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MEASURES and PROCEDURES
for ANALYSIS of
U. S. FOOD CONSUMPTION

Agriculture Handbook No. 206

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PREFACE

A considerable body of information on U. S. food consumption has been developed by the U. S. Department of Agriculture during the last 25 years. Estimates of annual data on per capita consumption of all major foods and several overall measures of food consumption, published regularly by the Agricultural Marketing Service prior to April 1961, are now issued by the Economic Research Service. In earlier publications such estimates and appraisals of the results have been described.

This bulletin goes one step further: (1) It considers the concepts underlying alternative economic measures of overall food consumption, both through time and among major population groups at one point in time; and (2) it describes special procedures developed for analysis of problems related to food consumption.

The research on farm-retail price spreads and marketing services, to which reference is made in this bulletin, was also transferred from the Agricultural Marketing Service to the Economic Research Service under the April 1961 reorganization of the U. S. Department of Agriculture. The Statistical Reporting Service received the responsibilities of the former Agricultural Estimates Division of AMS, including reports on current crop and livestock production and farm prices.

Noted at appropriate points in the text are recognitions of several contributions to the handbook made by members of the staff of the Consumption Section, Statistical and Historical Research Branch, and by others now in the Economic Research Service.

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MEASURES AND PROCEDURES FOR ANALYSIS OF U. S. FOOD CONSUMPTION

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Chapter 1. INTRODUCTION

The primary objective of this bulletin is to assist market research workers in choosing among alternative economic measures of U. S. consumption of all foods combined. The selection of economic measures often materially influences (1) the trends and patterns of consumption ascertained, (2) findings concerning the reasons for historical changes and variations, and (3) appraisals of future trends and needed adjustments in food production and marketing. A second objective is to aid research workers in selecting and applying appropriate procedures to the analysis of variations in food consumption.

All parts of the complex structure of United States food production, marketing, and consumption are changing. The nation's investment of resources in agriculture and in food marketing necessitate ever greater effort to maximize efficient adjustment to change. Such efforts must start from knowledge of directions and rates of change. Because this country apparently can produce all the food that U. S. consumers may want in the foreseeable future, with only minor exceptions, the key problem in the adjustment process is forecasting what foods and what food marketing services the people in this country are going to want to consume next year, 5 years from now, 10 years off, and so on.

1.1. Content and Plan

The knowledge on which forecasts of food consumption must rest has been growing with changes in the structure, but perhaps not fast enough or disseminated widely enough, to meet present-day needs. In the last decade, meanings of consumption have proliferated, as have terms to describe them and data to measure them. Clarification and delineation of alternative meanings of food consumption to be found in chapter 2 of this handbook provide a basis for more precise macroeconomic analysis of variations in food consumption.

Details of the construction of some familiar time-series measures of overall quantities and value of food are provided in other publications. ^{1/} They are reviewed briefly in chapter 3 of this handbook, as are newly developed measures, in order to provide a coordinated appraisal of historical statistics on quantities and values of all food consumed by U. S. civilians, measured at the supply level, the retail level, and the final market level.

To reveal the detailed structure of overall food consumption, cross-section data from several surveys of food consumption by U. S. households are meshed with some of the time-series data in terminology and summarized in chapter 3.

^{1/} As in Agr. Handb. 118 Major Statistical Series of the U. S. Department of Agriculture (24), Agr. Handb. 62 Consumption of Food in the United States, 1909-52 (6), and Agr. Handb. 91 Measuring the Supply and Utilization of Farm Commodities (12).

Numbers in parentheses refer to item numbers in Literature Cited and Other References, beginning on page 112.

Chapter 4 provides descriptions of several procedures developed for use with overall measures of food consumption in analysis of historical changes in cross-section differences. Reference to some familiar methods supplements the new material. Procedures described here are those used to obtain operational answers to practical problems, rather than to derive theoretically elegant measurements of economic relationships.

Several appendixes supplement information given in the main body of the text.

1.2. Organization of the Reference Scheme

The system of numbering text sections, tables, and figures has been adapted from technical works on statistics and economics to expedite cross-referencing in this handbook and to contribute to its usability as a reference work. The first digit of each text section number (3.1.2.2.), table number (3.2), and figure number (4.1) refers to the number of the chapter in which it is given. Appendix references begin with a capital letter, as B.1. The second digit is a text reference indicates a major section of the chapter except for appendix references in which the first digit performs this function. (Examples: 3.2 and B.2 both refer to second major section of chapter 3 or the appendix). Headings of these major sections of the chapter are included in the table of contents along with the page number on which each begins. Numbering of subsections follows the same system.

To help the reader become thoroughly familiar with the standard literature on food consumption, an abbreviated identification is used for each major reference, as well as the number assigned to it, in Literature Cited and Other References, at the end of the handbook. Example: Agr. Handb. 62 (6) refers to Agriculture Handbook No. 62, Consumption of Food in the United States, 1909-52 (and its annual supplements), which is number 6 in Literature Cited and Other References.

A coding system is also used for time series pertaining to quantities of food and food marketing services and to value data. A kind of road map for this system is provided in exhibits A and B of chapter 3.

Chapter 2. WAYS OF LOOKING AT FOOD CONSUMPTION

From an economic point of view alone, food consumption involves a complex of interrelated ideas. Certain complications arise from the variety of possible ways in which the subject may be considered. Others arise from the fact that many of these aspects are not mutually exclusive. A first step in clarification of the subject is the careful delineation of the different ways of looking at food consumption.

Aspects requiring clarification before an analysis of a problem in this area is begun include: (1) Commodity coverage; (2) choice among meanings of food consumption-- quantity, quality, and value; (3) levels at which food consumption is measured within the marketing system; (4) coverage in terms of both sources and uses; (5) channels through which food reaches consumers; (6) kinds and amounts of marketing services bought with food; (7) variations in food consumption among groups in the population at one point in time; (8) changes through time and (9) food consumption as differentiated from consumer acceptances, consumer preferences, and food habits.

2.1. Commodities Covered

This handbook is primarily concerned with all foods combined, with little attention given to the commodity sectors. The commodities included are those customarily consumed as human food in the United States, encompassing fishery products and spices as well as farm products. Alcoholic beverages are not generally classified as food by the U. S. Department of Agriculture. In some sets of data, however, expenditures for alcoholic beverages are not separated from those for food. Wherever this occurs, particular note is made of the exception.

2.1.1. Food Commodities and Food Use

All commodities with any food use may be described as food commodities; or one may limit the coverage to commodities used primarily for food. For example, agricultural economists often refer to food grains, meaning wheat, rye, and rice, as opposed to the feed grains -- corn, barley and oats. The first group -- food grains -- is used in this country primarily for food, whereas only relatively small quantities of the second group -- feed grains -- go for food. This handbook uses the terms in the more inclusive sense, that is, all commodities consumed as food by U. S. consumers.

2.1.2. Nonfood Commodities and Nonfood Use

Agricultural commodities that never are used for food can be readily identified as "nonfood commodities." But nonfood use of food commodities introduces complications. Food commodities may be used directly and wholly for nonfood purposes, such as the feeding of whole grain to livestock. Or food and nonfood products may be joint products of food commodities, as in the case of flour and bran from wheat. ^{2/}

Ordinary wastes and losses in distribution may or may not be considered as food use of food commodities. From an economic standpoint they represent use of agricultural resources instead of alternative use of marketing resources to reduce their occurrence. Some of these wastes and losses may therefore be regarded as a part of food consumption. This is particularly evident if consumption is to be measured at

^{2/} This problem is considered at length in Agr. Handb. 91 (12), pp. 15-16, 24-26.

the farm level. At the retail level, however, allowances for wastes and losses are usually made to exclude them from the measure of food, counting them statistically with nonfood use of food commodities.

2.2. Meanings of Food Consumption and Their Relationships to Level of Distribution

Concepts of quantity, quality, and value provide alternative meanings of food consumption that bear economic importance. The significance of each term appears superficially to be simple, but actually every one is quite complicated. This section points out some of the complications that make satisfactory definitions elusive, particularly those related to distribution levels. The term "consumption" must be considered first.

2.2.1. Consumption

For economic analysis, "food consumption" means the quantities of food taken from the market. To be precise, the time-series estimates of food consumption should be described as measuring the approximate quantities of food moving through trade channels into domestic consumption. Because of the relatively great perishability of most foodstuffs, measures of these movements are considered to be relatively good estimates of actual consumption in the economic sense, though their adequacy varies widely.

Ordinarily, home-produced supplies of food are included in "consumption" or "food use" along with those obtained through marketing channels.

2.2.2. Quantity

The meaning of the term "quantity" can be broadened to include "value" or "expenditure." Yet, in referring to food, it is usually restricted to weight or volume. When a person refers to quantity of food consumed, he generally means poundage. The poundage of a single food is an economically significant measure. But consideration of the total poundage of all foods combined is complicated by the need to distinguish the different poundages as they leave the farm gate, the processor, the wholesale produce dealer, or the retail store.

Quantity problems may arise even for a single commodity. The obvious example of frozen concentrated orange juice and fresh oranges comes to mind. Should the poundage of processed product or the weight of the reconstituted juice be added to the retail weight of the fresh oranges? A total including the cans of frozen orange juice and the retail weights of fresh oranges has little meaning. Should farm weight equivalents of processed products be added to farm weights of oranges sold to consumers in fresh form? To handle such problems, a common denominator is needed. There are at least four common denominators for food: (1) Pounds at any one of several levels in fresh or unprocessed equivalents; (2) content of a common ingredient such as fat or calcium in dairy products; (3) food energy value measured in calories; and (4) price-weighted indexes of quantity. An analyst's choice among these alternatives must be based upon a clear understanding of what is being measured, and why. The common denominator chosen must fit the attributes of food being studied in a given problem.

2.2.3. Quality

A comprehensive definition of quality was developed a few years ago by a group of food technologists, economists, statisticians, and home economists: "Quality is

the combination of attributes of a product that have significance in determining the degree of acceptability of the product to a user." ^{3/}

It is difficult to evaluate quality, for it may mean a type of food with less waste than another, or food that is more mature, more tasty, or more tender, or more costly to produce or to market or to buy than some other food, or food that contains more nutrients that are particularly needed. Does a shift from canned to frozen vegetables, or from potatoes to leafy, green and yellow vegetables represent an increase in food consumption? Most people would agree that a shift in consumption to a line that is higher priced and that requires more production and marketing services, represents an improvement in the quality of food consumed and, for certain analyses, an increase in food consumption.

This leads somewhat prematurely to one of the most difficult problems in economic analysis of food consumption -- the combination at the consumer level of marketing services with food as produced by farmers or by fishermen. The addition of some marketing services to foods (as in precooking, washing, grading, and so on) may provide attributes desired by consumers; thus its quality is increased. These two elements are distinct to producers and to marketing agencies, but not to consumers. In this handbook the distinction between farm and marketing inputs is maintained, with attention directed to the separate contribution of each.

Although nutritive value is an economically important aspect of food quality, it is considered only incidentally in this handbook. Those who are concerned with improving the general level of nutrition of our population are likely to consider an increase in consumption of foods with relatively scarce nutrients to be a desirable increase in food consumption, even if it occurs at the expense of reduced consumption of foods high in more plentiful nutrients. Obesity is currently recognized as one of the major problems of nutrition in this country. Some substitution of foods high in protein, minerals, and vitamins for foods high in carbohydrate and fat content is therefore preferable to net increases in total poundage of food consumed. Accordingly, many nutritionists would view such shifts as improvements in food consumption. The Institute of Home Economics regularly calculates the nutritive value of the per capita food supply in terms of 11 nutrients and food energy. As yet, however, there is no satisfactory common denominator for combining these nutrients into an overall nutritional index.

2.2.4. Value

Values of food consumed expressed in dollars are particularly useful for economic analysis of variation and trends in food consumption, provided both value concepts and matching data are carefully identified and comparability maintained. For example, the average market value of food consumption includes the value of all resource inputs by primary producers and all marketing inputs by processors and distributors. But the average farm value of food consumed includes only the value of productive resources used by farmers to provide cattle on the hoof, raw milk, and so on. ^{4/}

Looking at the meaning of value in another way, we see that it is composed of a price element in addition to a measure of quantity and quality. Introduction of price reflects economic inputs on the supply side, as just described, and preferences on the demand side.

^{3/} Page 117, Market Demand and Product Quality, (70).

^{4/} The division between farm and marketing inputs is indistinct at times but may be based on who pays the bill, as for picking fruit -- the farmer or the marketing agency.

For economic analysis of food consumption, five different concepts of value need to be identified: (1) Farm value, (2) retail value, (3) market value, (4) food expenditures, and (5) value of marketing services sold with food. ^{5/} The meanings of these terms, as indicated earlier in this chapter, are tied in with levels of the distribution system and with particular kinds of economic resources.

2.2.4.1. Farm value represents the total value of farm commodities in terms of prices received by farmers. Farm value of food means the portion of the total farm value of food commodities allocated to food use as contrasted with nonfood purposes. (This leads back to the problem of joint products mentioned in 2.1.2.) The farm value of food sold by farmers represents their returns for the food share of production of raw materials used in food products. Farm value of food produced for home consumption is the value imputed to those supplies, using the farm prices of comparable foods sold.

2.2.4.2. Retail value is the value of food priced at the retail-store level. Here we include the resources supplied by primary producers in the forms of the raw commodities and of the services supplied by marketing agencies from the producer level through the retail level. By convention, retail value excludes the services of meal preparation and serving supplied by eating places. In other words, it is the calculated value of all food consumed by civilians, assuming that all purchases were made at retail store prices.

2.2.4.3. Although the term market value is also applied to the value of food sold by farmers or retailers, in recent years it has been used to an increasing extent by economists of the U. S. Department of Agriculture to represent the value of foods at the prices paid by final consumers at several levels of distribution. Thus, market value includes all inputs of economic resources. It can be applied to those foods bought directly from farmers or wholesalers, as well as to foods purchased as prepared meals in eating places of all kinds.

2.2.4.4. Food expenditures are ordinarily taken to mean dollar outlays for food by consumers, excluding the imputed value of home-produced food. ^{6/} However, the best known set of data by that name, the Department of Commerce series, includes the value of most home-produced food and excludes food bought by business firms as meals for clients. This example indicates the need of precise knowledge of the connotations of a particular value concept and the apparently "matching data."

2.2.4.5. The value of marketing services sold with food is the counterpart of the idea of farm value of food alone. The value of all food services consumed include those of assembly, transportation, warehousing, processing, wholesaling, retailing, and meal preparation and serving. Thus marketing services include the inputs of labor, capital, and management beyond the farm level.

2.2.4.6. At this point a word about value in current dollars as opposed to "real" value in constant dollars is necessary. Most value data are in terms of current dollars, that is, dollars spent within the time period to which they refer. But economists are frequently concerned with "real" value, that is, value data adjusted for changes in the purchasing power of the dollar. For some purposes, it is highly

^{5/} Data matching these concepts are supplied in chapter 3; the description of the measures may help clarify the concepts.

^{6/} Strictly speaking, expenditures should also exclude the imputed market value of payments in kind, such as employees' meals. But this would complicate study of the flow of food through marketing channels since such food actually receives the same services as meals sold. Therefore, it is included with meals sold to consumers.

desirable to convert current dollars to constant dollars or real values, that is, the equivalents of values in a specified base period. This is usually done by dividing the current dollar figures by the pertinent price index of the Bureau of Labor Statistics or of the Department of Agriculture.

2.3. Sources of Food

Extensive discussion of sources of food (e.g. domestic farm produced, imported) properly belongs in a bulletin describing basic data on production or foreign trade or in a bulletin on production economics. But since the coverage of the sources has considerable bearing on economic analyses of problems in food consumption, the major sources of U. S. food are enumerated here. (See table 3.3.) Full descriptions will be found in three other handbooks. ^{7/} In brief, most of the U. S. food supply comes from domestic farm producers. Some of it is consumed by the households of the farms where it is produced, but most is sold. Many nonfarm households produce some farm food commodities for their own use. Also, we import substantial quantities of farm food commodities. Nonfarm foods include fishery products and the spices. These may be produced in this country or imported.

2.4. Broad Categories of Use and Users

This handbook is concerned primarily with consumption of food by the U. S. civilian population, but U. S. food commodities are also purchased by the U. S. Armed Forces and for nonfood purposes by civilians and the military. Nonfood use includes consumers' goods such as clothing, producers' goods for agricultural use such as for feed, seed, and hatching, as well as industrial goods. The other broad category is export, either through commercial channels or by the Government. Detailed descriptions of these categories are available in the three handbooks referred to in note 7.

2.5. Distribution Channels to Civilian Consumers

Distribution channels constitute an important aspect of food consumption because, first, they provide a key to the marketing services supplied with food, and, second, use of the several distribution channels is affected by different economic and social factors. Identification of the distribution channels relevant to a particular problem is a prerequisite to the choice among sets of data.

2.5.1. Home Production

Home production may be viewed either as a source of food or a distribution channel through which food reaches consumers. By home production we mean the growing or raising of crops and livestock for use in the household of the producer, the gathering of berries, or the catching of fish for use in the home. It is impossible to be as precise as one would like in the use of this term. For example, the feeding of a chicken after purchase for a few days before slaughter does not make the chicken home-produced in an economic sense, but the fattening of a purchased steer for several months is likely to be considered as home production. The example of feeding a steer shows how easy it is to have double counting in agricultural statistics.

Information on home production is complicated by the fact that food received as payments in kind for work done on another farm or as meals, or as gifts from family and friends, may have been home produced or it may have been purchased. Operationally, probably the best assumption is that such interchanges are offsetting.

^{7/} Vol. 5 of Agr. Handb. 118 (24); Agr. Handb. 62 (6); and Agr. Handb. 91 (12).

2.5.2. Purchased Foods

Food commodities may be purchased from producers, as at wayside stands, or from distributors at the wholesale or retail levels. The food may be bought by private households or it may be bought by institutions and eating places. Purchased foods ordinarily includes meals and snacks. The term "eating places" is often broadened to include institutions and to signify all places for eating food outside private homes. Institutions include hospitals, orphanages, penal establishments, and the like.

2.5.3. Prepared Meals

Food may be sold to consumers in the form of prepared meals or snacks by eating places, or it may be supplied without separate payment. For example, many eating places furnish meals to employees as part of their pay. Institutions furnish meals to inmates and patients, and travelers often receive meals along with other services of air and water transportation agencies. Most meals and snacks are sold outright. Some eating places also sell candy and ice cream, even prepared dishes for off-premise consumption.

2.6. Marketing Services Sold With Food

The major types of marketing services sold with food are mentioned earlier, in connection with their value. For economic analysis of food consumption it is important to separate the use of these services from the consumption of food commodities as primary products involving only farm or fishing resources -- because economic and social factors affect the two types of resources differently. Study of marketing services bought by consumers is within the scope of this handbook only insofar as it pertains to the analysis of food consumption. 8/

2.7. Variations in Food Consumption Among Population Groups at One Point in Time

Variations in food consumption at one point in time among groups in the population may refer to the quantity, quality, and value of food consumed and to several other aspects of food consumption. The patterns of consumption among such groups of consumers for individual foods and for the general level of all food consumed can be expected to differ according to whether the food is eaten in private homes or away from home in eating places, because of varying impact of certain economic and social factors. Food at home may be subdivided according to source -- purchased, home produced, gift or payment in kind. Breakdowns of food away from home vary among sets of data and are described in chapter 3.

For some economic analyses, it is important to consider variations in food consumption of the civilian population according to housekeeping status of the consumers. The definition of housekeeping households varies according to the purpose for which the data have been collected. For example, the Census Bureau defines households in terms of the residents of a dwelling unit. For the food surveys of the Institute of Home Economics, a household is a group of persons who share food supplies, and a housekeeping household is one in which at least one person had 10 or more meals from household food supplies during the seven days preceding the survey interview. The nonhousekeeping population includes the institutional population, as well as those individuals and households that do not come within the definition of housekeeping households. In this category are residents of hotels and rooming houses. A complication is introduced by the fact that some members of the Armed Forces live at home

8/ For further information, see vol. 4 of Agr. Handb. 118 (24) and Misc. Pub. 741 (9).

and all eat outside military establishments while on leave. Another arises because some service families obtain their foods from commissary supplies which are counted with military takings. Such complications have been handled by special adjustments where significant.

Other bases are often used for subdividing the U. S. civilian population, and thus the food consumed. These include: (1) Region -- the makeup of regions varies among censuses and according to problems being studied; (2) degree of urbanization -- whether urban, rural nonfarm, or farm; and size of city; (3) income -- usually current total, including nonmoney or current money only, before or after taxes; (4) family type according to number in the family and age and sex composition; and (5) other bases such as race, occupation, age or education of the head of the household or of the housewife, and national origin.

2.8. Changes in Food Consumption Through Time

There are even more possibilities of variations in food consumption through time than at one point in time. These include changes (1) in the quantity, quality, and value of food consumed; (2) in their combinations and commodity coverage; (3) in sources of food consumed; (4) in the relative importance of major categories of use and users; (5) in channels through which food reaches consumers; ^{9/} (6) in all these patterns of variations; (7) from those in one point in time to another point; and (8) in marketing services obtained through given channels.

These changes in food consumption through time may be considered in terms of (1) aggregates for the whole country, (2) annual averages per capita, or (3) patterns of consumption among specified groups in the population. In economic analysis of food consumption, it is sometimes important to consider changes in the seasonality or short-run variations from one year to another. A whole set of changes in food consumption has to do with how relationships of food consumption to economic and social factors change through time. Thus, the concept or meaning of changes in food consumption through time encompasses the great variety of possible combinations.

2.9. Consumer Acceptances, Preferences, and Food Habits

Finally, reference is made to three other concepts of food relevant to analysis of variations and changes in food consumption. These are consumer acceptances of food, consumer preferences for food, and food habits. ^{10/} Consumer acceptances appear to be fairly close in meaning to the idea of food consumption in terms of quantities disappearing from the market in a given period, though the meaning of consumer preferences is apparently broader than the quantity, quality, and value of food actually bought or consumed. Probably some consumers from time to time buy some foods of a type or quality that they would prefer not to buy if alternatives were available in the market. It is true that some consumers may prefer some quality or convenience factors not available to them. Food habits include not just the combinations of food bought and used in a particular period, but the ways in which they are shopped for, prepared in the kitchen, and combined into meals, and even the ways in which meals are served. These elements are difficult to measure quantitatively, but their descriptions often add much to one's understanding of the reasons for particular changes in food consumption.

^{9/} These ordinarily involve some changes in marketing services.

^{10/} For further discussion, see Meyers, Trienah "Predicting Market Acceptance," p. 1388 of Jour. Farm Econ., Dec. 1955 (63).

Chapter 3. ECONOMIC MEASURES OF FOOD CONSUMPTION

The objective of this chapter is to outline the sets of data available for economic analysis of variations and changes in U. S. food consumption. Reference is made to major sets of data already published; also, some new measures are presented. The review of cross-section survey materials encompasses the nationwide, all-food studies made in the last 30 years. Emphasis is on those survey data which have proved useful to macroeconomic research by the Agricultural Marketing Service on changes in food consumption. The data to be considered are largely from Government sources, particularly the Department of Agriculture.

Five major types of statistics are described. These are time series, one-time cross-section surveys, repeated or panel type cross-section surveys, special surveys of use and preference, and estimates of retail store sales. The analyses that we shall report draw mainly upon data from time-series and one-time cross-section surveys. Before using any of these types of statistics, an analyst must make certain decisions or choices with respect to concepts discussed in the preceding chapter.

3.1. Time Series of Quantities of Food Consumed

Consumption of all major foods by U. S. civilians in each calendar year is estimated and published regularly by the Agricultural Marketing Service (AMS). These estimates are often called disappearance data because of the way in which they are derived. They are based on a great variety of information, originally compiled for other purposes, pertaining to supplies moving through trade channels for use by the civilian population. This accounts for the several levels in distribution at which the official estimates of consumption of individual foods are measured. Current data in terms of these levels -- designated "primary distribution weights" -- are published regularly for many commodities in the National Food Situation, a quarterly issued by AMS. (13).

3.1.1. Derivation of Consumption Estimates

3.1.1.1. Primary Distribution Weights.--Estimates of total civilian consumption of major foods are derived as residuals from data on production, stocks, foreign trade, and military takings. The annual supply of each food consists of production (mostly as estimated by the Agricultural Estimates Division, AMS) plus beginning stocks (wherever reported by the U. S. Department of Agriculture, the U. S. Department of Commerce, or trade sources) and imports. From this total are deducted feed, seed, and other nonfood uses; exports and shipments; Government purchases for noncivilian users; and ending stocks. The residual is considered to be total civilian consumption. Such totals are divided by the number of people eating out of civilian supplies to derive civilian per capita consumption. 11/

For use in economic analysis, some of the primary distribution data on civilian consumption per capita must be converted either back to farm weights or forward to retail weights. A special procedure is applied to each commodity. As examples, the primary distribution weights of meat are carcass weights where slaughtered; fresh fruits and vegetables are in terms of farm weights; canned and frozen foods are reported in terms of their processed weights at the wholesale level of distribution. A key to such details will be found in appendix A.

11/ Detailed descriptions of the estimating process for each food item are given in Agr. Handb. 62 (6). Brief descriptions are also available in chapter 3, vol. 5, Agr. Handb. 118 (24).

3.1.1.2. Farm Weight Equivalents.--Farm weights are usually in terms the fresh or raw products. Because the inedible portion of meat animals is so great, farm weights of animals are rarely used in measuring food consumption, though logically they might be. For example, the farm weight of a steer may be 1,000 pounds, including bones, blood, and hide; the wholesale distribution or carcass weight runs about 550 pounds; and the quantity of meat sold at retail averages about 470 pounds.

For commodities that are mostly edible, such as fruits and vegetables, fresh commodity equivalents of processed items are often used, sometimes referred to as "farm weights." If great precision is not required, such data are generally not difficult to estimate because reasonably adequate conversion factors have been obtained, largely from trade sources. Processing yields from raw farm products vary slightly from year to year, but, for lack of information, most of the factors are held constant until changes become sharply apparent.

3.1.1.3. Retail Weights.--Conversions to retail weights from the primary distribution weights are necessary only for the so-called "fresh" foods, such as fresh meats and fruits and vegetables sold to consumers in the fresh form. ^{12/} Consumption of most processed foods is measured in terms of their processed weights and are thus equivalent to retail weights. Because of lack of reliable data on some foods, such as commercially baked goods and the newer convenience foods, the measurement of the flow of these foods into consumption has to be pushed back to an earlier level in the distribution process. Thus, flour, fats, sugar, and eggs going into bakery products are included in the consumption data with the quantities of these foods that consumers buy as such.

Even if these estimates of retail weights of food consumed were precise, they would still have certain limitations for the study of food consumption arising from the very nature of averages calculated from disappearance data. They are national average annual rates per capita derived without adjustment for changes in the composition of the population, such as age distribution. ^{13/} They do not reveal differences in consumption among seasons of the year; regions; urban and rural areas; or those due to family size, family income level, and occupational differences; and differences in consumption in private homes as contrasted with eating in institutions and restaurants, for example.

3.1.2. Quantity Measures for All Foods Combined

Consumption of individual foods may be combined by adding pounds or values of the quantities of individual foods.

3.1.2.1. Total Poundage.--Problems in measuring and interpreting the total poundage of all foods combined are discussed in the preceding chapter. The variety of weights that can be used for major food items indicates the necessity for care in determining the level at which total poundage is to be measured. Even though the author and many other economists have not found a series on total poundage to be a useful economic measure, such a series on a per capita basis is regularly prepared and published in table 38 of the annual supplements to Agr. Handb. 62 (6). It is a

^{12/} Retail weights exclude approximate wastes and losses in distribution and represent the basis on which they are purchased by consumers in retail stores.

^{13/} No directly comparable data are available on regional, State, or local consumption because of lack of information on distribution of supplies within the country.

byproduct of the work on retail weights for individual foods and major food groups preparatory to the estimation of the nutritive value of the per capita food supply and the calculation of the price-weighted index of per capita food consumption at the retail level.

For economic analysis of most problems bearing on the consumption of all foods combined, a price-weighted index is much more desirable. Several indexes prepared by the U. S. Department of Agriculture make use of prices in a given base period and changing quantities to derive measures of flows of farm products in constant dollars either at the farm level or at the retail level.

3.1.2.2. Index of Supply-Utilization -- Farm Level.--The master index of supply-utilization of farm commodities measures the annual flows of such commodities from broad categories of source into broad categories of use and users. ^{14/} This index was designed as a tool for analyzing changes in supply and use of all agricultural commodities as a coordinated whole, and for relating developments in one group of commodities or source of supply or channel of distribution to the whole flow. The measure combines detailed statistics on the supply and distribution of each commodity on the basis of equivalent farm value, using the corresponding 1947-49 average price. ^{15/} It includes overall changes in the use of farm commodities in unprocessed forms and of major products processed from them.

The major advantage of the master index and its subindexes is that, somewhat like a jigsaw puzzle, they can be put together and taken apart. Each subindex can be related to every other. For example, because information on foreign trade is integrated with data on domestic production, it is possible to analyze the extent of our self-sufficiency in farm commodities and the significance of foreign demand for products of American farms. The subindexes also provide means for appraising the significance of major factors contributing to changes in the supply and utilization of farm products in the past and for making projections for the future.

Several limitations on the usability of this index result from its basic structure. As average prices for 1947-49 are used throughout the series, the indexes do not measure changes in value resulting from price changes or from the addition of more marketing services to the unprocessed farm commodities.

As previously indicated, the index includes farm commodities used for feed and seed as part of crop production, and again as part of the value of marketings of livestock products -- thus, it measures "gross flow."

Finally, the basic concept of flow is another limiting factor. The index measures the total flow of farm commodities in each year; it does not indicate how much is available at any one time within the year.

The subindex of total food use by civilians measures the amount of farm resources used each year in the form of food by the civilian population of the United States. It is affected by shifts in the pattern of consumption from lower-farm-priced to higher-farm-priced commodities, as from potatoes to broccoli, insofar as they involve more or less farm resources. But shifts from fresh to processed foods

^{14/} See 2.3 and 2.4.

^{15/} A modified Laspeyres formula, in which changing quantities and fixed prices are combined, is used to derive the index. This formula provides a measure of changes in quantities based on the relative economic importance of each commodity. The index is described in Agr. Handb. 91 (12).

do not affect the subindex because all foods are measured as unprocessed commodities in terms of farm-value equivalent. This index includes only farm-produced foods and excludes fish and spices. It covers the period 1924 to date. 16/

A per capita index of civilian food use of farm commodities has been computed from the total index by means of estimates of the population eating out of civilian supplies. Accordingly, this index is measured in terms of quantities and prices at the farm level. However, it reflects reported changes in stocks from the beginning to the end of each year, even at wholesale levels of distribution. The series, identified as PFQ-1a, 17/ is given in table 3.1. An alternative series, PFQ-1b, includes only foods sold by farmers for civilian use equivalent to purchases by consumers, thus excluding all home-produced quantities in the disappearance data. For handy reference, the code numbers and 1955 data for these and other AMS per capita quantity and value series are arranged in exhibit A, which emphasizes the differences in definition and coverage among the series.

Several alternative series measuring per capita use of foods according to source of supply are given in table 3.2. All exclude domestic marketing services and apply to food alone. The series for all domestic farm foods (PFQ-4a) and domestic farm foods sold (PFQ-4b) were derived from per capita index of civilian food use of farm commodities (PFQ-1a) from all sources and the series for all farm foods sold (PFQ-1b) by subtracting the values of imported farm foods. An index to measure approximately the per capita use of all imported foods including fishery products was also constructed (PFQ-5). 18/ For some analyses an index of civilian food use of all foods (both domestic and imported farm commodities and fishery products) is needed. Therefore, another pair of indexes was computed -- PFQ-6b for those sold and PFQ-6a including foods sold (or bought) and home produced. Comparison of these series with the basic series for farm foods only (PFQ-1a and PFQ-1b in table 3.1) shows that the addition of fishery products has negligible effect on trends and most year-to-year changes.

3.1.2.3. Index of Per Capita Food Consumption -- Retail Level.--The index of per capita food consumption was developed from the per capita quantities for individual foods to describe overall changes in food consumption from year to year, and over a period of years (PFQ-2). It primarily measures changes in quantity though it also reflects certain changes in quality of foods consumed, such as the shift from lower-priced to higher-priced foods. It does not reflect price changes as such, because 1947-49 prices are used throughout. 19/

The index was designed to measure changes in the total quantity of food consumed per person at the retail level. It assumes that all food moves through retail stores. This is as close to the actual consumption level as price weights can be

16/ Current data are published in the annual supplements to both Agr. Handb. 62 (6) and Agr. Handb. 91 (12).

17/ The code represents the initial letters of per capita food quantity -- No. 1a.

18/ From data on farm values of imported farm foods in 1947-49 prices (derived from the value aggregates of the supply-utilization index) and from edible weights of imported fishery products priced at the 1947-49 average import price per pound; spices were not included.

19/ The Laspeyres formula is used. Details are given in pp. 132-159 of text of Agr. Handb. 62 (6). Subindexes for commodity groups are published each year in the statistical supplement to that handbook.

