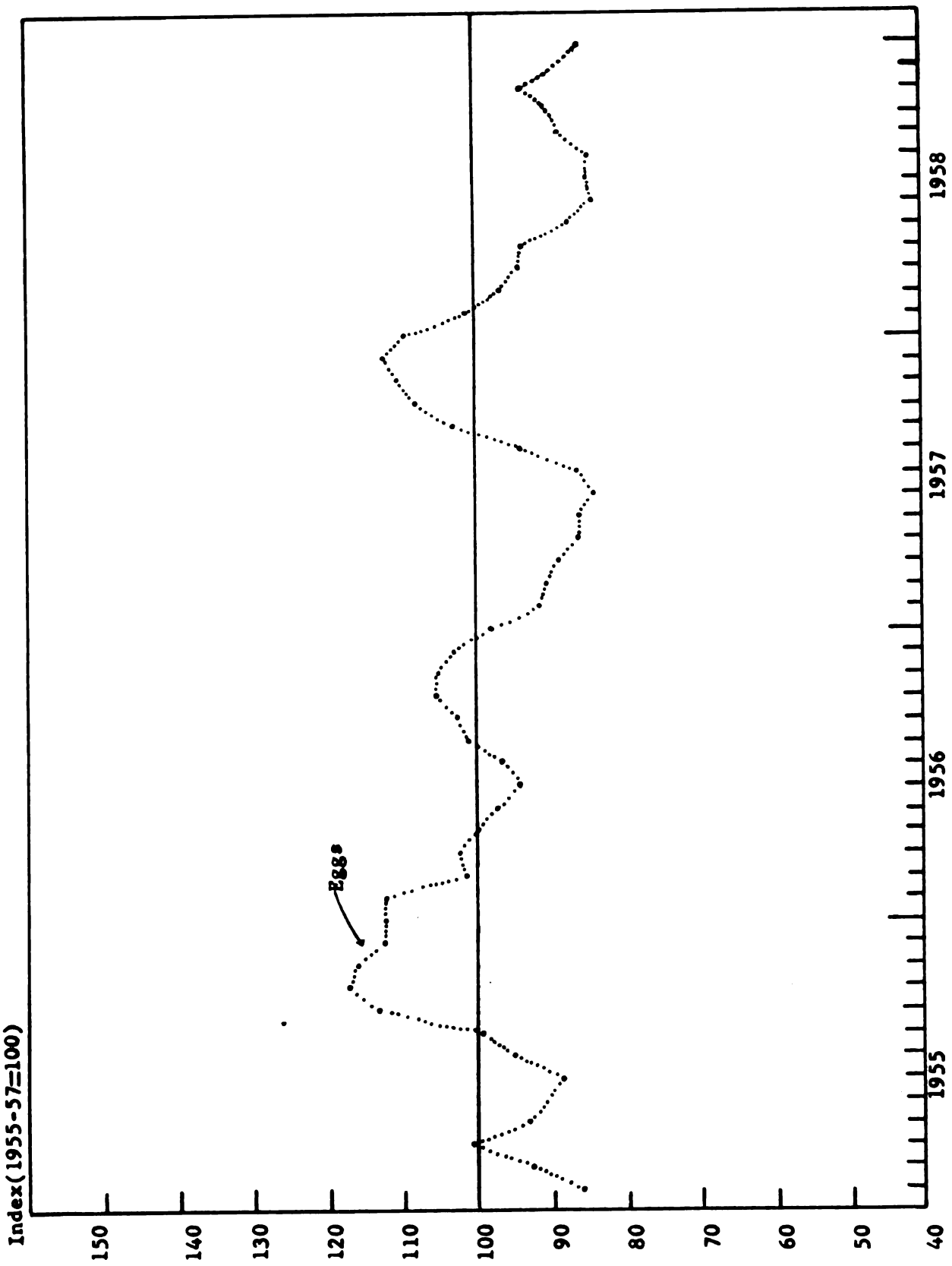


Fig. 28. Continued

Fig. 29. Changes in the annual average retail prices of food groups
M.S.U. Consumer Panel

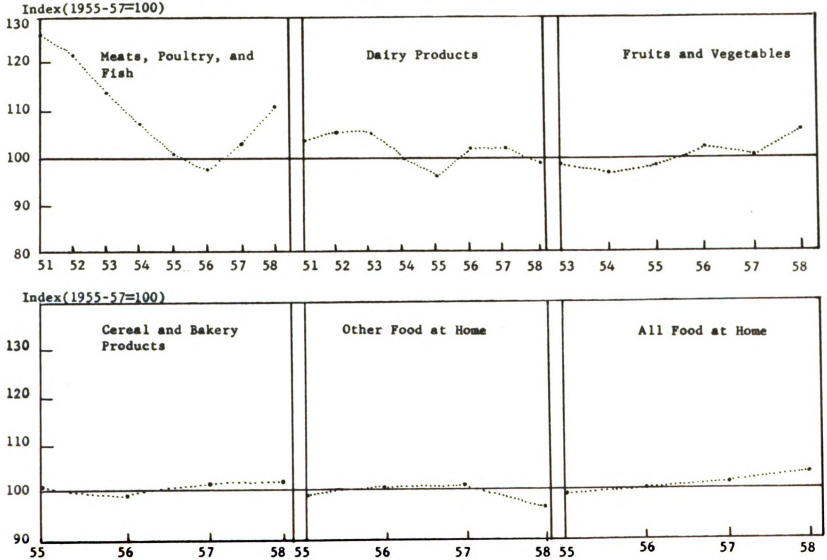


Fig. 30. Changes in the annual average retail prices of food subgroups
M.S.U. Consumer Panel

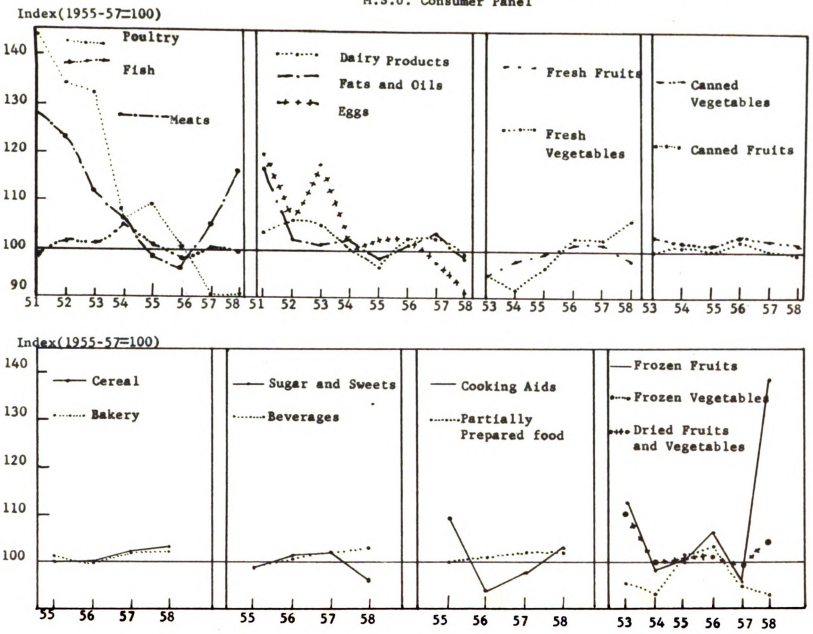


TABLE 10.--M.S.U. Consumer Panel retail food price index--group and subgroup indexes of selected foods
1955-57 = 100

Food groups	4 week period 1	2	3	4	5	6	7	8	9	10	11	12	13	Annual average
----1951----														
Meats, poultry and fish				124.9	125.4	125.3	126.3	126.4	125.0	128.8	125.3	123.3	123.2	125.4
Meats				126.6	127.4	128.7	131.7	128.6	129.1	130.4	129.6	128.4	127.6	128.8
Beef				140.2	142.9	142.5	143.7	142,5	142.4	143.2	143.2	143.6	143.4	142.8
Pork				117.6	114.2	118.0	123.0	117.7	120.5	130.7	116.7	114.3	112.7	118.5
Other meats				106.8	110.6	112.2	113.8	111.1	111.5	115.7	113.2	113.1	113.0	112.1
Veal				114.1	110.6	115.0	127.2	121.8	111.6	128.8	149.5	126.2	110.1	121.5
Lamb, leg				120.3	119.2	120.4	139.3	111.6	95.9	112.6	126.8	114.0	132.5	119.3
Poultry				151.8	158.3	147.4	132.0	155.8	138.4	159.3	140.2	130.0	133.7	144.7
Fish and sea foods				101.6	97.1	97.7	101.4	99.4	100.2	102.7	98.5	98.5	99.0	99.6
Dairy products				103.0	103.2	103.1	102.8	101.9	102.7	102.0	102.7	103.5	105.5	103.0
Fats and oils				126.9	127.7	123.2	119.3	115.4	108.7	113.6	111.3	109.3	111.9	116.7
Eggs				100.4	100.2	103.8	111.2	121.8	129.4	132.8	135.3	137.7	122.4	119.5
----1952----														
Meats, poultry and fish	123.8	120.5	120.8	120.2	123.9	122.4	121.9	123.2	123.0	123.2	120.4	117.1	114.2	121.2
Meats	125.6	123.6	121.4	123.2	125.0	125.7	125.6	126.5	127.6	125.4	123.2	119.3	115.4	123.7
Beef	142.9	138.7	137.9	139.8	139.8	138.9	136.0	136.0	135.6	132.6	130.6	125.4	122.0	135.1
Pork	107.5	107.2	103.0	104.2	112.0	113.5	117.9	119.1	123.8	121.0	118.2	115.3	110.2	113.3
Other meats	112.6	111.2	109.4	113.7	110.0	111.2	112.4	114.0	113.2	113.6	113.9	112.6	110.0	112.1
Veal	115.7	125.5	129.2	112.1	121.2	130.6	119.2	122.4	116.7	124.2	125.2	113.8	114.7	120.8
Lamb, leg	116.2	125.3	105.6	118.6	83.2	114.9	112.8	128.5	126.5	119.2	79.3	83.1	55.5	105.3
Poultry	145.9	139.0	157.4	130.2	153.1	133.6	124.5	135.9	119.9	133.2	130.8	123.5	124.5	134.7
Fish and sea foods	103.1	96.9	95.6	101.6	101.6	101.8	105.1	102.0	106.2	102.4	102.6	104.3	103.0	102.0

TABLE 10. --Continued

Food groups	4 week period 1	2	3	4	5	6	7	8	9	10	11	12	13	Annual average
Dairy products	106.5	106.0	104.9	104.1	103.0	103.4	103.8	104.0	104.2	104.6	106.3	106.9	107.3	105.0
Fats and oils	106.3	102.7	101.0	98.4	96.3	100.7	100.4	101.5	102.1	102.3	101.8	101.3	102.3	101.3
Eggs	102.8	88.8	84.6	86.1	86.0	86.5	91.8	118.0	127.7	126.0	125.6	129.4	115.0	105.3
----1953----														
Meats, poultry and fish	113.9	113.7	112.6	112.4	112.4	115.0	115.3	118.5	115.8	115.3	110.3	109.8	110.2	113.5
Meats	113.8	116.1	111.0	109.3	109.9	112.9	113.8	118.4	114.8	115.2	110.4	107.9	109.6	112.5
Beef	119.1	114.2	107.1	106.2	103.1	102.8	103.9	110.5	107.6	107.0	103.6	100.9	102.1	106.8
Pork	109.4	117.9	120.9	116.4	124.5	133.0	122.2	136.7	132.0	134.1	126.1	121.8	124.8	124.6
Other meats	107.4	107.2	104.3	105.6	104.5	104.4	106.2	106.1	105.5	105.9	102.8	104.5	105.7	105.4
Veal	122.7	111.3	97.7	105.8	96.1	103.8	104.6	113.3	94.1	94.9	91.2	86.4	86.6	100.7
Lamb, leg	88.9	104.3	116.2	96.9	91.2	106.7	113.0	122.1	101.4	97.7	98.9	101.4	95.1	102.6
Poultry	130.9	134.4	140.5	145.4	130.6	141.3	137.7	140.3	127.8	132.8	120.1	117.4	127.4	132.8
Fish and sea food	97.3	95.9	95.8	99.4	103.9	101.3	101.4	99.2	106.8	99.7	103.9	112.8	102.2	101.4
Dairy products	107.4	105.9	105.1	104.4	104.7	104.0	103.6	104.5	103.9	104.1	104.5	104.6	103.0	104.6
Fats and oils	99.2	100.0	97.5	98.4	100.1	100.7	102.4	103.4	101.7	101.0	101.2	99.9	104.2	100.7
Eggs	107.0	103.4	104.0	107.4	108.5	110.1	116.5	125.2	130.5	133.6	134.1	125.4	116.9	117.1
Fruits and vegetables	101.9	101.0	100.6	100.0	104.6	104.7	107.1	99.2	90.6	88.1	90.5	95.4	101.0	98.8
Fruits, fresh	90.4	90.1	93.8	100.9	112.5	109.2	118.2	100.1	81.8	79.3	76.7	86.4	86.7	84.3
Vegetables, fresh	109.5	99.3	101.5	93.2	101.5	101.1	104.7	92.5	77.8	71.0	79.6	85.8	108.0	94.3

TABLE 10.—Continued

groups	4 week period 1	2	3	4	5	6	7	8	9	10	11	12	13	Annu. averag
													101.2	99.2

TABLE 10. --Continued

Food groups	4 week period 1	2	3	4	5	6	7	8	9	10	11	12	13	Annual average
Canned fruits	99.2	98.3	98.3	98.2	96.3	98.1	100.0	101.0	101.1	97.5	98.7	102.1	101.2	99.2
Canned vegetables	103.4	102.4	103.1	102.4	100.3	101.2	102.0	101.1	101.4	102.1	104.0	102.8	104.2	102.4
Frozen fruits	111.7	110.7	110.7	111.0	111.5	111.5	103.8	108.7	108.4	113.1	118.0	117.4	115.9	111.7
Frozen vegetables	106.0	97.9	94.8	97.6	91.4	97.7	89.9	93.8	95.5	95.2	92.7	99.8	98.2	95.0
Dried fruits & vegetables	110.8	110.6	115.8	109.9	112.5	119.2	107.4	107.5	105.3	107.5	104.2	107.3	106.8	109.6
----1954----														
Meats, poultry and fish	107.5	106.9	107.1	107.6	109.1	111.6	109.5	107.4	106.4	104.9	102.2	104.0	100.5	106.5
Meats	107.5	105.9	107.5	108.4	109.6	111.5	109.2	108.4	106.0	105.0	102.2	104.9	101.3	106.7
Beef	100.7	98.0	98.6	99.4	101.5	101.8	103.4	101.3	101.4	99.9	101.6	100.8	98.5	100.5
Pork	121.6	121.3	123.9	125.3	126.9	130.2	120.8	121.4	114.6	115.9	105.2	110.2	105.8	118.7
Other meats	102.8	100.6	101.7	102.0	101.4	104.2	104.5	105.0	104.0	101.6	100.8	104.1	102.6	102.7
Veal	91.0	97.4	107.6	106.0	102.4	103.1	92.4	99.8	99.0	97.3	82.3	92.6	93.6	97.3
Lamb, leg	100.3	101.2	104.9	113.4	91.6	115.7	120.6	101.8	90.5	101.2	110.4	94.8	97.3	102.1
Poultry	111.4	118.4	110.4	113.0	105.4	107.8	108.9	112.9	115.0	102.9	96.3	95.8	92.1	106.9
Fish and sea food	104.9	106.0	103.9	100.9	108.9	114.0	111.5	105.5	103.3	106.5	105.5	102.3	102.4	105.8
Dairy products	103.8	103.8	103.0	99.6	98.1	98.5	98.2	97.6	97.2	97.5	97.5	97.5	98.9	99.3
Fats and oils	100.5	100.3	100.3	99.9	100.8	102.1	102.9	103.7	103.4	103.8	101.5	108.9	99.8	101.4
Eggs	109.7	108.0	104.2	95.6	90.3	88.0	91.8	101.7	106.3	106.1	102.5	98.7	93.0	99.7
Fruits and vegetables	99.0	95.2	93.6	95.2	98.7	107.6	106.7	99.8	90.9	88.4	91.1	95.3	96.4	96.8

TABLE 10. - Continued

od groups	4 week period 1	2	3	4	5	6	7	8	9	10	11	12	13	Annua averag

Food groups	4 week period 1	2	3	4	5	6	7	8	9	10	11	12	13	Annual average
Fresh fruits	90.0	92.7	94.1	97.8	104.6	101.2	119.7	103.4	89.5	86.2	85.7	86.2	91.1	97.1
Vegetables, fresh	100.6	92.4	90.4	89.9	85.4	106.1	102.8	92.5	78.6	71.5	80.9	93.1	92.3	91.3
Canned fruits	103.1	98.1	97.9	100.0	100.9	101.8	101.5	104.0	97.7	99.2	99.9	103.8	103.5	100.9
Canned vegetables	102.7	101.3	101.5	101.0	100.0	102.6	102.0	100.6	98.4	97.7	100.1	103.9	103.4	101.1
Frozen fruits	108.5	95.8	83.5	81.8	92.5	100.4	102.6	103.4	105.2	102.4	101.3	98.8	96.7	97.9
Frozen vegetables	92.8	87.7	89.4	94.6	93.8	91.8	97.8	95.1	85.7	94.0	94.2	97.3	92.1	92.8
Dried fruits & vegetables	103.6	99.9	96.6	101.6	90.8	99.1	100.1	101.8	97.4	98.5	99.6	99.3	100.4	99.9
----1955----														
Cereal & bakery products	99.8	100.8	101.1	101.0	101.4	101.2	100.6	100.7	101.7	101.4	99.2	100.5	99.8	100.7
Cereal	99.7	100.4	101.2	100.0	100.3	101.4	100.9	98.9	100.4	99.5	96.3	100.4	98.1	99.8
Bakery products	99.4	100.8	101.0	101.3	101.7	101.2	100.5	100.7	102.1	101.3	100.0	100.5	100.3	100.8
Meats, poultry and fish	98.2	97.8	101.1	99.3	100.6	102.0	102.5	101.1	103.9	101.7	99.8	99.7	97.4	100.4
Meats	98.5	98.3	99.1	98.7	99.6	100.3	100.8	98.4	98.3	100.9	99.8	97.8	96.5	98.8
Beef	96.3	96.2	97.7	98.9	99.2	99.7	98.9	98.4	102.4	98.8	100.7	99.4	100.7	99.0
Pork	94.6	93.8	100.2	96.4	98.1	100.1	103.4	97.6	100.5	104.0	98.3	94.7	89.5	97.8
Other meats	101.5	101.4	102.1	102.6	103.4	101.2	100.6	100.2	99.7	102.3	99.8	100.3	99.3	101.1
Veal	89.0	93.6	95.0	99.7	103.8	93.9	97.6	98.3	97.4	90.7	95.0	90.3	88.0	94.8
Lamb, leg	98.8	102.1	82.9	97.9	100.9	103.6	115.2	103.2	105.8	101.7	114.8	101.4	94.2	101.7
Poultry	105.6	102.8	116.1	109.4	108.3	118.6	113.3	115.8	118.6	110.2	101.7	101.8	96.4	109.1