Exhibit A.--Guide to AMS per capita food quantity and value series 1/

Item	Per capita quantity		Per capita value data 2/						
	(Indexes: 1947-49=100)		Supplier:	Retail	Market level		Expenditures		
			level	value	3/		3/		
	Code	1955	Code	Code	1955	Code	1955	Code	1955
			Dol.		Dol.		Dol.		
Food -- supplier level									
Domestic farm food commodities									
Sold	PFQ-4b	107	(TFV-1)	PFV-6	285			PFV-13b	311
Home produced			(TFV-2)	(TFV-7)					
All sources	PFQ-4a	101				(TFV-2)	PFV-12b	325	
Imported									
Farm			(TFV-3)						
Fishery products									
Total	PFQ-5	101		(TFV-8)					
Fishery products									
U. S.			(TFV-4)						
Total									
Domestic and imported									
Farm foods									
Sold	PFQ-1b	106							
All sources	PFQ-1a	101							
Farm foods and fishery products									
Sold	PFQ-6b	106						PFV-11b	363
All sources	PFQ-6a	101	(TFV-5)			PFV-10b	377		
All food at retail level 4/	PFQ-2	102		PFV-9	362				
Marketing services 5/									
With domestic farm foods	PFQ-7	106				(TFV-15a)			
With all food	PFQ-3	104				(TFV-14a)			
Composite quantity index of all foods used plus all marketing services	PFQ-8	103					PFQ-10b	377	

In this table the following initials are used: F for food; T for total; P for per capita; Q for quantity; and V for value.

1/ References to tables for data in other years and to text sections for description of series:

Code	Table	Section	Code	Table	Section
PFQ-1a	3.1	3.1.2.2	TFV-8	3.4	3.3.3
PFQ-1b	3.1	3.1.2.2	TFV-9	3.4	3.3.3
PFQ-2	3.1	3.1.2.3	PFV-9	3.4	3.3.3
PFQ-3	3.1	3.5.2	TFV-10a	3.5, 3.6	3.4.3.1
PFQ-4a	3.2	3.1.2.2	TFV-10b	3.6	3.4.3.1
PFQ-4b	3.2		TFV-10b	3.6	3.4.3.1
PFQ-5	3.2		TFV-11b	3.6	3.4.3.3
PFQ-6a	3.2		PFV-11b	3.6	3.4.3.3
PFQ-6b	3.2		TFV-12a	3.7	
PFQ-7	3.2	3.5.2	TFV-12b	3.7	3.4.3.2
PFQ-8	3.2	3.1.2.4	PFV-12b	3.7	
			TFV-13b	3.7	3.4.3.4
TFV-1	3.3	3.2.1.3	PFV-13b	3.7	
TFV-2	3.3	3.2.1.4	TFV-14a	3.8	3.5.1.1
TFV-3	3.3	3.2.2	TFV-14d	3.8	3.5.2
TFV-4	3.3	3.2.3	PFV-14d	3.8	
TFV-5	3.3	3.2.4	TFV-15a	3.8	3.5.1.2
TFV-6	3.4	3.3.2	TFV-15d	3.8	3.5.2
PFV-6	3.4	3.3.2	PFV-15d	3.8	
TFV-7	3.4	3.3.3			

2/ Code for total value data given for those series for which per capita data are not published.

3/ Subseries a excludes retail sales taxes and tips, b includes them. 4/ Includes all food and those marketing services between farm and retail level. 5/ Including services of eating places along with others to final market level.

constructed. Use of retail prices as weights results in combining the effects of shifts in consumption among foods having different processing and marketing costs with those of quantitative changes.

This index is subject to the basic limitations of the data from which it is computed plus those just mentioned. The overall index is published for current years each quarter in the National Food Situation (13). It is given in table 3.1 (PFQ-2) of this handbook.

3.1.2.4. Combined Quantity Index of All Foods Used Plus All Marketing Services.-- This index for all food plus all food services (PFQ-8) is derived, for use in this handbook, from the totals of the value aggregates, in 1947-49 dollars, of the index of per capita use of farm foods and fishery products (PFQ-6a) and those of the index of marketing services per capita (PFQ-3). The series, PFQ-8, is given in table 3.2. It differs from the retail index of per capita food consumption by reflecting all changes in the use of marketing services, not merely those of processing. However, the measure of the use of marketing services available at present is an approximation, not a directly developed index as described in a section 3.5.2.

3.1.2.5. Nutrient Supplies.--The Institute of Home Economics of the Agricultural Research Service prepares annual estimates of the average quantities of specific nutrients available for consumption in the country as a whole. Averages per person per day for 11 nutrients and food energy are calculated from the appropriate retail weights of foods consumed, as measured by AMS. The nutritive value series are particularly useful because they show trends in supplies of major nutrients that can be directly related to changing food patterns.

Details of the computations are described in chapter 4 of Agr. Handb. 62 (6). These estimates of nutritive value do not take into account losses and wastes after food leaves the retail outlets, or variations in the distribution of food among different groups in the population. Hence, these nutrient levels only indirectly measure the nutritional adequacy of the national food supply.

3.2. Time Series of Supplier Values

Supplier value data encompass the farm value of domestic farm foods, the value of imported foods, and the value of domestic fishery products. A guide to those series of supplier values, which are coordinated with the AMS market value data, is given in exhibit B.

3.2.1. Farm Value of Food

An increasing number of sets of farm value data have been developed in recent years by AMS in connection with (1) estimation of farm income, (2) measuring the supply and utilization of farm commodities, (3) calculating the marketing bill for farm products, and more recently, (4) the estimation of market value of food consumed by U. S. civilians.

Work on farm income includes the regular preparation of estimates of cash receipts from farm marketings and of noncash elements of gross farm income. 20/

20/ For details, see vol. 3, "Gross and Net Farm Income" of Agr. Handb. 118 (24).

Exhibit B.--Guide to components of AMS total food value series 1/

Item	Supplier level		Marketing services from supplier to retail level		Retail level		Marketing services from supplier to final market level 2/		Value at final market level 2/		Retail sales taxes and tips		Expenditures for purchased foods 2/	
	Code	Value : Bill. doll.	Code	Value : Bill. doll.	Code	Value : Bill. doll.	Code	Value : Bill. doll.	Code	Value : Bill. doll.	Code	Value : Bill. doll.	Code	Value : Bill. doll.
Food per se														
Domestic farm food commodities														
Sold to U. S. civilians	TFV-1	18.3			TFV-6	46.3								
Home produced (farm and nonfarm)	TFV-2	2.3			TFV-7	4.8								
Total		20.6				51.1								
Imported foods	TFV-3	3.3												
U. S. fishery products	TFV-4	.3												
Total	TFV-5	24.2			TFV-8	7.6								
Total														
Marketing services					TFV-9	58.7								
With domestic farm food commodities														
With all foods														
Total														
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3.2.1.1. Cash Receipts From Farm Marketings.--All sales of crops by farmers are included; purchases of feed and seed are deducted later, as production expenses. Similarly for livestock, estimates include all sales except those by one farmer directly to another farmer in the same State. Purchases of livestock by farmers from all sources outside their own State and from public stockyards within the State are later deducted as a production expense. Estimates for farm sales of firewood and other forest products are included in crop totals. These data have nonfood components. They also include food going to the Armed Forces and for export.

3.2.1.2. Farm values in terms of 1947-49 dollars are derived in the measurement of the flow of farm commodities from major sources into channels of distribution. These farm value data are the bases for the computations of the supply-utilization indexes described in 3.1.2.2. 21/

3.2.1.3. Annual data on the farm value of domestic farm foods sold to U. S. civilian consumers are estimated as an integral part of the computations of the marketing bill for farm foods. 22/ This methodology is basic to several other sets of value data recently developed. 23/ (The series is TFV-1 in table 3.3.)

The net farm values of major farm food commodities consumed domestically as food in 1913-39 were estimated, using the statistics on cash farm receipts from sales of food products with adjustments for resales to farmers (such as feeder cattle), nonfood byproducts or joint products, noncivilian takings, and changes in stocks. The net farm values for food groups were divided by the farmer's shares of retail costs indicated by the market basket series to obtain retail values. The market basket series are based on fixed combinations of foods, hence they do not reflect changes in makeup of food consumption within groups.

Substantial changes in food consumption since 1940 necessitated changes in methodology for estimating retail values and in methods for farm values as well. The changes within a commodity group are reflected to a greater degree (1) by dividing net farm value of individual products by farmer's share percentages and totaling than (2) by dividing the net farm value of the commodity group by the farmer's share for the group as a whole. In general, beginning 1940, the first method is used. But some minor adjustments were made in the commodity group estimates for 1940-46 to link the series at 1939.

Farm values of individual products are obtained by multiplying farm equivalents of civilian consumption from marketings (total civilian consumption less imported products and products consumed on farms where produced) by average price received by farmers. Farm values of some products are adjusted to allow for the value of nonfood byproducts.

21/ Value aggregates are given in tables 33-44 of Agr. Handb. 91 (12).

22/ The marketing bill for any specified group of farm products is the aggregate dollar amount of marketing charges paid to all agencies engaged in marketing these products. Thus, it may also be described as the dollar value of marketing services bought with those farm commodities, such as foods.

23/ This description was prepared with the assistance of Kathryn Parr, formerly of the Marketing Economics Research Division. Some further information is given on page 9 of vol. 4, "Agricultural Marketing Costs and Charges," Agr. Handb. 118 (24) and page 49 of Misc. Pub. 741 (9). Other sections of the latter publication describe commodity data. Further details may be obtained from the Marketing Economics Research Division, AMS.

A problem in computing farm value of commodity groups is the use of products of one group as ingredients of products of other groups. Because ingredients other than flour are so important in bakery products, corrections are made to avoid duplication. Farm values of milk, butter, lard, vegetable shortening, eggs, fruit, corn sirup, and sugar estimated to be used in bakery products are subtracted from their product groups and added to the farm value of grain to obtain the total farm value of bakery and cereal products. Such corrections were not made for any other products.

3.2.1.4. The farm value of home-produced food is composed of two segments: The output of farm households and the output of nonfarm households. The quantities of home-produced food used by farm households are valued at prices received for the sale of similar products. ^{24/} The value of food produced by nonfarm households for their own use was estimated by the author from detailed data on the quantities home-produced by such households (which form part of the disappearance data) using farm price data applicable to farm home-produced foods. ^{25/} The series of total values of home-produced food is given in table 3.3 (TFV-2).

3.2.2. Value of Imported Foods

Data on the value of imported foods are prepared in the Department in connection with the foreign trade work of the Foreign Agricultural Service (FAS), the measurement of the supply and utilization of farm commodities, and work on the market value of U. S. food. The FAS current value data on imports of all agricultural commodities are declared values of both processed and unprocessed commodities as stated at the ports of origin. The AMS measures of the inflow of imported foods are computed in farm value equivalents and 1947-49 dollars. ^{26/}

For work on the market value of U. S. food, it was necessary to construct a set of approximate value figures for imported food commodities, including fish, for U. S. civilians. This was done by summarizing the import values of foods imported from foreign countries, then subtracting military takings and approximate values of nonfood use of such commodities. In addition to these imported foods, estimates had to be made of the value of inshipments from the former U. S. Territories, Alaska and Hawaii. These presented a problem for the years 1948 through 1958 because inshipments from Alaska and Hawaii were not reported. However, quantity data for the major receipts from these areas were computed for the measurement of domestic food consumption, using trade sources. These were valued at prices derived from the import data for the same commodities from other Territories. The combined series is TFV-3 in table 3.3. (Consumption data used in this handbook apply only to the 48 States.)

3.2.3. Value of Domestic Fishery Products

The value of domestic fishery products is estimated regularly by the Fish and Wildlife Service of the Department of Interior and reported as the value of the Continental U. S. catch of edible fishery products. One adjustment is necessary -- to

^{24/} The detailed description is given on pages 15-16 of vol. 3, Agr. Handb. 118 (24).

^{25/} Details of the estimation of the quantities of individual commodities produced for home consumption are given in Agr. Handb. 62 (6) except for the revised procedure for estimates of vegetables for recent years, to which reference is made on page 46 of vol. 5 of Agr. Handb. 118 (24).

^{26/} Details of the computations of the value of imported foods in terms of 1947-49 dollars are given in the supply-utilization bulletin, Agr. Handb. 91 (12), and, in brief, in chapter 2 of vol. 5, Agr. Handb. 118 (24).

subtract approximate values of military takings, which were developed from supply and distribution data for these products. The series is TFV-4 in table 3.3.

3.2.4. The total supplier value of U. S. civilian food is the sum of the farm value of domestic farm foods sold to civilian consumers, all home-produced food, all imported foods, and domestic fishery products (TFV-5).

3.3. Time-Series of Retail Values

Data on the retail value of food are prepared in the Department in connection with the measurement of per capita consumption, the work on the marketing bill for farm foods, and the analysis of the market value of food consumed.

3.3.1. Value Aggregates of the Retail Consumption Index

The value aggregates of the per capita consumption index represent the retail-store value in 1947-49 dollars of all food consumed by U. S. civilians on a per capita basis. This series has not been published. ^{27/} Such value data cover home-produced and imported farm and nonfarm foods as well as farm foods purchased, all priced at average retail-store prices in 1947-49. ^{28/}

3.3.2. Retail Value of Domestic Farm Foods Sold

The retail value or cost of domestic farm foods sold to U. S. civilians is estimated for each year in connection with work on the marketing bill. ^{29/} Measured at the retail-store level, it does not include any costs of services in restaurants and other eating places, and it includes neither costs of nonfarm foods, such as fish, nor the cost of coffee, tea, and other imported foods.

The retail cost was originally computed by dividing the estimated farm value of each of six commodity groups of farm products by the farmer's share of retail cost for the group as determined by "market-basket" computations. This is the method used for estimates for the years before 1940. For more recent years the method is varied by commodity groups, depending on availability of data.

Where possible, the retail cost for each product is obtained by dividing the farm value, or payment received by farmers, by the farmer's share in percentage terms for that particular product. For example, farm values for beef, pork, and lamb are now inflated separately instead of inflating the total farm value for meat products as a group. Values for individual products are totaled into groups and the groups into a total of all farm food products. Inflating of farm values of individual products should result in more accurate estimates than inflating byproduct groups. This method takes account of changes in the relative importance of individual products within the group.

^{27/} The series can be readily approximated by applying the published indexes for all foods combined, and for food groups, to the revised base period aggregates reported in table 40 of the Supplement for 1956 to Agr. Handb. 62 (6).

^{28/} The price data are described in chapter 3 of Agr. Handb. 62 (6).

^{29/} This description was prepared by Kathryn Parr, formerly of the Marketing Economics Research Division. See also vol. 4, Agr. Handb. 118 (24).

For some food groups retail prices and farmer's share percentages are available for so few individual products that inflation is made by subgroups, as is the case for canned vegetables, canned fruit, and frozen fruit. This assumes that the farmer's share for a subgroup, based on the relatively few products for which retail prices are available, is representative of the subgroup including additional products.

Increases in the quantity of marketing services may not be reflected fully in the retail cost because adequate data on prices and volumes are often lacking for minor items. Where reasonably good estimates of prices and volumes can be developed, allowance is made for effects of changes in marketing services, such as the increased proportion of potatoes sold in the form of potato chips and the additional cost resulting from the shifts to smaller can sizes for canned fruits and vegetables. To improve the series, methods are changed from time to time as more data become available.

The total and per capita series are TFFV-6 and PFV-6, respectively, in table 3.4.

3.3.3. Retail Value of All Food Consumed

The retail value of all food consumed is estimated for AMS work on the analysis of changes in food consumption and on the market value of food (TFV-9 and PFV-9). To the retail cost of domestic farm foods sold to U. S. civilians are added allowances for home-produced foods, imported foods, and fishery products. The retail value of home-produced foods (TFV-7) was estimated from their farm value, utilizing relationships of farm to retail values for major home-produced items calculated in connection with the marketing bill for farm food commodities sold. The retail value of imported foods was estimated by calculating the retail value of major items (coffee, tea, bananas, and pineapples plus the value of sugar sold as such and the estimated value of sugar in processed foods), then comparing the retail value of these items with their imported value. These relationships were used to inflate the import value for all imported foods excluding fish (as tabulated from the Bureau of Census trade reports adjusted for nonfood use and for military takings) to the retail value for all items.

The retail value of fishery products was estimated from the retail value aggregates in 1947-49 dollars which go into the computation of the per capita consumption index by making adjustments for the changes in the civilian population and in retail prices of fishery products indicated by price data of the Bureau of Labor Statistics (BLS).

The total retail value of imported and nonfarm foods (TFV-8) and the total and per capita retail values of all food consumed by civilians in each year (TFV-9, PFV-9) are reported in table 3.4.

3.4. Time Series of Market Values

Estimates of the market value of all food consumed at home and away from home are derived from the three different sets of data that follow.

3.4.1. Based on Commerce Data

The Department of Commerce series called "consumption expenditures for food" can be adjusted so as to measure the market value of all food consumed by civilians. This food expenditure series is prepared by the National Income Division as part of the

process of estimating national income. It is described in section 3.6 along with other Commerce data.

3.4.2. Based on Value Aggregates of Per Capita Consumption Index

A second possible basis for estimates of the market value of all food consumed is the value aggregates of the per capita food consumption index. These represent the sums of the products of changing quantities of individual foods multiplied by average retail prices in 1947-49. To derive a measure of total market value in current dollars, several adjustments in these values in 1947-49 dollars must be made. First, they must be adjusted to a current dollar basis, using the BLS index of retail food prices. Then further adjustments are needed: (1) an addition to allow for the added cost of marketing services other than those in the usual channels from farm to retail and (2) a subtraction to allow for foods sold at less than retail prices. An unpublished experimental series runs close to that based on the marketing bill data next described.

3.4.3. Based on AMS Marketing Bill Data

3.4.3.1. The third basis for estimates of the market value of all food consumed at home and away from home (TFV-10a), the one adopted for the AMS series, is the marketing bill data of the Agricultural Marketing Service. The retail cost or value of domestic farm foods sold (TFV-6 described in 3.3.2) is adjusted to the concept of total market value by adding estimates of the extra cost of buying food in the form of meals rather than at retail stores; the farm value of food consumed on farms where produced and of nonfarm families' production for home use (TFV-2); and the retail values of imported foods and nonfarm foods (TFV-8). Because some food is sold to consumers at less than retail-store prices by farmers, processors, and wholesalers, an allowance for these differences between market values and retail values was subtracted. Details of the procedure used in deriving this set of data (as well as other AMS value series) are given in appendix B. The series on market value of all foods and its components are in table 3.5. The series labeled TFV-10a excludes retail-sales taxes and tips. (Reference to exhibit B may help the reader identify relationships among the AMS value series used in this bulletin.)

The estimates of market value of all civilian food based on the two AMS series and the one based on Commerce data are reasonably close together for the years since World War II. Prior to 1944, the two AMS-based series diverge from that of Commerce, apparently because of differences in the levels of food production indicated by the Censuses of Manufactures and the estimates of the Agricultural Estimates Division, AMS.

Because the measures of food quantity used herein are those of the AMS, the comparable market value series based on the marketing bill data is used throughout the descriptive and analytical sections of this handbook. Exhibit C compares the coverage of AMS series on market value of all foods with those for (1) the AMS series on retail store cost of domestic farm foods sold to civilians and (2) the Commerce series on consumption expenditures for food.

3.4.3.2. Market Value of Domestic Farm Foods.—The value of those farm foods produced by American farmers and consumed by U. S. civilians is estimated from the same sets of AMS data as the all-food series. For this series, it was necessary to subdivide the extra cost of food purchased as meals and snacks into the share for domestic farm foods and that for all imported foods and fishery products. This was done by means of the ratio of the retail value or cost of farm foods sold to the

Exhibit C.--Comparison of coverage of several value measures for food,
excluding alcoholic beverages ^{1/}

Item	AMS market value of all civilian food TFV-10a or b ^{2/}	AMS retail store cost of domestic farm foods sold to civilians TFV-6 ^{3/}	Dept. of Commerce series, consumption expenditures for food ^{4/}
Domestic production of farm foods for home use			
By farm households	Yes - farm value	No	Yes - farm value
By nonfarm households	Yes - farm value	No	No
Domestic farm foods			
Sold to U. S. military	No	No	Yes - wholesale value
Sold to U. S. civilians			
By farmers and distributors of food	Yes - market value	Yes - retail value	Yes - market value
As meals and snacks			
To businessmen (Nonconsumer purchases)	Yes - market value	Yes - retail value	No
With transportation and hospital services	Yes - market value	Yes - retail value	No
Other	Yes - market value	Yes - retail value	Yes - market value
Imported foods and fishery products			
Sold to U. S. military	No	No	Yes - wholesale value
Sold to U. S. civilians			
By fishermen and distributors: of food	Yes - market value	No	Yes - market value
As meals and snacks			
To businessmen	Yes - market value	No	No
With transportation and hospital services	Yes - market value	No	No
Other	Yes - market value	No	Yes - market value

^{1/} "Yes" means inclusion, "No" indicates exclusion. ^{2/} Described in section 3.4.3.1 and appendix B.
^{3/} Described in section 3.3.2. ^{4/} Described in section 3.6.2. See also pp. 78-79 of U. S. Income and Output,
1958 Supplement to the Survey of Current Business (27).

retail value of all foods sold. For some purposes, retail sales taxes and tips should be excluded, for others they should be included. Alternative series are therefore given in table 3.7 (TFV-12a, TFV-12b).

3.4.3.3. Civilian Expenditures for All Foods.--Two AMS series measure dollar outlays for food by U. S. civilians. They were derived from the AMS market value data described above by subtraction of the imputed value of home-produced food. The series pertaining to all food (TFV-11b in table 3.6) differs in coverage from the Commerce series, consumption expenditures for food (described in 3.6.2); for this reason and also because it excludes military food, but includes value of food bought with hospital and travel services and by business firms for clients. The per capita series derived from the total food expenditure series, PFV-11b, matches the food quantity series for all food sold to civilians, PFQ-6b, as indicated by exhibit A. The expenditure data generally used in this bulletin include retail sales taxes and tips.

3.4.3.4. Expenditures for Domestic Farm Foods by Civilians.--For analysis of several problems related to marketing of products of U. S. agriculture, a special expenditure series has been derived to cover domestic farm foods only, TFV-13b in table 3.7. It differs from that series on market value of domestic farm foods, which includes retail taxes and tips, TFV-12b, by the exclusion of home-produced food. The matching per capita food quantity series at the supplier level is the index of per capita food use of purchased domestic farm commodities.

3.4.3.5. A number of other value series have been developed as byproducts of the estimation of the market value of all food. They provide approximations of measures for relative importance of several channels through which food reaches U. S. consumers, such as eating places, purchased food, and so on. Although they form an integral part of the overall estimates of market value of all food consumed, they are likely to be much less reliable than other series. Independent data are available for checking the overall figures but not some of these components. Accordingly, the descriptions of these subseries and the data are relegated to appendix B. There the methodology is clearly described, and the nature of the bases on which they stand is set forth.

3.5. Marketing Services Sold With Food -- Time Series

The currently available economic measures of marketing services sold with food are based on the difference between the value of food as it leaves the farmer or other primary supplier and the amount paid by final consumers. These value measures are often described as the "marketing bills" for handling food commodities.

3.5.1. Value of Marketing Services

3.5.1.1. For all foods, the total marketing bill or the value of all marketing services rendered between the farm gate and final purchase as food in retail stores, and as meals and snacks, is calculated by subtracting total supplier value (TFV-5) from the total market value of all food (TFV-10a). Adjustments were made in the marketing bill to subtract special taxes paid by hog processors in 1934 and 1935 and to add Federal subsidies paid to food processors in 1943-46. The series which excludes retail taxes and tips is identified as TFV-14a and the one including those extra charges is TFV-14b, table 3.8.

3.5.1.2. Similar value data for all marketing services for domestic farm foods only are derived from the final market value of domestic farm food commodities and their farm values. The same adjustments in this marketing bill series were made as in that for all foods. The general code number for these farm food series is TFV-15 with series 15a excluding taxes and tips and series 15b including them (table 3.8). ^{30/}

The series for total marketing bill for all services sold with domestic farm foods excluding taxes and tips (TFV-15a) differs from the farm-retail marketing bill regularly estimated by AMS because of the inclusion of services of eating places and the deduction of services not supplied on food sold to consumers prior to the retail stage in distribution, as by farmers and wholesalers. The components of the farm-retail marketing bill have been studied extensively by marketing specialists of the Marketing Economics Research Division, AMS. An analytical summary in terms of labor costs, profits, transportation costs, and so on is given in Misc. Pub. 741 (9) and in the Marketing and Transportation Situation of July 1959 (10).

3.5.2. Quantity of Marketing Services

By deflating the marketing bill -- the value series for all marketing services sold with all food -- a much needed measure of the volume of food marketing services used can be approximated. But it is recognized that, since any quantity series derived by deflating a value or expenditure series is merely an approximation, it should be used only as long as a direct measure is not available. Measures of the quantities of such services in use by the Department have been developed from the value data in table 3.8 by use of the marketing margin between the farm and retail values of the AMS market basket of farm foods as a price index for marketing services. ^{31/} Here, too, it would be more desirable to have a directly constructed index, pricing fixed quantities of

^{30/} An analysis of the components of the total marketing bill was published in the July 1959 issue of the Marketing and Transportation Situation, "The Marketing Bill for Farm Food Products" (11). Reprinted as AMS-326.

^{31/} The AMS market basket series is constructed by pricing a fixed market basket of farm food commodities (the average quantities of farm products purchased for consumption at home by urban wage-earner and clerical worker families in 1952) at the farm level, using prices received by farmers, and at the retail level, using BLS average retail prices, in general. The difference between farm costs and retail costs is the marketing margin. For further explanation of this series, see Misc. Pub. 741 (9).

A price index derived with fixed weights tends to have a slight upward bias because buyers are constantly attempting to lower their costs by shifting among items. In effect, the marketing margin of the market basket series incorporates some gradually changing weights as the amounts of services of assembly, transportation, wholesaling, and retailing are varied. But the amount of processing services is fixed by the use of constant amounts of each form of processed food in the market basket and the services of eating places are not included.

Whereas the use of a price index to derive a measure of quantity from a value series often gives a downward bias to the quantity series, it is quite possible that the use of this price index based on the marketing margin may yield a reasonably satisfactory measure of quantity of marketing services. Research workers in AMS have experimented rather thoroughly with these series for services. They have obtained some meaningful research findings using the series, and no serious biases have been revealed.

individual marketing services, but none has been constructed. The index of the marketing margin does measure changes in the overall cost of getting specified quantities of principal forms of all major farm foods from the farmer to the purchaser in the urban retail store. Costs of services of eating places have probably changed in much the same degree.

The deflated per capita values of marketing services bought with all foods (PFV-14d) and with domestic farm foods (PFV-15d) are the bases for the index of all marketing services per capita (PFQ-3 in table 3.1) and the index of services with domestic farm foods only (PFQ-7 in table 3.2).

3.6. Department of Commerce Series

The Department of Commerce reports on national income, output, and retail trade, and the several censuses are invaluable sources of economic statistics needed for work on food consumption. In the following paragraphs a brief description is given of the coverage of disposable personal income, a derived series on disposable money income, the series on food expenditures, retail sales of food stores, and sales of eating and drinking places.

3.6.1. Income

Disposable personal income represents the actual current income receipts of persons from all sources less personal tax and nontax payments to Federal, State and local Governments. It is the closest overall statistical approximation for consumer purchasing power derived from current incomes (table 3.9).

A series on disposable personal money income has been derived from the published Commerce data by subtracting from disposable personal income (1) the series on personal income and consumption in kind and (2) the series on personal income partly in kind (which represents food and fuel) (table 3.9).

3.6.2. Food Expenditures

The concept and coverage of the Department of Commerce food expenditure series are considered briefly in section 2.2.4.4., but several other characteristics are to be noted. In addition to excluding expenditures by business firms for food for clients, the series omits the value of food supplied to inmates of institutions and travelers by water and air because these appear elsewhere in the accounts. In using this series, an analyst has to remember that it includes the value of food produced for home use by farm households and the value of food supplied to the Armed Forces.

The Department of Commerce publishes four subseries of the overall series on expenditures for food and alcoholic beverages: (1) Food and alcoholic beverages bought for off-premise consumption; (2) purchased meals and beverages; (3) food furnished Government (including military); and (4) commercial employees (valued at farm prices). The first two series -- off-premise purchases and purchases of meals and beverages -- are estimated for benchmark years according to the general procedure described as the "commodity-flow method." ^{32/}

^{32/} For further details, see (1) pp. 177-178, Agr. Handb. 62 (6); (2) pp. 103-104 of the 1954 edition of National Income (25), a supplement to the Survey of Current Business; (3) pp. 78-79 of U. S. Income and Output (27), 1958 supplement to the Survey of Current Business.

This method starts with the value of production at the primary producer level, then separates the parts going directly to consumers (priced at the level at which they are sold) and those processed. The latter are followed through the distribution system and valued at final costs to consumers. The latter two subseries are estimated independently of the "commodity-flow method." The series on food furnished Government employees is mostly for the Armed Forces and is based on official financial records. The value of food furnished commercial employees is developed from trade data. The series on value of home-produced food for farm households is supplied to the Department of Commerce by the Agricultural Marketing Service. This is the farm household part of the data described in 3.2.1.4 and is a component of gross farm income. From the total of these components, the Department of Commerce subtracts its estimates of sales of alcoholic beverages to consumers to derive the series described as "consumption expenditures for food."

The series on purchased meals is carried forward from benchmark years by means of data on sales of eating and drinking places.

Data on food purchased for off-premise consumption were formerly extrapolated for the years after the Census benchmarks using sample census data on retail sales of food and liquor stores and sales data for State liquor monopolies. This procedure has been somewhat changed since the incorporation of the 1954 benchmark, as described on pp. 78-79 of U. S. Income and Output (27). For 1951 and 1956, a short form of the "commodity-flow method" was used to develop estimates of off-premise consumption, using data from the annual census survey of manufactures. Interpolations for 1948-50, 1952-53, and 1955 were based on the components of the market value of all food consumed by U. S. civilians derived from the marketing bill data of the Agricultural Marketing Service (as in table 3.5).

3.6.3. Retail Sales

Estimates of retail sales of food stores and of eating and drinking places are published by the Bureau of the Census each month in the Monthly Retail Trade Report (16). The methodology and coverage of these series are described in the appendix to that report. The samples for the two sets of data were revised in April 1957, as set forth in the May 1958 issue. Each Census of Retail Trade provides a great deal of data on retail sales by various types of establishments and with numerous subdivisions. The 1954 Census did not report breakdowns of sales by commodity lines as had been done by earlier surveys. Therefore, it is not possible to determine the sale of foods as opposed to nonfood items as was the case in the Censuses of 1939 and 1948. 33/

3.7. Federal Surveys of Food Consumption

A number of nationwide surveys of consumption of all foods, as well as many covering individual sectors of the food market, have been made by agencies of the Federal Government. This section reviews those surveys which have been useful for analysis of changes in U. S. food consumption.

33/ For 1939 and 1948 the commodity-line data were used along with other Commerce and Agriculture data to develop estimates of food sales by major marketing channels. See "Distribution of the Food Supply of the United States" by this author in Agr. Econ. Res. July 1952 (49).

3.7.1. List of Major Surveys

3.7.1.1. Two general types of one-time, cross-section surveys have been made by Federal agencies: (1) Food consumption by housekeeping households as surveyed by the Institute of Home Economics and its predecessor agencies, ^{34/} and (2) expenditure surveys such as those by the Bureau of Labor Statistics. ^{35/} Differences between the objectives of the Institute of Home Economics and the Bureau of Labor Statistics in making such surveys affect the procedures and kinds of data obtained. Home economists are concerned particularly with appraisal of family diets and therefore concentrate on obtaining the best possible estimates of quantities of food consumed, as well as data on economic status and social characteristics of the family. ^{36/} Surveys of the Bureau of Labor Statistics are designed to yield data on all goods and services as well as relevant economic and social data. Accordingly, they must stress the collection of information on all expenditures and emphasize precision on food quantities. ^{37/}

In this section, reference is made only to the large scale surveys of the last 25 years because they provide the sets of data with sufficient comparability for analytical use. ^{38/}

3.7.1.2. BHE and BLS both cooperated with the Work Projects Administration in making the 1935-36 Consumer Purchases Study, and they both joined in the 1941-42 Study of Family Spending and Saving in Wartime. The 1935-36 Consumer Purchases Study yielded a considerable variety of income and expenditure data, for which U. S. totals were derived. The detailed food quantities for segments of the population were very difficult to combine satisfactorily because the samples were not designed to provide complete coverage.

3.7.1.3. The Institute of Home Economics made a nationwide survey of urban household food consumption in the spring of 1948. AMS joined the Institute in making the 1955 Survey of Household Food Consumption for each urbanization category, with regional subdivisions.

3.7.1.4. The nationwide survey of expenditures of urban consumers by the Bureau of Labor Statistics in the spring of 1951 covered both the year 1950 and food expenditures for home use during a week in the spring of 1951. Smaller scale surveys of urban purchases, including food, had been made by the Bureau of Labor Statistics in a week of September-October 1944 and in February 1945 in connection with surveys of prices paid by consumers.

^{34/} Bureau of Home Economics and Bureau of Human Nutrition and Home Economics.

^{35/} Surveys made prior to 1953 are summarized on pages 179-185 of Agr. Handb. 62 (6).

^{36/} For general description of IHE methodology, see pp. 174-200, Agr. Inf. Bul. 132 (33).