TABLE 10. -- Continued

d groups	4 week average 1	2	3	4	5	6	7	8	9	10	11	12	13	Annual average

TABLE 10. --Continued

Food groups	4 week average 1	2	3	4	5	6	7	8	9	10	11	12	13	Annual average
Fish and sea foods	100.6	101.1	100.6	95.5	100.4	99.0	103.5	103.5	104.9	100.1	99.1	106.0	101.8	101.2
Dairy products	98.1	95.6	95.2	94.5	94.2	94.2	94.3	94.8	95.3	96.1	97.9	98.7	98.4	95.9
Fruits and vegetables	97.6	97.5	97.0	99.8	103.7	104.1	106.2	96.7	94.0	91.1	95.2	98.9	99.3	98.2
Fruits, fresh	97.7	97.2	96.5	97.1	108.6	113.0	120.6	100.1	88.5	89.3	90.0	91.3	95.0	98.8
Vegetables, fresh	98.7	98.0	100.0	107.7	107.5	105.5	105.0	84.7	78.1	78.3	88.7	98.0	97.3	96.0
Canned fruits	100.0	97.7	98.9	98.0	98.2	99.0	100.1	100.4	101.8	95.5	98.8	102.0	101.3	99.4
Canned vegetables	99.5	100.0	99.3	96.6	98.5	99.5	99.8	101.8	100.1	98.3	100.1	103.7	104.1	100.1
Frozen fruits	88.6	82.5	91.5	96.2	97.5	101.6	101.7	101.5	103.9	104.6	108.2	107.7	106.6	99.4
Frozen vegetables	94.4	98.4	99.3	98.6	98.8	90.1	99.4	106.4	107.6	105.2	106.7	110.0	102.3	101.0
Dried fruits & vegetables	98.1	98.7	99.2	97.0	104.5	106.6	104.2	104.5	99.7	98.9	98.7	99.8	98.3	100.3
Other food at home	99.6	99.3	99.7	96.9	96.1	95.1	96.3	98.1	100.4	101.6	101.5	100.9	101.4	99.0
Sugar & sweets	99.1	98.2	100.7	97.9	96.7	96.6	96.1	96.8	97.6	99.4	99.4	100.6	101.4	98.5
Cooking aids	119.3	115.9	118.8	108.6	110.0	104.6	105.1	100.4	102.6	110.5	106.2	109.3	100.0	108.5
Partially prepared foods	101.2	99.7	100.2	97.0	101.6	103.2	97.0	99.6	98.3	98.2	97.6	98.8	101.0	99.5
Beverages	104.5	111.2	97.2	97.7	97.1	96.6	95.4	97.3	96.3	96.1	98.1	97.8	98.7	98.0
Fats & oils	100.7	100.4	99.0	97.9	96.0	98.6	97.8	97.8	98.5	97.5	95.8	94.7	97.2	97.4
Eggs	85.8	93.2	100.9	93.4	90.1	88.8	95.6	100.4	113.8	118.6	116.7	112.7	112.1	101.7
Miscellaneous	95.5	92.4	97.3	98.4	94.1	96.4	98.5	96.7	92.9	97.1	98.0	101.9	95.2	96.0
All food at home	98.5	97.7	99.2	98.4	99.1	99.6	100.1	98.6	99.2	98.6	98.9	99.7	99.0	99.0

TABLE 10.--Continued

ood groups	1	2	3	4	5	6	4 week period 7	8	9	10	11	12	13	Annual average
--1950--														

TABLE 10. --Continued

Food groups	4 week period 1	2	3	4	5	6	7	8	9	10	11	12	13	Annual average
----1956----														
Cereal & bakery products	99.6	99.9	100.0	99.5	99.6	98.5	97.6	99.0	99.5	99.7	99.4	99.1	100.6	99.4
Cereal	97.0	98.5	100.8	98.9	99.5	100.1	98.3	98.9	99.6	99.5	97.7	99.7	100.4	99.1
Bakery products	100.4	100.4	98.4	99.6	99.6	97.9	97.4	99.0	99.4	99.8	99.9	98.1	100.7	99.3
Meats, poultry and fish	94.7	95.6	92.2	93.0	96.2	98.8	99.0	97.9	99.4	97.9	98.4	98.8	97.3	96.9
Meats	91.3	92.6	89.6	92.1	93.4	97.1	98.9	97.4	101.3	99.1	99.1	99.6	97.5	96.0
Beef	92.5	93.1	91.8	92.6	92.8	94.9	96.4	98.0	103.7	99.4	98.9	102.0	98.4	96.5
Pork	86.5	90.4	81.8	90.7	94.8	101.8	94.2	93.9	101.0	102.2	100.6	97.7	97.5	95.2
Other meats	95.9	96.2	96.4	95.1	91.8	93.9	94.3	93.9	95.4	92.5	97.4	97.1	95.8	95.1
Veal	102.7	87.7	103.4	83.6	92.8	99.8	88.7	99.7	95.3	94.1	92.4	99.0	96.0	95.0
Lamb, leg	86.3	84.8	96.2	79.6	97.6	98.3	100.3	79.0	106.2	101.0	101.5	84.9	99.5	93.5
Poultry	107.4	111.2	98.8	89.3	115.6	112.5	109.0	104.6	91.7	97.6	92.1	93.6	85.2	100.7
Fish and sea foods	101.0	98.8	99.1	99.4	96.5	98.1	95.5	95.5	96.9	93.7	99.8	99.2	103.7	98.1
Dairy products	98.2	98.3	97.3	99.2	100.9	100.7	101.7	103.3	103.4	104.4	104.8	105.0	104.8	101.7
Fruits and vegetables	97.1	101.2	102.6	104.0	105.7	112.6	114.6	107.7	93.6	90.3	91.9	102.3	102.2	102.0
Fruits, fresh	91.7	103.3	98.7	106.3	113.1	126.5	122.6	102.0	83.5	84.4	81.4	102.4	97.3	101.0
Vegetables, fresh	97.5	99.2	105.5	105.3	107.7	118.2	125.6	116.0	84.7	75.8	84.2	103.6	104.6	102.1
Fruits, canned	98.4	101.3	100.3	101.7	99.6	100.2	102.3	99.6	103.3	98.6	101.4	106.6	103.3	101.3
Vegetables, canned	101.3	102.2	102.8	103.1	101.2	102.0	104.4	102.5	103.0	99.7	100.8	102.1	103.7	102.2
Frozen fruits	102.8	101.9	105.4	105.2	102.1	105.8	106.6	105.0	107.1	108.6	107.5	106.0	108.3	105.6

TABLE 10. Continued

ood groups	4 week period													Annual average
	1	2	3	4	5	6	7	8	9	10	11	12	13	

TABLE 10. --Continued

Food groups	4 week period 1	2	3	4	5	6	7	8	9	10	11	12	13	Annual average
Frozen vegetables	101.8	105.4	100.4	103.5	103.5	103.2	108.7	105.2	102.4	99.2	99.5	101.8	99.6	102.7
Dried fruits & vegetables	95.3	95.4	95.1	94.6	96.9	98.9	102.7	109.6	107.7	105.0	104.1	101.4	99.4	100.5
Other food at home	100.5	98.5	98.5	98.8	97.9	99.2	99.4	100.8	101.4	102.4	101.6	102.7	102.5	100.3
Sugar & sweets	101.6	100.4	99.2	98.5	99.4	99.7	99.5	100.3	99.6	98.9	99.1	101.0	102.9	100.0
Cooking aids	96.6	96.8	96.3	99.6	94.1	94.6	89.1	90.6	90.0	93.5	91.2	92.3	89.0	93.4
Partially prepared foods	99.8	97.9	98.9	95.0	103.2	104.6	99.4	100.4	100.9	101.1	99.5	99.8	104.0	100.3
Beverages	97.4	96.9	98.0	98.6	97.1	98.8	101.2	101.9	102.5	103.1	102.6	104.3	104.8	100.6
Fats & oils	95.3	97.2	97.1	98.0	101.2	102.3	101.4	100.6	99.7	103.7	100.5	102.5	104.2	100.3
Eggs	112.3	101.9	102.3	100.2	97.2	94.7	96.4	103.1	102.8	105.1	105.7	103.6	98.3	101.7
Miscellaneous	98.0	99.1	100.5	99.0	96.0	101.5	92.8	99.1	100.6	97.4	95.2	101.2	99.4	98.5
All food at home	97.7	98.2	97.1	98.0	99.5	101.6	102.1	101.1	99.6	99.2	102.7	101.7	101.1	100.0
----1957----														
Cereal & bakery products	99.5	99.9	99.5	101.8	102.3	102.0	102.6	103.4	104.6	103.8	100.8	102.5	102.8	101.8
Cereal	97.4	100.6	98.4	100.4	103.3	102.3	101.1	103.2	105.2	99.8	101.2	101.4	101.4	101.2
Bakery products	100.2	99.7	99.9	102.2	102.0	101.9	103.0	103.5	104.4	102.4	100.6	102.9	103.2	101.9
Meats, poultry and fish	97.3	96.6	97.4	98.1	100.8	102.9	105.8	108.7	108.3	104.8	103.0	103.6	106.0	102.6
Meats	98.4	96.8	98.5	98.8	103.2	104.7	108.6	111.5	112.8	109.9	106.0	107.7	110.3	105.2

TABLE 10. Continued

ood groups	4 week period 1	2	3	4	5	6	7	8	9	10	11	12	13	Annual average

TABLE 10. --Continued

Food groups	4 week period 1	2	3	4	5	6	7	8	9	10	11	12	13	Annual average
Beef	93.9	94.9	96.5	98.7	103.5	105.2	109.6	111.4	111.5	108.3	106.3	108.4	109.7	112.2
Pork	100.0	98.5	101.7	98.8	103.9	104.3	109.1	112.8	115.5	113.3	104.4	106.0	111.4	106.1
Other meats	96.1	97.4	98.1	97.6	99.7	103.6	105.1	108.4	109.3	107.6	106.9	109.7	108.8	103.7
Veal	109.8	112.4	101.7	110.7	113.4	113.7	108.8	112.4	119.8	111.0	110.4	104.0	107.0	110.4
Lamb, leg	75.3	88.1	91.4	98.2	105.2	92.8	103.5	122.4	124.5	112.6	99.3	116.0	130.4	104.7
Poultry	94.4	89.5	88.9	89.6	86.1	91.4	94.7	101.8	95.9	93.3	81.9	80.9	94.5	90.2
Fish and sea food	102.3	100.5	98.1	100.4	100.2	103.1	101.4	101.4	98.0	96.9	104.1	100.9	102.0	100.7
Dairy products	104.7	103.9	102.5	102.0	101.8	100.7	100.6	100.3	101.2	101.5	100.5	100.4	101.3	101.7
Fruits and vegetables	99.8	102.0	102.1	106.7	104.6	105.8	106.1	100.1	91.4	87.9	96.1	97.8	100.2	100.0
Fruits, fresh	93.4	103.3	102.5	115.5	114.3	109.9	110.7	103.7	88.0	78.6	99.0	95.0	94.2	100.6
Vegetables, fresh	104.2	104.2	104.2	109.0	109.6	114.3	114.0	98.5	86.6	81.6	91.9	99.6	106.8	101.9
Canned fruits	101.2	102.0	102.7	100.6	100.5	104.2	103.5	102.8	99.6	100.7	98.8	102.3	100.4	101.5
Canned vegetables	102.3	100.5	100.4	102.4	97.6	101.6	102.5	100.9	94.6	96.4	96.7	96.4	103.7	99.7
Frozen fruits	102.8	99.3	102.0	101.0	88.1	85.9	85.5	91.1	94.2	94.0	97.4	99.6	98.5	95.2
Frozen vegetables	96.0	94.6	96.0	92.4	93.2	99.1	100.6	98.8	90.1	93.6	91.5	97.4	92.0	94.2
Dried fruits & vegetables	98.7	99.0	99.0	99.8	98.2	99.4	100.3	98.8	97.8	97.2	97.7	99.7	97.5	98.8
Other food at home	101.4	100.6	100.2	101.1	98.8	99.1	99.8	100.9	102.7	101.0	101.4	103.0	102.4	101.0
Sugar & sweets	99.3	100.6	101.1	105.8	99.6	100.9	101.9	101.5	102.1	101.5	101.1	102.1	103.6	101.6

TABLE 10. — Continued

od groups	4 week period 1	2	3	4	5	6	7	8	9	10	11	12	13	Annu average
												97.8	100.3	97.3

TABLE 10. --Continued

Food groups	4 week period 1	2	3	4	5	6	7	8	9	10	11	12	13	Annual average
Cooking aids	99.7	96.8	93.0	98.5	94.8	97.0	98.9	96.2	95.4	98.8	98.2	97.8	100.3	97.3
Partially prepared foods	100.6	101.0	102.0	99.5	100.0	99.3	103.9	103.1	102.3	100.2	103.8	101.6	102.8	101.5
Beverages	105.1	103.2	103.9	105.7	103.1	103.5	102.4	102.4	102.8	98.2	97.8	100.4	99.1	102.1
Fats and oils	104.9	104.8	104.0	103.6	101.4	103.2	104.1	103.6	104.0	99.5	98.5	100.7	100.2	102.5
Eggs	91.8	90.9	89.0	86.5	86.1	84.4	86.3	84.5	103.2	108.7	110.2	112.5	109.7	96.4
Miscellaneous	105.8	107.3	99.9	104.3	105.3	107.1	108.4	105.8	101.1	100.1	111.5	106.5	108.6	105.5
All food at home	98.5	100.2	100.1	103.4	101.5	102.2	103.4	103.5	102.4	100.5	100.8	102.0	103.1	101.7
----1958----														
Cereal & bakery products	102.2	101.9	102.2	102.6	102.4	102.3	101.4	102.4	102.1	101.5	101.2	101.7	102.5	102.0
Cereal	102.2	99.5	103.3	103.5	103.5	103.5	103.4	103.2	102.4	100.9	99.8	102.0	102.9	102.3
Bakery products	102.2	102.7	101.8	102.2	101.9	101.8	100.8	102.2	102.1	100.3	101.6	101.6	102.3	101.8
Meats, poultry and fish	105.0	107.4	106.4	110.2	111.4	113.7	114.7	113.2	111.7	111.8	109.6	111.6	110.0	110.5
Meats	109.0	110.9	109.8	114.9	116.7	118.8	120.6	121.0	118.0	119.4	115.4	118.1	116.6	116.1
Beef	109.9	113.3	108.3	116.4	119.8	121.7	124.7	125.8	118.8	122.1	116.8	120.5	121.4	118.4
Pork	106.8	107.8	110.7	115.1	114.3	116.8	118.2	120.0	117.1	116.2	112.5	114.4	110.3	113.9
Other meats	110.9	110.8	111.8	114.2	114.0	116.1	114.9	116.7	118.4	116.6	117.5	119.8	116.7	115.3
Veal	107.0	95.9	111.7	104.0	104.1	105.8	109.1	103.4	114.4	118.4	111.4	109.8	107.6	107.9
Lamb, leg	110.2	129.7	119.7	72.1	122.8	123.5	121.6	66.9	115.2	141.2	115.5	114.9	104.0	112.1
Poultry	86.4	106.1	102.1	92.7	95.8	96.2	97.1	84.8	86.8	81.9	81.1	84.6	80.6	90.4
Fish and sea food	101.1	93.5	93.7	99.3	99.4	103.7	101.4	98.8	101.4	99.0	103.5	101.5	101.3	99.8

TABLE 10. - Continued

ood groups	4 week period 1	2	3	4	5	6	7	8	9	10	11	12	13	Annual average

TABLE 10. --Continued

Food groups	4 week period 1	2	3	4	5	6	7	8	9	10	11	12	13	Annual average
Dairy products	100.9	98.8	100.2	98.8	98.1	97.4	97.9	97.6	99.2	98.2	98.2	97.7	96.1	98.4
Fruits and vegetables	103.1	107.2	109.7	105.9	112.7	116.3	117.2	102.6	94.4	91.7	97.5	102.8	103.4	105.6
Fruits, fresh	93.4	105.8	100.5	115.4	112.5	119.8	114.5	91.1	82.5	76.1	85.2	83.1	82.3	97.1
Fegetables, fresh	115.9	117.5	129.1	136.6	130.4	119.6	112.2	92.2	73.5	71.2	79.5	93.8	101.0	105.6
Canned fruits	101.8	98.8	103.0	100.8	97.0	97.6	103.3	100.8	103.2	99.6	98.0	97.8	102.9	100.4
Canned vegetables	99.9	100.2	97.1	97.0	94.2	97.6	98.3	97.8	100.5	99.7	98.7	101.2	103.8	98.9
Frozen fruits	111.4	116.8	125.0	129.4	132.4	138.2	138.3	145.2	144.2	147.4	149.3	151.9	153.6	137.2
Frozen vegetables	90.5	99.2	90.8	89.6	85.4	90.7	95.2	95.1	98.9	91.8	93.8	93.1	88.0	92.2
Dried fruits & vegetables	98.2	101.0	102.9	105.7	106.5	106.4	104.5	107.9	105.7	104.7	103.4	102.6	101.1	103.9
Other food at home	100.4	97.8	98.9	98.3	97.2	97.0	95.9	96.1	96.3	95.9	95.5	95.0	99.1	96.9
Sugar & sweets	98.6	96.6	101.4	105.2	102.8	104.4	101.1	102.8	104.8	99.2	100.0	103.0	107.5	102.1
Cooking aids	98.3	96.7	108.3	100.4	98.5	99.6	101.2	100.4	99.8	110.8	100.0	113.2	105.3	102.5
Partially prepared foods	102.5	99.4	100.5	100.3	102.9	101.3	102.2	103.6	101.3	102.2	101.4	101.7	104.0	101.8
Beverages	99.2	97.6	97.5	96.3	96.6	97.7	95.5	96.1	94.6	94.5	92.5	91.8	91.3	95.5
Fats and oils	101.3	98.3	95.9	100.0	100.7	100.1	98.8	97.4	97.3	96.4	97.6	95.0	96.4	97.9
Eggs	101.9	97.0	94.1	94.1	88.0	84.6	85.8	85.6	89.4	90.5	94.5	89.9	86.3	90.9
Miscellaneous	108.2	107.8	107.0	104.2	103.7	103.4	106.5	106.6	106.7	103.7	106.0	101.4	108.3	105.6
All food at home	102.8	103.1	103.5	105.5	105.0	106.2	105.6	103.5	102.1	101.1	101.4	102.9	102.1	103.4

CHAPTER VII

COMPARISONS OF THE INDEXES CALCULATED BY USING DIFFERENT PRICES AND WEIGHTS, AND THE SAME PRICES BUT DIFFERENT WEIGHTS, FOR ALL FOODS

Introduction

Several comparisons, between the B. L. S. series and the M. S. U. Consumer Panel price series, have been made in Chapters III and IV. This chapter deals primarily with the construction of indexes, using different prices and weights, and using the same prices but different weights. Comparisons were made in order to: (1) evaluate the differences between the three food price indexes--the M. S. U. Consumer Panel food price index (based on the panel prices for Lansing), the B. L. S. food price index (based on the store sample for Detroit), and the N. I. C. B. index (based on the store sample for Lansing); and (2) test the effects of using the B. L. S. weights for Detroit and M. S. U. Consumer Panel weights for Lansing (both based on the panel prices) in constructing the food price index for Lansing.

Comparisons of the M. S. U. Consumer Panel Food Price Index with the B. L. S. Index for Detroit, and the N. I. C. B. Index for Lansing

Comparison of the M. S. U. Consumer Panel retail food price index and the Detroit B. L. S. retail food price index. --Figure 31 shows the movement of the "all food at home" index of the M. S. U. Consumer

Panel for Lansing and the B. L. S. for Detroit. The Detroit B. L. S. food price indexes (1947-49 = 100) were converted to the same base period as was used for the M. S. U. Consumer Panel (1955-57 = 100) in order to facilitate comparisons from time to time. These two indexes moved together fairly closely, with differences in price levels being due to the item specifications and the levels of the base period prices and the actual prices in the given periods. The correlations between the two indexes was .82, which is significant at the .1 percent level. Both indexes exhibit an upward trend. However, the Detroit B. L. S. index fluctuated over a longer duration than the Lansing M. S. U. Consumer Panel index. In comparing the annual average indexes, the B. L. S. series increased .8 percent from 1955 to 1956, 2.5 percent from 1956 to 1957, and 3.3 percent from 1957 to 1958, while the M. S. U. Consumer Panel series increased 1 percent, 1.7 percent, and 1.7 percent, respectively. The panel index showed more period-to-period variability. Presumably this variation in the panel index reflected more of the effects of the prices of "specials" and, to some extent, changes in the quality of some of the products purchased by the panel families from one period to another.

Comparison of the M. S. U. Consumer Panel retail food price index and the N. I. C. B. retail food price index, for Lansing.--The N. I. C. B. food price index was calculated four times a year; in March, June, September and December. These months correspond closely to the 3rd, 6th, 9th and 13th periods, of the panel series,

Fig. 31. Comparison of the retail food price indexes, calculated using different samples, between the B.L.S. for Detroit and the M.S.U. Consumer Panel for Lansing, Michigan

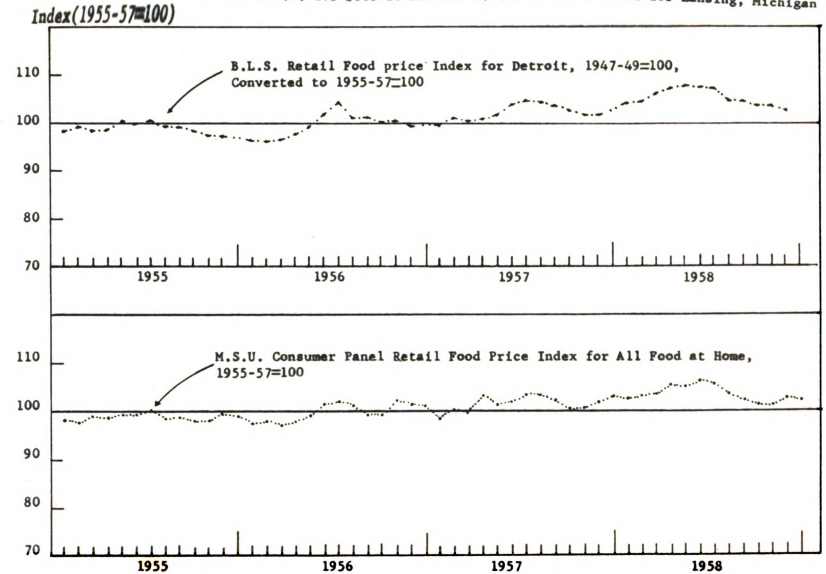
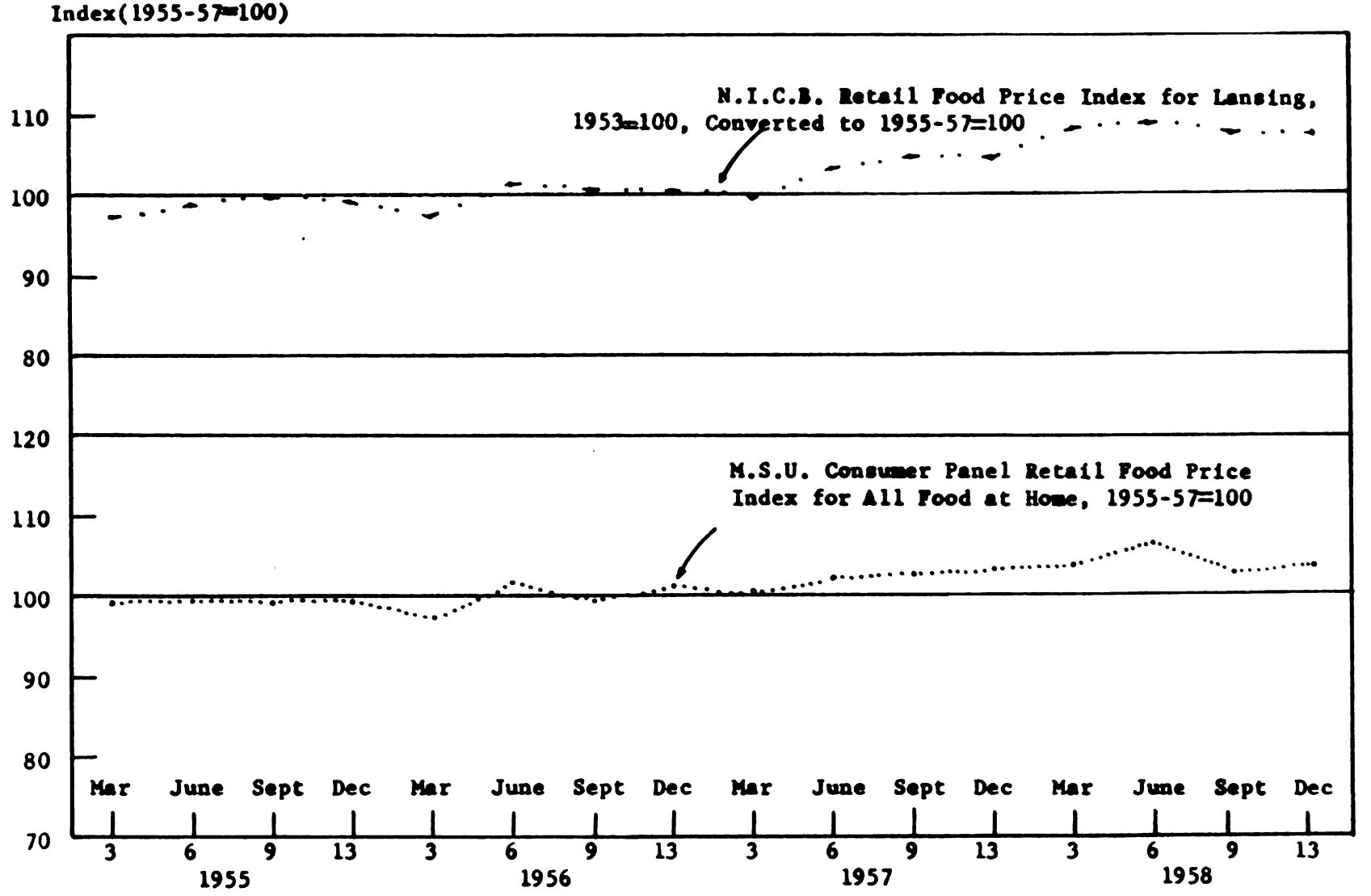


Fig. 32. Comparison of the retail food price indexes for Lansing, calculated using different samples, between the National Industrial Conference Board and the M.S.U. Consumer Panel



respectively. The M. S. U. Consumer Panel index and the N. I. C. B. index for Lansing were compared for these periods. The N. I. C. B. index included both food eaten at home and away from home, while the M. S. U. Consumer Panel index was for food eaten at home only.

A graphic comparison of the food price indexes for Lansing between the panel and the N. I. C. B. series is shown in Figure 32. The panel food price index moved parallel to the N. I. C. B. food price index despite varying specifications of the food items. The correlation between the two indexes was .81. This is significant at the 1 percent level.

Although the two indexes moved parallel to each other, there were wider fluctuations in the N. I. C. B. series than in the panel series. In comparing the annual average indexes, the N. I. C. B. series went up 1.3 percent from 1955 to 1956, 2.4 percent from 1956 to 1957, and 5.3 percent from 1957 to 1958, while the panel series went up 1 percent, 1.7 percent, and 1.7 percent respectively. The wider fluctuation in the N. I. C. B. index probably resulted from the combined effects of the greater relative importance of meats and fresh fruits and vegetables in the N. I. C. B. series than in the M. S. U. Consumer Panel series. The differences between the store sample prices and panel sample prices suggest another explanation.

Comparison of the Indexes, Based on the Same Prices, but Calculated by Using Different Weights

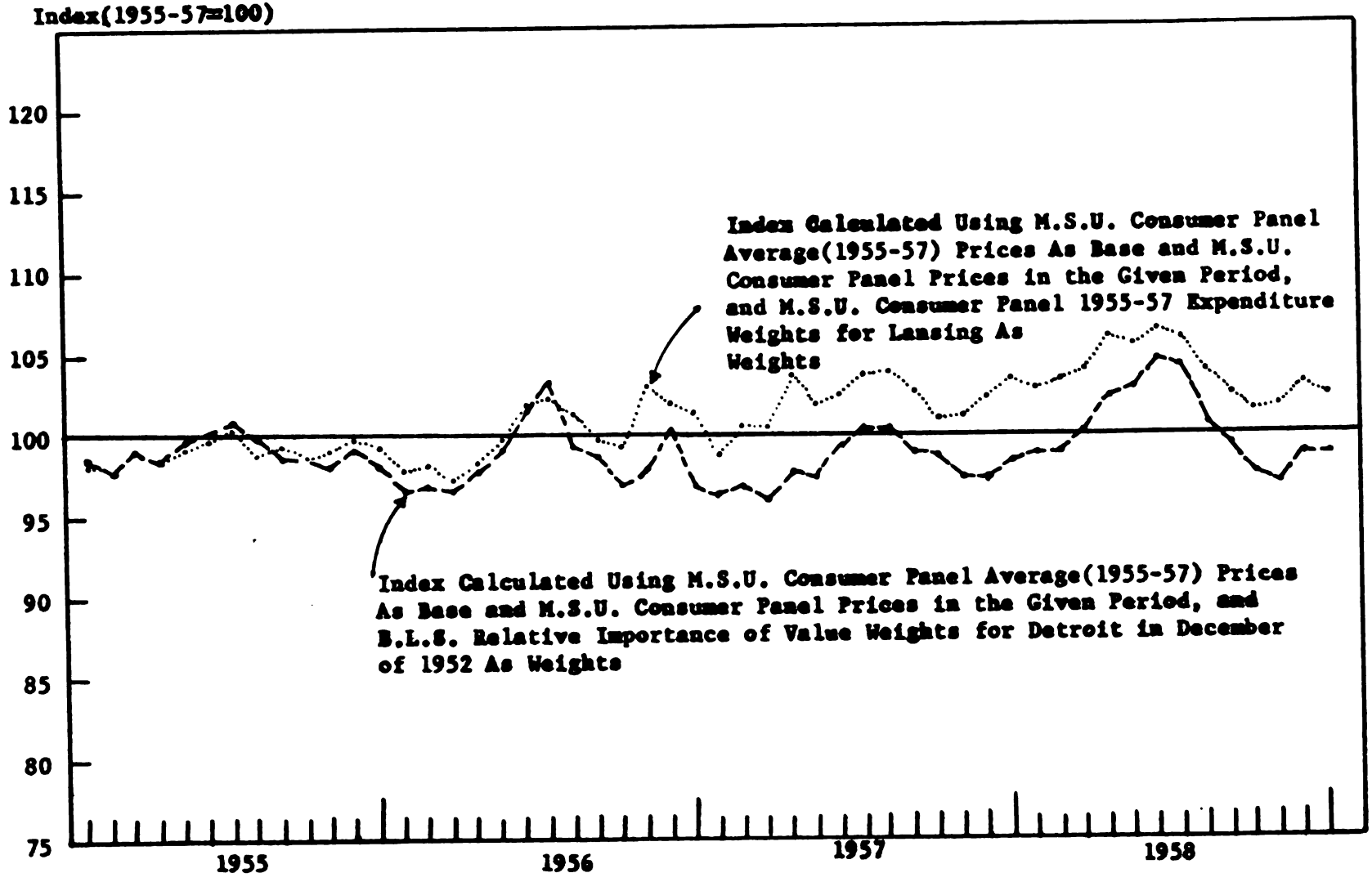
It seems desirable to evaluate the differences between using Detroit B. L. S. weights with the panel prices and the M. S. U. Consumer Panel weights with panel prices to construct a Lansing retail food price index. The B. L. S. weights represent the average family expenditures for foods of Detroit urban wage-earner and clerical worker families in the year 1952. These expenditure weights are currently used by the B. L. S. to calculate the retail food price index for Detroit and, at the same time, to combine Detroit with other cities to form the U. S. city average index. As we know, the proportion in which the consumer's dollar is shared among different kinds of foods changes over time. Even though the division of family expenditures on food does not change rapidly, small shifts of the relative importance of different groups of foods will affect the total food index. Considering the overall changes in eating habits that have taken place and the greater variety of foods that have been offered, as income increased from 1952 to 1957, it is reasonable to assume that the division of the food dollar spent by the Detroit families has also been changed from 1952 to 1957.

The division of expenditures for foods in different cities shows the effects of regional food habits. In the southern part of this country, in a city like Birmingham, Alabama, cereal and bakery products

presumably take a larger share of the food dollar than in the northern cities like Detroit and Lansing. The different levels of income between the North and South suggest one explanation; and Southern customs and eating habits indicate another. It would be reasonable to assume that the relative importances of the major components in family spending patterns for foods are about the same for both Detroit and Lansing families. In a broad sense, United States cities have spending patterns which resemble one another rather closely. The known expenditure patterns of neighboring cities have been used a number of occasions in the past, both by the B. L. S. and the N. I. C. B., for estimating the expenditure patterns for unsurveyed cities. These were done on the assumption that graphic proximity is an adequate basis for estimation (other factors such as income, climate, industrialization, family size are also correlated with spending patterns).

An effort to explore some of the differences between the B. L. S. expenditure patterns of foods, for the U. S. city average, and the M. S. U. Consumer Panel expenditure patterns, for Lansing, has been made in Chapter V, Table 9. The following graphic comparisons were made for two purposes. The first is to analyze the differences between the Lansing food price indexes using Detroit B. L. S. weights and panel prices, and using panel weights and panel prices. The second is to evaluate the bias of the B. L. S. food price index for Detroit, assuming that the Detroit families distributed their 1955-57 food expenditures in the same manner as the Lansing families did in the

Fig. 33. Comparison of the food price indexes, calculated using B.L.S. weights for Detroit and M.S.U. Consumer Panel weights for Lansing



1955-57 period and that the Detroit food prices increased at the same rate as the Lansing food prices from 1955 to 1958.

The two indexes, as shown in Figure 33, were both calculated by using Lansing prices obtained from the M. S. U. Consumer Panel. The first, represented by the dashed line, was calculated by using the B. L. S. weights for Detroit; the second, represented by the dotted line, was calculated by using the panel weights for Lansing. In the beginning of 1955, as shown in the figure, the two food price indexes converged. This was mainly due to low prices in dairy products and the high prices in fresh fruits and vegetables, and egge. The dairy products were relatively more important in the panel weights for Lansing than in the B. L. S. weights for Detroit; and the fresh fruits and vegetables and eggs were relatively less important in the panel weights for Lansing than in the B. L. S. weights for Detroit. During this period, the Lansing food price index would be the same whether the Detroit B. L. S. weights or Lansing panel weights were used. The similarity resulted mainly from the fact that the weight differences were offset by the different rate of the price changes between food items.

From the 4th period to the 9th period of 1955, the prices of fresh fruits and vegetables, and eggs continued to increase sharply while the prices of dairy products levelled off. During this period, the dashed line (representing the index calculated by the Detroit B. L. S. weights) moved above the dotted line (representing the index

calculated by the panel weights). This was due to the high prices of fresh fruits and vegetables, and eggs. The higher prices were accompanied by the low prices of fish in this period, but fish constituted a relatively less important component in the Detroit B. L. S. weights than in the panel weight. In this period, the Lansing food price index would overestimate the cost of foods for Lansing families, if the Detroit B. L. S. weights were used in constructing the index. At the same time, the B. L. S. food price index for Detroit would have biased upward the estimate of the food for Detroit families, if the Detroit 1955-57 family spending patterns were the same as the panel 1955-57 family spending patterns.

From the 9th period of 1955 through the 13th period of 1958, the index represented by the dotted line gradually moved above the index represented by the dashed line. The continued increase in prices of dairy products from the latter part of 1955 to the early part of 1958, accompanied by the sharply lower prices of eggs, were mainly responsible for this difference. The drop in the prices of dairy products in 1958 and the sharply decreased prices in the fresh fruits and beverages compensated for each other in the two indexes. Thus, the index which was calculated by the panel weights was still above the index which was calculated by the Detroit B. L. S. weights despite a slight decline in dairy product prices in 1958. From the 9th period of 1955 through the 13th period of 1958 (except the 7th period of 1956), the Lansing food price index would underestimate

the cost of foods for Lansing families, if it were based on the B. L. S. weights for Detroit. At the same time, the B. L. S. food price index would have a downward bias in estimating the food cost for Detroit families, if their spending patterns for food in the period of 1955-57 were the same as the panel families in the same period and the rate of increase or decrease in the food prices in Detroit were similar to the price changes of the food items in Lansing.