^{37/} See pp. 6-16 of "Methodology of the Survey of Consumer Expenditures in 1950" by Helen Humes Lamale, a monograph in Study of Consumer Expenditures, Incomes, and Savings, University of Pennsylvania (34).

^{38/} References to earlier survey data given in Williams, Faith M. and Zimmerman, Carle C. Studies of Family Living in the United States and Other Countries: An Analysis of Material and Method. U. S. Dept. of Agr. Misc. Pub. 223 (46).

Following is a description of available survey data pertaining to food consumption, arranged according to the type of data on food obtained. Only nationwide surveys that included consumption of all foods are covered.

3.7.2. Recalls of Annual
Food Value Data

Only value data are available as a measure of annual food consumption by households because it is impossible to recall quantities of individual commodities. ^{39/} To develop recall of expenditures for food and of home-produced food, the surveys required careful interviewing. Respondents were asked how much they spent for food in the year and how much they received as gifts and as payment in kind, as well as how much they had produced for home use. ^{40/} Even with extensive interview procedures, there always are unsolved problems of recall and of reporting.

3.7.2.1. The results of such survey efforts are available in the form of value data for certain years. Data on the market value of all food and alcoholic beverages consumed at home and away from home by all U. S. families and single individuals are available from the Consumer Purchases Study (1935-36) and from the Study of Family Spending and Saving in Wartime (1941). ^{41/} The data given in table 3.10 are in 1941 dollars.

3.7.2.2. For four different years, matching data are available on expenditures for food and beverages at home and away from home by urban families (table 3.11). The Study of Family Spending and Saving in Wartime provides the 1941 figures for families of two or more, but they include nonhousekeeping families. Estimates for the year 1944 are from the BLS study. ^{42/} Expenditure data for the year 1947, for housekeeping households only with two or more members, were obtained by the BHNHE in their urban food survey. ^{43/} The data for 1950 expenditures by families and single individuals, including nonhousekeeping households, are from the BLS survey. ^{44/}

3.7.2.3. The 1950 BLS expenditure survey provides another set of food expenditure data for urban families, as well as information on other consumer goods and services. These data have been summarized and published for individual cities and for three classes of cities (large cities, suburbs of large cities and small cities) in

^{39/} However, some privately financed panels of reporting households keep records through the year (3.8.2). But none covers all foods.

^{40/} Interviewers have helped by careful probing and reminding the respondent of various possibilities. For example, the interviewer usually starts with a discussion of current weekly expenditures, then discusses with the respondent how the weekly rate should be adjusted for the month and for the year. This involves consideration of the number in the family at various times in the year, vacations, and special food outlays.

^{41/} The 1935-36 data were published by the National Resources Committee in Consumer Expenditures in the United States (37). The 1941 data were published in the BLS Bul. 822, Family Spending and Saving in Wartime (43).

^{42/} Reported in an article by Dorothy S. Brady, "Expenditures and Savings of City Families in 1944," in the Monthly Labor Review, January 1946 (32). Table 2 provides the data for families of two or more.

^{43/} Table 25, page 56 of Agr. Inf. Bul. 132 (33).

^{44/} Reported in table 1-3, page 4, vol. XVIII of Study of Consumer Expenditures, Incomes and Saving (45).

Exhibit D.--Types of food data from first five reports on 1955 Survey of Household Food Consumption

Data Given in Survey Reports 1 to 5 (44)

- (1) Average money value per family of:
 - (a) All foods and beverages used in a week at home and away from home, including purchased and without direct expense;
 - (b) Purchased food for home use and meals, snacks and beverages consumed away from home;
 - (c) Food used at home received without direct expense from home production or as gifts or payment in kind. ^{1/}
- (2) For each of some 230 food items separately and for groups of foods, from all sources and purchased only:
 - (a) Percentage of households in group using item in week;
 - (b) Average quantity used at home per household in week;
 - (c) Average money value of the quantity used per household.
- (3) Use of major home-produced foods by rural nonfarm and farm households:
 - (a) Percentage of households in group using item in week;
 - (b) Average quantity used at home per household in week;
 - (c) Average money value of the quantity used per household.

Averages Reported for Households Grouped by --

Area	Urbanization category	1954 money income of family after income taxes ^{2/}	
United States	All combined	Under \$1,000	\$5-6,000
Northeast	Nonfarm	\$1-2,000	\$6-8,000
North Central Region	Urban	\$2-3,000	\$8-10,000
South	Rural nonfarm	\$3-4,000	\$10,000 and over
West	Farm	\$4-5,000	

Data Computable from Reported Statistics for Each Group

- (1) Per person averages for each type of data for individual foods and for groups of foods.
- (2) Per household averages for those households using item during week.
- (3) Estimates of regional, urbanization, and income shares of (a) the commercial market for all food and for individual foods, (b) home-produced foods, (c) all food consumed at home.
- (4) Breakdown of the money spent for food at home among commodities.
- (5) Average prices paid by selected groups of households for individual foods and groups of foods.
- (6) Cross-section indexes of food consumption per person (retail level), of total food use per person (farm level), and of use of purchased foods per person (farm level).

^{1/} Valued at prices paid for purchased item by households in the same urbanization category and region.

^{2/} Some income classes were combined in some urbanizations of some regions because of small number of cases in sample.

continued over more than a year. The samples were not designed to provide U. S. coverage. They included only households not receiving relief. However, some U. S. data have been estimated and published from time to time by analysts in the Department of Agriculture.

3.7.4.2. The Study of Spending and Saving in Wartime yielded detailed data on consumption of food at home in a week of April and May of 1942 for the U. S. as a whole. ^{48/} They were published by the Bureau of Human Nutrition and Home Economics in Misc. Pub. 550, Family Food Consumption in the United States (40). Income and expenditure data for all U. S. households and for urban households in the first quarter of 1942, as well as the annual recall data for 1941, were published in BLS Bul. 822 (43). Income and expenditure data for rural families from the same survey were published in USDA Misc. Pub. 520 (41).

The survey of urban housekeeping households in the spring of 1948 supplied data on food expenditures at home and away from home (including alcoholic beverages), the value of food obtained without direct expense, and detailed quantity and money value data for all foods consumed at home. This survey by the Bureau of Human Nutrition and Home Economics (later the Institute of Home Economics) covered food consumption in a week in spring for all U. S. housekeeping households of two or more. Supplementary data were obtained on food consumption in households in four cities during three seasons of 1948 and for those in two cities in two seasons of 1949. For a subdivision of southern households and northern households the U. S. spring data were tabulated by food group. Agr. Inf. Bul. 132 (33) contains both the basic data and an appraisal of methods of analysis.

3.7.4.3. The Bureau of Labor Statistics in its large scale survey of consumer expenditures covered expenditures for food in a week of spring 1951. ^{49/}

3.7.4.4. The Institute of Home Economics and the Agricultural Marketing Service cooperated in the 1955 Survey of Household Food Consumption. ^{50/} The 1955 survey was designed to provide reliable statistics on food consumption by all housekeeping households in the spring of that year and for major segments such as households grouped by region, urbanization, and income. The sample covered the U. S. housekeeping population of about 153 million civilians. Excluded from the survey were about 9 million people (1) who lived in households in which no one had 10 or more meals from household supplies during the survey week and (2) who lived in rooming houses or hotels, or in public or private institutions -- often described as the nonhousekeeping population. The types of data reported or obtainable from the first 5 survey reports are listed in exhibit D. ^{51/}

^{48/} A few urban schedules were collected in the early part of June, 1942.

^{49/} The data in vol. XII of Study of Consumer Expenditures, Incomes and Savings (45) on expenditures for food for home consumption cover all foods bought for such use, valued at retail, and not just food bought in stores as is indicated by the titles of tables 3-4.

^{50/} Data from this survey are published by the Department of Agriculture in a special series of survey reports (44). Survey Reports 1-5 contains the money value and food quantity data.

^{51/} An article by Burk and Lanahan in Agr. Econ. Res. July 1958, (53) describes aspects of the 1955 food survey data of interest to researchers in agricultural economics. Results of several checks on the reliability of the data, reported in that article, are given in appendix C.

three regions -- North, South, and West. ^{45/} In addition to these nine subdivisions, other groupings of families were also used -- income, family size, age of head, occupation of family head, family type, and so on, and combinations of income and certain of the other family characteristics. The University of Pennsylvania is engaged in a detailed analysis of the relationship of various family characteristics (income, family size, occupation of family head, family type, and so on) to expenditures for food by region and city size as part of the Study of Consumer Expenditures, Incomes and Savings (45).

3.7.3. Annual Recall of Home Food Production

Data on the production of food in the preceding year were obtained for 1941 as part of the Study of Spending and Saving in Wartime and for 1954 in connection with the 1955 Survey of Household Food Consumption. For 1941 some overall value data on urban production of food for home use are given in BLS Bul. 822 (43). More extensive data for rural households are given in Misc. Pub. 520, Rural Family Spending and Saving in Wartime (41). ^{46/} For farm households, there is information on the value of all home-produced foods, commodity detail for the values and quantities of livestock products, the flour, cereal, meal group, and for sirups and honey; value figures only are given for fruits and vegetables. This publication also contains information on home canning of fruits and vegetables and of meat and poultry by farm households and on storage, freezing and dehydrating of some items. For rural nonfarm households, it reports the value of all home-produced foods with broad commodity breakdowns, the quantities for major livestock items, and the quantity of all home-canned food.

Agr. Inf. Bul. 132 (33) reports the value of food home produced by urban households in 1947, subdivided into seven food groups.

Survey Report 12, Food Production for Home Use by Households in the United States, by Region, (44) on the 1955 Survey contains a considerable variety of data on the value and quantity of home-produced foods. These were analyzed and described from the marketing point of view in the National Food Situation for April and July 1958 (52). The survey data on the use of fruits during 1954 are inadequate. A new approach to estimates of current use of home-produced vegetables in the fresh form supplied a fairly comprehensive set of data for these foods for the first time, as described in the report's notes on use of the tables.

3.7.4. Recall of Food Consumption in a Week of Spring

Each of the publications with detailed food data from the national surveys describes the way in which the survey was made, and its coverage. Following is a review of the types of available data on a week's food consumption.

3.7.4.1. The Consumer Purchases Study for 1935-36 ^{47/} provided value and quantity data for all commodities for area and population segments. The interviewing

^{45/} Vol. III, "Summary of Family Expenditures for Food, Beverages and Tobacco" (1950), and vol. XII, "Detailed Family Expenditures for Food, Beverages and Tobacco" (1950 and spring 1951), Study of Consumer Expenditures, Incomes and Savings (45).

^{46/} Published by the Bureau of Human Nutrition and Home Economics.

^{47/} Data for large cities reported in Family Expenditures in Selected Cities, 1935-36. Vol. II, "Food." BLS Bul. 648 (42). The Department of Agriculture published the food data for farm, village, and urban households in Family Food Consumption and Dietary Levels. Five Regions. Farm Series. Misc. Pub. 405 (38). Urban and Village Series, Misc. Pub. 452 (39).

3.7.5. Spring Survey Data on Quantities Consumed

Survey data on quantities of individual foods consumed in the preceding week, usually in the spring, have proved to be particularly useful for study of changes in the structure of U. S. food consumption.

3.7.5.1. The food data for a week in spring 1942 cover consumption at home by families and single individuals grouped by urbanization and by family income level. Reports referred to previously in this handbook provide detailed quantity figures on consumption (and on home production by rural households) of individual foods and groups of foods. Separate data on food quantities for urban households of two or more persons were retabulated by the Institute of Home Economics for comparison with the spring 1948 data and are published in Agr. Inf. Bul. 132 (33). Information on the structure of food consumption in the spring of 1942 appears to be generally useful for comparison with 1955 survey data. 52/

Consumption of some items in spring 1942, however, was affected by the collection of data primarily in April and May, with only a few urban schedules in June. Some other items were affected by wartime food developments. Detailed analysis of commodity data has indicated that the seasonal differences were not major and were largely offsetting. Unfortunately, the effects of wartime food shortages on food consumption and food purchases and consumption at home by the housekeeping population cannot be measured directly with available data. But the short supplies of some items for consumption at home in spring 1942 appear to have been shared quite generally by rich and poor, farm and nonfarm people. Per person averages for consumption at home of meat and sugar, in particular, appear to be low in relation to AMS data on disappearance, but comparisons of the averages for each income class in the three urbanization categories with such data from the 1955 survey reveal a high degree of internal consistency. 53/ The possibility of significant variations because of seasonal differences or sharp changes in supplies from the period of one survey to another necessitates great care in the comparison of levels of "Engel curves" for particular types and forms of individual food commodities.

52/ Here the structure of food consumption refers to the whole configuration of average food consumption from all sources and from purchased supplies only by households grouped according to urbanization and to income.

53/ The survey average for meat consumption per person at home in April-May 1942 was somewhat lower than the AMS estimate of apparent meat disappearance in that period in to all civilian distribution channels for consumption in homes, eating places, and institutions (including, admittedly, rough quarterly data on farm home consumption). The possibility that the survey data on consumption at home were underreported is lessened by the facts that the 1942 "Engel curves" for beef and pork for households in each urbanization have generally the same slopes and shapes as their counterparts in 1955, though at different levels, and that the urban "Engel curves" for all meats in 1942 and 1948 are very close in slope and in level. Some error is also quite possible in the estimate of civilian meat disappearance in April-June 1942. Furthermore, commercial meat supplies distributed in spring 1942 for consumption at home were probably reduced by greatly increased sales through eating places and perhaps by unreported changes in stocks.

The term "Engel curves" refers to the graphic relationships between the averages for all foods or individual foods per person for each income class and average disposable money income for households in each urbanization.

3.7.5.2. The survey of urban housekeeping households of two or more persons made in the spring of 1948 supplied information on the quantities of purchased foods used at home and their values for all major commodities. In addition, data on supplies from all sources, including those received without direct expense, are given for subgroups of foods in Agr. Inf. Bul. 132 (33). As this bulletin contains full descriptions of the data, their limitations, and their uses, no further detail is needed here.

3.7.5.3. The 1955 Survey of Household Food Consumption supplied data on food used at home for the United States and the four regions by all housekeeping households grouped within each of the urbanization categories and by single person households as opposed to households of two or more persons. Only the households of two or more persons were subdivided by family income, therefore detailed data on quantities of food consumed at home by people at several income levels are available only for these households. Those types of data given or computable from the survey reports of particular value to consumption analysis are listed in exhibit D. As additional cross-tabulations are made by AMS, results will be published.

No commodity data can be repeated in this handbook -- the mass of statistics involved is too great. But some overall measures of the quantity of all foods consumed within households grouped by income have been developed by the Consumption Section of AMS from the 1942 survey and the 1955 survey. They are described in the next two sections.

3.7.5.4. A cross-section index of food consumption per person (retail level) has been constructed from the information on the quantities of food consumed at home in a week of spring 1942, as reported in Misc. Pub. 550 (40). The reported data were adjusted to the bases of the retail time series on per capita food consumption and combined by means of the retail price weights and the formula of the index of per capita food consumption (PFQ-2). The value aggregates computed for households in each income group within each of the urbanization categories were converted to averages per person and compared with the all-U. S. average. The comparisons yield the cross-section index given in table 3.12. Further details of the computations are provided in appendix D.

These indexes are subject to all the qualifications described in 3.7.5.1, plus those resulting from pricing all quantities at the same average retail price, irrespective of quality and of the extent of farm-retail services bought or not bought with the food. But they are a useful statistical tool for analysis of changes in U. S. food consumption from spring 1942 to spring 1955.

3.7.5.5. To measure for demand analysis the structure of overall food consumption in quantitative terms, three new indexes were developed from the 1955 food survey. Two match the definitions of the time-series indexes of per capita food use of farm commodities (PFQ-1a, b). One index covers consumption from all sources (CFQ-1a), the other only purchased foods (CFQ-1b). For these, the consumption data from the 1955 survey were converted to their farm commodity equivalents and valued at 1947-49 farm prices. The third index measures variations in consumption from all sources in terms of average retail value at 1947-49 average prices (CFQ-2). This index matches the time-series retail index of per capita food consumption (PFQ-2). The overall indexes for U. S. households grouped by urbanization and income are given in table 3.13. Details of the methodology and subseries for commodity groups are given in appendix D. The overall food data are considered to be quite reliable and generally representative of food consumption at home in all of 1955. The subindexes for commodity groups are subject to the same limitations as the weekly data from which they are computed -- seasonality, sampling, and so on.

3.7.6. Value Data on Food Consumed in a Week of Spring

This section describes a number of sets of overall food value data from household surveys of food consumption in a week of spring. To approximate comparability among the data from several surveys, the author made a series of adjustments in the reported data, as indicated in the footnotes of tables 3.14-16, which contain the adjusted data. It is quite unlikely that any two statisticians would adjust such diverse sets of data in exactly the same ways. But adjusted data are given for the benefit of researchers who may lack the time to develop their own.

3.7.6.1 For spring 1942, the market value of all food consumed at home in a week was published for all foods combined, and for individual items, in Misc. Pub. 550 (40). Data on expenditures for food away from home were derived from the recall of expenditures in the first quarter of 1942 for urban households, in BLS Bul. 822 (43) and for rural nonfarm households, in Misc. Pub. 520 (41). Comparable data for farm households had to be estimated from the 1941 data reported in Misc. Pub. 520. Data on expenditures for food at home represent a separate set of data tabulated from the schedules, and not the value of purchased food consumed at home. 54/

3.7.6.2. From the urban survey of spring 1948, the following sets of value data are immediately available in Agr. Inf. Bul. 132 (33): Total expenditures for food at home and away from home; value of food obtained without direct expense in total and for broad commodity groups; the value data for individual purchased foods used at home.

3.7.6.3. The survey of urban consumers made by the Bureau of Labor Statistics in the spring of 1951 supplied extensive sets of expenditure data. Those pertaining to the value of all purchased food at the retail level in spring 1951 were published by the Wharton School of Finance and Commerce in vol. XII of the series, Study of Consumer Expenditures, Incomes and Savings (45). These data represent the recall of the number of units purchased, unit size and price, and the total amount spent. As they were gathered as part of the survey of all consumer expenditures, less emphasis was paid to the development of food quantity data. The data in the published reports are in terms of expenditures without matching quantity figures.

3.7.6.4. The kinds of value data reported directly or computable from the published reports for the spring 1955 food survey are listed in exhibit D. Several sets of data for U. S. households grouped by urbanization and income are given in table 3.16.

3.7.7. Inherent Limitations of Cross-Section Data for a Week

3.7.7.1. These cross-section data have many uses, as illustrated in this bulletin, but they have certain inherent limitations too. The limitations arise, on the one hand, from changes made from one survey to another and, on the other, from the fact that they represent one week's consumption only. To meet changing objectives and needs, there have been changes from one survey to another in household coverage, definitions, and tabulations. For example, home canned fruits and vegetables were classified with commercially canned items in the report on spring 1942 data, but the 1955 survey reports include them with fresh supplies. 55/ Pork fat cuts provide

54/ These are hitherto unpublished data supplied by the Institute of Home Economics.

55/ On the basis of the experience of AMS analysts with these two procedures, it now appears that handling them as a separate category or subdivision is desirable.

another example of variation in handling -- for 1942 they are included with fats and oils, for 1955 with meats.

3.7.7.2. Household coverage has varied between surveys of the Bureau of Labor Statistics and of the Institute of Home Economics. Although BLS surveys of income and expenditures have covered all urban households, including nonhousekeeping households, detailed food data pertain only to housekeeping households. Institute of Home Economics surveys have all referred to housekeeping households. The 1948 survey covered only urban households of two or more persons, whereas the 1955 survey included one-person households and rural farm and nonfarm as well.

3.7.7.3. Analysis of findings from surveys of a week's food consumption must take into account these facts: (1) During a limited period the market availability of goods and services is practically fixed. (2) Demand is relatively fixed or static because outside influences and intra-family relationships have no time to change during the single week reported on by each respondent although the interviewing may be spaced over a several month period. (3) The data may reveal irregularities in consumption patterns, market structure, and prices which are peculiar to the particular period. (4) Problems for some individual foods arise because of seasonality. (5) Only housekeeping families are included. (6) An adjustment for meals eaten at home and away from home is made on a pro rata basis in obtaining per person averages for food at home, 21 meals at home being set equal to one person. While such adjustment is necessary, it may introduce some bias, particularly if there is a notable difference in the kind of foods eaten out. (7) Sampling and reporting errors have varied, reflecting improvements in sampling and collection methods on the one hand and difficulties such as obtaining cooperation of employed respondents and recall of data on more items, on the other.

Other limitations of these cross-section surveys, particularly the early ones, are reported in the literature. 56/

3.7.7.4. Although this handbook is concerned primarily with all foods combined, a section to guide analysts in making comparisons of commodity data from the 1955 food survey with other sets of data is given in appendix C.

3.8. Business Cross-Section Food Surveys

3.8.1. Cross-section surveys of food consumption made by business firms can be considered in this report only in general terms. It is evident, however, that they vary in several respects from such surveys conducted by the Federal Government. The only nationwide all-food study by private agencies whose existence is generally known is the one-time survey by Life magazine in 1956. This was part of a large scale study of consumer expenditures which is described in an article by Richard H. Ostheimer. 57/ For this survey, records were kept by families on their expenditures for foods in each of 10 days. The statisticians in charge of the survey reported difficulties in obtaining

56/ (a) Brady, Dorothy S. and Williams, Faith M. "Advances in the Techniques of Measuring and Estimating Consumer Expenditures." Jour. Farm Econ. May 1945 (48).
(b) Part II of BLS Bul. 822 (43). (c) Pp. 1-40 of the monograph by Helen Humes Lamale (34).

57/ Jour. Mktg., Jan. 1958, pp. 260-272.

Reference to this survey and others that follow does not constitute an indorsement of the data by the U. S. Department of Agriculture.

information on consumption by high-income households. Some food data were published in vol. I, Study of Consumer Expenditures (36). The data in this report on food provide only 18 subdivisions within all foods. Published data do not indicate how much detail on consumption of individual food items was obtained on the schedule.

3.8.2. Probably the best known panel for obtaining cross-section information on food in this country is that operated by the Market Research Corporation of America. The Federal Government purchased and published some data from this panel survey, hence its characteristics are generally known. The sample for the panel is made up of families who are paid for their participation with points which are redeemable in merchandise. Like all other panels, this one experiences problems in retaining randomness of the sample in the highest and lowest income groups. The survey is conducted by personal interviewers at the outset, but the weekly diaries are mailed in by each family. ^{58/} The MRCA panel now includes a wide variety of foods, but as of April, 1958, the schedule did not cover fresh meats, poultry, fish; bread; rolls; fresh vegetables, potatoes, sweet potatoes; dry beans and peas; eggs; ice cream; melons; and sugar.

3.9. Special Surveys for Market Development Research

Market researchers working on some specific food commodities make use of U.S.D.A. reports on special market surveys of preferences and use by households and industrial consumers. As of mid-1959, no reports on all foods combined had been published but some pilot research was in progress. To date, the food commodity studies have included potatoes, rice, citrus, bakers' use of fruits, apple juice, cranberries, cooking fats and oils, lamb, cherries, specific bread formulas, poultry, avocados, dates, raisins, peanuts, and tree nuts.

3.10. Retail Store Data

Information on sales by retail stores and the results of special experiments at the retail level also, under certain conditions, can be used for study of food consumption. The best known survey of sales of retail stores is the continuing survey by the A. C. Nielsen Company. As such data have not been purchased for use by the Department of Agriculture, details are not readily available, though certain general information regarding the survey is considered in appendix C.

Retail store experiments have been used to study a variety of marketing and merchandising problems. These have been on a relatively small scale, and, because of the expense involved, they cover only single commodities or commodity groups.

^{58/} Guidance to comparison of this type of survey data with information from the Government one-time surveys and with the AMS disappearance data is given in appendix C.

Table 3.1.--Major quantity indexes for civilian per capita use of food, measured at farm and retail levels, and for food marketing services, and civilian population, 1929-59

(Indexes: 1947-49=100)

Year	Index of per capita food use of farm foods ^{1/}		Index of per capita food consumption ^{2/}	Index of marketing services per capita ^{3/}	Civilian population, July 1 ^{4/}	
	All food	Purchased food			Number	Index
	PFQ-1a	PFQ-1b	PFQ-2	PFQ-3	Million	
1929	92	85	91	72	121.8	83.9
1930	91	84	91	72	123.1	84.8
1931	91	84	90	72	124.0	85.4
1932	89	81	88	68	124.8	86.0
1933	89	81	88	68	125.6	86.5
1934	91	84	89	68	126.4	87.1
1935	87	80	87	64	127.2	87.6
1936	90	84	91	68	128.1	88.3
1937	91	85	90	65	128.8	88.7
1938	90	84	91	70	129.8	89.4
1939	93	87	94	73	130.9	90.2
1940	95	91	95	78	132.1	91.0
1941	97	93	97	85	131.8	90.8
1942	96	92	96	88	131.5	90.6
1943	99	94	97	88	128.9	88.8
1944	103	99	100	94	128.6	88.6
1945	103	100	101	100	129.1	89.0
1946	105	103	104	105	138.4	95.4
1947	103	102	102	100	142.6	98.3
1948	99	99	99	100	145.2	100.0
1949	98	99	99	100	147.6	101.7
1950	99	100	100	101	150.2	103.5
1951	97	99	98	103	151.1	104.1
1952	99	102	100	102	153.4	105.7
1953	100	104	101	103	156.0	107.5
1954	100	104	101	103	159.1	109.6
1955	101	106	102	104	162.3	111.8
1956	103	109	104	108	165.3	113.9
1957	101	107	102	106	168.4	116.1
1958	99	105	101	103	171.4	118.2
1959 ^{5/}	101	108	103	105	174.4	120.2

^{1/} Measured in terms of farm commodities valued at average 1947-49 farm prices. All food series differs from purchased food by the amount home produced. PFQ-1a represents per capita food quantity - No. 1a.

^{2/} Derived from data on per capita consumption of individual foods using estimates of retail weights multiplied by average retail prices in 1947-49.

^{3/} Derived from series PFV-14d in table 3.8. See text, section 3.5.2.

^{4/} Civilian population data from the Bureau of the Census adjusted in 1941-45 to include military personnel eating from civilian supplies. For period before 1941 series covers entire population.

^{5/} Preliminary.

Table 3.2.- Several special indexes for the quantity of food used, measured at supplier level; an index of marketing services bought with domestic farm food commodities; and a composite quantity index of all foods plus all marketing services, 1929-59

Year	(Indexes: 1947-49=100)					Index of marketing services bought with domestic farm food commodities, per capita ^{5/}	Composite quantity index of all foods used plus all marketing services, per capita ^{6/}
	Index of per capita use of --						
	Domestic farm foods ^{1/}		Imported foods including fishery products ^{3/}	All farm foods and fishery products ^{4/}			
	All	Purchased ^{2/}		All	Purchased ^{2/}		
	PFQ-4a	PFQ-4b	PFQ-5	PFQ-6a	PFQ-6b	PFQ-7	PFQ-8
1929	91	84	101	93	86	69	82
1930	91	83	98	92	85	69	81
1931	92	83	93	91	84	69	81
1932	90	80	85	89	81	67	78
1933	91	81	84	90	81	68	78
1934	92	83	89	91	84	66	78
1935	86	77	106	88	80	61	75
1936	88	81	114	91	85	66	79
1937	90	83	109	92	86	63	78
1938	89	82	102	90	84	69	79
1939	93	86	101	93	88	72	83
1940	96	90	96	96	91	76	86
1941	97	92	100	98	93	82	91
1942	98	94	77	96	92	88	92
1943	102	97	71	99	94	91	93
1944	105	100	81	102	98	94	98
1945	106	102	83	104	100	105	102
1946	107	105	92	105	103	109	105
1947	104	103	94	103	102	100	101
1948	98	98	103	99	99	100	99
1949	98	98	103	98	99	100	99
1950	98	100	105	99	100	100	100
1951	97	99	104	98	100	102	100
1952	99	102	107	99	102	102	101
1953	99	104	110	100	104	102	102
1954	100	105	102	100	104	104	102
1955	101	107	101	101	106	106	103
1956	104	110	101	103	109	108	106
1937	101	107	104	101	106	106	104
1958	98	104	113	99	105	104	101
1959 ^{7/}	99	107	118	101	107	107	103

^{1/} Breakdown between imported and domestically produced supply of each commodity based on relative proportion of each in total wherever no better measure was available. Data from computations of supply-utilization index.

^{2/} Excludes home-produced farm commodities.

^{3/} Indexes developed from farm values of imported farm commodities at 1947-49 prices and from edible weights of imported fishery products priced at 1947-49 average import price.

^{4/} Value of fishery products at average 1947-49 prices added to farm value data from supply-utilization index.

^{5/} Derived from series PFV-15d in table 3.8.

^{6/} Combination of PFQ-6a and PFQ-3.

^{7/} Preliminary.

Table 3.3.- Supplier values of foods used by civilians, 1929-59

Year	Farm value of domestic food sold to civilians <u>1/</u>	Farm value of home-produced food <u>2/</u>	Import value of imported food <u>3/</u>	Wharf value of domestic fish catch for civilian use <u>4/</u>	Total supplier value
	TFV-1	TFV-2	TFV-3	TFV-4	TFV-5
	Bil.dol.	Bil.dol.	Bil.dol.	Bil.dol.	Bil.dol.
1929	7.2	2.0	1.1	0.1	10.4
1930	6.3	1.8	.8	.1	9.0
1931	4.7	1.5	.7	.1	7.0
1932	3.4	1.1	.5	.1	5.1
1933	3.6	1.2	.6	.1	5.5
1934	4.3	1.3	.6	.1	6.3
1935	5.0	1.5	.7	.1	7.3
1936	5.8	1.6	.8	.1	8.3
1937	6.0	1.7	.9	.1	8.7
1938	5.2	1.4	.7	.1	7.4
1939	5.2	1.4	.7	.1	7.4
1940	5.6	1.4	.6	.1	7.7
1941	7.1	1.7	.8	.1	9.7
1942	9.3	2.2	.6	.1	12.2
1943	11.4	2.9	.8	.2	15.3
1944	11.6	2.8	.9	.2	15.5
1945	12.6	3.1	1.0	.2	16.9
1946	15.7	3.2	1.4	.3	20.6
1947	18.7	3.4	1.9	.3	24.3
1948	19.3	3.4	2.1	.3	25.1
1949	16.9	2.8	2.2	.3	22.2
1950	17.6	2.6	2.7	.3	23.2
1951	20.0	3.0	2.9	.3	26.2
1952	19.9	2.9	3.2	.3	26.3
1953	19.0	2.7	3.3	.3	25.3
1954	18.4	2.4	3.4	.3	24.5
1955	18.3	2.3	3.3	.3	24.2
1956	18.7	2.3	3.3	.3	24.6
1957	19.5	2.2	3.3	.3	25.3
1958	20.7	2.2	3.3	.3	26.5
1959 <u>5/</u>	19.7	2.0	3.4	.3	25.4

1/ Described in text, section 3.2.1.3. TFV-1 represents total food value - No. 1.

2/ Includes home production by nonfarm households. See text, section 3.2.1.4.

3/ Described in text, section 3.2.2. Includes imported fishery products.

4/ See text, section 3.2.3.

5/ Preliminary.

Table 3.4.- Retail value of foods used by civilians, by source of supply, 1929-59 ^{1/}

Year	:Retail value of domestic:				: Retail value of all	
	: farm foods sold ^{2/}		:Retail value:	:Retail value:	: foods consumed	
	: Total	: Per capita	: of home- : produced : food	: of imported: : and nonfarm: : foods	: Total	: Per capita
	: TFV-6	: PFV-6	: TFV-7	: TFV-8	: TFV-9	: PFV-9
	: Bil.dol.	: Dol.	: Bil.dol.	: Bil.dol.	: Bil.dol.	: Dol.
1929	17.1	140	4.4	3.0	24.5	201
1930	16.2	132	4.3	2.8	23.3	189
1931	13.1	106	3.7	2.4	19.2	155
1932	10.6	85	3.1	1.9	15.6	125
1933	10.9	87	3.1	1.7	15.7	125
1934	12.5	99	3.2	2.0	17.7	140
1935	12.9	101	3.5	2.3	18.7	147
1936	14.3	112	3.6	2.4	20.3	158
1937	14.2	110	3.6	2.4	20.2	157
1938	13.4	103	3.3	2.2	18.9	146
1939	13.4	102	3.3	2.2	18.9	144
1940	14.1	107	3.2	2.2	19.5	148
1941	16.3	124	3.5	2.6	22.4	170
1942	19.8	151	4.1	2.3	26.2	199
1943	22.3	173	5.3	2.3	29.9	232
1944	22.5	175	5.2	2.7	30.4	236
1945	24.4	189	5.6	2.5	32.5	252
1946	30.8	223	5.9	3.4	40.1	290
1947	36.7	257	6.1	5.0	47.8	335
1948	39.2	270	6.2	5.5	50.9	351
1949	37.7	255	5.5	5.8	49.0	332
1950	38.5	256	5.0	6.5	50.0	333
1951	42.8	283	5.5	7.1	55.4	367
1952	44.4	289	5.6	7.3	57.3	374
1953	44.5	285	5.4	7.6	57.5	369
1954	44.9	282	4.9	7.8	57.6	362
1955	46.3	285	4.8	7.6	58.7	362
1956	48.3	292	4.9	8.1	61.3	371
1957	50.4	299	4.8	8.4	63.6	378
1958	52.8	308	4.8	8.4	66.0	385
1959 ^{3/}	53.4	306	4.9	8.3	66.6	382

^{1/} Sources and methodology described in text, section 3.3.2 and 3.3.3, and in appendix B. Retail value data exclude retail sales taxes and tips. ^{2/} This series published in Marketing and Transportation Situation, identified as retail-store cost of farm foods sold. ^{3/} Preliminary.

Table 3.5.- Derivation of the market value of all civilian food, 1929-59 ^{1/}

Year	Retail value of all foods sold TFV-6 + TFV-8 Bil.dol.	Farm value of all home- produced food TFV-2 Bil.dol.	Eating place markup over retail <u>2/</u> Bil.dol.	Minus estimated marketing charges saved on food sold prior to retail level <u>3/</u> Bil.dol.	Total market value of all civilian food, excluding taxes and tips <u>4/</u> TFV-10a Bil.dol.
1929	20.1	2.0	1.3	1.4	22.0
1930	19.0	1.8	1.3	1.1	21.0
1931	15.5	1.5	1.1	.8	17.3
1932	12.5	1.1	.9	.6	13.9
1933	12.6	1.2	.7	.7	13.8
1934	14.5	1.3	.6	1.0	15.4
1935	15.2	1.5	.6	1.0	16.3
1936	16.7	1.6	.7	1.1	17.9
1937	16.6	1.7	.8	1.0	18.1
1938	15.6	1.4	.9	.8	17.1
1939	15.6	1.4	1.0	.7	17.3
1940	16.3	1.4	1.0	.6	18.1
1941	18.9	1.7	1.2	.6	21.2
1942	22.1	2.2	1.4	.4	25.3
1943	24.6	2.9	1.8	.5	28.8
1944	25.2	2.8	2.0	.4	29.6
1945	26.9	3.1	2.4	.4	32.0
1946	34.2	3.2	2.9	.5	39.8
1947	41.7	3.4	3.1	.6	47.6
1948	44.7	3.4	3.3	.6	50.8
1949	43.5	2.8	3.3	.5	49.1
1950	45.0	2.6	3.3	.5	50.4
1951	49.9	3.0	3.8	.5	56.2
1952	51.7	2.9	3.9	.5	58.0
1953	52.1	2.7	4.0	.5	58.3
1954	52.7	2.4	4.1	.5	58.7
1955	53.9	2.3	4.3	.5	60.0
1956	56.4	2.3	4.5	.5	62.7
1957	58.8	2.2	4.8	.4	65.4
1958	61.2	2.2	4.9	.4	67.9
1959 ^{5/}	61.7	2.0	5.2	.3	68.6

^{1/} Procedures for estimation of component series described in text, section 3.4.3.1, in general terms, and in more detail in appendix B. ^{2/} Sources and methodology described in section 1.5 of appendix B. ^{3/} See section 1.6 of appendix B. ^{4/} Reference is to retail sales taxes. ^{5/} Preliminary.

Table 3.6.- All foods consumed by civilians: Total and per capita market value and expenditures, 1929-59 ^{1/}

Year	Total market value of all foods			Expenditures for all foods, including taxes and tips	
	Excluding taxes and tips	Including taxes and tips		Total	Per capita
		Total	Per capita		
	TFV-10a	TFV-10b	PFV-10b	TFV-11b	PFV-11b
Bil.dol.	Bil.dol.	Dol.	Bil.dol.	Dol.	
1929	22.0	22.1	181	20.1	165
1930	21.0	21.1	171	19.3	157
1931	17.3	17.4	140	15.9	128
1932	13.9	14.0	112	12.9	103
1933	13.8	13.9	111	12.7	101
1934	15.4	15.5	123	14.2	112
1935	16.3	16.5	130	15.0	118
1936	17.9	18.1	141	16.5	129
1937	18.1	18.3	142	16.6	129
1938	17.1	17.3	133	15.9	122
1939	17.3	17.5	134	16.1	123
1940	18.1	18.4	139	17.0	129
1941	21.2	21.5	163	19.8	150
1942	25.3	25.7	195	23.5	179
1943	28.8	29.3	227	26.4	205
1944	29.6	30.2	235	27.4	213
1945	32.0	32.7	253	29.6	229
1946	39.8	40.5	293	37.3	270
1947	47.6	48.3	339	44.9	315
1948	50.8	51.6	355	48.2	332
1949	49.1	49.9	338	47.1	319
1950	50.4	51.2	341	48.6	324
1951	56.2	57.1	378	54.1	358
1952	58.0	59.0	385	56.1	366
1953	58.3	59.4	381	56.7	363
1954	58.7	59.8	376	57.4	361
1955	60.0	61.2	377	58.9	363
1956	62.7	63.9	387	61.6	373
1957	65.4	66.7	396	64.5	383
1958	67.9	69.2	404	67.0	391
1959 ^{2/}	68.6	69.9	401	67.9	389

^{1/} Derived from AMS data as described in text, sections 3.4.3.1 and 3.4.3.3. Taxes refer to retail sales taxes.

^{2/} Preliminary.

Table 3.7.- Domestic farm foods consumed by civilians: Total and per capita market value and expenditures, 1929-59 ^{1/}

Year	Total market value of domestic farm foods only			Expenditures for domestic farm foods only, including taxes and tips	
	Excluding taxes and tips:	Including taxes and tips		Total	Per capita
		Total	Per capita		
	TFV-12a	TFV-12b	PFV-12b	TFV-13b	PFV-13b
Bil.dol.	Bil.dol.	Dol.	Bil.dol.	Dol.	
1929	18.8	18.9	155	16.9	139
1930	18.0	18.1	147	16.3	132
1931	14.7	14.8	119	13.3	107
1932	11.9	12.0	96	10.9	87
1933	12.0	12.1	96	10.9	87
1934	13.3	13.4	106	12.1	96
1935	13.9	14.1	111	12.6	99
1936	15.4	15.6	122	14.0	109
1937	15.6	15.8	123	14.1	109
1938	14.8	15.0	116	13.6	105
1939	15.0	15.2	116	13.8	105
1940	15.8	16.1	122	14.7	111
1941	18.4	18.7	142	17.0	129
1942	22.9	23.2	176	21.0	160
1943	26.3	26.7	207	23.8	185
1944	26.7	27.2	212	24.4	190
1945	29.3	29.9	232	26.8	208
1946	36.1	36.7	265	33.5	242
1947	42.2	42.8	300	39.4	276
1948	44.9	45.6	314	42.2	291
1949	42.9	43.6	295	40.8	276
1950	43.4	44.1	294	41.5	276
1951	48.6	49.4	327	46.4	307
1952	50.2	51.1	333	48.2	314
1953	50.1	51.0	327	48.3	310
1954	50.3	51.2	322	48.8	307
1955	51.8	52.8	325	50.5	311
1956	54.0	55.0	333	52.7	319
1957	56.3	57.4	341	55.2	328
1958	58.8	59.9	349	57.7	337
1959 ^{2/}	59.6	60.7	348	58.7	337

^{1/} Derived from AMS data as described in text, sections 3.4.3.2 and 3.4.3.3. Taxes refer to retail sales taxes.

^{2/} Preliminary.

Table 3.8.- Total marketing bill for all civilian foods and for domestic farm foods: Total in current dollars, and total and per capita in 1947-49 dollars, 1929-59

Year	Index of marketing margin (1947-49 =100) 1/	Total marketing bill for all foods 2/				Total marketing bill for domestic farm foods 4/			
		In current dollars		In 1947-49 dollars, excluding taxes and tips		In current dollars		In 1947-49 dollars, excluding taxes and tips	
		Including taxes and tips	Excluding taxes and tips	Total 3/	Per capita	Including taxes and tips 5/	Excluding taxes and tips	Total 3/	Per capita
		TFV-14b	TFV-14a	TFV-14d	PFV-14d	TFV-15b	TFV-15a	TFV-15d	PFV-15d
		Bil.dol.	Bil.dol.	Bil.dol.	Dol.	Bil.dol.	Bil.dol.	Bil.dol.	Dol.
1929	76	11.7	11.6	15.3	126	9.7	9.6	12.6	103
1930	78	12.1	12.0	15.4	125	10.0	9.9	12.7	103
1931	66	10.4	10.3	15.6	126	8.6	8.5	12.9	104
1932	59	8.9	8.8	14.9	119	7.5	7.4	12.5	100
1933	56	8.4	8.3	14.8	118	7.3	7.2	12.8	102
1934	59	8.9	8.8	14.9	118	7.5	7.4	12.5	99
1935	61	8.9	8.7	14.3	112	7.3	7.1	11.6	91
1936	63	9.8	9.6	15.2	119	8.2	8.0	12.7	99
1937	64	9.6	9.4	14.7	114	8.1	7.9	12.3	95
1938	61	9.9	9.7	15.9	122	8.4	8.2	13.4	103
1939	59	10.1	9.9	16.8	128	8.6	8.4	14.2	108
1940	58	10.7	10.4	17.9	136	9.1	8.8	15.2	115
1941	59	11.8	11.5	19.5	148	9.9	9.6	16.3	124
1942	65	13.5	13.1	20.2	154	11.7	11.4	17.5	133
1943	69	14.2	13.7	19.9	154	12.6	12.2	17.7	137
1944	70	15.2	14.6	20.9	163	13.3	12.8	18.3	142
1945	70	16.5	15.8	22.6	175	14.9	14.3	20.4	158
1946	78	20.4	19.7	25.3	183	18.3	17.7	22.7	164
1947	94	24.0	23.3	24.8	174	20.7	20.1	21.4	150
1948	102	26.5	25.7	25.2	174	22.9	22.2	21.8	150
1949	104	27.7	26.9	25.9	175	23.9	23.2	22.3	151
1950	103	28.0	27.2	26.4	176	23.9	23.2	22.5	150
1951	111	30.9	30.0	27.0	179	26.4	25.6	23.1	153
1952	116	32.7	31.7	27.3	178	28.3	27.4	23.6	154
1953	118	34.1	33.0	28.0	179	29.3	28.4	24.1	154
1954	119	35.3	34.2	28.7	180	30.4	29.5	24.8	156
1955	121	37.0	35.8	29.6	182	32.2	31.2	25.8	159
1956	123	39.3	38.1	31.0	188	34.0	33.0	26.8	162
1957	128	41.4	40.1	31.3	185	35.7	34.6	27.0	160
1958	134	42.7	41.4	30.9	180	37.0	35.9	26.8	156
1959 6/	135	44.5	43.2	32.0	183	39.0	37.9	28.1	161

1/ Calculated from the AMS "market basket" series. See reference in text, section 3.5.3.
 2/ Described in text, section 3.5. Taxes refer to retail sales taxes. Difference between total market value and supplier value except that Federal processor taxes have been deducted in 1934 and 1935 and allowances for Federal payments to processors have been added in 1943-46.
 3/ TFV-14d represents total food value series - No. 14a deflated.
 4/ Differs from farm-retail marketing bill because this series includes services of eating places and excludes share of markup on food sold prior to retail level. Difference between total market value and supplier value except that Federal processor taxes have been deducted in 1934 and 1935 and allowances for Federal payments to processors have been added in 1943-46.
 5/ Estimated retail sales taxes and tips for farm foods based on ratio of retail-store cost of farm foods sold to retail value of all food sold.
 6/ Preliminary.

Table 3.9.- Disposable total personal income and disposable money income, total and per capita, 1929-59

Year	Disposable total income ^{1/}			Disposable money income ^{2/}		
	U. S. total	Per capita in --		U. S. total	Per capita in --	
		Current dollars	1947-49 dollars		Current dollars	1947-49 dollars
	Bil.dol.	Dol.	Dol.	Bil.dol.	Dol.	Dol.
1929	83.1	682	930	76.8	631	861
1930	74.4	604	846	68.6	557	780
1931	63.8	515	792	59.0	476	732
1932	48.7	390	668	44.9	360	616
1933	45.7	364	658	42.5	338	611
1934	52.0	411	719	48.8	386	675
1935	58.3	459	782	54.8	431	734
1936	66.2	517	872	62.5	488	823
1937	71.0	551	897	67.0	520	847
1938	65.7	506	839	61.8	476	789
1939	70.4	538	906	66.4	507	854
1940	76.1	576	962	72.0	545	910
1941	93.0	697	1,108	88.1	660	1,049
1942	117.5	871	1,250	110.8	821	1,178
1943	133.5	977	1,320	124.9	914	1,235
1944	146.8	1,060	1,410	137.0	990	1,316
1945	150.4	1,075	1,398	139.6	998	1,298
1946	160.6	1,136	1,362	151.6	1,072	1,285
1947	170.1	1,181	1,237	161.5	1,121	1,174
1948	189.3	1,291	1,256	180.2	1,229	1,196
1949	189.7	1,271	1,249	180.5	1,210	1,189
1950	207.7	1,369	1,332	197.9	1,305	1,269
1951	227.5	1,473	1,327	216.2	1,400	1,261
1952	238.7	1,520	1,339	226.8	1,445	1,273
1953	252.5	1,582	1,383	240.2	1,505	1,316
1954	256.9	1,582	1,378	244.7	1,507	1,313
1955	274.4	1,660	1,450	262.0	1,585	1,384
1956	292.9	1,742	1,499	279.9	1,664	1,432
1957	308.8	1,804	1,501	294.8	1,722	1,433
1958	317.9	1,826	1,479	302.9	1,740	1,409
1959 ^{3/}	337.3	1,905	1,529	322.2	1,820	1,461

^{1/} Total series from U. S. Department of Commerce. Per capita data calculated by AHS.

^{2/} Derived from total series by subtracting income received wholly and partly in kind.

^{3/} Preliminary.

Table 3.10.- Average total disposable income and total market value of food consumed per person in year, at home and away, by income group, 1935-36 and 1941 ^{1/}

(In 1941 dollars)

Total income per consumer unit in current dollars ^{2/}	Distribution of family members ^{3/}	Average disposable income per person	Total market value of food per person
	<u>Percent</u>	<u>Dollars</u>	<u>Dollars</u>
		<u>1935-36</u>	
Under \$500	14.4	121	74
\$500-1,000	28.3	259	111
\$1,000-1,500	22.8	396	141
\$1,500-2,000	13.9	537	165
\$2,000-3,000	12.5	726	192
\$3,000-5,000	5.4	1,051	224
\$5,000 and over	2.7	3,499	368
Average	---	494	143
		<u>1941</u>	
Under \$500	5.1	122	91
\$500-1,000	15.2	293	130
\$1,000-1,500	16.1	446	167
\$1,500-2,000	17.7	529	179
\$2,000-3,000	23.5	734	206
\$3,000-5,000	16.0	1,008	247
\$5,000 and over	6.4	2,027	354
Average	---	680	191

^{1/} Data derived from 1935-36 Consumer Income and Expenditure Studies of the National Resources Committee and 1941 Study of Spending and Saving in War-time (37, 43). Disposable income includes money and nonmoney incomes; 1941 incomes adjusted for underreporting. Market value of all food including away-from-home and home-produced food, valued at local prices, and alcoholic beverages. Excludes institutional population.

^{2/} Approximately same as disposable income; includes nonmoney income.

^{3/} Including single individuals.

Table 3.12.- Cross-section indexes for 1942: Per person food consumption at home in housekeeping households, in a week of spring 1942 ^{1/}

First quarter 1942 money income per family at annual rate in current dollars	United States	Urban	Rural nonfarm	Farm
All	100.0	104.1	90.7	99.2
Under \$500	81.7	75.8	76.9	86.5
\$500-1,000	87.8	85.6	81.6	98.8
\$1,000-1,500	93.7	91.8	88.4	112.5
\$1,500-2,000	100.9	97.7	99.6	117.9
\$2,000-3,000	108.9	110.9	101.8	114.3
\$2,000-2,500	---	106.8	---	---
\$2,500-3,000	---	113.2	---	---
\$3,000 and over	114.2	113.9	112.1	114.6
\$3,000-5,000	---	113.4	---	---
\$5,000-10,000	---	115.8	---	---

^{1/} Described briefly in text, section 3.7.5.4 and in detail in appendix D. Quantities of individual foods used in a week at home in spring 1942 in housekeeping households, from Misc. Pub. 550, Family Food Consumption in the United States (40), combined with 1947-49 average retail prices used in time-series index of per capita food consumption; resulting per capita value aggregates compared with the all U. S. average to derive index matching concept of time-series index PFQ-2. Income data are given in table 3.14.

Table 3.13.- Three cross-section indexes of per person food use in spring 1955, and average disposable money income per person, by urbanization and income group ^{1/}

1954 disposable money income per family	United States	Urban	Rural nonfarm	Farm	United States	Urban	Rural nonfarm	Farm
	a. Per person food use - all sources (CFQ-1a) ^{2/}				b. Per person food use - purchased only (CFQ-1b) ^{3/}			
Under \$1,000	79.7	83.8	69.3	85.0	57.1	89.6	58.1	43.6
\$1,000-2,000	87.1	84.9	80.7	97.7	75.0	92.4	73.0	52.5
\$2,000-3,000	94.2	90.9	94.3	104.6	90.1	100.5	90.3	58.4
\$3,000-4,000	95.5	95.3	93.1	105.2	97.1	105.7	92.9	60.6
\$4,000-5,000	101.1	99.9	101.1	110.7	105.5	111.1	104.0	63.4
\$5,000-6,000	105.4	106.6	102.2	110.9	111.5	118.3	106.6	70.7
\$6,000-8,000	108.8	109.3	108.1	108.7	115.4	121.7	112.2	65.9
\$8,000-10,000	109.1	107.4	114.0	113.1	115.6	120.3	122.0	62.0
\$10,000 and over	117.3	118.3	111.7	124.8	127.1	131.2	114.3	88.6
Average - all households	100.0	101.7	95.9	101.8	100.0	112.8	95.2	56.8
	c. Per person food consumption - retail level (CFQ-2) ^{4/}				d. Average disposable money income per person (1954)			
					<u>Dollars</u>	<u>Dollars</u>	<u>Dollars</u>	<u>Dollars</u>
Under \$1,000	77.9	82.0	68.9	82.0	115	185	161	53
\$1,000-2,000	85.2	83.1	79.1	95.4	450	510	432	386
\$2,000-3,000	93.1	90.1	93.0	102.4	703	766	652	612
\$3,000-4,000	96.1	96.2	92.8	104.1	932	977	880	836
\$4,000-5,000	101.7	100.9	100.8	108.9	1,196	1,233	1,156	1,023
\$5,000-6,000	105.2	106.8	102.0	110.1	1,422	1,504	1,296	1,154
\$6,000-8,000	109.6	110.0	106.7	106.1	1,811	1,869	1,752	1,404
\$8,000-10,000	110.8	109.0	115.6	111.6	2,267	2,350	2,151	1,758
\$10,000 and over	119.3	120.4	113.2	124.7	4,076	4,224	3,314	3,854
Average - all households	100.0	102.4	95.3	99.6	1,250	1,480	1,021	698

^{1/} Described briefly in text, section 3.7.5.5, and in detail in appendix D. Quantities of individual foods used in a week at home in spring 1955 by housekeeping households (from 1955 Survey of Household Food Consumption) combined with 1947-49 average prices used in time-series indexes; resulting value aggregates on a per person basis compared with all U. S. average to derive indexes. ^{2/} Matches concept of time-series index of per capita food use - all sources (PFQ-1a); quantities of individual items converted to farm-weight equivalents and valued at average farm prices in 1947-49. ^{3/} Matches time-series index of per capita food use - purchased food (PFQ-1b); quantities of individual items converted to farm-weight equivalents and valued at average farm prices in 1947-49. ^{4/} Matches time-series index of per capita food consumption (PFQ-2); retail weights of individual items valued at average 1947-49 retail prices.

Table 3.14.- Spring 1942: Market value and expenditure data for food per person in a week, average income per person and percentage distribution of population of housekeeping families of two or more, by urbanization and income group 1/

First quarter 1942 money income per family at annual rate in current dollars 2/	Dispos- able money income per person in 1954 dollars 3/	Distri- bution of family members, exclud- ing singles 4/	Market value of all food at home and away 5/						Total expendi- tures for food and food and beverages away from home 10/	Dispos- able money per person in 1954 dollars 3/	Distri- bution of family members, exclud- ing singles 4/	Market value of all food at home and away 5/						Total expendi- tures for food and food and beverages away from home 10/	Total expendi- tures for food and food and beverages away from home 11/				
			All food at home		Expendi- tures for food and beverages at home 9/		Total 6/	Home pro- duced 7/				Dol.	Pct.	All food at home		Expendi- tures for food and beverages at home 9/				Total 6/	Home pro- duced 7/	Dol.	Pct.
			Dol.	Pct.	Dol.	Dol.								Dol.	Dol.	Dol.	Pct.						
			a. All households																				
Under \$500	128	16.2	4.54	4.45	12/	2.32	0.09	2.42	179	2.9	4.72	4.54	12/	3.88	0.18	4.06							
\$500-1,000	350	12.6	5.11	4.94	12/	3.57	.16	3.73	418	8.9	5.27	5.07	12/	4.85	.22	5.07							
\$1,000-1,500	588	13.1	6.08	5.65	12/	4.53	.42	4.96	656	11.0	6.42	5.82	12/	5.53	.60	6.13							
\$1,500-2,000	852	13.5	6.92	6.30	12/	5.60	.62	6.22	921	14.6	7.14	6.39	12/	6.42	.75	7.17							
\$2,000-2,500	1,134	21.9	7.98	7.01	12/	6.66	.97	7.63	1,092	16.5	7.90	7.03	12/	7.14	.88	8.02							
\$2,500-3,000									1,300	12.8	9.02	7.56	12/	7.63	1.46	9.10							
\$3,000-4,000	1,594	15.7	8.80	7.47	12/	7.17	1.34	8.51	1,602	22.6	9.00	7.56	12/	7.63	1.45	9.08							
\$4,000-5,000																							
\$5,000-6,000	2,350	7.0	10.58	8.18	12/	8.24	2.40	10.63	2,900	10.7	10.82	8.29	12/	8.47	2.53	11.00							
\$6,000-8,000																							
\$8,000-10,000																							
\$10,000 and over																							
Average - all households:	1,038	—	6.92	6.17	12/	5.27	.75	6.02	1,230	—	7.89	6.79	12/	6.82	1.10	7.92							
Average - excl. singles (calculated)	1,008	100.0	7.01	6.24	12/	5.22	.77	5.99	—	100.0	7.98	6.88	12/	6.88	1.10	7.98							
			c. Rural nonfarm households																				
Under \$500	189	18.2	4.15	4.10	1.26	2.82	.05	2.87	91	52.1	4.68	4.65	3.04	1.61	.04	1.65							
\$500-1,000	357	19.3	4.61	4.45	1.17	3.11	.16	3.27	300	15.8	5.53	5.44	3.46	1.96	.09	2.05							
\$1,000-1,500	564	21.4	5.33	5.05	.99	4.10	.27	4.37	476	10.4	6.61	6.50	4.06	2.36	.11	2.47							
\$1,500-2,000	803	15.6	6.24	5.76	1.19	4.61	.48	5.09	664	7.8	7.12	6.90	3.55	3.35	.22	3.57							
\$2,000-2,500	983	16.0	6.53	6.06	1.10	5.05	.48	5.53	1,006	7.4	7.34	6.94	4.23	2.85	.40	3.25							
\$2,500-3,000																							
\$3,000-4,000	1,542	8.0	8.00	6.97	}	6.22	1.02	7.24	1,192	4.0	7.36	7.01	}	3.11	.35	3.46							
\$4,000-5,000																							
\$5,000-6,000	12/	1.5	8.71	7.43	}	.88	}	7.69	1.28	}	7.89	7.34	}	3.75	.55	4.30							
\$6,000-8,000																							
\$8,000-10,000																							
\$10,000 and over																							
Average - all households:	682	—	5.53	5.18	1.13	4.08	.35	4.43	417	—	5.58	5.45	3.35	2.10	.13	2.23							
			d. Farm households																				

1/ Data derived by this author from reports on Study of Family Spending and Saving in Wartime (40, 41, 43) Adjustments made in attempt to achieve comparability with spring 1955 data. Computed from unrounded data. 2/ Based on disposable money income in first quarter of 1942. 3/ Disposable money income in first quarter 1942 times 4. Per person averages based on economic family size data. Converted to 1954 dollars using change in CPI (times 1.66). 4/ Includes a few nonhouse-keeping families. Distribution on basis of incomes in first quarter 1942. 5/ Food value data include food used by single-person households, adjusted to spring 1955 dollars using change in HLS index of retail food prices from April-May 1942 to April-June 1955 (times 1.83). Value of food consumed at home per household divided by household size to obtain per person averages. 6/ Sum of value of all food used at home and expenditures for food and beverages away from home. 7/ Estimated from data on p. 37 of Misc. Pub. 550 Family Food Consumption in the United States (40); averages for highest income group estimated from residuals. Includes home produced, purchased and food received as gift or pay. Value of food used reported separately. 8/ Rural nonfarm and farm data estimated from data on p. 42, Misc. Pub. 550. 9/ Based on unpublished data supplied by the Institute of Home Economics. Expenditures for food at home reported separately, not value of purchased food consumed during the week. 10/ Estimates for food and alcoholic beverages derived from following sources: Urban, expenditures by housekeeping families from p. 122 of HLS Bulletin No. 822 (43); rural nonfarm, expenditures in first quarter 1942 (less board at school) divided by 13; farm, expenditures in 1941 (less board at school) divided by 52. 11/ Sum of expenditures for food and beverages away from home and expenditures for food purchased for home consumption. 12/ Not available.

Table 111.- Spring 1955 and 1951, urban households only: Market value and expenditure data for food per person in a week, average income per person, and percentage distribution of the population of housekeeping families of two or more persons ^{1/}

Disposable money income in preceding year per family, in current dollars	1948 urban data ^{2/}							1951 urban data ^{9/}		
	Disposable money income per person, in 1954 dollars ^{3/}	Distri- bution of members of house- keeping families ^{4/}	Market value of all food at home and away ^{5/}				Total ex- pend- itures for food and beverages away from home ^{5/}	Disposable money income per person, in 1954 dollars ^{3/}	Distri- bution of members of house- holds ^{10/}	Expendi- tures for food at home and away from home ^{5/ 6/}
			Total	Food at home ^{6/}	Market value of all food ^{7/}	Expendi- tures for food and beverages away from home ^{8/}				
Under \$500	292	2.8	6.12	5.54	5.08	0.57	5.67	292	1.8	5.18
\$500-1,000	644	12.3	6.55	6.06	5.64	.49	6.13	642	7.7	4.71
\$1,000-1,500										
\$1,500-2,000										
\$2,000-2,500	918	28.5	7.34	6.53	6.20	.80	7.00	942	17.3	5.77
\$2,500-3,000										
\$3,000-4,000	1,190	26.2	8.12	7.08	6.80	1.05	7.85	1,172	26.7	6.30
\$4,000-5,000	1,523	12.7	9.16	7.55	7.18	1.58	8.76	1,440	20.5	6.59
\$5,000-6,000	2,072	11.3	9.69	7.49	7.22	2.21	9.44	1,978	7.4	7.53
\$6,000-7,000										
\$7,000-7,500										
\$7,500-8,000	3,702	6.2	11.87	8.69	8.38	3.16	11.55	2,326	4.6	7.67
\$8,000-10,000										
\$10,000 and over								4,685	2.7	8.65
Average	1,317	---	8.27	6.99	6.68	1.27	7.95	1,413	---	6.42

^{1/} Data derived from published reports. Adjustments made in attempt to achieve comparability with spring 1955 data. Computed from unrounded data.

^{2/} Derived from Agr. Inf. Bul. 132, Food Consumption of Urban Families in the United States (33).

^{3/} Preceding year's income converted to 1954 dollars using change in Consumer Price Index.

^{4/} Distribution of members of economic families according to their income in 1947.

^{5/} Converted to spring 1955 price level using change in BLS index of retail prices for food at home.

^{6/} Excludes expenditures for alcoholic beverages for home consumption.

^{7/} Includes food obtained without direct expense.

^{8/} Value of purchased food used in week, family basis.

^{9/} Derived from data in Vol. 12 of Study of Consumer Expenditures, Incomes, and Savings (45).

^{10/} Distribution of members of housekeeping households according to 1950 income; probably differs only slightly from that for economic family members.

Table 3.16.- Spring 1955: Market value and expenditure data for food per person in a week, average income per person, and percentage distribution of the housekeeping population, by urbanization and income group 1/

Disposable money income of family in 1954	Disposable money income per person	Distribution of population in families of 2 or more 2/	Market value of all food at home and away				Total expenditures for food at home and beverages away from home	Total expenditures for food at home and beverages away from home
			All food at home			Expenditures for food		
			Total 3/	Home produced	Expenditures for food			
Dollars	Percent	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	
a. All households								
Under \$1,000	115	5.8	5.39	5.11	1.50	3.30	0.28	3.59
\$1,000-2,000	450	9.2	6.22	5.68	1.01	4.39	.54	4.93
\$2,000-3,000	703	12.7	7.11	6.29	.66	5.39	.82	6.20
\$3,000-4,000	932	19.0	7.66	6.64	.44	6.02	1.02	7.03
\$4,000-5,000	1,196	19.7	8.37	7.08	.36	6.54	1.29	7.83
\$5,000-6,000	1,422	12.2	8.87	7.49	.33	6.99	1.38	8.37
\$6,000-8,000	1,811	12.4	9.85	7.83	.34	7.36	2.01	9.38
\$8,000-10,000	2,267	4.3	10.20	7.88	.32	7.47	2.32	9.78
\$10,000 and over	4,076	4.7	13.36	9.32	.20	8.93	4.04	12.97
Average 4/	1,250	---	8.40	7.02	.54	6.28	1.39	7.67
Average excluding singles	---	100.0	8.36	6.97	.54	6.24	1.38	7.62
b. Urban households								
Under \$1,000	185	1.8	6.15	5.51	5/	5.10	.64	5.74
\$1,000-2,000	510	6.1	6.32	5.51	5/	5.20	.81	6.01
\$2,000-3,000	766	10.8	7.15	6.24	5/	6.01	.90	6.91
\$3,000-4,000	977	18.8	7.98	6.84	5/	6.62	1.14	7.76
\$4,000-5,000	1,233	21.9	8.63	7.13	5/	6.93	1.50	8.43
\$5,000-6,000	1,504	13.4	9.25	7.79	5/	7.55	1.46	9.01
\$6,000-8,000	1,869	15.1	10.23	7.97	5/	7.73	2.26	9.98
\$8,000-10,000	2,350	5.4	10.25	7.85	5/	7.74	2.40	10.14
\$10,000 and over	4,224	6.7	13.97	9.66	5/	9.40	4.31	13.70
Average 4/	1,480	---	9.15	7.38	5/	7.14	1.77	8.91
Average excluding singles	---	100.0	9.08	7.32	5/	7.09	1.76	8.85
c. Rural nonfarm households								
Under \$1,000	161	6.9	4.69	4.56	.88	3.25	.13	3.38
\$1,000-2,000	432	11.4	5.74	5.32	.68	4.20	.42	4.62
\$2,000-3,000	652	15.3	6.94	6.13	.54	5.20	.81	6.01
\$3,000-4,000	880	21.8	7.15	6.25	.49	5.50	.90	6.40
\$4,000-5,000	1,156	18.7	7.97	7.00	.42	6.29	.97	7.26
\$5,000-6,000	1,296	12.0	8.17	6.86	.38	6.30	1.31	7.61
\$6,000-8,000	1,752	9.1	9.29	7.67	.42	7.13	1.62	8.75
\$8,000-10,000	2,151	2.5	10.96	8.33	.30	7.82	2.64	10.46
\$10,000 and over	3,314	2.3	10.70	7.57	.29	6.97	3.13	10.10
Average 4/	1,021	---	7.51	6.51	.50	5.71	.99	6.70
Average excluding singles	---	100.0	7.44	6.44	.50	5.66	1.00	6.65
d. Farm households								
Under \$1,000	53	21.6	5.59	5.34	2.51	2.62	.25	2.86
\$1,000-2,000	386	19.1	6.71	6.41	2.77	3.44	.30	3.74
\$2,000-3,000	612	15.8	7.33	6.79	2.79	3.77	.54	4.31
\$3,000-4,000	836	13.6	7.43	6.81	2.65	3.99	.62	4.60
\$4,000-5,000	1,023	12.0	7.61	6.90	2.69	4.04	.71	4.75
\$5,000-6,000	1,154	6.9	7.96	7.05	2.40	4.41	.91	5.32
\$6,000-8,000	1,404	6.9	7.62	6.90	2.49	4.31	.72	5.03
\$8,000-10,000	1,758	2.8	8.15	7.19	2.90	4.20	.96	5.15
\$10,000 and over	3,854	1.3	10.58	8.93	2.22	6.48	1.66	8.14
Average 4/	698	---	7.10	6.57	2.69	3.69	.53	4.22
Average excluding singles	---	100.0	7.06	6.53	2.68	3.66	.52	4.18

1/ Value data for food, excluding alcoholic beverages for home consumption, derived from table 2 of the 1955 Household Food Consumption Survey Report No. 1 (44). 2/ Distribution of members of those families reporting incomes. 3/ Includes value of food received as gift or pay as well as purchased and home produced. 4/ Average for all families, including singles and those not classified by income. 5/ Negligible.