When the index, calculated using the panel weights, moved below the index which was calculated using the Detroit B. L. S. weights, it was an indication either that there were price reductions in foods of which Lansing families buy relatively more or that the price increases were in foods of which Lansing families buy relatively less. In this period, the Lansing families would spend less money on food items than the Detroit families if the spending patterns for foods of Detroit families remained the same as they were in 1952. When the index, calculated using the panel weights moved above the index which was calculated using the Detroit B. L. S. weights, it was an indication either that there were price reductions in food of which Lansing families buy relatively less or that the price increases were in foods of which Lansing families buy relatively more. The Lansing families would spend more money on food items in this period than the Detroit families if the spending patterns of Detroit families for foods remained the same as they were in 1952. It seems unlikely that the Detroit families spent the same amount of money on each group of food items in the period of

1955-57 as the same as they did in 1952. It is very likely that the Detroit families have similar spending patterns in the period of 1955-57 to the Lansing panel families in the same period. In this case, if the Detroit family spending patterns in 1955-57 were the same as the Lansing families, the B. L. S. index for Detroit would have underestimated the cost of foods for Detroit families from the latter part of 1955 through the end of 1958 (except the 7th period of 1956). Likewise, the B. L. S. food price index for Detroit would have overestimated but very slightly the cost of foods for Detroit families from April to September of 1955. (See Figure 33.) In comparing the annual averages between the two indexes, calculated by using different weights, the index with panel weights stood at 99. 1 in 1955, 100. 1 in 1957, and 103. 5 in 1958, while the index with the Detroit B. L. S. weights stood at 98. 9, 98. 5, 97. 6, and 100. 2 respectively. This indicates that the index with panel weights was . 2 percent higher in 1955, 1. 6 percent higher in 1956, 4. 2 percent higher in 1957, and 3. 3 percent higher in 1958 than the index with the Detroit B. L. S. weights.

CHAPTER VIII

THE STRENGTH AND WEAKNESSES OF THE M. S. U. CONSUMER PANEL RETAIL FOOD PRICE INDEX IN COMPARISON WITH THE B. L. S. RETAIL FOOD PRICE INDEX

This chapter undertakes a comparison of the strength and weaknesses of the M. S. U. Consumer Panel retail food price index and of the B. L. S. retail food price index. The problem of constructing an index number is as much one of economic theory as it is of statistical technique. Most of the authors who have discussed index numbers have laid a strong emphasis on the problem of sampling and the choice of formulas. King says: "The problem of index number arises entirely from the fact that index numbers are problems of sampling, nothing more and nothing less. If complete data are used, it is easy enough to give the formula that will answer any definite question--hence there is no problem involved."[1]

Fisher gives over 150 different formulas for the construction of index numbers.[2] He recognizes, however, the other sources of errors in index numbers: choice of items (if a price index is in question), number of items included, and errors in the price quotations. Any one

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[1] Willford I. King, Index Number Elucidate (New York: Longmans, Green and Co., 1930), p. 49.

[2] Irving Fisher, The Making of Index Numbers (New York: Houghton Mifflin Co., 1927).

of these, he admits, may be more important than the choice of formula. But at the present time, he states, "The chief source of error is the formula."[3] This type of error could, in his opinion, be eliminated simply by using one of the many good formulas which he presents. Each of these other sources of errors "offers a field of study which has scarcely been touched."[4]

The sampling procedures and the selection of formulas for the index number construction have been discussed by many index number writers. It has been recognized that the practical necessity of building index numbers upon incomplete data does in fact make the sample as important as the choice of formula, in any index number construction. The consensus of opinion to date is that we would have many technical problems in constructing an index number even if we had complete data and appropriate formulas. With this in mind, therefore, an appraisal of the strengths and weaknesses of the panel food price index in comparison with the B. L. S. retail food price index, is not limited in the areas of sampling and formulas. The following brief discussion focuses on the differences between the two series of food price indexes, referring particularly to: (1) the methods of obtaining the spending patterns from a representative sample of families; (2) the techniques of choosing the items which are priced in the index; (3) the method of collecting prices; (4) the index formulas

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[3] Ibid., p. 342.

[4] Ibid., p. 331.

used; and (5) the weights used in index construction.

The methods of obtaining the spending patterns from a representative sample of families. --The B. L. S. family spending patterns, which formed the B. L. S. index weights, were determined by the 1950 survey. A complete record of the kinds, qualities, and amounts of foods was obtained by the interviewers who visited and interviewed those sample families which were selected by the B. L. S. to represent all city wage earners and clerical workers. The M. S. U. Consumer Panel family spending patterns, which formed the panel index weights, were determined by taking an average of the reporting diaries for the 3-year period, 1955-57.

Comparison of these two methods of collecting information from consumers shows that the panel method offers more strength than the B. L. S. direct survey in the following aspects: In the first place, the panel method is more sensitive to change in individual behavior from time to time. A 3-year average of weekly purchases, which was used to determine the spending patterns of the panel families, includes the changes in the consumption behavior from week to week over the entire 3-year period. The B. L. S. direct interviews, which were used to determine the spending patterns of the B. L. S. sample families, can only provide the information of kinds, qualities, and amount of foods bought at a particular time in the year of 1950. This information, which was provided by the interviewers, covered only the food purchases in a 7-day period. The information obtained may

be biased by the seasonal purchases of the families. Direct interviews can be done quickly for a specified period and the results become available in a short time. They cannot include information on changes in consumption behavior over time. Secondly, diary reports from panel families furnish more accurate information on food purchases than data which were obtained from interviews. It seems likely that those who are interviewed cannot recall their purchases as accurately as those who keep a diary record for their food purchases from week to week.

On the other hand, the panel method has the following weaknesses in comparison with the recall method: In the first place, the panel members may become conditioned to the items in the recording diary and may begin to exhibit a different kind of buying behavior than they would if they were not members of the panel. In this aspect, the direct survey may also bias the information collected by interviewers. Those who are interviewed are often affected by the interviews so that they usually become different from those who are not interviewed. The consequent loss of representativeness is obvious. Second, as time goes on, some panel members drop out and are replaced by new members. This may introduce an initial bias. In order to guard against this bias and maintain a representative sample of the universe, the M. S. U. Consumer Panel conducted three sample censuses over the 8-year period. Therefore, replacement members in the panel do not seriously affect the representativeness

of sample. Thirdly, the consumer reporting panel is an expensive operation, particularly on a national scale. It also requires constant and expert administration. These may be a weakness of the panel method of collecting information, but they are not a weakness of the panel retail food price index itself, since the panel data were already collected for other purposes before the construction of the panel index was initiated.

The techniques of choosing the items which are priced in the index.-- The techniques of choosing food items, which are used in the panel food price index, are the same as those used in the B. L. S. food price index. The selection of foods includes: items that are relatively important in family spending, items that are representative of price change for groups of related products, items that have distinctive price movements of their own, and, in some cases, several qualities of items priced to represent a single item. However, the panel index priced many more food items than the B. L. S. food price index. (For comparisons of the food items included in the panel series and the B. L. S. series, see Table 9, Chapter V). If these two samples are equally well representative of their population, then the more items priced in the index the smaller the error in measuring the average price change of all foods will be.

The method of collecting prices. --If the index is specifically designed for the purpose of measuring changes in cost of foods due to changes in prices, the strength of using panel methods to collect prices

in comparison with the B. L. S. store sample prices is obvious. The panel price series is the weighted average price. The price of each item is the total expenditure divided by the total quantity, bought by all panel families for each week. The B. L. S. food prices are collected from the food store only once a month. They are collected during the first three days of the week which includes the 15th of the month. It is fairly well accepted that most of the housewives buy their foods during the week end in order to take advantage of the week-end specials and discounts. The B. L. S. store prices are collected in the first three days of the week when only a small proportion of the total amount of foods are bought and few specials and discounts are offered. In this case, the panel price reflects the actual prices paid by the consumers for each food item purchased during the week, while the B. L. S. store sample price reflects only the prices charged by the stores in the specified time of each month. The food price index, which was calculated using panel prices, more accurately reflects the prices of food paid by the consumers than the index which was calculated using the B. L. S. store sample prices. On the other hand, the panel prices are not as explicit as the B. L. S. store sample prices. The panel prices which are paid by the panel families are for items of varying sizes and qualities. The B. L. S. store sample prices are for particular specifications of each given item. The price changes from one period of time to another are not due to quantity and quality differences, but only reflect changes in prices.

Therefore, the food price index which was calculated using panel prices not only reflects the price changes from one period to another but also reflects the differences in quantities and qualities purchased by the panel families from week to week.

The index formulas used. --The B. L. S. has adopted a chain index for its revised index with each link calculated by the Laspeyres' formula. The chain index simplifies the linking procedure when the weights are revised. The Laspeyres' formula was also used in combining prices in the panel index. Because the weights used in the panel index represent the average panel family expenditure patterns of the three years 1955-57, the panel index did not require any weight revision or linking. In this case, the panel index is an aggregative index constructed on a fixed base; commensurability exists between any two periods of time. The weights ascribed to each component of such an index defined the relative magnitude of each such component in relation to all others and to their totality. Each component of the index is made comparable to all others.

Similitude, which is the essence of all measurement, however, is not present in the case of chain indexes. When such indexes are constructed, the relative magnitude of the different components is not defined uniquely over the entire span of the time sequence. An index number composed of several different sets of weights linked together has no operational significance since a set of magnitudes derived on a basis of fixed weights during one period of

time is not commensurate with another set of magnitudes derived from a differing weighting pattern in another period of time.

The weight-fixed price index has a theoretical advantage if the index, for example, the panel food price index, is only applied over a short period. The panel food price index for total food was only constructed for the 1955 to 1958 period, because of the lack of data. However, the weights used in the panel food price index were based on the average of the 3-year (1955-57) expenditure patterns of the panel families. Therefore, the panel food price index did not require revision of the weights or linking. If the panel index continues over a longer period of time, the index would have to be chained if the weights were to be revised. In this case, the panel index would become a chain index like the B. L. S. index. Thus, the panel index would have no theoretical advantage.

Weights used in the index construction. --The "market basket" is the basic framework of the index. It is based on family spending patterns. But the spending patterns change over time. It is because of the changes in people's buying habits that the index weights have to be revised. The revision of weights reflects this change and brings the index up to date in terms of current buying.

The new "market basket" of the B. L. S. revised index was based on the survey of consumer spending patterns in 1960. The 1950 family spending patterns were adjusted for changes between 1950 and 1952. This provided the basis for the new "market basket" of

of the year 1952. The panel index weights were based on a 3-year (1955-57) average of expenditures of the panel families. The resulting index of the B. L. S. series is a measure of the effect of price changes on the cost of food in the 1955-57 "market basket." As time goes on, the changes of the consumption patterns will cause an increasing lack of representativeness of the B. L. S. family spending patterns and more errors will be introduced in the B. L. S. food price index. It is evident that the panel food price index which was calculated in terms of the 1955-57 "market basket" is less biased by this kind of error since the time period was short.

In summary, the panel index has both strength and weakness. The panel index provides an accurate measure of the costs of food since the spending patterns represented the actual purchases of the panel families and prices are those actually paid by the panel families. The panel index is less biased because the weights used were the 1955-57 spending patterns of the panel families. On the other hand, the panel price changes may be affected by the composition of the quality and quantity of food items, purchased by the panel families from one period to another. In selecting a preference for one index over the other, one would need to choose the type of error which is least harmful, the error caused by changes in qualities and quantities in the panel data or the error caused by selecting prices three days of the month when very little food is bought, selecting specific qualities of a product which may represent only a small proportion of

that actually bought, selecting a method of distribution, the retail store, to represent all methods of distribution, and selecting specific sizes and types of containers which may represent only a small proportion of all sizes and types for a product, as is done in the B. L. S. data.

CHAPTER IX

SUMMARY AND CONCLUSIONS

The principal objective of this study was to compile an M. S. U. Consumer Panel retail food price index. The index is a statistical measure of changes in the retail prices of foods bought by Lansing urban families.

A retail food price index is simply a part of a consumer price index. Consumer indexes are very important and widely used in demand analysis. Foods account for a major part of total family spending and constitute a very important component in the consumer price index. Because food prices change very frequently and because some food prices are seasonal, food forms a major problem in making up a consumer price index.

It has been recognized that the problems of constructing a retail food price index are many and difficult. But not all of the problems are of equal importance nor are they always independent of one another. The problem which we face is that of providing an accurate index for measuring the price movement of retail foods. The errors introduced into the index numbers are from different sources. Most of the index number writers recognize, however, five main sources of error in a price index number: errors in price quotations, choice of commodities, number of commodities included, selection of sample, and choice of formula.

The source of data, for constructing the retail food price index for Lansing, was the M. S. U. Consumer Panel. Weekly observations on prices, quantities, and total expenditures were available for meats, poultry, fish, dairy products, eggs, and fats and oils from 1951 to 1958, for fruits and vegetables from 1953 to 1958, and for a complete price series, including every item in the diary, from 1955 to 1958. The various series of prices were computed by dividing the total expenditures by the total quantities purchased by the entire panel.

It is quite clear that the M. S. U. Consumer Panel was not specifically designed to collect data for the purpose of constructing a food price index. The panel prices were those actually paid by the entire panel families. They were the weighted average prices for items of varying sizes and qualities. Therefore, the first problem encountered was that of examining the reliability of the panel data for constructing the retail food price index. As noted before, the type of price quotation is often one of the main sources of errors in food price indexes. Three problems exist: (1) whether the panel prices accurately reflect price changes in the retail stores; (2) whether the panel data are sufficiently accurate; and (3) whether the quality of the products in the panel is sufficiently consistent over time.

During the life of the panel, the food items were sometimes changed in order to get better information or more accurate reporting. In addition, tabulations of prices on food items were

changed on different occasions. Some data were adjusted in order that every item in the index would represent a relatively uniform quality of food from the beginning to the end. In some cases, several different qualities of items, which were combined in the panel data, were separated into individual qualities, or in other cases, several individual qualities were combined to represent a single item, for calculating the index. The original panel data and tabulation methods did not insure the comparability of pricing items from one period of time to another.

In order to determine the comparability of the panel prices from period to period, several comparisons were made. The panel prices for Lansing were compared with prices for similar products which were collected from food stores by the Bureau of Labor Statistics for constructing their U.S. city average index, and their index for Detroit.

Firstly, comparisons were made between the panel prices for Lansing and the B.L.S. prices for the U.S. city average. These comparisons were: (1) the levels of the two price series; (2) the movements of the two price series; (3) the closeness of the two price series; and (4) the magnitude of price changes of the two price series. Direct comparisons of the price levels are difficult because there is considerable difference in qualities between the B.L.S. quoted items and the items actually purchased by the panel families. Comparisons of the level of prices between the two series not only indicate the difference

in prices but also reflect the difference in qualities. More important was the comparison of the price movement over time for similar items. These two comparisons, price level and price movement, were made by using index numbers and graphs. Regression and correlation analyses were used for comparisons of closeness and the magnitude of price changes between the two price series.

In order to compare both levels and changes between the B. L. S. price series for the U. S. city average and the panel series for Lansing, the "first index" was compiled. This term, "first index," is used in order to distinguish it from the other indexes in this dissertation. This index was compiled using the same weight and base as the B. L. S. used, but using the M. S. U. Consumer Panel prices in the given periods. The resulting index and the B. L. S. index provide a means of comparison of the price levels and price changes between the panel price series and the B. L. S. price series. The index was calculated for each group of products and plotted on graphs in order to facilitate comparisons with the B. L. S. index. (See Figures 1-7.)

Comparisons of the two series indicate that the B. L. S. quoted prices for the specified products were higher than the panel price in each group of similar products. The higher level of prices in the B. L. S. series compared with those in the panel series was mainly due to the fact that the B. L. S. specified qualities were usually above those qualities actually bought by the bulk of consumers.

Comparisons of the price changes between the two price

series show that both the B. L. S. and the panel series followed similar patterns of price movements in each group of the products. However, the rate of price change in the panel series relative to the rate of change in the B. L. S. series was not exactly the same. Nevertheless, the two price series moved parallel to each other despite some differences in qualities between the two samples. This comparison of the panel prices with the B. L. S. prices, which were specified for homogeneous qualities of products, provides some evidences of the reliability of the panel data for constructing price indexes.

In determining the closeness and the magnitude of price changes between the B. L. S. series and the panel series, a series of correlation coefficients and regression coefficients were calculated. These coefficients were calculated using actual prices, and each pair of group indexes, for the two series. In calculating these coefficients using actual prices, the equation was fitted by traditional least square regression methods. The mathematical form of the equation was as follows:

$$y = a + bx$$

where x = prices of the B. L. S. products for the U. S. city average

y = prices of the M. S. U. Consumer Panel products.

The two groups, cereal and bakery products, and meats, were calculated using the actual prices. The reason for choosing these

two groups is that the prices of cereal and bakery products did not follow the B. L. S. movement very closely, while meats did follow each other very closely, as shown in the graphs.

The correlation coefficients indicated that only four of the nine items of the "cereal and bakery products" group were found to be significantly correlated with each other. These four products were rolled oats, corn flakes, bread, and soda crackers. When dealing with meats, all meat items were found to be significantly correlated with each other.

When applying regression analysis, the question arises as to whether or not the trend should be removed before the regression analysis is commenced. If a trend is present in the price movement, this may dominate the short-term fluctuation. Trends may give rise to spurious regression. As shown in Figures 1-7 (also Figures 8-14), there was no food group showing a clear trend, except the "cereal and bakery products" group, which showed a slight upward trend in the B. L. S. series. The results of regression analysis for the cereals and bakery products indicate that only the panel prices of corn flakes varied more widely than in the B. L. S. series. The negative regression coefficients show that the prices of wheat flour and corn meal in the B. L. S. and the panel series changed in the opposite directions. This was due primarily to the effect of the greater frequency of the price fluctuations in the panel series. The B. L. S. prices gradually increased while the panel prices fluctuated up and down from one

period to another. When dealing with meat items, the regression coefficients indicate that only the prices of rib roast and lunch meat in the panel series fluctuated more widely than in the B. L. S. series. The panel prices for other meat items fluctuated less than in the B. L. S. series.

In determining the closeness and the magnitude of price changes of each group of products, between the B. L. S. series and the panel series, the indexes of each group of products were used. The correlation coefficients and regression coefficients were calculated for each group of foods and the all foods group. The estimating equation was:

$$y = a + bx$$

where x = index of B. L. S. groups of products for the U. S. city average

y = index calculated by using B. L. S. weights and base, but using the M. S. U. Consumer Panel prices in the given periods.

The correlation coefficients between the two price series, as measured by the indexes of each food group, were all highly significant. These results indicated that the prices of each pair of food groups, between the two series, moved very closely with each other.