Chapter 4. INTRODUCTION TO PROCEDURES FOR ANALYSIS OF U. S. FOOD CONSUMPTION

This chapter contains a description of some of the procedures used in analysis of historical changes and cross-section variations in U. S. food consumption. For other procedures references are given to standard statistical works. The most complicated statistical procedures among those referred to in this chapter are standard regression analysis and the t test of significance. The author's objective, actually, is to focus attention on rather simple methods that are regularly used in analyses of U. S. food consumption.

Such complicated procedures as simultaneous equations may be more desirable conceptually than the simpler ones, but their use often implies greater precision than the basic data on food consumption can provide.

Topics covered in this chapter are: (1) Organization of data for use in analysis; (2) graphic analysis, with some examples; (3) description of means for combining consumption rates with alternative population distributions; and (4) methods for analyzing changes in an aggregate, such as the overall market value of all food from one year to another.

4.1. Organizing Data for Use in Analysis

Before undertaking an analysis of any economic problem, several questions must be answered. Among these are: What are the objectives? What definitions or concepts for economic elements are most suitable? What data are available? This section covers some of the processes of getting the data ready to use in study of a problem related to food consumption in the United States.

Three preparatory phases may be distinguished. The first is the preparation of food consumption data, whether from time-series or cross-section sources, in the form needed for the analysis, for example, computing or combining per capita figures. Another phase in some studies is the computation of supplementary statistical series from consumption and price data. For example, the overall value data and special measures, such as those for marketing services, were developed to meet the data requirements of comprehensive analysis of changes in U. S. food consumption. Finally, comes the assembly of related economic and social statistics and preparation for later computations.

4.1.1. Time-Series Data on Consumption

The statistical measures of U. S. food consumption through time are described in chapter 3. The annual supplements to Agr. Handb. 62 (6) supply data usually needed for special combinations of data required for particular studies. Many examples are provided in chapter 3. Clues to other possibilities may be found in the text of that handbook or, for the supply utilization index, in Agr. Handb. 91 (12). Because procedures for developing data vary, no general directives are practicable. Instead, attention is directed to a description of the procedure used to derive market value data, which is given in appendix B.

4.1.2. Time-Series of Related Economic and Social Statistics

The major categories of statistics related to food consumption that are used in analysis of time-series data pertain to population, prices, income, and expenditures

for other goods and services. Detailed references to source materials are given in appendix E. 59/

Two revised editions of important compilations by the Department of Commerce provide a variety of other statistics. These are U. S. Income and Output (27), a 1958 supplement to the Survey of Current Business (formerly called National Income), and Historical Statistics of the United States, Colonial Times to 1957 (15), issued by the Bureau of the Census.

The major types of adjustments needed in such statistics are derivation of per capita series, deflation, and adjustments for coverage. In deriving per capita figures, one must be sure to have the correct population, for example, total or civilian only. Some guidance to choice and handling of such statistics is provided in Analytical Tools for Studying Demand and Price Structures by Richard J. Foote, Agr. Handb. 146, pages 27-33 (60). Adjustments of the series to match coverage of the consumption data must be based on careful study of the fine print of definitions, the sample, and so on.

4.1.3. Cross-Section Data on Food Consumption

The kinds of adjustments to be made in cross-section data preparatory to analysis depend on the definitions of commodity coverage found in each survey, in terms of value and quantities, how tabulations have been run and reported, and characteristics of data with which comparability is sought. For example, the average value data for family food published in table 2 of Reports 1 to 5 of the 1955 Survey of Household Food Consumption (44), were tabulated on the basis of the primary economic family, hence the count of family members given in table 2 must be used to derive per person averages. 60/ The rationale of this tabulation stems from the fact that away-from-home expenditures can be adequately reported only for members of the primary economic family by the respondent, who is usually the homemaker of that family.

In contrast, data in table 3, and those following, in the 1955 Survey Reports 1-5 are on a household basis and pertain to consumption at home (or from home supplies) by all members of the household and guests. The number of persons based on 21-meal equivalents is used to derive per person rates in order to offset the systematic variations of average household size with income level, urbanization, and region.

Detailed information necessary for matching the 1955 cross-section food data with time series and other types of survey data is provided in appendixes A and C. A checklist for use in studying problems in matching data is given in 4.1.5.

59/ Chapter 5 of Agr. Handb. 62 (6) describes some of the major series, for which current data are published in annual supplements to that handbook. These series include civilian population, retail food prices, disposable income (with a number of series computed from the Department of Commerce aggregates), the Commerce estimates of consumption expenditures for food (described in 3.6.2), and the AMS data on farm value (TFV-1), and retail cost of U. S. farm foods sold to civilians (TFV-6).

60/ The term "per person" is used in this bulletin for cross-section averages per head, whereas the term "per capita" is reserved for time-series data. This differentiation helps the user of the data to remember the differences in coverage between the two sets of data.

Adjustment of the value data to comparable price levels is necessary for many comparisons. Adjustments to allow for the change in the purchasing power of the dollar are regarded as economically sound. But problems in the use of particular indexes do arise, especially in handling the prices for an abnormal period of supply and demand for food, and the spring of 1942 was such a period.

4.1.4. Derivation of Approximate Income-Size Distributions

4.1.4.1. Adjustments of income-size distributions are often necessary for study of food consumption patterns under alternative conditions and assumptions. The objective of such adjustments is to develop distributions of the population for use in recombining or reweighting averages for income groups within each urbanization category and the urbanization averages to derive overall averages.

Surveys of household food consumption made in recent years have provided income-size distributions of families which can be converted to income-size distributions of family or household members to match the averages for groups by which the consumption data are tabulated. The use of income-size distributions from sources other than the food data requires watching the definitions of income and the population coverage of the survey. It even requires alertness in keeping the same degree of underreporting of income as that involved in groupings of households according to which the consumption data have been tabulated.

4.1.4.2. Two examples of the methodology discussed above follow: Example A is the process of shifting the income-size distributions from the 1955 Survey of Household Food Consumption, based on the families' 1954 incomes at the 1954 price level, back to a distribution with the same real income but in terms of 1942 dollars. This is clearly an adjustment for change in the general price level.

Example B is the projection of income-size distributions for the three urbanizations from 1955 to 1975 under certain assumptions. This illustrates the adjustment in income-size distributions for changes in average real income. The implicit assumptions for this procedure are that there is no change in the degree of inequality of real income ^{61/} and that the changes in consumption and income of one-person families and nonhousekeeping households may be disregarded because they will not affect the overall change.

The 1955 Survey of Household Food Consumption provides the following data, which give us the distribution of the housekeeping population according to size of family money income after taxes: (1) The number of families of two or more persons in each income class within each of the three urbanizations are given in table 1 of Survey Report 1. (2) The average family size for each income class is reported in table 2. (3) The combination of (1) and (2) yields the distribution of family members (in families of 2 or more persons) participating in the spring 1955 survey according to the size of family disposable income in 1954.

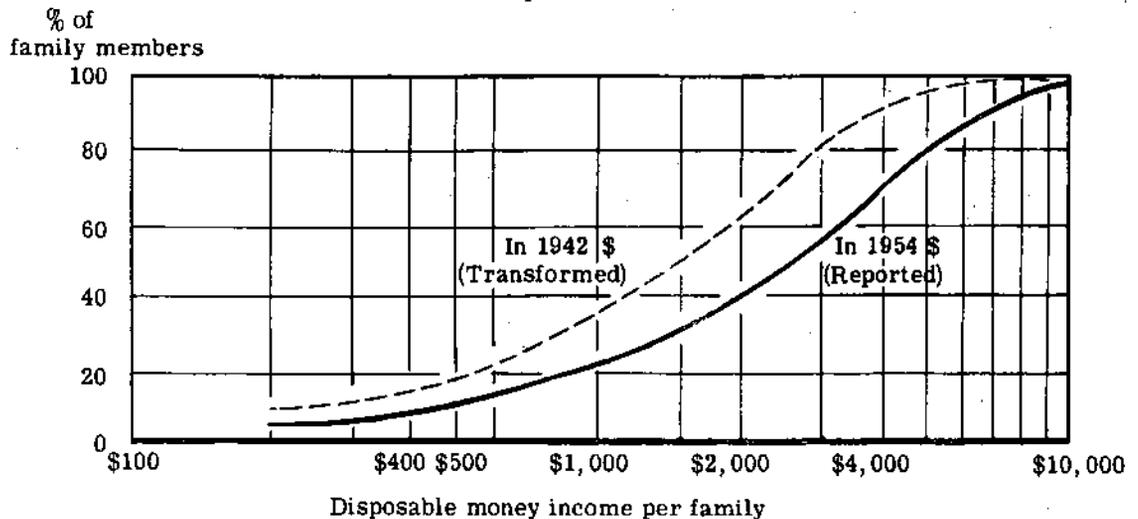
4.1.4.3. Example A.--Following is a step-by-step description of the graphic procedure for adjusting the 1955 income-size distribution to a distribution among income classes in terms of first quarter 1942 dollars, without a change in relative

^{61/} In technical terms, the Lorenz curve is unchanged.

distribution of income: 62/

1. Lay out the scale for disposable money income per family on the logarithmic horizontal scale of semilog graph paper and the percentage of family members on the natural or arithmetic vertical scale. (As illustrated by chart 4.1, use of semilog paper condenses the range of income into manageable proportions.)
2. Cumulate the percentage frequencies of family members for each income class below each class limit, starting from the lowest level on the worksheet.
3. Plot these cumulated frequencies against the upper class limit of each income class and draw a freehand curve joining the points.
4. To adjust the distribution from the 1954 price level to that of the first quarter 1942, move the curve to the left by the ratio of the CPI in the first quarter of 1942 to the CPI in 1954, 59 percent. This allows for the depreciation in the purchasing power of each dollar.

Chart 4.1--Work chart for cumulative frequency distribution of members of farm families by income level in 1954 and transformation to first quarter 1942 dollars



USDA

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62/ A statistical procedure to yield more precise results is described in Income Distribution in the United States, by Size, 1944-50, footnote 12, p. 38 (3). This is a 1953 supplement to the Survey of Current Business.

A combined statistical and graphic procedure was developed by Maurice Liebenberg to short-cut the extensive computations of the preceding method. It is described in "Nomographic Interpolation of Income Size Distributions," Rev. Econ. Stat. Aug. 1956 (61). This procedure is used by the National Income Division to adjust for changes in price level which they measure by changes in implicit price deflators for personal consumption expenditures given in U. S. Income and Output, table VII-13, p. 228 (27).

5. Move the curve according to this example:

- (a) 59% of \$1,000 = \$590. The farm curve given in chart 4.1 in 1954 dollars intersects the \$1,000 line at 22%. Therefore, we plot the new point for the cumulated curve in 1942 dollars at \$590 and 22%.
- (b) 59% of \$3,000 = \$1,770. The farm curve in 1954 dollars intersects the \$3,000 line at about 58%. So we plot a second point for the new curve at \$1,770 and 58%.
- (c) Other points are located in the same fashion and joined by freehand curve.
- (d) Chart 4.1 shows both the 1955 distribution for farm households and the transformation of the cumulated frequency curve to first quarter 1942 dollars.

6. Read the cumulated frequencies for the adjusted curve at the class limits and calculate the frequencies for each class by subtraction.

7. The adjusted frequencies of family members in the spring of 1955 are given in terms of 1942 dollars in table 4.1. Comparable distributions adjusted from the first quarter 1942 dollars to 1954 dollars are in the same table.

4.1.4.4. Example B.--The following procedure is used to derive some approximate income-size distributions for the three urbanization categories for 1975.

Begin with the same 1955 cumulated frequencies plotted on a semilog chart, in the same way as that described for example A. Daly's economic framework for 1975 provides an indication that the increase in real income from 1954 to 1975 on a per capita basis might amount to 50 percent. 63/

The application of this procedure to this problem requires moving the curve to the right to allow for the 50 percent increase in real income per capita. 64/ Other steps are exactly the same as those for example A. The basic assumption of a general upward shift of the whole population with no change in the relative distribution of the population by income was used. A few adjustments were necessary to keep within the overall average of the three urbanizations combined. The approximate income-size distributions based on these assumptions are given in table 4.2.

4.1.4.5. Reservations.--These procedures provide working approximations, but they should be supplemented by additional information wherever possible. 65/ The

63/ Daly's economic framework indicates about a 40 percent increase in per capita real income from 1956 to 1975. The income data of the 1955 survey were for 1954 income, hence the change from 1954 to 1975 would amount to about 50 percent. The framework is described in "Prospective Domestic Demands for Food and Fiber," paper submitted for hearings on Policy for Commercial Agriculture ... (55).

64/ Recall that example A involves a shift to the left because \$1,000 in 1954 dollars was worth only \$590 in first quarter 1942 dollars. Here the shift is to the right because with increased productivity, a general rise in income levels is expected. Thus, average real income per capita is raised from \$1,250 in 1954 to around \$1,875 in 1975 (in 1954 dollars), under Daly's economic framework.

65/ As illustrated in study by Liebenberg, Maurice and Kaitz, Hyman "An Income-Size Distribution from Income Tax and Survey Data." Studies in Income and Wealth. Volume 13 (62).

Table 4.1.--Percentage distributions of members of housekeeping families of 2 or more persons in first quarter 1942 and spring 1955, by urbanization and income ^{1/}

Family income in dollars ^{2/}	In first quarter 1942 based on current money income at annual rate				In spring 1955 based on disposable money income in 1954			
	United States	Urban	Rural nonfarm	Farm	United States	Urban	Rural nonfarm	Farm
	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
	a. In current dollars				b. In current dollars			
Under 500	16.2	2.9	18.2	52.1	} 5.8	1.8	6.9	21.6
500-1,000	12.6	8.9	19.3	15.8		} 9.2	6.1	11.4
1,000-1,500	13.1	11.0	21.4	10.4	} 12.7		10.8	15.3
1,500-2,000	13.5	14.6	15.6	7.8		} 19.0	18.8	21.8
2,000-2,500	} 21.9	{ 16.5	{ 16.0	7.4	} 12.2		13.4	12.0
2,500-3,000						12.8		
3,000-4,000	} 15.7	22.6	{ 8.0	4.0	} 12.4	15.1	9.1	6.9
4,000-5,000								
5,000-6,000	} 7.0	{ 8.4	{ 1.5	2.5	} 4.7	6.7	2.3	1.3
6,000-7,000								
7,000-7,500	} 7.0	{ 8.4	{ 1.5	2.5	} 4.7	6.7	2.3	1.3
7,500-8,000								
8,000-10,000	} 7.0	{ 8.4	{ 1.5	2.5	} 4.7	6.7	2.3	1.3
10,000 and over								
Percentage of U. S.	100.0	57.9	21.9	20.2	100.0	58.9	28.6	12.5
	c. In 1954 dollars				d. In spring 1942 dollars			
Under 500	} 18	5	21	5	} 6	2	7	20
500-1,000								
1,000-1,500	} 15	10	25	17	} 9	7	12	15
1,500-2,000								
2,000-2,500	} 16	15	21	11	} 33	{ 17	18	11
2,500-3,000								
3,000-4,000	16	20	15	6	17	20	14	10
4,000-5,000	11	15	8	4	8	10	7	4
5,000-6,000	7	10	4	3	3	4	1	2
6,000-7,000	} 8	12	3	2	} 2	2	1	1
7,000-7,500								
7,500-8,000	} 8	12	3	2	} 2	2	1	1
8,000-10,000								
10,000 and over	5	7	1	.5	1.5	2	1	3/

^{1/} Distribution of family members in current dollars for first quarter 1942 derived from data in BLS Bul. 822, Family Spending and Saving in Wartime (43), and for spring 1955 from U. S. Department of Agriculture 1955 Survey Report 1, Food Consumption of Households in the United States (44). Distributions in terms of dollars of other period derived by graphic adjustment of cumulative curve of income-size distribution for change in price level, measured by change in the Consumer Price Index.

^{2/} Net money income in first quarter 1942, disposable money income in 1954.

^{3/} Negligible.

Table 4.2.--Preliminary approximations of distribution of population of housekeeping families of 2 or more persons by income-size and by urbanization in 1975, under certain assumptions ^{1/}

Disposable money income in 1954 dollars	Urban	Rural nonfarm	Farm ^{2/}	All ^{3/}
	Percent	Percent	Percent	Percent
Under 1,000	1	3	6	2
1-2,000	2	6	10	3
2-3,000	5	7	15	6
3-4,000	9	12	17	10
4-5,000	12	13	14	12
5-6,000	16	15	14	16
6-8,000	23	25	11	22
8-10,000	14	10	8	13
10,000 and over	18	9	5	16
Percent of all	75	18	7	100

^{1/} Assuming 50 percent increase in real income per capita from 1954 to 1975 and no overall change in degree of inequality of distribution of incomes. For method of estimating these distributions, see text section 4.1.4.4. U. S. average income postulated at \$1,875 in 1954 prices; averages for individual urbanizations work out thus: Urban \$2,050, rural nonfarm \$1,475, farm \$1,050. These data are given here as working tools, not forecasts.

^{2/} Includes some minor adjustments in lower income range on basis of historical trends and to keep overall average change at 50 percent.

^{3/} Based on distributions for three subcategories.

income-size distributions so derived are not nearly so precise as those developed for official use and publication by Selma Goldsmith and others of the National Income Division (NID) of the Department of Commerce, but they do have the advantage of matching the definition of after-tax income and the urbanization breaks of the 1955 survey data.

The NID income-size distributions cannot be applied directly to the 1955 survey averages by income class because they incorporate the results of extensive research to overcome underreporting of income, a common survey malady. However, study of the NID size distributions of income after tax for recent years indicates little change in the relative distribution. Accordingly, the 1955 survey distributions can be shifted to the right by the increase in real income. The degree of precision desired by the analyst must determine how detailed a procedure he adopts -- whether he uses all urbanizations combined, a farm and nonfarm break, or develops approximations for the three separate urbanizations of the 1955 survey data. ^{66/}

^{66/} A procedure for adjusting one income-size distribution according to changes in relative distribution of income shown by another has not yet been developed.

4.1.5. Checklist for Problems in Matching Data

A checklist of some of the most significant problems encountered in matching sets of consumption data is provided in the following section. It is incorporated in this handbook to help analysts identify inconsistencies among sets of household survey data that they may be using, and between survey data and time-series data. This list is organized under three topics. At the end, some sources are noted for answers to such questions as may be raised.

4.1.5.1. Coverage of Overall Data

- a. U. S. civilian or military too? Housekeeping households only? Including singles or households of two or more only? Households of two or more classified by income or all such households?
- b. Home produced included? Farm or nonfarm too?
- c. Gifts and payments-in-kind included?
- d. At home only, or including away from home?
- e. Alcoholic beverages in or out? Tobacco?
- f. U. S. farm foods only or including imported foods and domestic fishery products?
- g. Including purchases for storage reported or unreported? Or releases from stocks?
- h. Including businessmen's purchases and food supplied with hospital and travel services?
- i. Including donations or other special distributions of food to consumers?

4.1.5.2. Basis for Overall Measure

- a. Poundage at farm level, retail?
- b. Price weighted -- farm or retail base period prices?
- c. In current dollars -- farm values, retail values or final market values including services of eating places?
- d. Expenditures or dollar outlays only or including estimated values of home-produced foods?
- e. If constant dollars, how deflated?
- f. Household or family or per person averages? Basis for calculating per person average?

4.1.5.3. Commodity Problems ^{67/}

- a. Meats -- including home canned, frozen? Offals in or out? Poultry meat? Game? Slaughter weights or retail weights? Including pork fat cuts? Including content of prepared combined dishes? Including donations or other special distributions to civilians?
- b. Processed foods -- processed weights? If equivalents, fixed or changing factors used? Commercially prepared only or home processed included too?
- c. Dairy products -- butter included? Basis for combination -- fat content, calcium content, all milk solids not fat, whole milk equivalent?
- d. Flour, fats, sugar, eggs -- including content of bakery products, dairy products, confections?
- e. Fats and oils -- product weight or fat content of salad dressings, mayonnaise, sandwich spread? Including butter? Including pork fat cuts?
- f. Canned vegetables -- including baby foods? Baked beans? Sauerkraut? Soups?

4.1.5.4. Guides to Answers to Questions Raised in 4.1.5.3

- a. Introduction to survey reports and descriptions of samples.
- b. Footnotes to tables of the reports.
- c. Technical appendixes of the reports.
- d. Appendix A, this bulletin.
- e. Agr. Handb. 62 (6) and volume 5 of Agr. Handb. 118 (24).
- f. Commodity articles in the National Food Situation in 1957 and 1958 based on the 1955 survey (13).

4.2. Use of Graphic Analysis in Studying Relationships

4.2.1. Most of the graphic procedures used in the analysis of food consumption are described in Graphic Analysis in Agricultural Economics by Frederick V. Waugh (74). The procedures include plotting cumulative frequencies, plotting trends on arithmetic graphs, studying seasonal variations and cycles, graphic methods for regression analysis, comparison of time series, derivation of averages of two relationships, and calculation of elasticities.

4.2.2. Logarithmic and Arithmetic Scales

Particularly useful in the analysis of food consumption patterns are logarithms, both in graphic work and in computations. Certain distinctions between the use of natural or arithmetic scales and logarithmic scales have to be recognized. ^{68/} Equal

^{67/} Appendix A contains some information on this subject.

^{68/} Based on Allen, R. G. D. Mathematics for Economists, pp. 219-225 (47).

distances between points of natural or arithmetic scales indicated equal absolute changes in a variable, whereas equal distances between points on logarithmic scales indicate equal proportional changes in the variable. A natural or arithmetic graph is preferable for study of absolute changes.

Semilogarithmic graphs are used for comparison of percentage changes in the value of one variable with gradual changes in another, and for studying relative changes in a variable (on the logarithmic scale) through time (plotted on the natural or arithmetic scale). Plotting of two variables on double logarithmic graph paper is helpful in comparison of proportional changes. Logarithms have the characteristics of magnifying small variations and of reducing large ones to reasonable proportions, and they are especially valuable for comparison of price and quantity changes and for study of relationships between income and food consumption. Two parallel lines on double logarithmic paper have the same elasticity at every level. But two parallel lines on arithmetic paper having the same arithmetic slopes (and regression coefficients) may have quite different elasticities or relationships between variables plotted on the two axes.

Consumption analysts make frequent use of logarithmic charts of consumption per person plotted against average income per person of families in that class. Household and family averages are also studied in this way. Such curves, plotted on logarithmic or arithmetic paper, are called Engel curves after Ernst Engel, a nineteenth century Saxon statistician who worked extensively with family expenditure data.

4.2.3. New Procedure to Study Variability in Engel Curves

A simple graphic and arithmetic procedure has been developed by the author to study variability in Engel curves. Much information about variations in consumption among households across the income scale is lost by calculation of average income-food relationships by the method of least squares. Computations for fitting nonlinear curves are usually too extensive and complicated to use, and they imply greater precision than such data possess. The procedure described here can be used to compare: (1) Variations in Engel curves for two or more measures for food, and/or (2) variations for the same measure among households in two or more urbanization categories, and/or (3) variations for the same measure among households of a given urbanization category at two or more points in time. The comparisons are facilitated by using the U. S. mean income per person for all households as the key level in the second type of these variations, and the income for one year as the base for comparisons of variations at two points in time.

The first step in preparing for these comparisons is to adjust the averages from two or more periods in time for changes in the prices of food and in the purchasing power of the dollar. The BLS retail food price index and the Consumer Price Index have been used for such adjustments for table 3.14. The data used in these comparisons are the per person averages for each income group, usually within each urbanization category.

Engel curves are the starting point. As an example, we begin by plotting the Engel curve for total market value for all food at home and away from home by all U. S. households per person in a week of spring 1955 (chart 4.2). The next step is to locate the arithmetic mean of per person income for all households in the category or for all U. S. households. In 1954 this was \$1,250 for all U. S. households. This mean is marked on a horizontal income scale drawn at the top of the chart. A vertical line is drawn down to the Engel curve, as at point A. Similarly, selected percentages

above and below the mean income point are located to the left and right of the mean on the scale at the top of the chart. From these points lines are drawn down to the Engel curve.

A table is needed for tabulation of data for each point, such as table 4.3. Consumption rates are read from the chart at points where the income lines reach the Engel curve, such as points A, B, C, D, and E of chart 4.2, and inserted in a table as in the first line of table 4.3. The next step is to calculate the percentages by which these consumption rates vary from the consumption rate at the mean income point for entry in the table, as in line 2. Such computations provide a way to isolate facts like these: U. S. households with incomes 50 percent above the average per person in 1954 used food valued at 17 percent more per person than those at the mean level of income. The market value of food used by households with per person incomes 50 percent below the mean was 19 percent less than at the mean. However, the average rate of food use by households with income three times as high as the 1954 mean was only 53 percent above the rate among households of average income.

Comparisons with the rate of consumption at another year's average level of income can be developed by superimposing a second income scale across the top of the chart for a given year. Suppose we want to know how the market value of all food in spring 1955 among households with incomes 50 percent above the 1942 mean level of income compared with the average value of food for households at that real income point in spring 1942. Average income in the first quarter of 1942 was at the rate of \$1,038 per year (in 1954 dollars), according to the Study of Family Spending and Saving. This should be plotted on a second income scale drawn above the 1954 scale on chart 4.2, and a new set of lines drawn down to the same curve as before. These would provide the necessary data for comparisons with data from a variability table with 1942 data.

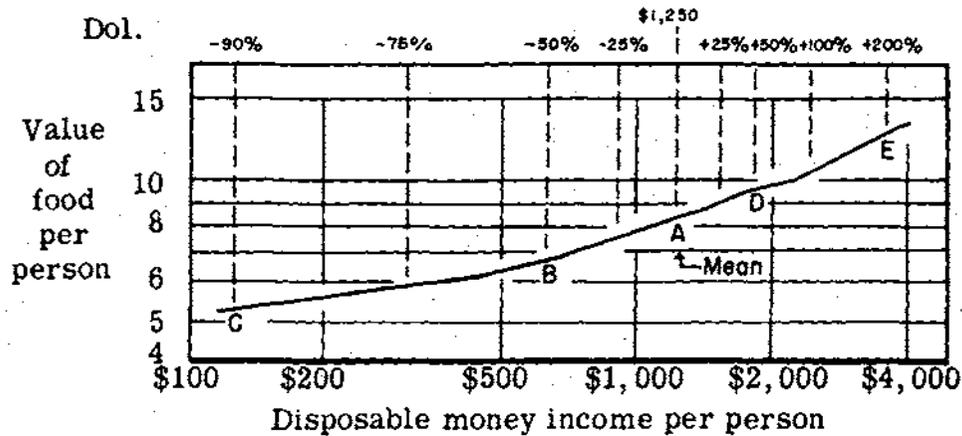
4.3. Alternative Combinations of Consumption Rates and Population Distributions

4.3.1. Data on survey consumption rates, income-size distributions, and urbanization distributions can be used to explore a number of problems. In their use, the explorer must fully recognize and keep in mind the risks involved in generalizations from patterns of food consumption at home by housekeeping households in a survey period to consumption patterns by the whole population at home and away from home. In the section which follows, simple procedures are described for use in the four types of analyses: (1) Calculation of regional distributions of the U. S. food market from per person rates of survey data; (2) calculation of effects of change in one economic factor, holding others constant; (3) derivation of approximations for consumption rates in subareas of regions, such as States; (4) projections for future years or for historical periods based on information on the structure of food consumption in a given period.

4.3.2. Calculation of Regional Distribution of the U. S. Food Market

For some purposes regional variations in consumption of food by housekeeping households at home in a given period may be generalized to describe regional variations in consumption by the whole population at home. Such generalizations are probably valid for consumption of all foods combined, but for particular commodities they have less validity. Because there are no data on commodities consumed away from home,

Chart 4.2--Work chart for study of variability of market value of all food with income, spring 1955 ^{1/}



^{1/} Market value of all food in a week of spring 1955 and 1954 disposable money income per person, all U. S. households of 2 or more persons, for groups of families.

USDA

NEG. 8320 - 60 (12) AMS

Table 4.3.--Variability of market value of all food in a week of spring 1955 with disposable money income in 1954, all U. S. households, per person averages

Item	Unit	Below mean income				At 1954 mean disposable money income level, \$1,250	Above mean income			
		-90%	-75%	-50%	-25%		25%	50%	100%	200%
Market value	Dol.	5.45	6.00	6.85	7.65	8.45	9.20	9.90	10.75	12.90
Variation	Pct.	-36%	-29%	-19%	-9%	0	+9%	+17%	+27%	+53%

either for the U. S. or for the regions, we turn to the 1955 household survey data to derive the first approximations of regional differences in the overall U. S. food market.

Following is a shortcut method of estimating regional shares in the U. S. market from the 1955 survey data. For each region, multiply per person averages by the survey percentage of the population of members of housekeeping families (Northeast - 27.0 percent, North Central Region - 30.1 percent, South - 32.1 percent, West - 10.8 percent). Add the products to get the U. S. total, then divide the products for each region by the U. S. total to obtain the percentages of the U. S. market. Following this procedure is far simpler than trying to blow up the sample data to regional aggregates for the entire housekeeping population.

4.3.3. Calculation of Effects of Change in an Economic Factor

4.3.3.1. The effect of a change in one particular economic factor among several may be evaluated by the familiar procedure of making alternative combinations of values for two or more variables. In some respects this method is a reweighting procedure. This description is apt because the procedure encounters some of the problems met in construction of index numbers, for example, applicability and interpretation of fixed weights.

The procedure is illustrated in table 4.4, employing selected survey data for spring 1942 and 1955: (1) Expenditures for food at home in a week in spring, averages per person in households of two or more persons, grouped by income (identified as Exp₄₂ and Exp₅₅); (2) income-size distributions of family members within the urban, rural nonfarm, and farm categories (identified as Inc₄₂ and Inc₅₅); (3) distribution of these family members by urbanization category (identified as Urb₄₂ and Urb₅₅).

Actual U. S. average expenditures in a week of spring were: 69/

$$\begin{array}{rcllcl} 1942 & = & \$5.22 & = & \text{Exp}_{42} & \times & \text{Inc}_{42} & \times & \text{Urb}_{42} \\ & & (\text{Col. 1}) & & (\text{Col. 3}) & \times & (\text{Col. 5}) & & \\ & & (\text{Line A2}) & & (\text{" 7}) & \times & (\text{" 9}) & & \text{Line B, 1942} \\ & & & & (\text{" 11}) & & (\text{" 13}) & & \\ \\ 1955 & = & \$6.24 & = & \text{Exp}_{55} & \times & \text{Inc}_{55} & \times & \text{Urb}_{55} \\ & & (\text{Col. 2}) & & (\text{Col. 4}) & \times & (\text{Col. 6}) & & \\ & & (\text{Line A2}) & & (\text{" 8}) & \times & (\text{" 10}) & & \text{Line 3, 1955} \\ & & & & (\text{" 12}) & & (\text{" 14}) & & \end{array}$$

The method involves calculation of ranges of possible effects of changes in each of several factors, holding others constant. The patterns of expenditures at each level of income within each urbanization reflect changes in all factors other than income and urbanization. No completely satisfactory basis for reconciling or compromising the ranges for the several factors has been developed, as will become clearer when we consider the concluding section.

69/ References are to columns and lines in table 4.4.

Table 4.4.—Worksheet for alternative combinations of (1) group averages for expenditures for food at home in a week, (2) income-size distributions, and (3) urbanization distributions, household survey data, spring 1942 and 1955

Item	All U. S.		Urban				Rural nonfarm				Farm			
	Expense per person		Expense per person		Income-size distribution		Expense per person		Income-size distribution		Expense per person		Income-size distribution	
	1/		1/		2/		1/		2/		1/		2/	
	1942	1955	1942	1955	1942	1955	1942	1955	1942	1955	1942	1955	1942	1955
	Dol.	Dol.	Dol.	Dol.	Pct.	Pct.	Dol.	Dol.	Pct.	Pct.	Dol.	Dol.	Pct.	Pct.
A. Income per family in current dollars														
Under 500			3.88	5.10	2.9	1.8	2.82	3.25	18.2	6.9	1.61	2.62	52.1	21.6
500-1,000			4.85		8.9		3.11		19.3		1.96		15.8	
1,000-1,500			5.53	5.20	11.0	6.1	4.10	4.20	21.4	11.4	2.36	3.44	10.4	19.1
1,500-2,000			6.42		14.6		4.61		15.6		3.35		7.8	
2,000-2,500			7.14	6.01	16.5	10.8	5.05	5.20	16.0	15.3	2.85	3.77	7.4	15.8
2,500-3,000			7.63	6.62	22.6	18.8	6.22	5.50	8.0	21.8	3.11	3.99	4.0	13.6
3,000-4,000			7.63	6.93		21.9	6.29			18.7	4.04		12.0	
4,000-5,000			8.47	7.55		13.4	6.30			12.0	4.41		6.9	
5,000-6,000			7.74	7.73	10.7	15.1	7.69	7.13	1.5	9.1	3.75	4.31	2.5	6.9
6,000-8,000			7.74	7.74		5.4	7.82			2.5	4.20		2.8	
8,000-10,000			9.40	9.40		6.7	6.97			2.3	6.48		1.3	
10,000 and over														
1. Average for all households	5.27	6.28	6.82	7.14			4.08	5.71			2.10	3.69		
2. Average for 2+ households	5.22	6.24	6.88	7.09	100.0	100.0	5.66	5.66	100.0	100.0	3.66	3.66	100.0	100.0
B. Distribution by urbanization 3/					57.9	58.9			21.9	28.6			20.2	12.5
1. 1942 urbanization averages combined with 1955 urbanization	5.48													
2. 1955 urbanization averages combined with 1942 urbanization	6.08													
C. Alternative combinations of group averages and income distributions														
1. 1942 group averages combined using 1955 income distribution 4/			7.17				4.93				2.53			
Combined into U. S. using urbanization distribution of														
a. 1942	5.74													
b. 1955	5.95													
2. 1955 group averages combined using 1942 income distributions 5/			6.84				4.84				3.16			
Combined into U. S. using urbanization distribution of														
a. 1942	5.66													
b. 1955	5.81													

1/ Data for spring 1942 from table 3.14 and for spring 1955 from table 3.16. 2/ Distribution of members of housekeeping families according to size of family income for 1942 from table 3.14 and for 1955 from table 3.16. 3/ Distribution of population of housekeeping families according to surveys in spring 1942 and spring 1955. 4/ Distribution for 1955 by income size transformed to 1942 dollar basis, as in table 4.1. 5/ Distribution for 1942 by income size transformed to 1954 dollar basis, as in table 4.1.