The regression coefficients, as calculated for each pair of the groups of products, indicate that only the prices of the "fruits and vegetables" group changed more widely in the panel series than in the B. L. S. series. The prices of other groups changed less in the

panel series than in the B. L. S. series. The correlation coefficients and regression coefficients calculated using indexes of food groups were as follows:

	Correlation coefficients (r)	Regression coefficients (b)
Meats, poultry and fish	.95	.95
Dairy products	.43	.50
Fruits and vegetables	.91	1.25
Cereal and bakery products	.48	.24
Other food at home	.48	.74
All food at home	.91	.66

The above results (graphic comparisons and least squares regression and correlation analysis) indicate that the panel prices for Lansing displayed a close relationship to the B. L. S. prices for the U. S. city average. The price levels and changes were reflected in both series of prices. However, the panel prices showed more variability and lower prices of the products than the B. L. S. prices for the U. S. city average. This greater frequency of variations and lower prices of products reflected the effect of "specials," and of changes in composition of the purchases of panel families, from one period to another.

In order to compare price changes between the B. L. S. price series for Detroit and the panel price series for Lansing, a "second index" was compiled. Because neither the price of each item in the base period nor the index of each item at any later date was available, the B. L. S. price base used for the Detroit index could not be derived from the available data. Therefore, the second index was

designed only for comparison of price changes between the B. L. S. series for Detroit and the panel series for Lansing. This index was calculated using the B. L. S. "relative importance of value weights" (in the retail food price index for Detroit), the M. S. U. Consumer Panel average price (1955-57) as base, and the M. S. U. Consumer Panel prices in the given periods.

Comparisons of the price changes between the two series, after plotting the indexes on graphs, indicate that the changes in prices between the B. L. S. for Detroit and the panel for Lansing were about the same as the B. L. S. for the U. S. city average and the panel for Lansing. Each pair of food groups, of the two price series, followed a very similar pattern and moved up and down together fairly closely.

In calculating the correlation coefficient and the regression coefficient using actual prices, the estimating equation was as follows:

$$y = a + bx$$

where x = prices of the B. L. S. products for Detroit

y = prices of the M. S. U. Consumer Panel products.

The correlation coefficients indicated that the relationships between the panel series for Lansing and the B. L. S. series for Detroit were the same as the relationship between the panel series for Lansing and the B. L. S. series for the U. S. city average.

The regression coefficients of actual prices for cereals and bakery products show that the relationship between the panel for

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Lansing and the B. L. S. for Detroit were the same as those between the panel for Lansing and the B. L. S. for the U. S. city average. The regression coefficients for meat products indicate that the prices of rib roast, ham, lamb, and lunch meat changed more widely in the panel series than in the B. L. S. series. The prices for other meat products in the panel fluctuated with less amplitudes than the B. L. S. series.

In calculating the correlation coefficients and regression coefficients using the index of each food group, the estimating equation was as follows:

$$y = a + bx$$

where x = index of the B. L. S. groups of products for Detroit

y - index calculated using: the B. L. S. "relative importance of value weights" for Detroit, the M. S. U. Consumer Panel average price (1955-57) as base, and the M. S. U. Consumer Panel prices in the given periods.

The correlation coefficients between the two price series for each group were also highly significant. However, the correlation coefficients were higher than those between the panel series and the B. L. S. series for the U. S. city average. These results were due primarily to the fact that the panel prices moved more closely with the B. L. S. prices for Detroit than with those for the U. S. city average.

The regression coefficients show that the relationships of price changes between the panel series and the B. L. S. series for

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Detroit were similar to the relationship between the panel series and the B. L. S. series for the U. S. city average. Among the food groups, only the panel prices of the "fruits and vegetables" group changed more widely than the B. L. S. series. The price indexes of the food groups, other than the "fruits and vegetables" group, changed less in the panel series than in the B. L. S. series for Detroit. The correlation coefficients and regression coefficients that were calculated using the indexes were as follows:

	Correlation coefficients (r)	Regression coefficients (b)
Meats, poultry and fish	.95	.91
Dairy products	.60	.82
Fruits and vegetables	.91	1.15
Cereal and bakery products	.49	.32
Other food at home	.60	.76
All food at home	.91	.76

In order to determine the food expenditure patterns of Lansing families, for use as expenditure weights in the index, the panel family expenditure distribution was measured and compared with the expenditure pattern for foods for families in other samples. The percentage distribution of food expenditures of the 3-year (1955-57) annual average formed the "value weights" of the panel food price index. The actual distribution of expenditures (1955-57) showed that the panel families spent 30.66 percent of their total food expenditures on the "meat, poultry and fish" group; 20.34 percent on the "other food at home" group; 20.03 percent on the "dairy products" group;

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16.93 percent on the "fruits and vegetables" group; and 12.03 percent on the "cereal and bakery products" group. The relative importance figures for other than the base period (1955-57) indicated how Lansing families would distribute their expenditures on foods if they continued to buy the same kinds and amounts of foods they purchased on the average in 1955-57. The relative importance figures in the 13th period of 1958 showed that the Lansing families would have to spend more money on "meat, poultry and fish" and "fruits and vegetables" and less on "dairy products" and "other foods at home" and the same amount of money on "cereal and bakery products" in December, 1958 than they did in 1955-57, if they were to buy the same kinds and amounts of foods that they purchased in 1955-57. (See Table 9, Chapter V.)

Four different samples of families--the Michigan State University Consumer Panel for Lansing, the Bureau of Labor Statistics sample for the U.S. city average, the National Industrial Conference Board sample for Lansing, and the Agricultural Marketing Service sample for the United States--were used in order to compare the differences between various expenditure patterns. The relative importance figures represented the spending patterns for the sample families in the periods of 1955-57 for the M.S.U. Consumer Panel, 1952 for the B.L.S. U.S. city average, 1953 for the N.I.C.B. for Lansing, and 1955 for the A.M.S. for the U.S. Comparisons of these relative importance figures between the different samples showed that panel families distributed about the same proportion of their total

food expenditures on the "cereal and bakery products" group and the "meat, poultry and fish" group as the B. L. S. and N. I. C. B. samples of families. But they spent 10 percent less and 6. 4 percent more on the "cereal and bakery products" group and the "meat, poultry and fish" group, respectively, than the A. M. S. sample of families. The percentage of the total food expenditures which was spent on the "fruits and vegetables" group was about the same in all four samples of families. The percentage of expenditures on the "dairy products" group by the panel families was about 3. 5 percent, 1. 7 percent, and 4. 7 percent higher than it was for the B. L. S., N. I. C. B., and A. M. S. sample families, respectively. The percentage that panel families spent on the "other food at home" group was about 2. 4 percent lower than the B. L. S. sample of families and about the same as the N. I. C. B. and A. M. S. sample of families. The results indicate that the differences between the panel and the B. L. S. samples in the "dairy products" group and the "other foods at home" group were primarily due to an increase in consumption of the "dairy products" group and a decrease in consumption of the "other foods at home" group from 1952 to 1955-57.

The A. M. S. sample families spent more of their food expenditures on the "cereal and bakery products" group, and less on the "meat, poultry and fish" group and the "dairy products" group, than the panel families. They spent about the same for the other groups of foods. This indicates that the farmers' spending patterns

for foods differ from those of the city workers. The low-income families customarily spent more of the food dollar for bread and cereal products than the high-income families. Smaller shares were spent by the farmers for dairy products because many farmers satisfy their own needs for some home-produced products.

The above studies provide evidence that the panel data are sufficiently accurate and consistent for constructing a retail food price index. Although the accuracy and consistency of the data are of considerable importance in constructing index numbers, a sample cannot be expected to be representative unless an adequate number of items are included. A large sample of food items was selected in order to attempt to obtain reliable index numbers.

The retail food price index of the M. S. U. Consumer Panel (the third index) was specifically designed to measure the effect of price changes on the cost of food in the 1955-57 "market basket" for Lansing urban families. The average size of the families in 1955-57 included in the index was estimated to be about 3.2 persons, and their average family income was estimated at about $5,452 after taxes. The content of the "market basket" was assumed to remain the same, so that the changes in cost from period to period are the result of changes in price alone.

In the sampling procedure it was assumed that a relatively small number of properly selected items would be representative of an entire group. The estimate of general spending patterns of all

Lansing urban families was determined from the actual spending of a representative sample of the Lansing urban families.

With this in mind, the data were first arranged in terms of the major groups of expenditures on foods by the panel families. The five major groups were constructed to represent the major components of family food expenditures. These five major groups (major components of the index) were further divided into 21 subgroups (subcomponents of the index). Thus, a definite stratification was established in which each of the basic expenditure items was classified by type and assigned a proper subgroup.

The main criteria used in selecting the items to be priced for each period were their importance and representativeness. The importance of the item in the total family food expenditures was used as a criterion, because the effect of price changes varied with the relative importance of the item. The representativeness of the item, in a group of items, was used as a second criterion, because the price change of the item selected for pricing in the index was used to represent the price changes of the unpriced items. Two factors were considered in determining expected similarities in price fluctuations. One was the pattern of the past price fluctuation, and the other was the usage of the products. The basic expenditure items were grouped according to the above considerations, and one or more products were chosen to represent each subgroup. The expenditure for the selected items was then used to represent the combined expenditures of the group it represented.

The method of combining prices into the food price index was basically the technique defined by the Laspeyres' formula. The panel index numbers were weighted by base-year quantities. The simple mathematical notation for the formula was:

$$I_t = \frac{\Sigma q_o p_t}{\Sigma q_o p_o} \cdot 100$$

In words this says: The index for time"t" equals the sum (Σ) of the products of the quantities (q_o) of the items (fixed according to the panel family purchases at time "o") and the prices (p_t) of the items for "t," divided by the sum (Σ) of the products of the same quantities (q_o) and the prices (p_o) of the same items for the base period "o." Since the index is a percentage measure, the quotient of the two sums is multiplied by 100 to give an index number. This formula was also used for the major group and the subgroup index.

In actual practice, however, a variation of this formula was used, namely,

$$\frac{\sum \frac{p_t}{p_o} \cdot p_o q_o}{\sum p_o q_o}$$

Thus, the weights used in the index were "value weights." The summation of these value weights for the group of items makes it impossible to identify the quantity factors attached to each index item, despite the fact that the "base price" and the "value weights" were both derived from the same quantity of products in the same period of time.

Quantity weights, therefore, were only implicit in the index structure.

The panel food price index was based on the panel family expenditures for 1955-57. This expenditure represented the recent spending patterns of the Lansing urban families. Hence no considerations need necessarily to be taken of basic changes in items and weights. Therefore, the panel food price index did not require weight revision or linking.

According to the main criteria used for selecting items, 131 food items were priced in the index. The items which were chosen were of outstanding importance in family purchases. These items in themselves represented the greater part of the food expenditures of Lansing families.

The index was calculated using the average prices in each 4-week period. The 4-week average prices were compared with the prices obtained during the base period, 1955-57, average. The price relative of each item was calculated. Then, these price changes were put together to determine what happened to the prices on the average. To do this, each price relative was applied to its index weight to determine how much the price changes affected the total food expenditures.

Seasonal variation in food consumption presents both practical and theoretical problems when index numbers are constructed. The panel food price index employed constant annual weights for fresh fruits and vegetables. Lack of prices for given items in given seasons was handled by estimation. The out-of-season prices of the items were either held constant until price again became available or assumed to

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The M. S. U. Consumer Panel food price index is subject to limitations in measurement and use. This food price index is not an exact measurement. All the statistical measurements are subject to some kinds of limitations. One kind of limitation is "sampling errors." The index was based on a sample of families, not the entire population. In addition, the items selected are only a fraction of the total.

The degree of error introduced into the index through product sampling depends mainly upon the amount of variations in prices that exists in the index within groups of items. In order to keep the total effect of these errors to a minimum, the number of items priced in the index was increased as the price variability and their importance in the all food index increased. For example, prices of fresh fruits and vegetables, which are important in the family food expenditure, change frequently and have different seasonal patterns for different items. Hence, in order to measure the average change in all fruits and vegetables satisfactorily, a large number of them were priced in the index.

Another type of "error" occurs in the index because housewives probably do not report the information exactly. Some may have reported lower prices than they actually paid, some higher, so that these "errors of reports" may tend to cancel out. Nevertheless, the expenditure data and price data were compared and adjusted in

order to keep the effect of these "errors" as small as possible.

Another limitation is that of use of the index. The panel index is based on a specific sample. Use of the index to measure price changes for families other than the Lansing families will be appropriate only to the degree of similarity in spending patterns to the Lansing urban families included in the index.

The index "market basket" is held constant so that price change alone will be reflected by the index. The index cannot be used to measure the level of consumption since it does not take into account the quantities of food consumed. Hence, to show changes in the "total cost of foods," the "market basket" would have to be re-assessed at each period.

The index was calculated for the all food at home group, for each major group, and for each subgroup. The indexes calculated were presented in Table 10 at the end of Chapter VI. The changes in prices of each food group, from one period to another, were measured by each group index in the table. A graphic presentation of the price movements of each major group and subgroup of products was shown in Chapter VI. A brief analysis of each price movement followed each graphic presentation.

After the panel food price index was calculated, comparisons were made with other indexes. In the first place, comparisons were made in order to evaluate the differences between the three different food price indexes, all for Michigan cities. The three different

indexes were the M. S. U. Consumer Panel food price index (based on the panel prices for Lansing), the B. L. S. food price index for Detroit (based on the store sample prices for Detroit), and the N. I. C. B. index for Lansing (based on the store sample prices for Lansing).

Comparison between the M. S. U. Consumer Panel retail food price index for Lansing and the B. L. S. retail food price index for Detroit indicated that these two indexes moved together fairly closely, with differences in price levels being due to different price quotations, different levels of base period prices, and different prices in the given periods. The correlation coefficient between the two indexes was .82. However, the B. L. S. index fluctuated with larger amplitude but less frequently than the panel food price index. Presumably the greater frequency of variations in the panel index reflected more of the effects of the prices of "specials" and, to some extent, changes in the quality of some of the items purchased by the panel families from week to week.

A comparison of the food price index for Lansing between the panel series and N. I. C. B. series showed that the two indexes moved parallel to each other despite varying specifications of the food items. The correlation coefficient between the two indexes was .81.

As shown in Figure 32, there were wider fluctuations in the N. I. C. B. series than in the panel series. In addition to the differences between the store sample and panel sample prices, the wider fluctuation in the N. I. C. B. index probably resulted from the

combined effects of the greater relative importance of meat and fresh fruits and vegetables in the N. I. C. B. series than in the panel series.

Secondly, comparison was made in order to test the effects of using the B. L. S. weights for Detroit and the M. S. U. Consumer Panel weights for Lansing (both based on the panel prices) in constructing a food price index for Lansing. The two indexes were calculated using the same base and same prices in the given period; but one was calculated using panel weights for Lansing (represented by the dotted line) and another was calculated using the B. L. S. weights for Detroit (represented by the dashed line).

The two indexes, as shown in Figure 33, converged in the beginning of 1955. During this period the Lansing food price index would be the same whether the B. L. S. weights for Detroit or the panel weights for Lansing were used. From the 4th period to the 9th period of 1955, the dashed line moved above the dotted line. In this period the Lansing food price index would overestimate the cost of foods for Lansing families, if the Detroit B. L. S. weights were used in constructing the index. On the other hand, the B. L. S. food price index for Detroit would have biased upward the estimate of the cost of food for Detroit families, if the Detroit 1955-57 family spending patterns were the same as the panel 1955-57 family spending patterns. From the 9th period of 1955 through the 13th period of 1958, the index represented by the dotted line gradually moved above the index represented by the dashed line. In this period the Lansing food price index

would underestimate the cost of foods for Lansing families, if it were based on the B. L. S. weights for Detroit. On the other hand, the B. L. S. food price index would have a downward bias in estimating the food cost for Detroit families, if their spending patterns for food in this period were the same as those of the panel families.

It is very likely that the Detroit families, in the period of 1955-57, had spending patterns similar to those of the Lansing panel families in the same period. In this case, if the Detroit family spending patterns were the same as the Lansing families' in the period 1955-57, the B. L. S. index for Detroit would have underestimated the cost of foods for Detroit families from the latter part of 1955 to the end of 1958. Likewise, the B. L. S. index for Detroit would have overestimated, but very slightly, the cost of foods for Detroit families from April to September of 1955.

The M. S. U. Consumer Panel food price index has both strengths and weaknesses. The obvious strength of the panel index is the method of obtaining information for prices and for weighting patterns. The panel method is more sensitive to change in individual behavior from time to time because the data are collected over time. The B. L. S. direct survey method cannot reflect the changes in consumption over time, since the information, which was obtained from interviews, covered only a very short period of time. The panel method can furnish more accurate information from weekly reporting diaries than the B. L. S. recall interviews. The panel index provides

a more accurate measure of the costs of food, since the spending patterns represent the actual purchases of the panel families and prices are those actually paid by the panel families.

When comparing the weighting patterns actually used in this study, the panel index is less biased, since the weights used were the actual spending pattern of the panel families in 1955-57. The B. L. S. food price index is biased more by its weighting pattern, since the index weights were based on the 1952 spending patterns.

In selecting a preference for one index over the other, one would need to choose the type of error which is least harmful. Many researchers have suspected for some time that pricing on the basis of the most commonly purchased items would result, over the years, in a more realistic measure of price changes than pricing tied tightly to a specific quality of product which represents only a small proportion of that actually bought.

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APPENDIX

APPENDIX 1

The M. S. U. Consumer Panel was not specifically designed for constructing a retail food price index. During the life of the panel food items were sometimes changed in order to get better information or more accurate reporting. Also, tabulations of prices on food items were changed on different occasions. Some data have been adjusted in order that every item in the index represented a uniform quality of food from the beginning to the end. In some cases several different qualities of items which were combined in the panel data were separated into individual qualities, or in other cases several individual qualities were combined to represent a single item, for the index. The original panel data and tabulation methods did not insure the comparability of pricing items from one period of time to another. The following table shows the original data in the panel and the adjusted data for the index.