4.3.3.2. Measurement of the effect of change in urbanization only:

(1) Based on 1942 expenditure averages

(a) And 1942 income-size distributions

$$\text{Exp}_{42} \times \text{Inc}_{42} \times \text{Urb}_{42} = \$5.22, \text{ actual U. S. average}$$

$$\text{Exp}_{42} \times \text{Inc}_{42} \times \text{Urb}_{55} = 5.48, \text{ calculated in line B 1}$$

$$\$5.48 + \$5.22 = 1.05 = 5\% \text{ increase}$$

(b) And 1955 income-size distributions (from table 4.1, part d)

$$\text{Exp}_{42} \times \text{Inc}_{55} \times \text{Urb}_{42} = \$5.74, \text{ calculated in line C 1a}$$

$$\text{Exp}_{42} \times \text{Inc}_{55} \times \text{Urb}_{55} = 5.95, \text{ calculated in line C 1b}$$

$$\$5.95 + \$5.74 = 1.04 = 4\% \text{ increase}$$

(2) Based on 1955 expenditure averages

(a) And 1955 income-size distributions

$$\text{Exp}_{55} \times \text{Inc}_{55} \times \text{Urb}_{55} = \$6.24, \text{ actual U. S. average}$$

$$\text{Exp}_{55} \times \text{Inc}_{55} \times \text{Urb}_{42} = 6.08, \text{ calculated in line B 2}$$

$$\$6.24 + \$6.08 = 1.03 = 3\% \text{ increase}$$

(b) And 1942 income-size distributions (from table 4.1, part c)

$$\text{Exp}_{55} \times \text{Inc}_{42} \times \text{Urb}_{55} = \$5.81, \text{ calculated in line C 2b}$$

$$\text{Exp}_{55} \times \text{Inc}_{42} \times \text{Urb}_{42} = 5.66, \text{ calculated in line C 2a}$$

$$\$5.81 + \$5.66 = 1.03 = 3\% \text{ increase}$$

Comments.--These combinations provide four slightly different answers because of interactions, just as the Paasche and Laspeyres formulas provide two different answers in the index number problem where two sets of prices can be combined with two sets of quantities, base period or current period. Several significant points pertaining to these results merit attention. The differences in variability between the expenditure patterns in 1942 and 1955 account for the differences between (1a) and (2b) and between (1b) and (2a). Similarly, the variations in the income-size distributions between the 2 years apparently cause the differences between (1a) and (1b) and between (2a) and (2b). But comparisons in (1a) differ from the comparisons in (2a) because of changes in both the expenditure patterns and the income-size distribution. Intuitively, it seems safer to hold two factors constant in the same year and to vary the third, as in (1a) and (2a). These examples demonstrate how complicated the analyses of effects of changing factors on food consumption can be. Even so, they yield a range of results which provide a good idea of the relative importance of each factor in changes in food consumption through time. This point will be considered further after the other two factors are explored.

4.3.3.3. Measurement of the effect of change in income only:

(1) Based on 1942 expenditure averages

(a) And 1942 urbanization distribution

$$\begin{aligned} \text{Exp}_{42} \times \text{Inc}_{42} \times \text{Urb}_{42} &= \$5.22, \text{ actual U. S. average} \\ \text{Exp}_{42} \times \text{Inc}_{55} \times \text{Urb}_{42} &= 5.74, \text{ calculated in line C 1a} \\ \$5.74 + \$5.22 &= 1.10 = 10\% \text{ increase} \end{aligned}$$

(b) And 1955 urbanization distribution

$$\begin{aligned} \text{Exp}_{42} \times \text{Inc}_{42} \times \text{Urb}_{55} &= \$5.48, \text{ calculated in line B 1} \\ \text{Exp}_{42} \times \text{Inc}_{55} \times \text{Urb}_{55} &= 5.95, \text{ calculated in line C 1b} \\ \$5.95 + \$5.48 &= 1.09 = 9\% \text{ increase} \end{aligned}$$

(2) Based on 1955 expenditure averages

(a) And 1955 urbanization distribution

$$\begin{aligned} \text{Exp}_{55} \times \text{Inc}_{55} \times \text{Urb}_{55} &= \$6.24, \text{ actual U. S. average} \\ \text{Exp}_{55} \times \text{Inc}_{42} \times \text{Urb}_{55} &= 5.81, \text{ calculated in line C 2b} \\ \$6.24 + \$5.81 &= 1.07 = 7\% \text{ increase} \end{aligned}$$

(b) And 1942 urbanization distribution

$$\begin{aligned} \text{Exp}_{55} \times \text{Inc}_{55} \times \text{Urb}_{42} &= \$6.08, \text{ calculated in line B 2} \\ \text{Exp}_{55} \times \text{Inc}_{42} \times \text{Urb}_{42} &= 5.66, \text{ calculated in line C 2a} \\ \$6.08 + \$5.66 &= 1.07 = 7\% \text{ increase} \end{aligned}$$

Comments.--Here the range of the four sets of combinations indicates that the changes in income reflected in the income-size distributions probably raised food expenditures 7 to 10% per person.

4.3.3.4. Measurement of the effect of change in expenditure averages for each income group (i.e. the Engel curves):

(1) Holding 1942 income size distributions constant

(a) Combined with 1942 urbanization distribution

$$\begin{aligned} \text{Exp}_{42} \times \text{Inc}_{42} \times \text{Urb}_{42} &= \$5.22, \text{ actual U. S. average} \\ \text{Exp}_{55} \times \text{Inc}_{42} \times \text{Urb}_{42} &= 5.66, \text{ calculated in line C 2a} \\ \$5.66 + \$5.22 &= 1.08 = 8\% \text{ increase} \end{aligned}$$

(b) Combined with 1955 urbanization distribution

$$\begin{aligned} \text{Exp}_{42} \times \text{Inc}_{42} \times \text{Urb}_{55} &= \$5.48, \text{ calculated in line B 1} \\ \text{Exp}_{55} \times \text{Inc}_{42} \times \text{Urb}_{55} &= 5.81, \text{ calculated in line C 2b} \\ \$5.81 + \$5.48 &= 1.06 = 6\% \text{ increase} \end{aligned}$$

(2) Holding 1955 income-size distributions constant

(a) Combined with 1955 urbanization distribution

$$\begin{aligned} \text{Exp}_{42} \times \text{Inc}_{55} \times \text{Urb}_{55} &= \$5.95, \text{ calculated in line C 1b} \\ \text{Exp}_{55} \times \text{Inc}_{55} \times \text{Urb}_{55} &= 6.24 = \text{actual U. S. average} \\ \$6.24 + \$5.95 &= 1.05 = 5\% \text{ higher} \end{aligned}$$

(b) Combined with 1942 urbanization distribution

$$\begin{aligned} \text{Exp}_{42} \times \text{Inc}_{55} \times \text{Urb}_{42} &= \$5.74, \text{ calculated in line C 1a} \\ \text{Exp}_{55} \times \text{Inc}_{55} \times \text{Urb}_{42} &= 6.08, \text{ calculated in line B 2} \\ \$6.08 + \$5.74 &= 1.06 = 6\% \text{ increase} \end{aligned}$$

Comments.--It is apparent that a fairly strong argument exists for preferring measures (1a) and (2a) which utilize income and urbanization distributions for the same year. Income and urbanization are probably highly interrelated.

4.3.3.5. Conclusions.--The ranges of the results in the example using expenditures for food at home in a week are summarized below with the calculated increases given both in dollars and in percentages:

<u>Effect of change in:</u>	<u>Dollars</u>		<u>Percent</u>	
	<u>From</u>	<u>To</u>	<u>From</u>	<u>To</u>
(1) Urbanization distribution	0.15	0.26	3	5
(2) Income-size distributions	.42	.52	7	10
(3) Expenditure patterns	<u>.29</u>	<u>.44</u>	<u>5</u>	<u>8</u>
	.86	1.22	15	23

It will be noted that the high of each range of the effect of change in one factor measured in percentages is established by holding other factors constant at the 1942 level. The low point of each is set by the converse -- holding other factors at the 1955 level. The degree of variability in income distributions, expenditures, and urbanization distribution was higher in 1942.

The actual change in the U. S. average expenditure for food at home between the two surveys (in 1955 dollars) was \$1.02 or 20 percent. Therefore, we come to the problem of allocating the actual change among the three factors. Some of the solutions were obviously high, others low. Perhaps a geometric mean of the 4 calculated averages might be worked out here, as in the case of Fisher's ideal index. A simple average of the two extremes of the range for each set of changes yields an answer

close to the actual change. [\$0.20 for (1) + \$0.47 for (2) + \$0.36 for (3) = \$1.03.] This provides a working solution, but some readers will ask whether the effects of these factors are additive or multiplicative. Neither the author nor other economists consulted can provide a satisfactory answer at this time.

4.3.4. Derivation of Consumption Rates for Subregional Areas

A first approximation of consumption patterns in subregional areas such as States and metropolitan areas may be developed from regional survey data on the basis of certain general assumptions. These include:

- (1) Households of a given income level within each urbanization category in the subregional area have about the same consumption patterns as the average of households for the comparable group in the region.
- (2) A reasonably adequate breakdown of the area's population by urbanization and by income can be made.

As an example, take approximations for average expenditures for food at home for the State of Kansas in the spring of 1955. ^{70/} The first assumption is that about the same amounts were spent for food at home by Kansas households as amounts spent by comparable urbanization and income in the whole North Central Region. Here again, it is likely that this assumption holds reasonably true for all foods, but less so for individual foods.

The first requirement for developing these estimates is a distribution of the population of Kansas by urbanization. Such information for 1955 is not directly available. But the following percentage distribution of the total population by urbanization (according to Census definitions) for the North Central Region and for Kansas for 1950 was derived from the 1950 Census of Population, volume II, part 1, table 58 (20):

	<u>Urban</u>	<u>Rural nonfarm</u>	<u>Farm</u>
North Central	64%	19%	17%
Kansas	52	25	23

The urban proportion for Kansas is 81 percent of the urban share of the North Central Region, the rural nonfarm proportion 131 percent, and the farm sector 135 percent. On the assumption that these differentials were the same in 1955 as in 1950, the 1955 distribution for Kansas can be estimated by applying them to the urbanization distribution for the housekeeping household population of the North Central Region obtained in the 1955 Survey of Household Food Consumption. The resulting percentages are approximations for 1955:

^{70/} This example was worked out by Robert J. Lavell, Economic and Statistical Analysis Division, ERS.

	<u>Urban</u>	<u>Rural nonfarm</u>	<u>Farm</u>
North Central Region	58%	26%	16%
Estimated Kansas	47	<u>71/31</u>	22

The next set of information needed for calculation of the estimates for Kansas pertains to income. A supplement to the Survey of Current Business provides average personal income for each State. ^{71/} According to this report, per capita income in Kansas in 1954 was \$1,684, 90 percent of average per capita income for the North Central Region. This provides the first key to the estimation of an income-size distribution for Kansas for 1955. The only published source of income-size distributions for both the North Central Region and Kansas is volume II of the 1950 Census of Population. These distributions are for all urbanization categories combined. The distributions of families by size of income in 1949 for Kansas and the North Central Region were as follows, in percentages:

	<u>North Central Region</u>	<u>Kansas</u>
Under \$1,000	12	15
\$1-2,000	13	17
2-3,000	19	22
3-4,000	21	19
4-5,000	13	11
5-6,000	9	6
6-7,000	5	3
7-10,000	5	4
10,000 and over	3	3

According to these distributions, the proportion of families that fell in the lower range of income was larger for Kansas than for the North Central Region. The farm and rural nonfarm populations constitute a larger proportion of the total for the State than for the region.

The next problem is to develop income-size distributions for each urbanization. This is necessarily done in a round about way. The process starts with information on farm income. The Farm Income Situation (7) in September 1958 reported that average disposable money income per farm from farm operations in 1954 was about 3 percent higher in Kansas than in the North Central Region. Another piece of information comes from volume II of the Census of Agriculture for 1954 -- table 3, chapter IX. Data are given on the value of all farm products sold per farm for each State and region. The Kansas average was about 7 percent higher than that for the North Central Region. Accordingly, we may conclude from these 2 sets of data that average money income per farm household in 1954 was perhaps 5 percent higher in Kansas than in the North Central Region. The average size of farm households is assumed to be about the same in the State as in the region.

Because the per capita income was about 10 percent lower for the entire Kansas population than for the North Central Region, and Kansas farm incomes were a little

^{71/} The first approximation of the Kansas urbanization distribution added up to 103 percent. The extra 3 percent was subtracted from rural nonfarm category.

^{72/} Personal Income by States Since 1929 (4).

higher, urban and rural nonfarm incomes must have averaged enough lower in Kansas than in the region to bring the overall average down to 10 percent below the North Central Region. This is not surprising since Kansas has relatively less industry and commerce than a number of the other States in the region. Without direct information on rural nonfarm and urban incomes, it is necessary to make some arbitrary guesses. We selected the following estimates as reasonable and yielding the 10 percent lower Kansas average: Rural nonfarm income per capita in Kansas at 5 percent below the north central average and the Kansas urban average at 7 percent lower than the regional rate. Approximations for Kansas income rates on these bases are given in table 4.5.

Table 4.5.--Reported average disposable money income and distribution of housekeeping population by urbanization in North Central Region, 1954, and approximations for Kansas ^{1/}

Urbanization	Average income per person			Distribution of population	
	Reported for North Central Region	Approximations for Kansas	Kansas as percent of North Central Region	Reported for North Central Region	Approximations for Kansas
	Dollars	Dollars	Percent	Percent	Percent
All urbanizations	1,441	1,296	90	100	100
Urban	1,689	1,570	93	58	47
Rural nonfarm	1,187	1,128	95	26	31
Farm	901	946	105	16	22

^{1/} Data for North Central Region as reported in 1955 Survey of Household Food Consumption. See text for description of how Kansas approximations were developed.

The next step is based on the assumption that the degree of inequality of income measured for the North Central Region by the income-size distribution for each urbanization category in the spring 1955 survey was generally the same for Kansas. From this assumption and the comparisons of average incomes shown in table 4.5, the income-size distribution for Kansas households for each urbanization was estimated by shifting the cumulative frequency curve according to the procedure described in 4.1.4. The distributions are given in table 4.6.

With this urbanization distribution and the income-size distributions for Kansas, estimates of expenditures per person for food at home for each income class can be combined into overall averages. Note again the assumption that average expenditures by Kansas households in spring 1955 were about the same as those by north central households of the same income level within each urbanization. Weighted averages for expenditures for food at home (excluding alcoholic beverages) per person representing first approximations for the State of Kansas are urban, \$7.40; rural nonfarm, \$5.75; farm, \$4.00. Their combination with the urbanization distribution yields an estimate of \$6.15 per Kansan. This estimate is 94 percent of the average expenditure per person for food at home in the North Central Region in a week of spring 1955.

Table 4.6.--Approximations of income-size distribution of Kansas households in each urbanization in spring 1955 ^{1/}

Disposable money income in 1954 dollars per family	Urban	Rural nonfarm	Farm
	Percent	Percent	Percent
Under 2,000	7	17	29
2-3,000	10	14	16
3-4,000	19	22	13
4-5,000	22	21	16
5-6,000	14	10	11
6-8,000	14	} 16	15
8-10,000	7		
10,000 or more	7		

^{1/} Methodology and basic data described in text.

As stated previously, one of the most important steps in using the reweighting procedure is to check the results with all other available data. The only check data immediately available were retail sales data for food stores in the 1954 Census of Business (18). Per capita sales for Kansas were 96 percent of the average for the North Central Region. Accordingly, it appears that our estimates provide reasonable working approximations for expenditures for food at home by Kansas households.

4.3.5. Procedure for Development of Preliminary Projections for 1975

The approach outlined for development of projections from cross-section data must be coordinated with approximations developed from time-series data on consumption, and with projections of supplies of food likely to be available at specified levels of prices.

Assumptions regarding the economic framework for 1975 are taken from Daly's paper in Policy for Commercial Agriculture (55). Data used in this example are: (1) Expenditures for food at home in 1955 dollars in a week of spring 1942 and 1955 for households grouped by income within the three urbanizations. ^{73/} (2) The income-size distributions for 1975 developed in 4.1.4.4, are given in table 4.2. The latter provide the necessary key to projections of consumers' purchasing power.

The procedure for developing these approximations involves the following steps and considerations:

(1) Combine the 1955 income-class average expenditures for food at home in table 4.4 with the 1975 income-size distribution for each urbanization. Averages resulting are: Urban, \$7.64, rural nonfarm, \$6.34, farm \$4.05.

^{73/} They are also used in table 4.4 and have been taken from tables 3.14 and 3.16.

(2) Compare these averages with the actual averages for 1955: Urban, \$7.09, rural nonfarm, \$5.66, farm, \$3.66. The average expenditures for each income class in spring 1942 reweighted with the 1955 income-size distributions yield these estimates for use in judging changes in the level of the Engel curves: Urban, \$7.17, rural nonfarm, \$4.93, and farm, \$2.53.

(3) Because the 1942 price adjustment for urban households involves some over-estimate, amounting to perhaps 5 percent, it appears likely that there was some slight rise in the level of the Engel curves, even for urban households. The changes in levels for rural nonfarm and farm households are obvious. We may expect further adjustments in the levels of these Engel curves, but probably not as much as from spring 1942 to spring 1955. Therefore, we may hazard the adjustment of the calculated averages to these: \$7.80 for urban, \$6.75 for rural nonfarm, and \$5.00 for farm.

(4) These averages may be combined, using an urbanization distribution for 1975, which begins with Louis J. Ducoff's projection that the farm population in 1975 may be only about 7 percent of the U. S. total. ^{74/} The substantially larger population will result in reclassification of former rural areas; we may therefore expect a considerable increase in the urban proportion. Estimates of 75 percent for the urban population and 18 percent for rural nonfarm appear plausible. Application of these percentages to the adjusted averages yields a tentative approximation of \$7.40 for expenditures per person in U. S. households for food at home in a week in 1975 in terms of 1955 prices. This approximation turns out to be 19 percent above the average reported by U. S. households in a week of spring 1955, which was \$6.24.

(5) The most important step in developing projections is perhaps the checking of the approximations worked out by such a procedure. The following three checks are possible:

(1) We may compare postulated changes in income and in food expenditures from 1955 to 1975 with U. S. average changes from 1942 to 1955 shown by survey data. With respect to the period 1955 to 1975, change in real income is postulated at 50 percent and change in food expenditures is calculated to be 19 percent. In the period 1942 to 1955, change in real income per person, according to survey data from first quarter 1942 to 1954 calendar year, was 20 percent. Change in average food expenditures from April-May 1942 to April-June 1955 was about 20 percent. Several ideas pertinent to complications in the expenditure data can be stated briefly: (a) The "true" change in expenditures was probably somewhat less than 20 percent because of over-adjustment for the price change. (b) Food expenditures and food consumption in spring 1942 probably were lagging behind incomes, for incomes had been rising sharply. (c) Decreased home production from 1942 to 1955 contributed to much greater increases in expenditures than income-food expenditure relationships would lead us to expect. Therefore this first check on the 1975 projection is inconclusive.

(2) We may compare the relationship of the projected income and changes in food expenditure with income elasticities derived from regression equations of survey data. The income elasticities available for comparison are those pertaining to expenditures for food at home and away from home, because regressions have not been computed for the expenditures for food at home only. We would expect the latter coefficients to be slightly lower than those including away-from-home expenditures. The all-U. S. household coefficient for spring 1942 was .52, that for spring 1955, .38. The income

^{74/} In "The Farm Population and the Agricultural Labor Force in 1975," Applications of Demography: The Population Situation in the U. S. in 1975 (56).

elasticity based on the change in food expenditures projected from 1955 to 1975 and the projected change in real income is about .4. This is close to the elasticity derived from cross-section data for all expenditures for one point in time. Historically, the time-series changes have been greater than the cross-section data indicate owing to changes in factors not reflected at one point in time. Therefore, we may suspect that the projected change in expenditures from 1955 to 1975 may be a little conservative.

(3) This check is concerned with change in data on the retail value of food products sold, excluding those sold by eating places (table B-1), related to the change in income from 1941 to 1954. ^{75/}

1942 = \$18.5 billion + 131.5 million people = \$141 per capita
\$141 + BLS retail food price index for food at home of 61.3
yields \$230 in 1947-49 dollars.

1955 = \$44.3 billion + 162.3 million people = \$273
\$273 + BLS retail food price index of 109.7 = \$249 in 1947-49
dollars.

This change in the per capita estimate for this retail value series from 1942 to 1955, based on time-series data, amounted to 8 percent; it may be compared with the 25 percent increase in disposable real income per capita from 1941 to 1954. Thus the retail value series for food sold per capita (excluding sales in eating places), which approximates expenditures for food at home, was up a third as much as real disposable income.

We may conclude from these checks that the \$7.40 average expenditure per person per week projected for food at home, representing a 19 percent increase from 1955 to 1975, is a reasonable estimate.

4.3.6. Inherent Advantages and Disadvantages of Reweighting

Analysts who use the reweighting procedures we have outlined must always be aware of the implications involved.

Advantages of the reweighting procedure are the following: (1) It permits full use of the potentials of cross-section information on relationships among food consumption, income level, and urbanization. (2) It involves relatively simple arithmetic -- the analyst can study the economic implications of each step as he goes along. (3) Because all major aspects of the structure of consumption are considered explicitly, it provides an opportunity for the analyst to adjust the parts of the whole as he deems desirable, on the basis of related economic and social information.

Disadvantages of the reweighting procedure stem from certain characteristics of the Engel curves. Income-food relationships for one period may be abnormal in certain aspects. Often this can be ascertained only after extensive analysis. These relationships reflect net results of a variety of demand and supply factors at single points in time and do not alone provide a key to rates of change through time. The data used for Engel curves apply only to households, and, for most food information,

^{75/} These years are used to approximate the period covered by the income data of the two surveys (first quarter 1942 and 1954).

only to consumption at home. They may not, therefore, take account of important shifts in the food situation. To cope with these problems, it is usually possible to make adjustments based on economic research.

Another disadvantage of the reweighting procedure arises from irregularities in the Engel curves for small subgroups or individual commodities. Probably these curves should be smoothed and adjusted averages used for the income classes in the reweighting procedure.

4.4. References to Standard Statistical Procedures

Because the objective of this chapter is to supplement rather than to repeat information on procedures available in standard works for methodology of least squares computations, the reader is referred to statistical books by Ezekiel (57), Croxton and Cowden (54), Mills (55), Snedecor (69), Ferber (58), and to more recent texts by Wallis and Roberts (73) and by Ostle (67). The t test of significance often used to evaluate coefficients is that developed and described by Fisher (59). Croxton and Cowden also have a good section on this test.

4.5. Methods for Analysis of Changes in the Market Value of All Food

4.5.1. The change in the market value of all food for civilians from 1941 to 1955 is used to demonstrate the possibilities of macroeconomic analysis. During this period the changes in U. S. food consumption were great. Fortunately, cross-section data for spring 1942 and spring 1955 are available for use with time-series data.

The objectives of such an analysis as this are to determine the subareas of greatest changes within the overall increase in market value, to assess the relative importance of price and quantity elements in changes in food per se and in food marketing services, and to appraise the relative importance of factors contributing to these changes. The results are tabulated in table 4.7.

4.5.2. Procedures for Analysis by Component

Data from table 3.5 provide the starting point for analysis by component. According to series TFV-10a, the total market value of food for civilians in 1941 was \$21.2 billion, in 1955 \$60.0 billion, an increase of \$38.8 billion. The major components of this aggregate are the payments for basic productive resources (data in table 3.3) and for marketing services (table 3.8).

4.5.2.1. Payments for basic productive resources are subdivided for many analyses into those going to U. S. farmers and those to importers and fishermen.

(1) To U. S. farmers

	<u>1941</u>	<u>1955</u>	<u>Increase</u>
Sales (TFV-1)	\$7.1 bil.	\$18.3 bil.	
Home production (farm and nonfarm, TFV-2)	<u>1.7</u> "	<u>2.3</u> "	
Total	8.8 "	20.6 "	\$11.8 bil.

Table 4.7.—An analysis of the change in the total market value of all food between 1941 and 1955 1/

Item	1941	Increase		1955
		Basis for estimate	Amount	
	Bil. dol.		Bil. dol.	Pct.
Total market value of all food for U. S. civilians, excluding taxes and tips, current dollars	<u>21.2</u>		<u>38.8</u>	<u>100.0</u>
I. Analysis by components				
A. Payments for basic productive resources				
1. To domestic producers of farm foods				
a. Farmers' sales for civilian foods	7.1			18.3
b. Home produced, farm and nonfarm	<u>1.7</u>			<u>2.3</u>
Total	8.8			
For increased quantity and quality		30 percent increase in total civilian food use, domestically produced	2.6	6.7
For price rise to get more food and general rise in price level, in 1955 dollars		Residual	<u>9.2</u>	<u>23.7</u>
Total to domestic producers	<u>8.8</u>		<u>11.8</u>	<u>30.4</u>
2. To importers and fishermen				
For increased quantity and quality		20 percent increase in total civilian use of imported farm foods, 14 percent increase in edible weight of fish consumed	.2	.5
For price rise to get more food and general rise in price level, in 1955 dollars		Residual	<u>2.5</u>	<u>6.5</u>
Total to importers and fishermen	<u>.9</u>		<u>2.7</u>	<u>7.0</u>
Total for productive resources	<u>9.7</u>		<u>14.5</u>	<u>37.4</u>
B. Payments for marketing services				
For more services in 1941 dollars		51 percent increase in constant dollars in total		
To handle increased quantity and quality of food moving through commercial channels		40 percent more commercial food	4.6	
For additional services per unit		51 percent less 40 percent	<u>1.3</u>	
Total			<u>5.9</u>	<u>15.2</u>
For price rise to get more services and general rise in price level, in 1955 dollars				
On 1941 volume of services		105 percent of \$11.5 billion	<u>12.2</u>	<u>31.4</u>
For additional volume of services, combined result of price and quantity			<u>6.2</u>	<u>16.0</u>
Total			<u>18.4</u>	<u>47.4</u>
Total for marketing services	<u>11.5</u>		<u>24.3</u>	<u>62.6</u>
			<u>38.8</u>	<u>100.0</u>
II. Analysis by economic and social factor				
A. Price in 1955 dollars				
		Derived from part I	<u>30.1</u>	<u>77.6</u>
B. Nonprice factors in 1941 dollars				
1. Population increase		23 percent applied to 1941 total	<u>4.9</u>	<u>12.6</u>
a. More food			2.2	5.6
b. More marketing services			2.7	7.0
2. Changes in income		From survey data, 45 percent of change per person	<u>1.7</u>	<u>4.4</u>
a. For more food		Increase in per capita use of farm foods	.5	1.3
b. For more marketing services		Residual	1.2	3.1
3. Decrease in home production not due to income change, all for more marketing services		Residual, but 9 of 14 percent increase in food moving through commercial channels due to decrease in home production	2.1	5.4

1/ See text sections 1 and 2 of 4.5.2 and section 4.5.3.

2/ Including \$0.1 billion to balance for rounding losses.

The \$11.8 billion increase in current dollar value was due partly to price and partly to increased quantity and quality of the productive resources used. The total civilian food use of domestic farm foods, a measure which reflects quantity and quality of food per se, increased 30 percent. ^{76/} This percentage applied to \$8.8 billion indicates a \$2.6 billion increase needed to pay for greater quantity and quality in 1941 dollars. The residual is \$9.2 billion, which can be ascribed to the increase in prices. This may be checked by dividing the \$9.2 billion figure by the sum of \$8.8 billion and \$2.6 billion. It indicates an 81 percent increase in price and checks well with the 85 percent increase for the farm price of foods in the AMS market basket of domestic farm foods,

(2) To importers and fishermen

	<u>1941</u>	<u>1955</u>	<u>Increase</u>
Import value of imported food	\$0.8 bil.	\$3.3 bil.	
Wharf value of domestic fishery products	.1 "	.3 "	
Total	.9 "	3.6 "	\$2.7 bil.

Total food use of imported farm foods increased 20 percent. ^{77/} Imports of fishery products measured in terms of edible weight went up somewhat more, but they make up a small part of the total value. Total civilian consumption of fishery products (including imported) increased 14 percent on an edible weight basis. Increased imports plus the increase for domestic fishery products could account for a \$200 million rise in the value of these productive resources in 1941 dollars. The \$2.5 billion residual of the increase in the supplier value of imports and fishery products would have to be attributed to price. There are no satisfactory price indexes for all these items. But the BLS retail price of coffee, the most significant single item, went up from 24 cents a pound in 1941 to 93 cents in 1955. (This is a 288 percent increase, whereas the implicit price increase for the total is about 227 percent.)

The foregoing computations are summarized in part I A of table 4.7.

4.5.2.2. Payments for marketing services increased from \$11.5 billion to \$35.8 billion in 1955. Part of the increased outlays were necessary to handle the 40 percent increase in the quantity (and quality) of food flowing through commercial channels as home production declined and as total consumption increased, indicated by the 23 percent increase in the total civilian population and the 14 percent rise in the per capita use of all purchased foods (PFQ-6b). According to TFV-14d in table 3.8 the total payments for food marketing services in 1947-49 dollars rose 51 percent between 1941 and 1955. This can serve as a first approximation of the change in total quantity of marketing services. ^{78/} The 11 percent residual after subtracting the allowance for increased volume is made up of two types of increases in marketing services. The first type is additional services of the "older type" supplied per unit of food handled -- more transportation, more meal preparation and serving, more services of retailers instead of direct sales by farmers, more canning and freezing and

^{76/} From column 2 of table 22, Supplement for 1956 to Agr. Handb. 91 (12). This is the index of the U. S. civilian total corresponding to the per capita index given in table 3.1, identified as PFQ-1a.

^{77/} From column 3 of table 22 of the Supplement for 1956 to Agr. Handb. 91 (12).

^{78/} This is an approximate measure, derived by deflating the value data of the total food marketing bill. (Described in 3.5.2.)

so on. The other type of additions are the services involved in new convenience foods. Research on the measurement of these services is under way. 79/

The next problem is to allocate the \$24.3 billion increase in the all-food marketing bill between payments for more services and price increases. The 51 percent increase in the marketing bill in 1947-49 dollars applied to the 1941 base of \$11.5 billion yields an increase of \$5.9 billion in 1941 dollars as an approximation of costs of additional services. Parenthetically, we note that this figure can be further subdivided between the increased services required to handle the 40 percent increase in total volume of food (\$4.6 billion) and \$1.3 billion for the 11 percent increase in services resulting from additional services per unit handled. 80/

As a first approximation, the increase in payments for marketing services owing to the rise in prices is estimated at \$18.4 billion on the basis of the 105 percent increase in the index of the marketing margin of the market basket. Some of this increase reflects the general inflation in the economy; but some was probably necessary to obtain the 51 percent increase in the volume of marketing services. This total also includes (1) increased costs on the 1941 volume of services and (2) the costs of the additional services. Allocations for these services can be made by applying the 105 percent price increase first to the 1941 marketing bill of \$11.5 billion, yielding an estimate of \$12.2 billion for the increased payments on 1941 volume of services and second, to the cost of additional volume of services as derived above (\$5.9 billion in 1941 dollars), giving \$6.2 billion as the payment for the increase in volume. 81/

The results of the analysis thus far are summarized in part I B of table 4.7.

4.5.2.3. Further analysis of the problem of allocating the increased payments for marketing services between those for price and those for quantity is desirable. This problem is similar in some respects to Mills' problem of separating the contribution of labor inputs and productivity gains to an increase in output. 82/ It is also similar to the problem of allocating the shares in increased corn production between the effects of increased acreage and increased yield per acre.

The allocation of the increased payments for marketing services between the changes in p and the changes in q starts from the following facts: (1) The value of marketing services bought with all food in 1941 was \$11.5 billion (V_{41}) and \$35.8 billion in current dollars in 1955 (V_{55}). (2) The only measure of change in prices of marketing services is that indicated by the change in the marketing margin of the AMS market basket of domestic farm foods between the farm and retail levels. This increased 105 percent. The price index is indicated by P_{41} and P_{55} . (3) The only available measure of change in quantity of marketing services (Q_{41} and Q_{55}) is derived by dividing the value changes by the price index, yielding an increase of 51 percent. Accordingly, this quantity measure is not independent of the price measure.

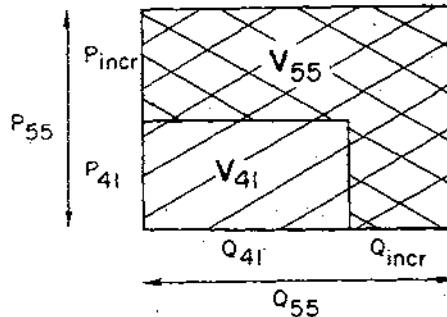
79/ First reported in Waldorf, "Indexes of Factory Production of Domestic Farm Food Products," Mktg. Transp. Sit., July 1959 (29). Additional information supplied in Waldorf, Output of Factories Processing Farm Food Products in the United States, 1909-58 (30).

80/ This calculation has been revised by the author since the publication of an analysis in an article in Jour. Am. Stat. Assn. (51).

81/ A fractional adjustment of \$0.1 billion for rounding losses was put in the price increase on 1941 volume.

82/ Note 3, pp. 31-36 of Mills Productivity and Economic Progress (64).

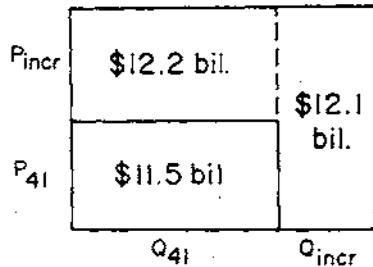
A graphic presentation of the problem is shown below:



Possibility No. 1 for Allocation.--Payments for the increased quantity of marketing services could be measured thus:

- (1) $V_{41} \times P_{incr}$ = increased outlays for 1941 volume of services
 $\$11.5 \text{ bil.} \times 105\% = \12.2 bil. 83/
- (2) $V_{incr} (\$24.3 \text{ bil.}) - \$12.2 \text{ bil.} = \$12.1 \text{ bil.}$ increased payments for more services

The difficulty with this method is that it does not allow for the higher prices paid for the increased volume of marketing services, as shown below.



Possibility No. 2.--Payments for the increased price of marketing services could be measured thus:

- (1) $V_{41} \times Q_{incr}$ = increased payments for more services
 $\$11.5 \text{ bil.} \times 51\% = \5.9 bil. in 1941 dollars
- (2) $V_{incr} (\$24.3 \text{ bil.}) - \$5.9 \text{ bil.} = \$18.4 \text{ bil.}$ for increased costs due to rise in prices, in 1955 dollars.

83/ See note 81/.

The difficulty with this procedure is that it does not allow for the fact that some of the increase in prices was due to the increased pressure of greater demand for services on available supplies of those services.

P_{incr}	\$18.4 bil.	
P_{41}	\$11.5 bil.	\$5.9 bil.
	Q_{41}	Q_{incr}

It is fairly clear that \$6.2 billion of the increase was due to the combined effects of changes in quantity and price. Because the measure of change in quantity of services is derived by use of the measure of change in their price, it is difficult to split satisfactorily the \$6.2 billion between these elements. Therefore, it may be argued that the analyst should identify the \$6.2 billion properly and note the fact that the \$5.9 billion increase for quantity is measured in 1941 dollars.

P_{incr}	\$12.2 bil.	\$6.2 bil.
P_{41}	\$11.5 bil.	\$5.9 bil.
	Q_{41}	Q_{incr}

Possibility No. 3.—This is an application of Mills' method for allocating an overall increment between two factors:

- (1) $V_{41} \times Q_{incr}$ = first approximation for share for greater quantity of marketing services

$$\$11.5 \text{ bil.} \times .51 = \$5.9 \text{ bil.}$$

- (2) $V_{41} \times P_{incr}$ = first approximation for share for higher prices for marketing services

$$\$11.5 \text{ bil.} \times 1.05 = \$12.2 \text{ bil.}$$

- (3) Component due to combination of two factors

$$\$24.3 \text{ bil.} - \$5.9 \text{ bil.} - \$12.2 \text{ bil.} = \$6.2 \text{ bil.}$$

Mills suggests that the \$6.2 billion should be divided on the basis of the relative magnitude of changes in the two factors (here the p and q).

$$Q_{41} = 1.00 = \text{index of quantity in 1941}$$

$$Q_{41} + Q_{incr} = Q_{55} = 1.51 = \text{index of quantity in 1955}$$

$$P_{41} = 1.00 = \text{index of price in 1941}$$

$$P_{41} + P_{incr} = P_{55} = 2.05 = \text{index of price in 1955}$$

$$V_{41} = P_{41}Q_{41} = 1.00 = \text{index of value in 1941}$$

$$V_{41} + V_{incr} = (Q_{41} + Q_{incr})(P_{41} + P_{incr}) = 3.11 = V_{55}$$

If assume linearity of changes in P and Q,

$$\bar{Q} = Q_{41} + \frac{Q_{incr}}{2} = 1.00 + \frac{.51}{2} = 1.255$$

$$\bar{P} = P_{41} + \frac{P_{incr}}{2} = 1.00 + \frac{1.05}{2} = 1.525$$

$$\begin{aligned} \text{Increase in price associated with increase in } Q &= Q_{incr} \left(P + \frac{P_{incr}}{2} \right) \\ &= .51 (1.525) = .7775 \end{aligned}$$

$$\begin{aligned} \text{Increase in quantity associated with increase in } P &= P_{incr} \left(Q + \frac{Q_{incr}}{2} \right) \\ &= 1.05 (1.255) = 1.31775 \end{aligned}$$

$$Q_{incr} \left(P + \frac{P_{incr}}{2} \right) + P_{incr} \left(Q + \frac{Q_{incr}}{2} \right) = P Q_{incr} + Q P_{incr} + P_{incr} Q_{incr} = V_{incr}$$

$$.7775 + 1.31775 = V_{incr} \text{ in index numbers}$$

$$2.09525 I = \$6.2 \text{ bil.}$$

$$\frac{.7775}{2.09525} + \frac{1.31775}{2.09525} = \$6.2 \text{ bil.}$$

$$.37 + .63 = \$6.2 \text{ bil.}$$

Share for Q + share for P = combined effect

$$\$2.3 \text{ bil.} + \$3.9 \text{ bil.} = \$6.2 \text{ bil.}$$

P_{incr}	\$12.2 bil.	\$3.9 bil. \$2.3
P_{41}	\$11.5 bil.	\$5.9 bil.
	Q_{41}	Q_{incr}

Although there is considerable argument for adopting the division of the \$6.2 billion worked out immediately above, a compromise is used in table 4.7 by carrying the \$6.2 billion under price and inserting reference to combined action. The desirability of this compromise stems from these facts: The quantity index has been derived by dividing the value of marketing services by the only available measure of price change for marketing service (described in 3.5.2). Thus the two measures are

not independently estimated. As noted in section 3.5.2, the price measure in turn has some deficiencies because it is not independently constructed. Finally, there is an unresolved problem in the fact that the payments for higher prices are necessarily measured in terms of 1955 dollars, whereas the payments for increased quantity are in 1941 dollars. There appears to be no neat solution to this problem. But it does call for increased awareness on the part of the analyst who develops and uses such measures.

4.5.3. Procedure for Analysis by Economic and Social Factor

Another objective of macroeconomic analysis in the food sector is to measure effects of major economic and social factors. The results of such an analysis are summarized in part II of table 4.7.

4.5.3.1. Price.--Here the costs of price increases measured in part I are summarized. These reflect both the general rise in the price level and extra costs involved in obtaining the increased quantity and quality of food and of marketing services. The \$30 billion total increase in 1955 dollars for higher prices represents about a 100-percent increase on the \$21.2 billion base for 1941 plus the \$8.7 billion direct increase in 1941 dollars for greater quantity and quality of food and services. The BLS urban retail price index for food at home rose 110 percent from 1941 to 1955. During the same period, prices of nonfood goods and services increased 63 percent, according to the BLS urban retail price data. The allocation of the \$30 billion total between (1) change in purchasing power of the dollar and (2) payments necessary to get increased quantity and quality of food and marketing services must be left to future analysis.

4.5.3.2. Nonprice Factors.--The effect of the increase in population can be measured simply by applying the 23 percent increase in the civilian population to the 1941 bases for productive resources and for marketing services.

The effect of changes in income has been measured by means of the reweighting procedure described in 4.3.3.3. The survey data on market value of all food at home and away from home reweighted by alternative income and urbanization distributions give a range of 8 to 9 percent for changes in income, no change for urbanization, and 10 to 11 percent for changes in patterns of market value at each income level. Using the ratio of these ranges, we may allocate 45 percent to income and 55 percent to change in patterns. Application of the 45 percent to the \$3.8 billion residual after taking out the effects of changes in price and population leaves a \$1.7 billion total increase for income change. This must in turn be subdivided between the effect on quantity and quality of food and that on marketing services.

Calculation of the effect of the increase in income on food per se involves the following steps:

(1) The index of per capita use of farm foods and fish shows a 4 percent increase from 1941 to 1955. Applying this increase to the \$9.7 billion base for 1941 plus the \$2.2 billion cost in 1941 dollars for supplying the 1941 per capita volume of food to the increase in the population, we obtain \$0.5 billion as the cost for the increased quantity and quality of food alone due to higher incomes.

(2) In part I, the total increase for quantity and quality of food is indicated to be \$2.6 billion for domestic farm foods and \$0.2 billion for imported foods and fishery products. The cost of supplying the same average quantity per person as in

1941 to the increase in population amounted to \$2.2 billion. Subtracting \$2.2 billion from \$2.8 billion leaves only \$0.6 billion for an increase in the total due to higher incomes or changes in patterns of expenditures. It is safe to conclude that practically all of this may be allocated to the income change.

The effect of higher incomes on payments for marketing services is figured as a residual. From the \$1.7 billion total for food and services, we subtract \$0.5 billion to obtain \$1.2 billion as a measure of how the rise in incomes reacted on payments for marketing services (measured in 1941 dollars).

The effect of the changes in the relationships of average market value of all food to income is calculated as a residual:

\$3.8 billion - \$1.7 billion for income = \$2.1 billion for change
in relationships to income.

Practically none of this total can be attributed to payments for more food, since the change in income accounted for almost all of the increase in consumption of food per se. The \$2.1 billion must be attributed to more marketing services.

Elsewhere in this analysis it was noted that the quantity of food per capita that moved through commercial channels was 14 percent greater in 1955 than in 1941. Of the 14 percent, about 9 percent was accounted for in decreased home production of farm foods. ^{84/} Applying this 9/14 ratio to the \$4.6 billion total payments to handle the increased flow of food (shown under I B in the table) a figure of \$2.9 billion is obtained. This is higher than the \$2.1 billion residual -- it is obvious that the decrease in home production accounted for all of the change in the relationships between income and market value of food. The differential between the \$2.9 billion and \$2.1 billion can be attributed to the change in home production, largely the result of higher incomes in the later period. Thus it was part of the preceding \$1.2 billion figure in the table, representing the effect of increased income on the payments for marketing services.

^{84/} The value aggregates from the supply-utilization index provide the best set of data for studying changes in civilian use of food per se. For this handbook the aggregate for U. S. civilian food was subdivided into purchased foods and those home-produced. If the 1941 proportion purchased by civilians had held for 1955, the quantity of food purchased per person would have been about 9 percent less than actually occurred.

Appendix A. COMPARISON OF HOUSEHOLD SURVEY AND TIME-SERIES COMMODITY COVERAGE

Table A.1.—Comparison of divergent classifications of commodities in the 1955 Household Food Survey Reports 1-5, primary distribution categories and retail summary table for annual per capita food consumption data

Used at home as reported in Survey Reports No. 1-5 1/	Annual per capita civilian consumption data 2/	
	Primary distribution basis as in tables 8-26 of Agr. Handb. 62	Summary food groups on retail weight basis as in table 35 of Agr. Handb. 62
Table 5.— Summary measures of milk, cream, ice cream, cheese Fluid milk equiv. based on calcium content (excluding butter) Milk fat (excluding butter) } Milk solids-not-fat }	All dairy products combined in terms of fluid whole milk on a fat content basis. 3/ Same basis as survey except includes butter. 3/	Same basis as survey. 3/ Not shown.
Table 6.— Milk, cream, ice cream, cheese Includes weight of chocolate in drink and cocoa in dry cocoa mixes, and fruit etc., in ice cream; excludes sherbet, ices.	Fluid milk and cream measured at farm or distributor level on a fluid milk equivalent basis; other items in terms of product weight: (see table 31 for complete list of minor dairy products). 3/	Differs from primary distribution basis in that fluid milk and fluid cream are shown separately—cream in terms of 25% fat content equivalent (here half and half is considered to be cream). Ice cream is shown in terms of milk and cream used (see table 9 for product weight) to avoid duplication with fruits, sugar, etc.
Table 7.— Fats and oils Includes ingredients other than fats and oils in salad dressing, mayonnaise, and sandwich spread.	Measured at processing level. 3/	Same as primary distribution basis except includes fat pork cuts.
Table 8.— Flour and cereal products Includes all ingredients of prepared flour mixes, noodles, and ready-to-eat breakfast cereals. Includes popcorn, tapioca, potato flour and soya flour.	Grain products (excl. corn sugar and sirup) measured at milling or processing level. 3/ Excludes all non-grain material except small amounts of sweetener or flavoring in breakfast cereals and infant foods. Barley expressed in terms of malt equivalent. Excludes popcorn, soya flour, and tapioca. Potato flour in the potato figures.	Same as primary distribution basis. Soya flour included with dry beans and peas on product weight basis.
Table 9.— Bakery products, commercial	No comparable series. Ingredients of mixed foods are included in their respective basic food groups.	
Table 10.— Meat, poultry, fish Includes the non-meat ingredients in luncheon meats, sausage, etc. These items purchased in a variety of forms.	Meat — measured at the slaughter level and expressed in terms of carcass weight, which excludes edible offal. Fish — market weights converted to edible weight. Poultry — slaughter weight converted to ready-to-cook basis. Excludes edible offal and game.	Same as primary distribution basis for fish and poultry. Meat converted to "fresh retail cut" equivalent using constant conversion factors for all years. Fat cuts of pork included with fats and oils. Includes edible offal and game.
Table 11.— Eggs Data given in dozens of assorted sizes.	Measured at the farm level. Data expressed in number of eggs. 3/	Primary distribution data converted to retail weights using constant loss factor (except in war period when breakage was considered slightly higher). Poundage derived using constant factor of 1.5 pounds per dozen 1909-1946, increasing thereafter to allow for larger size eggs in recent years.
Table 12.— Sugar, sweets Excludes chocolate sirup. Includes all ingredients of jams, jellies, candy, and fruit, butterscotch and caramel sirups.	Sugars and sirups 3/ — Beet and cane sugar, measured at the refining level, is expressed as granulated sugar, but because amounts of powdered and brown sugars reported in the survey are small, no significant difference is noted.	Same as primary distribution basis except excludes duplication of sugars and sirups used in the processed foods and given elsewhere in this set of statistics (e.g., canned fruits and vegetables, condensed milk, etc.).
Table 13.— Potatoes, sweetpotatoes Includes product weight of chips and sticks.	Measured at farm level. Canned and frozen potatoes and sweetpotatoes reported in the vegetable tables; chips and sticks and dehydrated potatoes included on a fresh weight equivalent with the fresh category. Excludes quantities produced in home gardens.	"Fresh" converted to retail weight by use of constant conversion factors; canned and frozen same as primary distribution basis. Includes quantities produced in home gardens.
Table 14.— Fresh vegetables Home canned and home frozen vegetables included on product weight basis. Includes sauerkraut, not canned, and horseradish.	Measured at farm level. Excludes quantities from home gardens. Sauerkraut and horseradish excluded. Melons, also given in the tables, being a truck crop.	Farm weights converted to approximate retail weights by use of constant conversion factors for individual items. Includes quantities from home gardens. Sauerkraut and horseradish excluded.
Table 15.— Fresh fruit Home canned and home frozen included on product weight basis.	Measured at farm level. Excludes all home produced fruits and since 1934 apples grown in noncommercial areas of the United States. Excludes melons and minor fruits and berries.	Farm weight converted to approximate retail weights by use of constant conversion factors for individual items. Includes apples grown in noncommercial areas, and melons, but excludes all fruit produced in home gardens or grown wild and minor fruits and berries.
Table 16.— Commercially frozen fruits and vegetables Excludes frozen fruit juices and potatoes.	Includes frozen fruit juices and fruit ades and potatoes. 3/	Same as primary distribution basis except excludes potatoes and includes frozen citrus juices on single strength basis. 3/

Continued -

Appendix A. COMPARISON OF HOUSEHOLD SURVEY AND TIME-SERIES COMMODITY COVERAGE - Continued

Table A.1.-Comparison of divergent classifications of commodities in the 1955 Household Food Survey Reports 1-5, primary distribution categories and retail summary table for annual per capita food consumption data -Continued

Used at home as reported in Survey Reports No. 1-5 ^{1/}	Annual per capita civilian consumption data ^{2/} Primary distribution basis as in tables 8-26 of Agr. Handb. 62	Summary food groups on retail weight basis as in table 38 of Agr. Handb. 62
Table 17.- Commercially canned fruits and vegetables Excludes bulk sauerkraut, tomato catsup, chili sauce, etc. and pickles, olives, and relishes. ^{3/} Includes baby food and baked beans and mature peas.	Includes all sauerkraut; excludes minor canned fruits, baby foods, baked beans, and canned mature peas. ^{3/} (Baby food shown as separate category and baked beans and canned mature peas included with dry beans and peas in terms of their dry equivalents.)	Same as primary distribution basis, except fruit and vegetable baby foods and all canned soups are included. ^{4/}
Table 18.- Fruit and vegetable juices Canned fruit and vegetable juice data include home-canned and -frozen juices. Frozen concentrated juice data exclude frozen ades (e.g. lemonade).	Data for juices reported in the tables on canned fruit juices, canned vegetables, and frozen fruit. Includes only commercially produced canned fruit and vegetable juice. Concentrated frozen fruit ades are included. ^{3/}	Same as primary distribution basis. ^{4/}
Table 19.- Dried fruits and vegetables. Excludes canned baked beans and canned mature peas.	<u>Dried beans and peas</u> Measured at farm level, on a cleaned basis. Includes dry bean equivalent of canned baked beans; excludes quantities produced in non-farm gardens. <u>Dried fruit</u> measured at the packer level.	Same as primary distribution basis except includes quantities of dry beans and peas produced in all home gardens and soya flour on product weight basis. Dried fruit is shown with fruits.
Table 20.- Beverages Coffee, tea, chocolate and cocoa Coffee includes coffee substitute. Ingredients of chocolate syrup included.	Measured at the import level. Coffee in terms of green beans; chocolate and products in terms of cocoa beans. ^{3/}	Coffee converted to roasted equivalent, cocoa beans to chocolate liquor.
Soft drinks, bottled, canned and powdered and fruit ade other than frozen.	No comparable series. Ingredients included in their respective basic food groups.	
Frozen fruit ade	Frozen lemonade, etc. included with frozen fruit juices.	Same as primary distribution basis.
Alcoholic beverages (no quantity data collected)	Not classified as a food; ingredients not included.	
Table 21.- Miscellaneous foods		
Nuts and peanut butter	Peanut butter included in shelled peanut equivalent. ^{3/}	Same as primary distribution basis, included in dry bean, pea, nut category.
Soups, including home canned and dehydrated and frozen	Commercially canned only.	Same as primary distribution basis, included with canned vegetables.
Catsup, chili sauce, etc. Pickles, olives, relishes (both include home made products)	Commercial only. Tomato products, pickles and relishes included in canned vegetable data, olives in canned fruit data.	Same as primary distribution basis.
Puddings, pie fillings, icing mix, fudge mix, and mixtures other than baby food, prepared or partially prepared	No comparable series, ingredients included in basic food groups.	
Strained canned pudding (baby) Baby and junior foods, mixed, prepared or partially prepared.	Included with baby food in a separate category, "canned baby food."	Excluded. Ingredients included in basic food groups.
Sherbets, ices	Included with dairy products.	Same as primary distribution basis.
Leavening agents (yeast, baking powder, cream of tartar, soda)	No series available.	No series available.
Seasonings (vinegar, salt, spices, extract, flavors, flavoring sauces, meat tenderizer)	Data on spices only, measured at import level.	Not included.

^{1/} Quantities consumed at home per household; product weight. Unless otherwise noted, excludes quantities in mixed foods. Table numbers shown refer to tables in each of the 5 reports (44). ^{2/} As published in Agr. Handb. 62; Consumption of Food in the United States (6); includes all use away from home. Items on primary distribution basis are annual averages for the United States, measured at whatever level data are available, derived as a residual from data on production, stocks, foreign trade, and military takings, and include quantities used in producing mixed foods such as bakery products. Retail weight data are derived from primary distribution data using various loss factors or making other adjustments such as those to avoid duplication with other foods listed. Reference to tables are those in Agr. Handb. 62. ^{3/} Includes quantities used in mixed foods, such as bakery products, salad dressings, soft drinks, etc. ^{4/} In table 38 of Agr. Handb. 62 the fruits and vegetables are in 3 nutritional groupings: Citrus fruit and tomatoes; leafy green and yellow vegetables; and other vegetables and fruit. ^{5/} As shown in table 21 - Miscellaneous foods, tomato catsup, chili sauce, etc. and pickles and relishes do not separate data for commercial and home canned items.

Appendix B. PROCEDURE USED IN ESTIMATING MARKET VALUE OF ALL FOOD AND SOME BY-PRODUCT DATA

The procedure used in estimating the new series on market value for all food is described here in detail because it is not yet available in any of the statistical handbooks on food consumption. This appendix elaborates the brief description of the procedure given in 3.4.3.

B.1. Market Value of All Foods

B.1.1. The statistical series that measures the market value of all foods is based on the data on retail cost of farm foods sold to U. S. civilians, described in 3.3.2; but with several adjustments.

B.1.2. The first of the adjustments is the addition of the farm value of the farm and nonfarm consumption of home-produced foods (3.2.1.4). The value of home production by farm families is regularly derived as part of the AMS work on gross farm income [described on pages 15-16 of volume 3 of Agr. Handb. 118 (24)]. The quantities of food produced by farmers for their own use are estimated for most foods by the Crop Reporting Board. These data are supplemented by estimates of vegetable production prepared by this author and by estimates for some minor commodities made by the Farm Income Branch, AMS. The quantities of individual foods are valued at prices received by farmers for such foods in each year. For nonfarm home production, the quantities of livestock products home produced are estimated by the Crop Reporting Board. The estimates for vegetables are described on page 46 of volume 5 of Agr. Handb. 118 (24). These quantities for individual food groups produced by nonfarm families were compared with the quantities farm home-produced. Then the ratios were applied to the values of farm home-production for each commodity group to derive total values.

B.1.3. The second adjustment is the addition of the retail value of imported food (described in 3.3.3), estimated as follows. First, the retail values of coffee, tea, bananas and pineapples are calculated using the total quantities consumed by civilians and BLS prices at retail. Next, the retail value of imported sugar consumed by civilians is determined by estimating its retail value if all were bought as such, then making an allowance for extra costs of sugar in processed forms. The allowance for the higher cost of sugar in processed foods is made according to the relationships in table 41 of Agr. Handb. 62 (6). The third step is the tabulation of the import value of these major items and of all other items (except fish) from the Census trade reports. Adjustment is also made to exclude military takings and nonfood use. Also, estimates are added for the value of inshipments of sugar and pineapple from Hawaii, based on the quantities derived from trade data and sugar control data and the import price for each year derived from data for Puerto Rico. The final steps are the comparison of the import value of the major items with their retail value and the application of this ratio to the import value of all foods for civilian use.

B.1.4. The third series added is the retail value of fishery products. These data are based in the first instance on the retail values per capita of fishery products consumed in each year in 1947-49 prices which are derived in the estimation of the index of per capita food consumption. The per capita values are multiplied by the civilian population and then adjusted from the 1947-49 price level to current prices for each year, using the changes in prices indicated by the Bureau of Labor Statistics data for the meat, poultry and fish group at retail and for wholesale fish.

B.1.5. The fourth adjustment in the derivation of the market value of all foods is the allowance for the cost of marketing services in the preparation and serving of meals and snacks by eating places. This represents the difference between the retail value of food and the meal values. Derivation of this eating place markup requires the estimation of the market value of all meals and snacks served by eating places. This is developed in sections.

B.1.5.1. One section is meals and snacks sold by eating places other than boarding houses. This set of data is based primarily on the Commerce series for on-premise sales of meals and beverages (including taxes and tips) and unpublished data of the National Income Division of the Department of Commerce on nonconsumer purchases of food and beverages. From the total of these two series are deducted the Commerce estimates of taxes and tips on meals and beverages and the estimates by this author on on-premise sales of alcoholic beverages. (The approximate part of total sales of alcoholic beverages sold as drinks by eating places is based on 1939 and 1948 Census of Business benchmark data (18), trends in sales of drinking places, and some trade data.) This computation yields the market value of meals sold by eating places except boarding houses. The wholesale value of such meals is derived using 47 to 50 percent of meal sales. Then the retail value of food in such meals is approximated by applying the estimated retail store markup over food cost (supplied by the Marketing Economics Research Division). This retail value of meals sold is compared with the market value of meals sold to derive the markup over retail on meals sold by eating places other than boarding houses.

B.1.5.2. A series of values of meals sold by boarding houses, which must be regarded as only rough approximations, has been estimated by the author using information from consumer surveys in 1941 and 1950 and the estimated size of the nonhouse-keeping population, exclusive of permanent institutional residents. The markup of meal value over retail is estimated to be 20 percent.

B.1.5.3. The next section is the estimation of the markup over retail value on meals furnished. This is derived in two parts. The food furnished civilian employees includes meals supplied to employees of eating places and to employees of institutions, hospitals, and nonfood service establishments. No allowance for the costs of preparing meals furnished employees of those eating places selling their meals should be included because these costs form part of the markup on meals sold. Meal preparation and overhead costs for meals furnished employees for institutions, hospitals, and non-food service establishments are estimated to be 10 percent of the total value of all food furnished civilian employees, a series based on unpublished data supplied by the National Income Division of the Department of Commerce. Estimates of the value of meals furnished travelers and institutional inmates are also based on unpublished Commerce data on the wholesale value of food going into such meals. A 20 percent markup for meal value over retail is used.

The total eating place markup over retail is the sum of the markups on meals sold by eating places other than boarding houses, on meals sold by boarding houses, and on meals furnished employees and travelers and institutional inmates.

B.1.6. The final step in the derivation of the estimates of the market value of all food is a subtraction of estimated costs of farm-to-retail marketing services which are not incurred because the food is sold by producers and distributors directly to consumers. This series is estimated from some rather extensive benchmark data for commodity groups developed from the Censuses of Distribution and of Manufactures for 1929, 1939, and 1948 described in the article, "Distribution of the Food Supply of the United States," Agr. Econ. Res. July 1952 (49), and some Crop Reporting Board data on direct sales of milk to consumers and special surveys of farmers' marketings of fresh produce and poultry and eggs.

B.1.7. The sum of the retail cost of farm foods sold, the farm value of all home-produced foods, the retail value of imported food and of fishery products, and the total eating place markup over retail minus an allowance for farm-to-retail costs of marketing services not incurred yields the market value series for all food (TFV-10) given in table 3.5. These data have been checked extensively with other series of estimates described in 3.4.1 and 3.4.2, as well as estimates derived from Census data for 1939 and 1948, described in the 1952 article on distribution of the U. S. food supply.

Data used in deriving the market value for all foods also form the basis for the estimates of the market value of domestically produced farm foods (TFV-12a described in 3.4.3.2) and the matching food expenditure series for all food (TFV-11b) and for farm foods only (TFV-13b).

Other by-products of this estimating procedure are a number of subseries which are described in the next section.

B.2. Retail Value of All Foods Subdivided by Channel

B.2.1. In table 3.4 the retail value of foods used by civilians is tabulated according to the sources of supplies. Some additional subseries of retail value derived in the process of estimating the market value of all food provide approximate measures of the retail value of food sold as food and that sold or furnished as meals. Also, there is the retail value series for home-produced food (TFV-7 in table 3.4), described in 3.3.3.

B.2.2. The retail value of food handled by eating places is estimated in order to derive the markups over retail for meals sold and furnished. The critical elements in the derivation of the subseries on meals sold by eating places other than boarding houses, shown in table B.1, are, first, the estimation of the breakdown of alcoholic beverages between on-premise and off-premise sales and, second, the size of the markups of meal values over retail values and over wholesale food costs. For the breakdown of the alcoholic beverage data, benchmarks were used to set the level, but the year-to-year changes are mere approximations although the general direction is believed to be correct. The markup estimates are based on some trade data and on the findings of a pilot study of eating places in Minneapolis and Fairmont, Minnesota, reported in Mktg. Res. Rept. 3 (68).

B.2.3. The boarding house series is certainly only a series of rough approximations, but it seems wiser to use such a series than to ignore boarding houses completely.

B.2.4. Estimates of sales of candy and of other foods by eating places to consumers for off-premise consumption are based on benchmark data from the Censuses of Distribution (18) in 1939 and 1948 and on household survey data for 1950. The 1954 Census provides no breakdown of sales by commodity line.

B.2.5. These subseries of the retail value of food handled by eating places have been checked with earlier estimates based on the Censuses. There have been some minor changes in definitions and in approximations made to represent missing data. However, the results are substantially the same as those reported in the article, "Distribution of the Food Supply of the United States" (49).

B.2.6. No breakdown of total food handled by eating places into commodity groups is possible because of complete lack of data.

B.2.7. The retail value of food sold or purchased as food products, given in table B.1, is estimated as a residual. It represents the total of the retail values of farm foods sold (TFV-6) and of imported foods and fish (TFV-8) from table 3.4 minus the retail value of food handled by all eating places.

B.3. Market Value of All Food Handled by Eating Places

Several sets of data on market value for food handled by eating places which were developed in the procedures described above have been assembled in table B.2. These provide some approximations of the market or sales value of all food handled by eating places. The estimation of these series involves most of the critical elements set forth in the preceding section on retail value of food handled by eating places. Therefore, these sets of data must be considered as approximations. More reliable estimates cannot be developed until comprehensive surveys of eating places are made.

Table B.1.--Approximations of retail values of flows of food through several channels to civilian consumers ^{1/}

Year	Retail value of food products of home-produced food		Meals sold by eating places except board-ing houses		Meals furnished to employees, travelers, inmates		Sales of candy, etc. for off-premise consumption		Total Value	Percent of total retail value of all food
	Bil. dol.	Bil. dol.	Bil. dol.	Bil. dol.	Bil. dol.	Bil. dol.	Bil. dol.	Bil. dol.	Pct.	Bil. dol.
1929	4.4	17.0	1.9	0.5	0.5	0.2	3.1	12.7	24.5	
1930	4.3	16.0	1.8	.5	.5	.2	3.0	12.9	23.3	
1931	3.7	12.7	1.6	.5	.5	.2	2.8	14.6	19.2	
1932	3.1	10.3	1.4	.4	.3	.1	2.2	14.1	15.6	
1933	3.1	10.8	1.0	.4	.3	.1	1.8	11.5	15.7	
1934	3.2	12.8	.9	.4	.3	.1	1.7	9.6	17.7	
1935	3.5	13.6	.8	.4	.3	.1	1.6	8.6	18.7	
1936	3.6	14.9	.9	.4	.4	.1	1.8	8.9	20.3	
1937	3.6	14.3	1.1	.4	.6	.2	2.3	11.4	20.2	
1938	3.3	13.1	1.1	.4	.7	.3	2.5	13.2	18.9	
1939	3.3	12.9	1.2	.5	.7	.3	2.7	14.3	18.9	
1940	3.2	13.6	1.3	.5	.6	.3	2.7	13.8	19.5	
1941	3.5	15.8	1.6	.5	.7	.3	3.1	13.8	22.4	
1942	4.1	18.5	1.8	.5	.9	.4	3.6	13.7	26.2	
1943	5.3	20.1	2.6	.5	1.0	.4	4.5	15.1	29.9	
1944	5.2	20.3	3.0	.5	1.0	.4	4.9	16.1	30.4	
1945	5.6	21.2	3.6	.5	1.2	.4	5.7	17.5	32.5	
1946	5.9	27.6	4.2	.5	1.3	.6	6.6	16.5	40.1	
1947	6.1	34.4	4.7	.5	1.4	.7	7.3	15.3	47.8	
1948	6.2	36.8	5.2	.6	1.4	.7	7.9	15.5	50.9	
1949	5.5	35.8	5.2	.5	1.4	.6	7.7	15.7	49.0	
1950	6.0	37.3	5.2	.4	1.5	.6	7.7	15.4	50.0	
1951	5.5	41.4	5.9	.4	1.6	.6	8.5	15.3	55.4	
1952	5.6	42.9	6.2	.3	1.7	.6	8.8	15.4	57.3	
1953	5.4	43.0	6.4	.3	1.7	.7	9.1	15.8	57.5	
1954	4.9	43.5	6.6	.2	1.7	.7	9.2	16.0	57.6	
1955	4.8	44.3	6.9	.2	1.7	.8	9.6	16.4	58.7	
1956	4.9	46.2	7.4	.2	1.8	.8	10.2	16.6	61.3	
1957	4.8	48.1	7.9	.2	1.8	.8	10.7	16.8	63.6	
1958	4.8	50.4	8.0	.1	1.9	.8	10.7	16.4	66.0	
1959 ^{2/}	4.9	50.3	8.5	.1	1.9	.8	11.4	17.1	66.7	

^{1/} Described in section B.2.