Prices and Items in the Panel Tabulation	Prices of Items Combined for the Index
Beef steak	Beef steak
1951-54 Prices of all steaks	1951-58 Prices of the following individual items combined: Round and Swiss steak Sirloin steak Porterhouse and T-bone steak Other steaks
Beef roast	Beef roast
1951-54 Prices of all roasts	1951-58 Prices of the following individual items combined:

	Chuck roast, bone removed Chuck roast, bone in Rib roast, bone removed Rib roast, bone in Other roast, bone removed Other roast, bone in
Ham	Ham
1951-54 Prices of all hams	1951-58 Prices of the following individual items combined: Ham, whole or half, bone removed Ham, whole or half, bone in Other hams, bone removed Other hams, bone in Ham, center slice Canned ham
Chicken	Chicken
1951-53 Prices of broilers or fryers, ready to cook, fresh	1951-58 Prices of the broilers and fryers, ready to cook, fresh
Salmon	Salmon
1951-53 Prices of all salmon 1954-58 Prices of canned salmon	1951-58 Prices of canned salmon
Tuna	Tuna
1951-53 Prices of all tuna 1954-58 Prices of canned tuna	1951-58 Prices of canned tuna
Fish	Fish
1951-53 Prices of fish, other 1954-58 Prices of fish, other, cleaned and frozen	1951-58 Prices of fish, other, cleaned and frozen

APPENDIX 2

Retail Prices of Individual Foods, Average of the Three Years 1955-57, M. S. U. Consumer Panel

Food and unit		1955-57 average in cents
Cereal & bakery products		
Cereal		
Wheaties	lbs.	32.4
Corn flakes	lbs.	30.0
Corn sugar frosted flakes	lbs.	44.4
Rolled oats	lbs.	14.9
White flour	lbs.	9.4
Corn meal	lbs.	11.6
White cake mix	lbs.	28.6
Rice	lbs.	26.6
Biscuit mix	lbs.	17.7
Spaghetti or macaroni	lbs.	23.2
Bakery products		
Bread, white	lbs.	18.1
Diet bread	lbs.	25.1
Buns, hamburg	.08 ea.	35.0
Soda crackers	lbs.	28.6
Cookies--plain & sugared	.05 ea.	41.4**
Doughnuts--frosted and sugared	.07 ea.	46.8**
Cherry pies	lbs.	37.1
Coffee cake	lbs.	56.0
Meat, poultry and fish		
Meat		
Beef		
Hamburger	lbs.	39.6
All roast	lbs.	58.4
All steak	lbs.	93.7
Pork		
Pork chops	lbs.	71.2
Pork roast	lbs.	48.1
Ham	lbs.	52.5
Bacon	lbs.	54.3
Sausage	lbs.	45.1
Other meats		
Wieners & frankfurters	lbs.	50.7
Bologna	lbs.	51.9
Other cold cuts	lbs.	72.8
Prem, Spam, Treet	lbs.	52.8
Veal cutlet	lbs.	70.1
Lamb	lbs.	65.6
Poultry		
Fryers	lbs.	43.9
Roasters	lbs.	49.5
Turkey, ready-to-cook frozen	lbs.	60.7
Fish, sea foods		
Tuna	lbs.	73.3
Fish sticks	lbs.	64.5
Other fish	lbs.	45.8
Oysters	lbs.	107.3
Shrimp	lbs.	100.6
Dairy products		
Milk, fresh (Vit. D)	qt.	20.6
Milk, fresh (Reg. Past.)	qt.	20.7
Milk, evaporated	lbs.	15.7
Milk, powdered, skim	lbs.	40.1
Coffee cream	.5 pt.	23.7
Cheese (Natural American)	lbs.	61.6
Cheese (processed, American)	lbs.	50.9
Cottage cheese	lbs.	28.2
Butter	lbs.	67.2
Ice cream, pre-packaged	pt.	22.4
Fruits and vegetables		
Fruits, fresh		
Strawberries*	qt.	50.1

Food and unit		1955-57 average in cents
Grapefruits*	ea.	9.7
Lemons	ea.	5.8
Oranges	ea.	4.5
Apples	lbs.	10.4
Bananas	lbs.	16.3
Grapes	lbs.	23.1
Cantaloupe, muskmelon*	ea.	30.4
Watermelon*	lbs.	6.4
Peaches*	lbs.	18.3
Vegetables, fresh		
Cabbage	lbs.	8.5
Celery	bu.	25.7
Lettuce	head	21.8
Beans, green*	lbs.	23.3
Carrots	bu.	14.1
Corn	ear	6.8
Peppers	ea.	9.5
Squash	lbs.	8.7
Sweet potatoes	lbs.	12.8
Cauliflower	head	29.7
Cucumbers	ea.	11.1
Onions, mature	lbs.	9.8
Onions, green	bu.	9.6
Tomatoes	lbs.	28.4
Potatoes, Michigan	lbs.	4.2
Potatoes, Idaho	lbs.	7.1
Radishes	bu.	10.7
Canned fruits		
Apples and applesauce	lbs.	16.1
Olives	lbs.	85.6
Peaches	lbs.	18.9
Pears	lbs.	23.2
Baby food, pears	lbs.	32.0
Pineapple	lbs.	24.5
Fruit cocktail	lbs.	23.5
Canned vegetables		
Lima beans	lbs.	18.5
Snap beans	lbs.	20.6
Carrots	lbs.	33.3
Corn	lbs.	16.8
Peas	lbs.	17.7
Pumpkin	lbs.	11.2
Beans, Navy, baked, white	lbs.	14.5
Beans, kidney	lbs.	13.4
Beets	lbs.	16.8
Cucumber pickles	lbs.	25.4
Tomato catsup paste	lbs.	24.9
Tomato juice	lbs.	11.0
Frozen fruits		
Strawberries	lbs.	40.0
Orange juice	lbs.	43.4
Frozen vegetables		
Beans	lbs.	38.4
Peas	lbs.	31.0
Dried fruits and vegetables		
Prunes	lbs.	32.0
Dry beans	lbs.	15.8
Potato chips	lbs.	75.4
Other foods at home		
Sugar and sweets		
Sugar, white, powdered	lbs.	10.4
Corn syrup	lbs.	21.8
Fondant, mints, marshmallows	lbs.	39.6
Solid chocolate	lbs.	67.5
Grape jelly	lbs.	35.7
Cooking aids		
Chocolate, baking	lbs.	70.7
Meat sauces	lbs.	64.8
Salt	lbs.	7.1
Partially prepared foods		
Vegetable & meat soup	lbs.	25.8
Pizza pie mix	lbs.	52.8
Chicken soup	lbs.	26.4
Tomato soup	lbs.	22.4
Beverages		
Beer	12 oz.	15.0

Food and unit		1955-57 average in cents
Coffee	lbs.	92.2
Tea bags	lbs.	246.8
Soft drinks, bottles	7oz.	5.2
Fats and oils		
Oleomargarine	lbs.	25.7
Vegetable shortening	lbs.	29.6
Cooking oils	lbs.	36.2
Mayonnaise	lbs.	35.7
Salad dressing	lbs.	29.4
Peanut butter	lbs.	48.9
Lard	lbs.	19.2
Eggs	doz.	52.7
Miscellaneous		
Flavored gelatin	lbs.	43.8
Pudding or pie fillings	lbs.	43.3

*The estimates of the out-of-season prices are included in the average.

**Cookies--if weights were not given, .05 was used for each.
Doughnuts--if weights were not given, .07 was used for each.
Buns--hamburg--if weights were not given, .08 was used for each.

Price in table refers to price per pound.

APPENDIX 3

The M. S. U. Consumer Panel retail food price index employed constant annual weights for fresh fruits and vegetables. Lack of prices for given items in given seasons was handled by estimation--either by holding constant (using annual averages of the prices in season for the prices of out-of-season periods) until prices again become available, or by assuming the same price changes for out-of-season items as for year-round items.

The out-of-season prices of the items which were used in the index were estimated as follows: The out-of-season prices of grapes and peaches were estimated by using the apple prices. The out-of-season prices of grapefruit were estimated by using the prices of oranges. Grapes and peaches have price movement patterns similar to apples. Grapefruit have price movement patterns similar to oranges. Apples and oranges are year-round items.

The same reasons were applied in using tomato prices to estimate the price of green beans. However, no other items, according to the patterns of price movements, can be used properly for estimating the out-of-season prices of strawberries, watermelons and "cantaloupe and muskmelon." Therefore, the annual averages of the prices in season were used for the prices of the out-of-season prices for watermelons and "cantaloupe and muskmelon." Since both strawberries and lemons used to have high prices in May and low prices in June, the lemon prices were used to estimate the out-of-season prices of strawberries.

APPENDIX 4

1951			1952			1953			1954		
Date		Week	Date		Week	Date		Week	Date		Week
12-31 to	1-6	1	12-30 to	1-5	1	12-23 to	1-3	1	12-27 to	1-2	1
1-7	1-13	2	1-6	1-12	2	1-4	1-10	2	1-3	1-9	2
1-14	1-20	3	1-13	1-19	3	1-11	1-17	3	1-10	1-16	3
1-21	1-27	4	1-20	1-26	4	1-18	1-24	4	1-17	1-23	4
1-28	2-3	5	1-27	2-2	5	1-25	1-31	5	1-24	1-30	5
2-4	2-10	6	2-3	2-9	6	2-1	2-7	6	1-31	2-6	6
2-11	2-17	7	2-10	2-16	7	2-8	2-14	7	2-7	2-13	7
2-18	2-24	8	2-17	2-23	8	2-15	2-21	8	2-14	2-20	8
2-25	3-3	9	2-24	3-1	9	2-22	2-28	9	2-21	2-27	9
3-4	3-10	10	3-2	3-8	10	3-1	3-7	10	2-28	3-6	10
3-11	3-17	11	3-9	3-15	11	3-8	3-14	11	3-7	3-13	11
3-18	3-24	12	3-16	3-22	12	3-15	3-21	12	3-14	3-20	12
3-25	3-31	13	3-23	3-29	13	3-22	3-28	13	3-21	2-27	13
4-1	4-7	14	3-30	4-5	14	3-29	4-4	14	3-28	4-3	14
4-8	4-14	15	4-6	4-12	15	4-5	4-11	15	4-4	4-10	15
4-15	4-21	16	4-13	4-19	16	4-12	4-18	16	4-11	4-17	16
4-22	4-28	17	4-20	4-26	17	4-19	4-25	17	4-18	4-24	17
4-29	5-5	18	4-27	5-3	18	4-26	5-2	18	4-25	5-1	18
5-6	5-12	19	5-4	5-10	19	5-3	5-9	19	5-2	5-8	19
5-13	5-19	20	5-11	5-17	20	5-10	5-16	20	5-9	5-15	20
5-20	5-26	21	5-18	5-24	21	5-17	5-23	21	5-16	5-22	21
5-27	6-2	22	5-25	5-31	22	5-24	5-30	22	5-23	5-29	22
6-3	6-9	23	6-1	6-7	23	5-31	6-6	23	5-30	6-5	23
6-10	6-16	24	6-8	6-13	24	6-7	6-13	24	6-6	6-12	24
6-17	6-23	25	6-15	6-21	25	6-14	6-20	25	6-13	6-19	25
6-24	6-30	26	6-22	6-28	26	6-21	6-27	26	6-20	6-26	26
7-1	7-7	27	6-29	7-5	27	6-28	7-4	27	6-27	7-3	27
7-8	7-14	28	7-6	7-12	28	7-5	7-11	28	7-4	7-10	28
7-15	7-21	29	7-13	7-19	29	7-12	7-18	29	7-11	7-17	29
7-22	7-28	30	7-20	7-26	30	7-19	7-25	30	7-18	7-24	30
7-29	8-4	31	7-27	8-2	31	7-26	8-1	31	7-25	7-31	31
8-5	8-11	32	8-3	8-9	32	8-2	8-8	32	8-1	8-7	32
8-12	8-18	33	8-10	8-16	33	8-9	8-15	33	8-8	8-14	33
8-19	8-25	34	8-17	8-23	34	8-16	8-22	34	8-15	8-21	34
8-26	9-1	35	8-24	8-30	35	8-23	8-29	35	8-22	8-28	35
9-2	9-8	36	8-31	9-6	36	8-30	9-5	36	8-29	9-4	36
9-9	9-15	37	9-7	9-13	37	9-6	9-12	37	9-5	9-11	37
9-16	9-22	38	9-14	9-20	38	9-13	9-19	38	9-12	9-18	38
9-23	9-29	39	9-21	9-27	39	9-20	9-26	39	9-19	9-25	39
9-30	10-6	40	9-28	10-4	40	9-27	10-3	40	9-26	10-2	40

APPENDIX 4. --Continued

1951			1952			1953			1954		
Date		Week	Date		Week	Date		Week	Date		Week
10-7 to	10-13	41	10-5 to	10-11	41	10-4 to	10-10	41	10-3 to	10-9	41
10-14	10-20	42	10-12	10-18	42	10-11	10-17	42	10-11	10-16	42
10-21	10-27	43	10-19	10-25	43	10-18	10-24	43	10-17	10-23	43
10-28	11-3	44	10-26	11-1	44	10-25	10-31	44	10-24	10-30	44
11-4	11-10	45	11-2	11-8	45	11-1	11-7	45	10-31	11-6	45
11-11	11-17	46	11-9	11-15	46	11-8	11-14	46	11-7	11-13	46
11-18	11-24	47	11-16	11-22	47	11-15	11-21	47	11-14	11-20	47
11-25	12-1	48	11-23	11-29	48	11-22	11-28	48	11-21	11-27	48
12-2	12-8	49	11-30	12-6	49	11-29	12-5	49	11-28	12-4	49
12-9	12-15	50	12-7	12-13	50	12-6	12-12	50	12-5	12-11	50
12-16	12-22	51	12-14	12-20	51	12-13	12-19	51	12-12	12-18	51
12-23	12-29	52	12-21	12-27	52	12-20	12-26	52	12-19	12-25	52
									12-26	1-1	53

1955			1956			1957			1958		
Date		Week	Date		Week	Date		Week	Date		Week
1-2 to	1-8	1	1-1 to	1-7	1	12-30 to	1-5	1	12-29 to	1-4	1
1-9	1-15	2	1-8	1-14	2	1-6	1-12	2	1-5	1-11	2
1-16	1-22	3	1-15	1-21	3	1-13	1-19	3	1-12	1-18	3
1-23	1-29	4	1-22	1-28	4	1-20	1-26	4	1-19	1-25	4
1-30	2-5	5	1-29	2-4	5	1-27	2-2	5	1-26	2-1	5
2-6	2-12	6	2-5	2-11	6	2-3	2-9	6	2-2	2-8	6
2-13	2-19	7	2-12	2-18	7	2-10	2-16	7	2-9	2-15	7
2-20	2-26	8	2-19	2-25	8	2-17	2-23	8	2-16	2-22	8
2-27	3-5	9	2-26	3-3	9	2-24	3-2	9	2-23	3-1	9
3-6	3-12	10	3-4	3-10	10	3-3	3-9	10	3-2	3-8	10
3-13	3-19	11	3-11	3-17	11	3-10	3-16	11	3-9	3-15	11
3-20	3-26	12	3-18	3-24	12	3-17	3-23	12	3-16	3-22	12
3-27	4-2	13	3-25	3-31	13	3-24	3-30	13	3-23	3-29	13
4-3	4-9	14	4-1	4-7	14	3-31	4-6	14	3-30	4-5	14
4-10	4-16	15	4-8	4-14	15	4-7	4-13	15	4-6	4-12	15
4-17	4-23	16	4-15	4-21	16	4-14	4-20	16	4-13	4-19	16
4-24	4-30	17	4-22	4-28	17	4-21	4-27	17	4-20	4-26	17
5-1	5-7	18	4-29	5-5	18	4 28	5-4	18	4-27	5-3	18
5-8	5-14	19	5-6	5-12	19	5-5	5-11	19	5-4	5-10	19
5-15	5-21	20	5-13	5-19	20	5-12	5-18	20	5-11	5-17	20

APPENDIX 4. --Continued

1955			1956			1957			1958		
Date		Week	Date		Week	Date		Week	Date		Week
5-22 to	5-28	21	5-20 to	5-26	21	5-19 to	5-25	21	5-18 to	5-24	21
5-29	6-4	22	5-27	6-2	22	5-26	6-1	22	5-25	5-31	22
6-5	6-11	23	6-3	6-9	23	6-2	6-8	23	6-1	6-7	23
6-12	6-18	24	6-10	6-16	24	6-9	6-15	24	6-8	6-14	24
6-19	6-25	25	6-17	6-23	25	6-16	6-22	25	6-15	6-21	25
6-26	7-2	26	6-24	6-30	26	6-23	6-29	26	6-22	6-28	26
7-3	7-9	27	7-1	7-7	27	6-30	7-6	27	6-29	7-5	27
7-10	7-16	28	7-8	7-14	28	7-7	7-13	28	7-6	7-12	28
7-17	7-23	29	7-15	7-21	29	7-14	7-20	29	7-13	7-19	29
7-24	7-30	30	7-22	7-28	30	7-21	7-27	30	7-20	7-26	30
7-31	8-6	31	7-29	8-4	31	7-28	8-3	31	7-27	8-2	31
8-7	8-13	32	8-5	8-11	32	8-4	8-10	32	8-3	8-9	32
8-14	8-20	33	8-12	8-18	33	8-11	8-17	33	8-10	8-16	33
8-21	8-27	34	8-19	8-25	34	8-18	8-24	34	8-17	8-23	34
8-28	9-3	35	8-26	9-1	35	8-25	8-31	35	8-24	8-30	35
9-4	9-10	36	9-2	9-8	36	9-1	9-7	36	8-31	9-6	36
9-11	9-17	37	9-9	9-15	37	9-8	9-14	37	9-7	9-13	37
9-18	9-24	38	9-16	9-22	38	9-15	9-21	38	9-14	9-20	38
9-25	10-1	39	9-23	9-29	39	9-22	9-28	39	9-21	9-27	39
10-2	10-8	40	9-30	10-6	40	9-29	10-5	40	9-28	10-4	40
10-9	10-15	41	10-7	10-13	41	10-6	10-12	41	10-5	10-11	41
10-16	10-22	42	10-14	10-20	42	10-13	10-19	42	10-12	10-18	42
10-23	10-29	43	10-21	10-27	43	10-20	10-26	43	10-19	10-25	43
10-30	11-5	44	10-28	11-3	44	10-27	11-2	44	10-26	11-1	44
11-6	11-12	45	11-4	11-10	45	11-3	11-9	45	11-2	11-8	45
11-13	11-19	46	11-11	11-17	46	11-10	11-16	46	11-9	11-15	46
11-20	11-26	47	11-18	11-24	47	11-17	11-23	47	11-16	11-22	47
11-27	12-3	48	11-25	12-1	48	11-24	11-30	48	11-23	11-29	48
12-4	12-10	49	12-2	12-8	49	12-1	12-7	49	11-30	12-6	49
12-11	12-17	50	12-9	12-15	50	12-8	12-14	50	12-7	12-13	50
12-18	12-24	51	12-16	12-22	51	12-15	12-21	51	12-14	12-20	51
12-25	12-31	52	12-23	12-29	52	12-22	12-28	52	12-21	12-27	52

APPENDIX 5

Pocket No: 1 Suppl.

[redacted]

MAR 19 1964

MICHIGAN STATE UNIVERSITY

WEEKLY CONSUMER FOOD PURCHASE DIARY

This diary is for recording all food purchases for the week of

JUN 29 1958

Sunday..... through Saturday..... DEC 5 1956

1. May we emphasize that each of your diaries is important to us, whether your food purchases are many or few. Your diaries will be of most value if made out accurately and returned promptly — every week.

2. We suggest that you enter food items in the diary each day as you make the purchase.

3. If a food item that you use is home-grown or a gift, show this by writing "home-grown" or "gift" in the price column.

4. If you don't know under which heading to enter a food item, you can list it in one of the blank spaces on page 19.

5. At the end of the week check through the diary to make sure you haven't forgotten any purchase or made any incomplete entries.

6. As you are checking the diary also √ the squares (☐ None) if appropriate.

7. If you want any information, call us at — number ED. 2-1511, extension 3030.

INDEX

WHAT YOU CAN EARN BY KEEPING A DIARY

If you return the diary for 52 weeks or more without missing a week, you earn **40 points** for each diary returned in the sequence.

or

If you return the diary for 12 to 51 weeks without missing a week, you earn **35 points** for each diary returned in the sequence.

or

If you return the diary for 5 to 11 weeks without missing a week, you earn **25 points** for each diary returned in the sequence.

or

If you return the diary less than five weeks in a row, you earn **10 points** for each diary.

PLUS

1. A bonus of **5 points** for each diary returned on time (postmarked before Tuesday noon of the following week).
2. A bonus of **70 points** if you return every diary on time for a year.
3. A bonus of **10 points** for each diary returned during July and August.
4. A bonus of **5 points** for each diary returned after returning 52 diaries.

You can earn 2500 points the first year and 2760 points in each additional year.

DAIRY PRODUCTS

MILK

NONE ☐

FRESH	1100	Number of Qts.	Number of ½ Gal.	Price per Qt.	Price per ½ Gal.	Total Amt. Paid	31-32 Brand	33 Where Purchased*
Homogenized—Vit. D.	1110							
Multiple Vitamin Milk — (Brown Bottle)	1111							
Homogenized—Plain	1120							
Regular Pasteurized	1130							
Jersey or Guernsey	1140							
Buttermilk	1150							
Chocolate	1160							
Skim Milk	1170							
Sour Milk, Yoghurt, etc.	1180							
Egg Nog, etc.	1181							
Other Milk	1190							
Half & Half	1192							

See note below

CREAM NONE ☐	1400	Number of ½ Pints	Price per ½ Pint	Total Amt. Paid	Brand	Where Purchased*
Coffee Cream	1410					
Whipping Cream—bottle or carton	1421					
Whip. Cream—can (Reddi-Whip, etc.)	1422					
Sour Cream—½ Pint Size	1430					
Sour Cream—12 Oz. Size	1430					

See note below

*For Fresh Milk and Cream — Please indicate from whom it was bought in the last column as follows:

1. If delivered by milkman
2. If bought from grocery store
3. If bought from cash and carry specialized dairy store
4. If bought from coin-operated milk dispenser
5. If bought from other source

CANNED (Liquid)	1200	Number of Cans	Weight of Each Can	Total Amt. Paid	Brand	Where Purchased
Evaporated—Unsweetened	1210					
Condensed—Sweetened	1220					
Canned Skim	1230					
Canned—Baby Formulas	1240					

See bottom of Page 3

DRIED	1300	Number of Pounds	Price per Pound	Total Amt. Paid	Brand	Where Purchased
Powdered—Skim Milk	1310					
Powdered—Whole Milk	1320					
Powdered—Baby Formulas	1330					
Ice Cream Mix	1340					
Sherbet Mix	1341					
Malted Milk Powder	1321					
Pream (Powdered Cream)	1350					

DAIRY PRODUCTS (cont.)

ICE CREAM	NONE ☐		Number of Pints	Number of ½ Gal.	Price Per Pint	Price Per ½ Gal.	Total Amt. Paid	51-52 Brand	53 Where Purchased
Hand Packed Ice Cream	1510								
Pre-Packaged Ice Cream	1520								
Other Ice Cream	1530								
Sherbets and Ices	1540								
Dairy Queen, Frostie, etc.	1550								

CHEESE	NONE ☐		Number of Lbs., Ozs.	Price per Pound	Total Amount Paid	Where Purchased
Natural American (Cheddar, etc.)	1610					
Processed American (Velveta, etc.)	1620					
Swiss Cheese	1730					
Cheese Spread	1720					
Cream Cheese (Philadelphia, etc.)	1750					
Other Cheese	1740					
Cottage Cheese	1820					

FATS AND OILS

FATS	NONE ☐		Number of Pounds	Price per Pound	Total Amt. Paid	53 Where Purchased
Butter	2110					
Oleomargarine	2120					
Lard	2130					
Swiftning	2131					
Vegetable Shortening (Crisco, Spry, etc.)	2140					
Other Fats (name kind)	2150					

OILS	NONE ☐		Number of Pints or Ozs.	Price per Unit	Total Amt. Paid	Where Purchased
Cooking Oils	2210					
Mayonnaise	2220					
Salad Dressing	2221					
Roquefort Dressing	2222					
Salad Oils, etc.	2230					
Other Oils	2240					
French Dressing, etc.	2231					
Sandwich Spreads, Tartar Sauce	2242					
Whips (name kind)	2250					

For all items on pages 2 and 3, except fresh milk and cream, indicate where purchased as follows:

A — A&P Store
B — Bazley or Junedale Store
K — Kroger Store
M — Market Basket (National) Store
S — Schmidts Store
SR — Shop-Rite Store
W — Wrigleys (Big Bear) Store
G — Any other grocery store or meat market not listed
O — Any place other than grocery store or meat market, i.e., drug store, restaurant, farm, dairy store, etc.

FRUITS

		AMOUNT BOUGHT EXAMPLES: 1 gallon, 1-1 lb. 6 oz. can, ½ bu., 1 large, 3 medium, 2-8 oz. jars	Total Amt. Paid	CHECK ONE: Fresh 1 (1 Prepkgd., 2 Bulk)	Fresh 2 Frozen	Fresh 3 Canned	Fresh 4 Dried
BERRIES NONE ☐	3100						
Blueberries qts. fresh	3110						
Cranberries	3120						
Currants qts. fresh	3121						
Dewberries and Blackberries qts. fresh	3130						
Raspberries qts. fresh	3140						
Strawberries qts. fresh	3150						
Other Berries (name kind)	3160						
Berry Juice (kind)	3170						
CITRUS NONE ☐	3200						
Grapefruit no. fresh	3210						
Grapefruit Juice	3219						
Lemons no. fresh	3220						
Lemonade	3225						
Lemon Juice	3229						
Limes no. fresh	3230						
Lime Juice	3231						
Limeade	3233						
Oranges no. fresh	3240						
Frozen Orange Juice	3248						
Orange Juice (not frozen)	3249						
Orange Drink (Hi-C, etc.)	3246						
Tangerines no. fresh	3250						
Tangerine Juice	3251						
Other Citrus (name kind)	3260						
Other Citrus Juice (name kind)	3270						
Mixed Citrus Fruit	3290						
Mixed Citrus Juices	3299						
OTHER FRUITS NONE ☐	33-35						
Apples	3310						
Applesauce and Applebutter	3311						
Apple Cider	3318						
Apple Juice	3319						
Apricots	3320						

In reporting Fruits and Vegetables please indicate the actual amount bought in weight or liquid measure, *EXCEPT* for those fresh Fruits and Vegetables indicated with qts., no., heads, bunches after the name of the product it is all right to express the amount bought in these units.

FRUITS (cont.)

OTHER FRUITS Cont.		AMOUNT BOUGHT EXAMPLES 3 pints 3-6 oz. cans 1-12 oz. pkg. 2 lb. & 3 oz. 8 qts. (est.) home grown	Total Amt. Paid	CHECK ONE Fresh 1 (1 Prepkgd. 2 Bulk)	2 Frozen	3 Canned	4 Dried
Apricot Nectar	3329						
Avocados	3330						
Bananas lbs. fresh	3340						
Cherries—Maraschino	3350						
Cherries—Sour	3351						
Cherries—Sweet	3352						
Dates	3360						
Figs	3370						
Grapes	3380						
Grape Juice (single strength)	3389						
Grape Juice (concentrated)	3388						
Cantalope and Muskmelon no. fresh	3411						
Watermelon	3412						
Nectarines	3420						
Olives	3435						
Persimmons	3430						
Peaches	3440						
Pears	3450						
Pineapple	3460						
Pineapple Juice	3469						
Plums	3470						
Prunes	3480						
Prune Juice	3489						
Raisins	3510						
Rhubarb	3520						
Hawaiian Punch Base	3540						
Mixed Fruits (except citrus)	3590						
Fruit Cocktail	3591						
Fruit Pie Mix (kind)	3592						
Mixed Fruit Juices	3542						
Fruit Gelatin Salad—prepared	3570						
Powdered Juice (kind)	3550						
Candied Fruit (kind)	3560						
Fruit Pickles (kind)	3580						
All Other Fruit Juice (kind)	3549						
All Other Fruit (name kind)	3530						

Please don't forget to enter home grown, and gift items.

VEGETABLES

GREEN LEAFY VEGETABLES — NONE ☐		AMOUNT BOUGHT EXAMPLES: 1-1 lb. 4 oz. pkg. / 3-12 oz. cans / ½ doz. ears; 8 medium / 1 large / 1 bunch	Total Amt. Paid	CHECK ONE: Fresh 1 (1 Prepkgd., 2 Bulk)	2 Frozen	3 Canned	4 Dried
Brussel Sprouts	4110						
Cabbage lbs. fresh	4120						
Cabbage Salad	4122						
Sauerkraut	4121						
Celery bunches fresh	4130						
Celery Cabbage bunches fresh	4140						
Endive, Chicory, Escarole	4160						
Greens—Beet, Mustard, etc.	4240						
Lettuce—Head heads fresh	4210						
Lettuce—Leaf	4220						
Lettuce — Bibb	4221						
Parsley, Swiss Chard, Water Cress	4250						
Spinach	4260						
Mixed Leafy Vegetables	4290						
Other Leafy Vegetables	4300						

GREEN AND YELLOW VEGETABLES — NONE ☐		AMOUNT BOUGHT	Total Amt. Paid	Fresh (Prepkgd., Bulk)	Frozen	Canned	Dried
Artichokes	4410						
Asparagus	4420						
Beans — Lima 1 ☐ check if in pod	4430-1						
Beans—Snap	4440						
Bean Sprouts	4450						
Broccoli	4460						
Carrots bunches fresh	4470						
Corn—Sweet no. of ears fresh	4480						
Peas 1 ☐ check if in pod	4530-1						
Peppers no. fresh	4540						
Pumpkin lbs. fresh	4550						
Squash lbs. fresh	4560						
Soya Steak and Choplets	4951						
Mixed Green and Yellow Vegetables	4590						
Other							

Check prepackaged for fresh Fruits and Vegetables if the product has been wrapped or placed in a consumer size package with a specific price indicated for each package before the customer enters the store.

VEGETABLES (cont.)

ALL OTHER VEGETABLES

NONE ☐ 47-49

AMOUNT BOUGHT
MORE EXAMPLES
4-8 oz. bottles 1 peck
20 lb. 0 oz. 2 small
2 lb. (estimate) gift

CHECK ONE

		Total Amt. Paid	Fresh 1	1	2	3	4
			Prepkgd.	Bulk	Frozen	Canned	Dried
Beans—Navy, Baked, White	4701						
Pork and Beans	4701						
Beans—Kidney	4703						
Beets	4710						
Cauliflower heads fresh	4720						
Cucumbers no. fresh	4731						
Cucumber Pickles	4733						
Relish	4734						
Egg Plant no. fresh	4740						
Garlic	4750						
Horseradish	4760						
Mushrooms	4780						
Onions—Mature	4811						
Onions—Green bunches fresh	4812						
Parsnips	4830						
Pimentoes	4770						
Michigan Potatoes	4841						
Maine Potatoes	4842						
Idaho Potatoes	4843						
California Potatoes	4844						
Potatoes grown in Other States	4845						
Potatoes (Don't know state)	4846						
Potatoes—French Fries	4866						
Potato Chips	4867						
Potato Sticks	4868						
Potato Salad	4869						
Mashed Potatoes or Patties	4865						
Sweet Potatoes and Yams	4570						
Radishes bunches fresh	4850						
Tomatoes	4871						
Tomato Catsup, Paste, Sauces	4872						
Tomato Juice	4873						
Turnips and Rutabagas	4880						
Prepared Veg. Gelatin Salad	4983						
Mixed Vegetables	4950						
Chop Suey, Chow Mein, without meat	4974						
Mixed Vegetable Juice	4960						
Other Vegetables (name kind)	4900						

Be sure to fill in both the "Amount Bought" and "Total Amount Paid" columns, as well as check the method of preservation.

MEAT

BEEF NONE ☐	5100	Number of Lbs., Ozs.	Price per Pound	Total Amt. Paid	51 Check If Frozen When Bought	53 Where Purchased
Canned Beef	5110					
Corned Beef	5120					
Chipped Beef	5121					
Ground Beef, Hamburger	5130					
Ground Round Steak, Lean Gr. Beef	5131					
Beef Liver and Baby Beef Liver	5141					
Heart, Tongue, other Organ Parts	5142					
Chuck Roast (Pot Roast)	5164					
Rib Roast 0 ☐ Bone Removed 1 ☐ Bone In	516					
Other Roast 2 ☐ Bone Removed 3 ☐ Bone In	516					
Round and Swiss Steak	5170					
Sirloin Steak	5171					
Porterhouse and T-Bone Steak	5172					
Other Steak	5173					
Stewing Beef (Boneless)	5181					
Boiling Beef or Short Ribs	5183					
All Other Beef (name kind)	5190					

PORK NONE ☐	5300	Number of Lbs., Ozs.	Price per Pound	Total Amt. Paid	Check if Frozen When Bought	Where Purchased
Bacon	5311					
Canadian Bacon	5312					
Canned Pork	5320					
Chops	5330					
Steaks	5335					
Ham—Center Slice	5340					
Ham—Whole or Half 1 ☐ Bone Removed 2 ☐ Bone In	534					
Ham—Canned	5343					
Ham—Other 4 ☐ Bone Removed 5 ☐ Bone In	534					
Picnic Ham, Cured Butts	5346					
Pork Liver	5351					
Heart, Tongue, other Organ parts	5352					
Roast—Fresh	5370					
Sausage—Link	5380					
Sausage	5381					
Spareribs	5382					
Side or Salt Pork	5391					
Other Pork (name kind)	5390					

MEAT (cont.)

LAMB-MUTTON NONE ☐	5200	Number of Lbs., Ozs.	Price per Pound	Total Amt. Paid	$1 Check if Frozen When Bought	$3 Where Purchased
Chops-Steaks	5220					
Roast (Leg, etc.)	5260					
Other Lamb-Mutton (kind)	5280					

VEAL NONE ☐	5400	Number of Lbs., Ozs.	Price per Pound	Total Amt. Paid	Check if F.W.B.	Where Purchased
Cutlets, Chops, Steaks	5420					
Ground Veal	5430					
Calf Liver	5441					
City Chicken	5443					
Roast 0 ☐ Bone Removed 1 ☐ Bone In	546					
Stewing, Soup Veal	5470					
Other Veal (name kind)	5490					

OTHER MEAT AND MEAT MIXTURES NONE ☐	5500	Number of Lbs., Ozs.	Price per Pound	Total Amt. Paid	Check if Frozen When Bought	Where Purchased
Wieners and Franks, etc.	5510					
Bologna—Ring or Large Round	5511					
Other Cold Cuts	5513					
Other Cold Cuts	5513					
Prem, Spam, Treet, etc.	5514					
Rabbit, Domestic	5520					
Venison and Other Game Animals	5530					
Chop Suey Meat and Kabobs	5540					
Bouillon Cubes	5596					
Beef Stew	5594					
Chile Con Carne	5591					
Hash	5592					
Mincemeat	5593					
Meat Balls and Spaghetti	5595					
Ravioli and Tamales	5598					
Chop Suey, Chow Mein with Meat	5599					
Potted Meat	5560					
Meat Spreads	5570					
Pork and Beans	4701-3					
Other	5550					

For all items on pages 8 and 9 indicate where purchased as follows:

A — A&P Store
B — Bazley or Junedale Store
K — Kroger Store
M — Market Basket (National) Store
S — Schmidts Store
SR — Shop-Rite Store
W — Wrigleys (Big Bear) Store
G — Any other grocery store or meat market not listed
O — Any place other than grocery store or meat market, i.e., delicatessen, farm, city market, food locker plant, etc.

POULTRY, FISH, EGGS

POULTRY NONE ☐	5600	Number of Lbs., Ozs.	Price per Pound	Total Amount Paid	[51] Check One: 1 Alive	2 Dressed Undrawn	3 Ready to Cook	4 Boned	5 Selected Parts	[52] Check One: 1 Fresh	2 Frozen	3 Canned
CHICKEN												
Broilers or Fryers	5611											
Roasters	5612											
Stewing	5613											
Barbecued Chicken	5614											
TURKEY	5620											
DUCK	5630											
OTHER POULTRY (kind)	5640											
Game Birds	5650											
MIXTURES—CHIEFLY CHICKEN	5690											
Chicken Noodle Dinner	5691											
Chicken a la King	5692											
Chicken Chop Suey, etc.	5694											
Other (kind)	5696											

EGGS NONE ☐	5700	Number of Dozen	Price per Dozen	Total Amount Paid	[51] Size	[52] Grade	Check if Ungraded

FISH AND SEA FOOD NONE ☐		Number of Pounds and/or Ozs.	Price per Pound	Total Amount Paid	[51] Check One: 1 Fresh	2 Frozen	3 Canned	4 Dried	[52] Check One: 1 Dipped in Batter	2 With Shell or Scales	3 Cleaned or Shelled	4 Other
Tuna	5811											
Salmon	5812											
Fish Sticks	5814											
Other Fish (kind)	5813											
Lobster, Lobstertail	5819											
Oysters	5820											
Oyster Stew	5821											
Scallops	5830											
Shrimp	5840											
Tuna Pie or Casserole	5891											
Sardines in Oil	5892											
Sardines in Sauce	5893											

JAM, JELLY, SOUP, MEAT PIES, DINNERS (11)

JAM, JELLY, PRESERVES, ETC.	None ☐	Number of Cans or Jars	Weight Each Can or Jar	Total Amt. Paid
Blueberry	3110-5			
Cranberry	3120-5			
Currant	3121-5			
Raspberry (red or black)	3140-5			
Strawberry	3150-5			
Other Berry (kind)	3160-5			
Orange	3240-5			
Apple Jelly	3310-5			
Apricot	3320-5			
Cherry	3351-5			
Grape	3380-5			
Peach	3440-5			
Pineapple	3460-5			
Plum	3470-5			
Mixed Fruit	3590-5			
Other Fruit (kind)	3530-5			

SOUP, BROTH, CONSOMME, ETC.	None ☐	Code 5	Number of Cans or Pkgs.	Weight Each Can or Pkg.	Total Amt. Paid	52 Check If Frozen	53 Check If Dried
Tomato Soup		4874					
Vegetable Soup (incl. Minestrone Soup)		4991					
Vegetable and Meat Soup		5580					
Chicken Soup or Broth		5693					
Mushroom Soup		4781					
Pea Soup		4532					
Other ☐ Asparagus ☐ Bean 4421 4702 ☐ Celery ☐ Onion 4131 4813							

MEAT PIES	None ☐	Number Bought	Weight of Each	Total Amt. Paid	Check If Frozen	Check If Dried
Beef Pie	5597					
Chicken Pie	5695					
Turkey Pie	5621					
Pizza Pie Mix	5581					
Pizza Pie—Prepared or Frozen	5582					

DINNERS — Brought Home	None ☐	Number Bought	Price of Each	Total Amt. Paid	Check if Frozen	Check if Hot
Chicken-in-the-Rough	0100					
T.V. Dinner	0100					
Other (kind)	0100					

PREPARED BABY FOOD

Code 9 None ☐

FRUITS		No. of Cans, Jars	Weight Each Can, Jar	Total Amount Paid
Applesauce	3311			
Apricots	3321			
Bananas	3340			
Peaches	3440			
Pears	3450			
Plums	3470			
Prunes	3480			
Other	3530			
Apple-Apricot	3601			
Pear-Pineapple	3602			
Other Mixed	3603			
Apricot-Farina	3620			
Plum-Farina	3621			
Apricot-Oatmeal	3622			
Other mixed	3623			
Apple Juice	3319			
Orange Juice	3249			
Orange-Apricot J.	3640			
Orange-Prune J.	3641			
Orange-Apple J.	3642			
Pineapple Juice	3460			
Other Juice	3549			
Teething Biscuits	6294			
Puddings	7421			
Baby Cereal (kind)				

VEGETABLES		No. of Cans, Jars	Weight Each Can, Jar	Total Amount Paid
Beets	4710			
Carrots	4470			
Green Beans	4440			
Peas	4530			
Spinach	4260			
Squash	4560			
Sweet Potatoes	4570			
Other Vegetables	4900			
Mixed Vegetables	4990			

MEATS				
Beef	5150			
Chicken	5615			
Lamb	5250			
Liver	5143			
Other Meats	5552			
Mixed Meats	5551			
Eggs	5901			
Eggs and Bacon	5902			
Soup (Baby Food)	4993			

VEG. & MEAT				
Veg. and Beef	5561			
Veg. and Chicken	5662			
Veg. and Bacon	5563			
Veg. and Liver	5564			
Veg. and Lamb	5565			
Other	5566			

BAKERY AND CEREAL PRODUCTS

BREAD None ☐		No. of Loaves	Lbs., Oz., Each Loaf	Total Amt. Paid
White Enriched Bread	6101			
White Enriched Bread	6101			
White Non-Enriched Bread	6102			
Whole or Cracked Wheat Bread	6104			
Rye Bread	6105			
Raisin Bread	6106			
Cinnamon Bread	6107			
Diet Bread	6112			
Half and Half Bread	6117			
Other 08 ☐ Vienna, French 10 ☐ Date Nut 03 ☐ Potato 09 ☐ Boston Brown 11 ☐ Bran 03 ☐ Salt Rising	61			
Other 13 ☐ Pumpernickel 15 ☐ Rusk 14 ☐ Zwieback 16 ☐ Toast ☐	61			

BUNS, ROLLS, CAKES None ☐			No. Pkgs.	No. in Each Pkg.	Lbs., Oz., Each Pkg.	Total Amt. Paid
Biscuits	1 ☐ Oven Ready 2 ☐ Refrig. (can or tube) ☐	620				
Buns	1 ☐ Hamburg 2 ☐ Wiener ☐	621				
Buns	1 ☐ Hamburg 2 ☐ Wiener ☐	621				
Breakfast Rolls	1 ☐ Raisin 3 ☐ Nut Covered 5 ☐ Plain Frosted 2 ☐ Cinnamon 4 ☐ Butterscotch ☐	622				
Breakfast Rolls	1 ☐ Raisin 3 ☐ Nut Covered 5 ☐ Plain Frosted 2 ☐ Cinnamon 4 ☐ Butterscotch ☐	622				
Dinner Rolls	1 ☐ Parkerhouse 2 ☐ Poppy Seed 3 ☐ Brown and serve	623				
Dinner Rolls	1 ☐ Parkerhouse 2 ☐ Poppy Seed ☐	623				
Other Rolls	1 ☐ Whole Wheat ☐	624				
Muffins	1 ☐ Plain 3 ☐ English 5 ☐ Corn 2 ☐ Bran 4 ☐ Blueberry ☐	625				
Coffee Cake		6260				
Angel Food Cake	1 ☐ Iced 2 ☐ Not Iced	630				
Cheese Cake		6310				
Layer Cake	1 ☐ Plain Frosting 2 ☐ Choc. Frosting	632				
Cup Cakes	1 ☐ Chocolate, Frosted 3 ☐ Chocolate Not Frosted 2 ☐ Plain, Frosted 4 ☐ Plain Not Frosted	633				
Fruit Cake		6340				
Loaf Cake	1 ☐ No Frosting 3 ☐ Chocolate Frosting 2 ☐ Plain Frosting ☐	635				
Sponge Cake	1 ☐ No Frosting 2 ☐ With Frosting	636				
Jelly Roll		6370				
Cream Puffs		6375				
Eclairs		6378				

(14) BAKERY AND CEREAL PRODUCTS (cont.)

COOKIES

None ☐

		No. Pkgs.	Lbs., Oz., Each Pkg.	Total Amt. Paid
Cookies—Plain or sugared	6410			
Cookies—Plain with Frosting or Marshmallow	6411			
Cookies—Chocolate	6412			
Cookies—Chocolate with Frosting or Marshmallow	6413			
Cookies—Fruit Filled	6414			
Cookies—Assorted	6415			

DOUGHNUTS, PIES

None ☐

			No. Pkgs.	No. In Each Pkg.	Lbs., Oz., Each Pkg.	Total Amt. Paid
Doughnuts—Raised	1 ☐ Frosted or Sugared 2 ☐ Not Frosted or Sugared	642				
Doughnuts—Cake Type	3 ☐ Frosted or Sugared 4 ☐ Not Frosted or Sugared	642				
Doughnuts—Bismarks		6426				
Pies	1 ☐ Cream 3 ☐ Mincemeat 5 ☐ Chiffon 2 ☐ Custard 4 ☐ Pumpkin ☐	650				
Pies—Fruit	10 ☐ Apple 12 ☐ Blackberry 14 ☐ Boysenberry 11 ☐ Apricot 13 ☐ Blueberry 15 ☐ Cherry	65				
Pies—Fruit	16 ☐ Peach 18 ☐ Raisin 20 ☐ Rhubarb 17 ☐ Pineapple 19 ☐ Raspberry 21 ☐ Strawberry	65				
Pies—Fruit	22 ☐ Apple-Blueberry 24 ☐ Strawberry-Rhubarb 23 ☐ Apple-Cherry ☐	65				

MIXES

None ☐

			No. Pkgs.	Lbs., Oz., Each Pkg.	Total Amt. Paid
Cake Mix	1 ☐ White 3 ☐ Chocolate 5 ☐ Spice 2 ☐ Yellow 4 ☐ Angel Food ☐	661			
Cake Mix	1 ☐ White 3 ☐ Chocolate 5 ☐ Spice 2 ☐ Yellow 4 ☐ Angel Food ☐	661			
Cookie Mix	1 ☐ Plain 2 ☐ Chocolate ☐	662			
Hot Roll or Biscuit Mix	1 ☐ Hot Roll 2 ☐ Biscuit	663			
Bread Mix	1 ☐ Corn 3 ☐ Plain 2 ☐ Bran ☐	664			
Muffin Mix	1 ☐ Corn 3 ☐ Plain 2 ☐ Bran ☐	665			
Pie Crust Mix		6660			
Complete Pie Filling and Crust Mix		6661			
Pancake or Waffle Mix	1 ☐ Buckwheat 2 ☐ Plain ☐	667			
Other Mix (kind)		668			

FLOUR, CORN MEAL

None ☐

			No. Pkgs.	Lbs., Oz., Each Pkg.	Total Amt. Paid
Cake Flour		6690			
Graham Flour		6691			
White Flour	2 ☐ Enriched 3 ☐ Non-Enriched	669			
Corn Meal		6694			
Corn Starch		6695			
Other Flour	99 ☐ Whole Wheat 87 ☐ Barley 97 ☐ Buckwheat 96 ☐ Rye	66			

BAKERY AND CEREAL PRODUCTS (cont.) (15)

CRACKERS

None ☐

		No. Pkgs.	Lbs., Oz., Each Pkg.	Total Amt. Paid
Soda Crackers, Others Similar	6280			
Other Salted Crackers	6281			
Graham Crackers — 1 ☐ Chocolate Covered 2 ☐ Not Choc. Covered	629			
Other Crackers (kind)	6295			
Cracker Meal	6296			

SPAGHETTI, ETC.

None ☐

		Check One: 1 Box	2 Can	3 Bag, Sack	Check One Here Too: 1 Plain	2 Meat	3 Gravy or Meat Sauce	4 Cheese	5 Tomato	6 Other	No. Pkgs. or Cans	Lbs., Oz., Each Pkg. or Can	Total Amt. Paid
Spaghetti or Macaroni	67												
Spaghetti or Macaroni	67												
Noodles	68												
Rice	69												
Minute Rice	6917												
Tapioca	6959												

BREAKFAST CEREAL

None ☐ 60

	No. Pkgs.	Lbs., Oz., Each Pkg.	Total Amt. Paid
Ready-to-Serve (kind—Wheaties, etc.)			
Ready-to-Serve (kind)			
Ready-to-Serve (kind)			
To Be Cooked (kind)			
To Be Cooked (kind)			

APPETIZERS, ETC.

None ☐ 69

Crackerjacks, Karmel Corn	6970			
Cheese Twist, Cheese Sticks, Corn Pone, Etc.	6971			
Popped Corn, Fritos	6972			
Pop Corn—Raw	6973			
Pretzels	6974			
Cones for Ice Cream	6977			
Other (kind)				

OTHER GRAIN PRODUCTS

None ☐

SUGAR, SWEETS, CANDY

SUGAR	NONE ☐	7100	Number of Pounds	Price per Pound	Total Amt. Paid
White or Powdered		7100			
Dextrose, Maltose		7110			
Brown		7120			
Maple		7130			
SYRUP AND HONEY	NONE ☐	7200	Number of Pounds and Ozs. or Pts.	Price per Unit	Total Amt. Paid
Corn Syrup		7210			
Cane Syrup		7220			
Maple Syrup		7230			
Molasses		7240			
Sorghum		7250			
Other Syrup		7260			
Toppings for Ice Cream		7265			
Honey		7270			
CANDY & SWEETS	NONE ☐	7300	Number of Pounds and Ounces	Price per Pound	Total Amt. Paid
Fondant, Mints, Marshmallow		7310			
Cream—Chocolate Covered		7320			
Cream—Fruit, Nut		7330			
Cream—Chocolate, Fruit, Nut		7340			
Solid Chocolate		7350			
Other Candy or Sweets		7360			
PREPARED DESSERT MIXES	NONE ☐	7400	Number of Packages	Lbs., Oz., Each Pkg.	Total Amt. Paid
Gelatin—Unflavored		7410			
Flavored Gelatin (Jello, Royal, etc.)		7415			
Puddings or Pie Fillings—Dry Mix		7420			
Candy Mix		7440			
Frosting Mix		7450			

NUTS AND NUT PRODUCTS

NONE ☐	35-37	Number of Lbs., Ozs.	Price per Pound	Total Amt. Paid	Check One 38 (1) In Shell	(2) Shelled
Coconuts	751					
Peanuts	752					
Peanut Butter	7532					
Almonds	754					
Brazils	755					
Walnuts, Pecans	756					
Mixed Nuts	757					
Other Nuts (kind)	758					

Have you included all of the food purchases by other members of the household?
Do not include sales tax in reporting price or total amount paid.

BEVERAGES

NONE ☐	8000	Number of Bottles, Pkgs.	Size of Unit Specify Ozs., Lbs., etc.	Price per Unit	Total Amount Paid
Beer	8110				
Liquors (Whiskey, Gin, Rum, etc.)	8220				
Wine	8230				
Cocoa 0 ☐ Mix 1 ☐ Plain	831				
Coffee—Ground	8420				
Coffee—Instant	8421				
Tea 0 ☐ Bags 1 ☐ Loose 2 ☐ Instant	853				
Soft Drinks—bottled	8610				
Soft Drinks—Liquor Mixes	8611				
Soft Drinks—powdered	8720				
Postum	8810				
Ovaltine	8811				
Other (kind)					

NONE ☐ VITAMINS AND MINERALS

			Quantity Purchased	Total Amount Paid
VITAMINS	(name kind)	9100		
MINERALS	(name kind)	9200		

COOKING AIDS

NONE ☐	9300	Number of Units	Lbs., Oz., Each Unit	Price per Unit	Total Amount Paid
Baking Powder	9311				
Baking Soda	9312				
Canning Aids (Certo, etc.)	9369				
Chocolate—Baking, Chocolate Chips	9321				
Extracts (name kind)	9330				
Junket Tablets	9345				
Mustard—Prepared	9436				
Meat Sauces (name kind)	9340				
Meat Tenderizer	9375				
Salt	9350				
Spices (name kind)	9360				
Pepper	9361				
Vinegar	9371				
Yeast	9372				
Cream of Tartar	9374				

Directions for Keeping Your Diary

1. Foods to be reported

a. You are to report all food items including beverages brought into your home whether (1) purchased, (2) received as a gift, (3) home-grown, or (4) obtained by hunting and fishing.

b. Items that you buy or grow and give to someone as a gift are not to be reported in your diary.

c. Meals purchased and eaten away from home should be reported as follows: On page 19 of your diary report the number and total amount spent for such meals away from home. If members of your household are guests for meals away from home report the number of such meals. If meals eaten out are paid for by your employer they are reported similar to guest meals, that is, report the number of such meals, but not the amount spent for them. If you serve meals to guests enter the guest meals on page 19. Do not report meals that you serve to guests in a restaurant if you pay for the meals.

d. Do not report in your diary items such as Coca-Cola, ice cream cones, candy bars, etc. that are purchased and eaten away from home unless you consider them a complete or regular meal.

e. Food that is brought into your home and later used for school lunches, workmen's lunches, picnics, etc. should be reported in your diary. Meals comprised of such foods are not considered meals away from home.

2. When to report items in your diary

a. Please record food which you *purchase* on the day it is purchased. Record *gift* items on the day they are received. Record *home-grown* foods on the day they are brought into the home (or put in your frozen food locker if you rent one). Record items obtained by *hunting and fishing* on the day they are brought into the home (or put in your frozen food locker if you rent one).

b. Please be careful not to report any food items twice. For example, do not report home-canned items both when they are purchased or brought into the home and again when they are used.

c. Products which you had on hand before you became a panel member are not to be recorded.

3. Special points on reporting

a. Products are *prepackaged* if they are wrapped or placed in a consumer size package with a specific price indicated for each package before the customer enters the store. The opposite is "bulk" in which the product is not wrapped or placed in a consumer size package before the customer enters the store.

b. *Frozen* products are frozen when you buy them. Do not check as *frozen* the unfrozen items you buy to take home and later freeze. If the product is frozen when you obtain it, check *frozen* regardless of the type of container it is in.

c. In reporting fruits and vegetables please indicate the amount in weight or liquid measure, *except* for those *fresh* fruits and vegetables indicated with "qts., no., heads, ears, or bunches" after the name of the product it is all right to express the quantity in these units. For example, fresh strawberries may be recorded as number of quarts, fresh grapefruit may be recorded as 3 grapefruit or 1 doz. grapefruit, etc., head lettuce may be reported as number of heads, or radishes may be reported as number of bunches, etc. Unless one of these units follows the name of the product, please report fresh products in pounds and ounces, or if bought in large amounts pecks, bushels, etc. may be used. All frozen, canned, dried, jam, jelly, and soup items should be recorded in weight or liquid measure.

d. If you are not sure of the weight of home-grown, gift, or hunting and fishing items please make an estimate and enter it in the diary.

4. Vacations, trips, etc — if you are going to be away from home for 2 months or less please arrange for a supply of diaries to last during the period.

5. Change in household membership — In reporting a change in the size of household report only changes which you expect to last 2 months or more. If less than 2 months, report visitors' meals as guest meals and meals of household members who are away as meals away from home.

6. Reporting income — Record the income of members of your household each week that earnings in any amount are received. All of your income should be reported, except that federal income tax preferably should be deducted. No other deductions from income (i.e., car payments, social security, bonds, retirement, etc.) should be made when reporting.

7. Do not report sales tax as a part of the expenditure for food items. Do not include bottle deposit as part of the cost of milk and beverages.

EXTRA SPACE (for items not listed in diary) [19]

Description	Number of Units	Size of Unit	Price per Unit	Total Amount Paid

VITAL DATA QUESTIONS

1. Has there been any change in your household membership since your last reporting week? YES NO (circle one)
   If yes, what was their: Relationship to homemaker Age

   _____ _____

   _____ _____

   How many are there in your household now?_____

2. How many regular meals were eaten away from home by members of your household last week?_____(One meal consists of either breakfast, dinner or supper for ONE person). Total amount spent_____

3. How many guest meals were served during the past week?_____
   (A guest is anyone not a regular household member).

4. What was the total income payment actually received during the diary week by:
   The male and female head of the household?_____
   Other members of the household?_____
   Check if none_____.

5. Was this before or after Federal Income Tax deductions? Before ( ) After ( )

   (In reporting income payments, please keep in mind that they might come from many sources. These include wages, salaries, commissions, pensions, interest and dividends, annuities, profit from business and professional services, profit from rent, government payments, gifts, and any other sources.)

This information will be held strictly **confidential,** and your name will not be associated with it. It is necessary to ask these questions in order to get the greatest value from your diary.

Professor G. G. Quackenbush

M. S. U. Consumer Panel
Michigan State University
East Lansing, Michigan

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