^{2/} Preliminary.

Table B.2.--Summary of approximate market values of all food handled by eating places ^{1/}

Year	Market value of meals sold			Sales of candy, etc. by eating places for off-premise consumption	Market value of meals furnished	Total market value of all food handled by eating places
	Eating places excluding boarding houses	Boarding houses	Total			
	Billions of dollars	Billions of dollars	Billions of dollars	Billions of dollars	Billions of dollars	Billions of dollars
1929	3.0	0.6	3.6	0.2	0.6	4.4
1930	2.9	.6	3.5	.2	.6	4.3
1931	2.6	.6	3.2	.2	.5	3.9
1932	2.2	.6	2.7	.1	.3	3.2
1933	1.6	.5	2.1	.1	.3	2.5
1934	1.3	.5	1.8	.1	.4	2.3
1935	1.3	.5	1.8	.1	.4	2.3
1936	1.4	.5	1.9	.1	.5	2.5
1937	1.7	.5	2.2	.2	.6	3.1
1938	1.8	.6	2.3	.3	.7	3.4
1939	2.0	.6	2.6	.3	.7	3.6
1940	2.1	.6	2.7	.3	.7	3.8
1941	2.6	.6	3.2	.3	.8	4.3
1942	3.0	.6	3.6	.4	1.0	5.0
1943	4.2	.6	4.8	.4	1.1	6.3
1944	4.8	.6	5.4	.4	1.1	6.9
1945	5.8	.7	6.5	.4	1.3	8.2
1946	6.9	.7	7.5	.6	1.4	9.5
1947	7.5	.7	8.2	.7	1.5	10.4
1948	8.2	.7	8.9	.7	1.6	11.2
1949	8.2	.6	8.8	.6	1.6	11.0
1950	8.3	.5	8.8	.6	1.6	11.0
1951	9.5	.4	9.9	.6	1.8	12.3
1952	9.8	.4	10.2	.6	1.9	12.7
1953	10.2	.4	10.5	.7	1.9	13.1
1954	10.4	.3	10.7	.7	1.9	13.3
1955	11.0	.2	11.2	.8	1.9	13.9
1956	11.8	.2	12.0	.8	2.0	14.8
1957	12.5	.2	12.7	.8	2.1	15.6
1958	12.6	.2	12.8	.8	2.1	15.7
1959 ^{2/}	13.4	.2	13.6	.8	2.2	16.6

^{1/} See description of sources of data and methodology in section B.1.5 and discussion of critical elements in B.2.2.4. Totals derived from unrounded data.

^{2/} Preliminary.

Appendix C. CHECKS ON 1955 SURVEY DATA AND GUIDES FOR
COMPARISON WITH OTHER DATA 85/

C.1. Checks on the Level of Food Consumption Indicated
by the 1955 Survey

A variety of checks on the overall dollar figures, on overall measures of per capita food consumption, and on quantities of major foods consumed have been made. Before going into the findings, these facts need emphasis: A range of error is to be expected in these survey data as well as in the aggregate figures for food expenditures and food disappearance. Neither set of data proves or disproves the validity or accuracy of the other.

In brief, these are the findings to date:

1. The survey data on market value of all farm food commodities consumed, adjusted to United States aggregates for the year, are 5 or 6 percent higher than the AMS estimates of the market value of all farm foods and meals consumed by the civilian population. About half of the difference arises from the disparity between the amount of home food production as estimated for the disappearance data and that reported by housekeeping households, both for a week of spring 1955 and for the year 1954.

2. A comparable degree of difference was found between the overall level of use per person of farm food commodities by the sample of housekeeping households in a week of spring 1955 and the level indicated by the index of per capita use of farm foods in the year 1955. Again, about half of the difference arose from the estimation of home production. The small discrepancy remaining seems to indicate that seasonal variations for individual foods balance out in the total for all foods.

3. Among commodities, there is wider variation between averages computed from survey data for the housekeeping population's use of food at home and those derived from disappearance data. Average use of sugar at home in all forms, adjusted to a yearly total from the survey data, was much lower than average annual per capita consumption. But use at home excludes all the candy, soft drinks, and desserts consumed away from home.

At the other extreme, survey data on eggs appear to average substantially higher than AMS estimates of per capita consumption. The procedure by which equivalent persons are calculated apparently leads to upward or downward bias for foods consumed primarily at one meal of the day. 86/ When allowance is made for seasonal variations in food consumption, the survey data for meats and for fats and oils were found to be close to the levels indicated by annual per capita consumption data. Study of data for other commodities is still in progress.

For individual commodities and farm consumption of home-produced foods, analysts working with survey data will frequently face the problem of seasonality of supplies and of consumption. Reference to seasonal analyses in earlier household surveys 87/, quarterly disappearance data for some foods, carlot shipment and trade

85/ Extracted from the article, "Use of 1955 Food Survey Data for Research in Agricultural Economics," by Marguerite C. Burk and Thomas J. Lanahan, Jr. Agr. Econ. Res., July 1958 (53). (See 3.7.4.4 and 3.7.7.4.)

86/ See Burk, Marguerite C., "Introduction to 1955 Household Survey Data on Eggs." Poultry and Egg Sit., May 1957. Pp. 13-19 (50).

87/ Agr. Inf. Bul. 132, pp. 9-10 and 102-103 (33).

data helps one to understand such variations and to develop necessary adjustments. Fortunately, the spring of 1955 was remarkably "normal" in both supplies and prices for most foods.

C.2. Guides for Comparison of Data from the 1955 Household Food Survey With Other Sets of Data

Household food surveys provide statistics on variations in food consumption that lie behind the U. S. annual averages. Comparisons of averages from survey data with AMS data on annual per capita civilian consumption are informative, provided proper attention is paid to difference in classification, in level of distribution, and in universe covered. Even though the commodity details in 1955 Survey Reports 1 to 5 (44) were organized along marketing lines, there are many variations from the classifications and specifications used in the annual consumption data. A key to these differences in classification is provided in appendix A.

In addition to regroupings, a variety of adjustments must be made to convert the retail-product weights of the survey data to weights appropriate to the level of distribution desired for the analysis to be undertaken. ^{88/} Some of the complexities and the significance of such conversions have been discussed in chapter 2. For comparisons, particular care is needed for commodities having both "direct" consumption such as use of purchased sugar and "indirect" consumption as content of purchased prepared foods such as bakery products and candy. This problem is especially significant for sugar, flour, and fats and oils.

In working with commodity detail from the 1955 household survey data and the AMS disappearance data (annual per capita civilian consumption), it is essential to keep in mind these differences of fact: The 1955 survey data on commodities cover use of food at home in a week by housekeeping households surveyed in April to June, whereas the annual disappearance data cover the consumption of the entire civilian population at home and away from home, in eating places of all kinds, and in public and private institutions. It is not surprising, therefore, that the averages per person derived from the survey multiplied by 52 do not match the disappearance data.

The author does not have access to the A. C. Nielsen retail sales data, derived from a sample of retail food stores. But a few comments may be helpful to others who do have these data and wish to compare them with the 1955 survey data.

First, the household survey data include only the purchases (or consumption) of housekeeping households and not the food bought from retail food stores by small restaurants, boarding houses, and others in the nonhousekeeping population. The proportion of children in the housekeeping population may differ from that of the whole clientele of retail food stores.

Second, the household survey data include supplies obtained from sources other than retail food stores — department stores, local produce markets, delicatessens, milkmen, farmers, and wholesalers.

Third, the household statistics pertain to use of food in a week in a specified number of meals for a carefully identified population, whereas buyers at retail food stores are not identified directly in the process of obtaining the Nielsen sales data.

^{88/} Most of the factors needed for adjusting the data are available in Conversion Factors and Weights and Measures for Agricultural Commodities and Their Products (72).

Problems are also encountered in comparing the 1955 United States Department of Agriculture household survey data with those collected from the household panel of the Market Research Corporation of America (MRCA). (See 3.8.2.)

First, the USDA survey collected data on all foods used by the household through extended interviews by specially trained interviewers, using a detailed schedule. Although it is reported that there is a personal interview when a family joins the MRCA panel, apparently the panel members receive most of their instructions by mail and send in their records each week.

Second, the USDA household survey data pertain to use of food in a week in a specified number of meals for a carefully identified number of persons, but MRCA data pertain to purchases during the period, not use.

Third, as already indicated, the USDA survey collected data on use of all foods, whereas MRCA panel members report purchases of only specified items on the records they keep.

Fourth, the USDA sample was a self-weighting probability sample, whereas, because of dropouts, it is difficult to maintain a continuous panel on a random probability basis, even if it is started in that way.

Fifth, the income data given in the 1955 food survey reports pertain to 1954 money income after payment of income taxes, whereas the MRCA data refer to income before taxes and usually are not shown in dollars or in much detail.

Appendix D. CROSS-SECTION INDEXES OF PER PERSON FOOD CONSUMPTION

D.1. Cross-Section Indexes of Food Use of Farm Commodities Per Person in Spring 1955 ^{89/}

The cross-section indexes of food use of farm commodities per person in 1955 measure variations in the quantities of farm food commodities consumed, from all sources (CFQ-1a) and from purchased supplies only (CFQ-1b), among households grouped by income within urbanizations and regions. These cross-section measures match the time-series indexes of per capita food use of farm commodities, combined in terms of farm level values at 1947-49 prices. (PFQ-1a and PFQ-1b.) ^{90/} Purchased foods in the cross-section indexes exclude food received as gifts and payments-in-kind whereas the time-series index for use of purchased farm foods excludes only home-produced foods.

Table 3.13 carries the indexes for U. S. households subdivided by urbanization and income. The overall indexes for farm foods from all sources and the subindexes by commodity group for the U. S. are in table D.1. Comparable indexes for purchased farm foods are in table D.2. ^{91/}

D.1.1. Data Used

Information on the quantities of individual foods consumed per household, in retail weights, was taken from the statistics published in Survey Reports 1-5 (⁴⁴) on the 1955 Survey of Household Food Consumption and from unpublished supplementary tabulations. They pertained to consumption of food at home from all sources and from purchased supplies only by housekeeping households in a week of April-June 1955. The fresh commodities were converted from retail to farm or primary distribution weights by means of the factors given in table 27 of Agr. Handb. 62 (⁶). The content of individual farm commodities in processed mixed foods was estimated and combined with the primary processed items -- for example, the flour content of bread with flour bought as such. The principal source of these factors to derive the commodity content was Conversion Factors and Weights and Measures for Agricultural Commodities and their Products (⁷²). But some came from unpublished data on food composition of the Institute of Home Economics, and others were estimated by comparing census and trade data on materials used with comparable data on products manufactured.

The prices used with the quantities of individual foods to derive farm value aggregates were the average farm prices for 1947-49 used in the calculations of the index of supply-utilization. These farm prices could be applied directly to the quantities of each "fresh" commodity, but calculation of farm values of processed foods required an intermediate step. Processed items such as flour had to be valued first at average 1947-49 wholesale prices (as in the procedure for the supply-utilization index). From this wholesale value the equivalent farm value was derived by applying the 1955 ratio of the farm value of the commodity processed to the total wholesale value of the products of a given farm commodity as developed for the supply-utilization index, (e.g., the farm value of wheat processed in 1955 in terms of 1947-49 farm prices to the total wholesale value of flour, cereals, and mill feeds in 1955 valued at their 1947-49 wholesale prices).

^{89/} By Leva C. Taylor, Economic and Statistical Analysis Division.

^{90/} The time-series measures are described in 3.1.2.2.

^{91/} Matching regional indexes were published in the National Food Situation, July 1959 (³⁵).

Table D.1.--UNITED STATES: Cross-section indexes of per person food use (farm level, all sources) for major commodity groups, by urbanization and family income, 1955 1/

(Index: U. S. all household average = 100)

Urbanization and income groups (dollars)	Livestock						Crops						
	All food 2/	Meat ani- mals 3/	Poul- try	Eggs	Dairy: prod- ucts 4/	All live- stock 5/	Grains	Oil crops 6/	Sugar crops	Fruits	Vege- tables 7/	Pota- toes: and sweet- pota- toes	All crops 8/
ALL URBANIZATIONS													
All households	100	100	100	100	100	100	100	100	100	100	100	100	100
Households of 2 or more persons	100	100	99	99	100	100	99	101	101	100	99	101	100
Under 2,000	84	78	89	91	85	83	131	72	102	73	81	91	88
2 - 3,000	94	95	90	95	91	94	110	95	100	89	91	102	96
3 - 4,000	96	96	89	98	95	95	99	108	103	94	94	106	97
4 - 5,000	101	103	95	99	104	102	92	112	100	100	97	103	99
5 - 6,000	105	108	110	101	105	107	92	111	99	108	101	98	102
6 - 8,000	109	110	113	105	107	109	88	112	102	117	109	104	107
8 - 10,000	109	108	111	108	111	109	81	112	104	124	112	94	109
10,000 and over:	117	116	131	117	121	119	81	105	98	128	132	95	114
URBAN													
All households	102	104	113	97	98	103	88	104	93	98	107	93	99
Households of 2 or more persons	101	104	112	96	98	103	86	104	93	97	106	93	98
Under 2,000	85	90	103	83	68	86	100	82	86	69	88	81	82
2 - 3,000	91	96	98	88	82	92	96	95	88	75	95	90	88
3 - 4,000	95	97	100	92	93	96	91	106	96	88	97	99	93
4 - 5,000	100	103	106	93	101	101	85	110	93	94	101	95	96
5 - 6,000	107	109	123	102	105	109	85	112	94	103	107	90	101
6 - 8,000	109	111	120	104	108	110	86	115	100	110	114	99	107
8 - 10,000	107	105	119	109	106	107	77	110	102	124	114	84	108
10,000 and over:	118	117	133	120	119	120	78	105	97	127	139	91	114
RURAL NONFARM													
All households	96	94	82	99	95	93	111	107	104	104	90	107	102
Households of 2 or more persons	95	94	81	98	95	93	111	108	103	103	88	108	101
Under 2,000	76	65	77	86	79	72	136	73	95	69	72	98	86
2 - 3,000	94	92	87	95	88	91	122	107	102	97	88	108	102
3 - 4,000	93	91	68	101	92	90	108	117	105	101	89	114	101
4 - 5,000	101	102	79	105	106	101	100	121	109	106	87	113	102
5 - 6,000	102	103	88	101	103	101	105	121	104	114	92	106	106
6 - 8,000	108	111	92	103	104	106	90	114	104	142	103	111	113
8 - 10,000	114	116	100	106	120	114	92	130	115	122	114	110	115
10,000 and over:	112	101	132	100	127	110	92	111	100	139	101	114	115
FARM													
All households	102	96	81	115	117	102	131	73	128	104	88	117	102
Households of 2 or more persons	102	96	81	114	117	101	131	73	128	104	88	116	102
Under 2,000	91	80	83	105	107	90	154	59	123	79	85	94	94
2 - 3,000	105	101	71	116	123	104	131	74	132	116	85	126	105
3 - 4,000	105	101	82	129	118	106	121	82	134	106	88	122	103
4 - 5,000	111	112	70	127	123	112	112	93	127	120	96	131	109
5 - 6,000	111	111	86	115	125	112	111	83	131	130	89	132	109
6 - 8,000	109	107	113	121	115	112	110	81	126	112	85	133	102
8 - 10,000	113	118	65	109	133	114	99	87	141	133	91	146	110
10,000 and over:	125	137	114	118	130	130	96	94	129	129	105	119	112

1/ Derived from 1955 Household Food Consumption Survey data on household use of individual foods, measured in terms of farm commodities valued at average 1947-49 farm prices. Family money income in 1954 measured after income taxes. Food from all sources differs from purchased food by the amount of food received without direct expense, mainly home-produced food. 2/ Farm foods only, excludes fish. 3/ Includes lard. 4/ Includes butter. 5/ Includes corn used for sugar and sirup. 6/ Includes all peanuts. 7/ Includes melons. 8/ Includes some commodity groups (dry beans and peas, coffee, tea, and cocoa, etc.) not shown separately.

Table D.2.--UNITED STATES: Cross section indexes of per person food use (farm level, purchased) for major commodity groups, by urbanization and family income, 1955 ^{1/}

(Index: U. S. all household average = 100)													
Urbanization and income groups (dollars)	Livestock						Crops						
	All food ^{2/}	Meat ani- mals ^{3/}	Poul- try	Eggs	Dairy: prod- ucts ^{4/}	All live- stock	Grains: ^{5/}	Oil crops ^{6/}	Sugar crops	Fruits	Vege- tables ^{7/}	Pota- toes and sweet- potatoes	All crops ^{8/}
ALL URBANIZATIONS													
All households	100	100	100	100	100	100	100	100	100	100	100	100	100
Households of 2 or more persons	100	100	99	100	100	100	100	101	100	99	99	100	99
Under 2,000	68	68	62	60	53	63	126	69	101	58	56	80	78
2 - 3,000	90	92	84	86	84	88	111	96	100	85	87	98	94
3 - 4,000	97	97	91	101	99	97	100	109	102	93	96	107	97
4 - 5,000	106	106	103	108	113	107	93	113	99	103	103	105	101
5 - 6,000	111	112	117	114	115	114	94	113	99	115	108	102	106
6 - 8,000	115	115	121	116	121	117	90	114	102	122	118	110	111
8 - 10,000	116	112	119	123	121	116	82	113	105	137	124	98	115
10,000 and over:	127	122	142	136	138	130	82	105	98	144	151	109	121
URBAN													
All households	113	113	129	117	114	116	88	106	93	112	121	101	106
Households of 2 or more persons	112	113	127	117	114	115	87	105	93	111	120	101	105
Under 2,000	92	97	112	95	76	94	100	81	85	77	95	87	87
2 - 3,000	100	105	111	104	94	103	97	96	88	85	106	98	95
3 - 4,000	106	106	115	111	109	108	93	107	96	99	110	107	100
4 - 5,000	111	112	122	114	117	114	86	112	93	107	116	102	103
5 - 6,000	118	119	138	124	122	122	87	113	94	119	120	98	108
6 - 8,000	122	121	140	124	126	125	87	116	100	127	130	107	115
8 - 10,000	120	116	132	135	124	122	78	111	97	147	133	92	117
10,000 and over:	131	127	153	144	139	135	79	105	97	148	161	100	123
RURAL NONFARM													
All households	95	96	78	98	97	94	112	108	104	93	81	106	98
Households of 2 or more persons	95	96	78	97	97	94	111	107	103	92	80	106	96
Under 2,000	67	65	60	68	59	64	134	70	95	54	46	86	77
2 - 3,000	90	91	73	82	86	87	123	105	102	90	78	101	98
3 - 4,000	93	93	69	101	93	91	109	118	105	90	81	110	97
4 - 5,000	104	104	84	115	115	106	102	122	109	95	85	113	100
5 - 6,000	107	107	91	110	114	107	106	122	104	113	94	111	106
6 - 8,000	112	115	97	117	121	115	90	115	104	120	102	119	107
8 - 10,000	122	125	118	116	133	125	93	131	115	118	120	121	116
10,000 and over:	114	103	110	110	149	114	94	112	99	130	105	127	114
FARM													
All households	57	53	25	33	47	46	125	73	126	67	46	87	82
Households of 2 or more persons	56	53	24	33	47	46	125	73	127	67	46	87	82
Under 2,000	48	48	20	21	28	37	140	59	121	46	34	68	73
2 - 3,000	58	55	23	38	47	48	128	74	131	72	45	91	84
3 - 4,000	61	54	28	40	57	50	119	83	132	72	54	96	86
4 - 5,000	63	53	27	44	67	52	112	94	126	87	57	94	90
5 - 6,000	71	67	39	44	65	61	112	83	131	99	63	101	93
6 - 8,000	66	63	32	38	69	58	109	82	126	76	57	103	86
8 - 10,000	62	51	22	38	70	50	101	88	141	91	55	98	90
10,000 and over:	89	85	67	48	99	82	98	95	130	122	92	87	105

^{1/} Derived from 1955 Household Food Consumption Survey data on household use of individual foods, measured in terms of farm commodities valued at average 1947-49 farm prices. Family money income in 1954 measured after income taxes. Food from all sources differs from purchased food by the amount of food received without direct expense, mainly home-produced food. ^{2/} Farm foods only, excludes fish. ^{3/} Includes lard. ^{4/} Includes butter. ^{5/} Includes corn used for sugar and sirup. ^{6/} Includes all peanuts. ^{7/} Includes melons. ^{8/} Includes some commodity groups (dry beans and peas, coffee, tea, and cocon, etc.) not shown separately.

Value aggregates for individual commodities were combined into commodity groups and into totals for all farm commodities, by region, urbanization, and income. Aggregates per household for a week were reduced to per person averages by dividing by the number of 21-meal equivalent persons in the average household in each classification. The average values per week were multiplied by 52 to get annual estimates.

To compare average consumption rates of groups of households with the U. S. average, indexes were computed by means of a Laspeyres type formula. Changing quantities were valued at the same commodity prices for all households. Value aggregates for the U. S. average per person for all sources and for purchased were each set at 100 and average values for groups of households were compared with the U. S. average.

D.1.2. Notes on Procedures for Major Commodity Groups

The following notes describe procedures used in handling the information for the major food groups. Each type of meat used by households reporting in the survey was treated separately. The beef content of luncheon meats and other meat food mixtures was derived by applying to their product weights pertinent factors from Conversion Factors and Weights and Measures for Agricultural Commodities and Their Products. Offal was reported for all meats together. Beef offal was estimated at 19 percent of the total, which was the proportion of beef offal in total offal production in 1955, and valued separately at the wholesale level. The total retail weight of beef other than offal was converted to its carcass weight equivalent by means of factors in Agr. Handb. 62 (6), then valued at average wholesale prices in 1947-49. A similar procedure was used for veal. Then the combined wholesale value of beef and veal was reduced to its farm value by applying the ratio of the 1955 farm value of beef and veal slaughtered to the wholesale value of beef and veal products produced in 1955 (all in terms of 1947-49 average prices).

The hog category includes pork sold as such, pork in mixed foods such as luncheon meats, offal, and lard. Estimates of the lard contained in shortening, margarine, confectionery, potato chips and sticks, bakery products, and flour mixes were included as well as the direct uses. Quantities of pork, in terms of carcass equivalents, and lard were first valued at their 1947-49 wholesale prices. Then the aggregate value was reduced to a farm value by applying a 1955 ratio derived in the same way as that for beef and veal.

The same procedure was used for lamb and mutton.

Data on milk solid equivalents of dairy products (except butter) consumed per household are reported in Survey Reports 1-5. To these data were added the milk solid contents of butter used as such and of butter and milk used in prepared mixes, bakery products and candy. Total milk solids were valued at the average 1947-49 price received by farmers for milk converted to a price for equivalent milk solid content.

Use of eggs as such and the egg content of mayonnaise, salad dressing, flour mixes, cakes, doughnuts, and cookies was valued at average 1947-49 farm prices.

Total use of chicken meat, both as such and in mixed foods, was converted to live-weight equivalents and valued at 1947-49 farm prices. Some of the unpublished survey data provided information on minor items containing chicken. The chicken content was approximated by applying estimates of amounts of chicken per unit of mixed food.

The vegetable oils used in margarine, shortening, cooking and salad oils, flour mixes, baked goods, potato chips and candy were estimated by use of conversion factors. Butter and lard in these food items were allocated to the dairy and hog categories. The remainder was allocated to the three major categories of food oilseeds -- cottonseed, soybeans, and peanuts -- according to the proportions of these oils processed for civilian food use in 1955. The oils were first valued at their average wholesale prices for 1947-49, then reduced to farm value by applying the ratio of farm value of seeds used in crushing to the wholesale value of products processed in 1955. For the peanut category, peanuts consumed as nuts and as peanut butter and candy were converted to approximate farmers' stock equivalents and valued at the 1947-49 average farm price of peanuts.

Wheat cereals and flour (including flour content of commercial mixes and bakery products), were priced at their average 1947-49 wholesale prices. Then the values were adjusted to equivalent farm values according to the ratio of the farm value of wheat processed to the wholesale value of all products produced.

Corn and oat food products, consumed as breakfast cereals, meal, and grits, were converted to grain equivalents and valued at 1947-49 average farm prices of the grains. Corn sirup, including an estimate of the use in candy, was converted to a grain equivalent basis and included in the corn category.

The sugar category includes direct and indirect uses of sugar and molasses. Data on sugar in soft drinks, beverage powders, and prepared desserts are given in Report 6 of the survey. Estimates of sugar content of canned and frozen fruits and vegetables (including home canned and home frozen), bakery goods, jams, preserves, jellies, candies, condensed milk, baby puddings, mayonnaise, and salad dressing were derived by use of conversion factors for each item. The general procedure of calculating first wholesale values, then farm values was used.

Fruits used fresh, canned, dried, as chilled, frozen and canned juices, in canned baby foods, and in jams and jellies were converted to farm commodity equivalents. Conversions for major items were made separately, others were grouped. The general factor used for the "others" was from 1955 information on civilian use. Major fruits were valued individually at their 1947-49 farm prices. Others were valued at production weighted average farm price for the group in 1947-49. Vegetables and melons were handled in a comparable manner.

The potato and sweetpotato category includes potato chips and sticks, frozen potatoes, and canned sweetpotatoes, as well as the fresh or raw commodities. They were handled according to the same procedure as that for fruits except that the potato content of mixed foods was ignored because of the small amounts involved.

Beans used in canned baked beans, chili con carne, and other mixed foods, and beans and peas in soups are included with the dry beans and peas. The farm commodity equivalents were valued directly at 1947-49 farm prices.

Rough estimates of the nut content of candy were added to the tree nuts consumed as such.

Coffee was priced at a green bean level. Reported purchases of tea were high in relation to the time-series data, so the general level was adjusted downward. Chocolate and cocoa used as such and in chocolate sirups and candies were priced in terms of cocoa beans. Coffee, tea and cocoa were priced at 1947-49 New York bulk prices, approximating their import or supplier values.

D.1.3. Relative Importance of
Food Groups in Cross-Section
and Time-Series Indexes

The relative importance of individual foods in the overall averages for all farm foods consumed by households in spring 1955 differs from that for all civilian use in calendar 1955. The primary reasons are seasonality in consumption of some items, and some significant differences in home food patterns from those of meals and snacks eaten out. Two examples of seasonality are the relatively low rates for vegetables and turkey in spring household use. The higher proportions of total farm value of annual civilian food allocated to beverages, sugars and sirups, and dairy products, than in home use in spring may be explained by their popularity in between-meal snacks. Potatoes were relatively higher in annual data, perhaps due in part to seasonality and partly to possibly greater frequency in restaurant meals and institutional feeding than in home meals, which include more breakfasts. Fruits and chicken were more important in the total value of farm foods consumed in homes in spring 1955 than in the all U. S. annual averages. The explanation for fruits may be their common use for breakfast and as desserts for family meals. The greater importance of chicken in the household total probably is related to its current widespread use for every day meals.

Finally, reference must be made to the fact that the same average prices were used for all consumption of each food by every household group. For example, all retail cuts of beef were converted to carcass weights by means of overall physical conversion factors irrespective of differences in their grades and prices, and thence to farm values. Although this handling did not affect the importance of individual foods in the total for food consumed by all U. S. households, it probably led to some understatement of degree of differences in use of farm resources in form of foods among groups of households.

D.2. Cross-Section Index of Food Consumption Per Person,
All Commodities at Retail Level, Spring 1955 92/

The cross-section index of food consumption per person measures variations in average consumption of all foods, at the retail level, among groups of households in the spring of 1955. This index, identified as CFQ-2 in table 3.13, matches insofar as possible the time-series index of per-capita food consumption, PFQ-2 in table 3.1. Subindexes for all foods and major food groups for households in the U. S. and each region, grouped by urbanization and income, are given in table D.3. 93/

D.2.1. Data Used

Quantities of individual foods consumed per household were derived from data of the 1955 Survey of Household Food Consumption. They cover consumption of all food at home (including fishery products) from all sources by households in a week of April-June 1955. In order to match the handling of some foods in the calculations of the time-series index, the commodity content of mixed foods had to be estimated and combined with primary commodities. Bakery products are the principal example. The commodity equivalents or contents were calculated using conversion factors given in Conversion Factors and Weights and Measures for Agricultural Commodities and Their Products (72), factors developed from Department of Commerce reports on ingredients used by food industries, reports from the Census of Manufactures and, in one instance at least, from recipes. The content of a few relatively minor items could not be determined, such as the ingredients of soups and chocolate, nuts, and fruit in bakery products.

92/ By Helen M. Eklund, Economic and Statistical Analysis Division.

93/ Matching regional data in the National Food Situation, July 1959 (35).

Table D. 3.--UNITED STATES: Cross-section indexes of per person food consumption (retail level) for major commodity groups, by urbanization and family income, 1955 1/

(Index: U. S. all household average = 100)

Urbanization and income groups (dollars)	Livestock					Crops							
	All food 2/	Meat 3/	Poul-try 4/	Eggs 5/	Dairy prod-ucts 6/	All live-stock 7/	Grain prod-ucts 8/	Fats and oils 9/	Sugar and sirups 10/	Fruits 11/	Vege-tables 12/	Pota-toes and sweet-pota-toes 13/	All crops 14/
ALL URBANIZATIONS													
All households	100	100	100	100	100	100	100	100	100	100	100	100	100
Households of 2 or more persons	99	100	99	99	100	100	99	100	100	99	99	100	99
Under 2,000	82	74	89	92	78	81	109	96	90	68	76	93	83
2 - 3,000	93	94	90	95	91	92	104	93	95	84	90	103	93
3 - 4,000	96	95	89	98	97	95	101	97	103	92	97	109	98
4 - 5,000	102	104	96	99	106	102	97	98	102	103	102	105	102
5 - 6,000	105	109	109	101	107	106	100	101	103	110	104	98	104
6 - 8,000	110	112	113	105	110	110	97	104	107	120	109	104	109
8 - 10,000	111	110	110	108	111	111	91	115	113	134	114	95	112
10,000 and over	119	119	130	117	120	121	91	120	111	144	130	94	118
URBAN													
All households	102	106	113	97	99	103	93	98	95	107	106	94	101
Households of 2 or more persons	102	105	112	97	99	103	93	98	95	104	105	94	101
Under 2,000	83	90	104	83	64	83	94	83	78	76	79	82	82
2 - 3,000	90	96	96	88	82	90	96	86	84	79	92	89	89
3 - 4,000	96	98	101	92	95	96	96	94	95	91	98	100	96
4 - 5,000	101	104	106	92	104	101	94	94	95	103	106	95	101
5 - 6,000	107	111	124	102	106	109	95	100	99	111	107	90	104
6 - 8,000	111	112	119	104	110	111	97	105	105	121	113	98	110
8 - 10,000	109	107	119	109	106	109	87	113	108	135	115	85	111
10,000 and over	120	120	133	120	117	122	90	123	110	149	135	87	119
RURAL NONFARM													
All households	95	92	82	99	94	93	107	100	104	94	93	110	100
Households of 2 or more persons	95	92	81	97	94	92	108	99	103	93	92	109	99
Under 2,000	75	61	77	86	71	71	112	97	85	62	69	99	81
2 - 3,000	93	89	88	95	88	89	113	94	99	86	90	108	98
3 - 4,000	93	89	68	101	92	88	111	95	108	90	95	117	101
4 - 5,000	101	101	78	105	105	100	103	106	108	100	96	114	103
5 - 6,000	102	104	87	101	104	101	110	100	108	106	101	109	106
6 - 8,000	107	111	93	103	108	106	99	101	108	122	106	111	109
8 - 10,000	116	116	99	106	123	115	98	118	120	134	119	109	119
10,000 and over	113	101	129	100	134	114	97	116	108	129	110	116	112
FARM													
All households	100	92	81	115	115	103	112	111	114	88	88	119	95
Households of 2 or more persons	99	92	81	113	115	103	112	111	114	88	86	119	95
Under 2,000	88	74	82	105	100	90	119	108	104	66	80	97	86
2 - 3,000	102	96	71	116	123	106	114	110	120	96	87	127	98
3 - 4,000	104	97	82	129	122	109	109	113	124	94	89	122	98
4 - 5,000	109	110	71	127	123	113	107	113	122	106	97	134	104
5 - 6,000	110	110	86	115	131	115	108	107	122	107	95	135	103
6 - 8,000	106	104	113	122	119	114	105	109	118	97	87	136	97
8 - 10,000	112	117	65	109	130	117	99	126	132	118	96	150	105
10,000 and over	125	139	139	118	147	138	97	106	119	129	107	124	111

1/ Derived from 1955 Household Food Consumption Survey data on household use of individual foods, using average retail prices in 1947-49. Family money income in 1954 measured after income taxes. 2/ Includes fish. 3/ Excludes lard. 4/ Includes all ingredients in ice cream and condensed milk, excludes butter. 5/ Excludes corn sugar and sirup. 6/ Excludes peanuts and peanut butter. 7/ Includes melons. 8/ Includes some commodity groups (dry beans and peas, coffee, tea, and cocoa, etc.) not shown separately.

The unpublished data of the 1955 Survey on use of specific items, available for each region by urbanization, supplied more detailed breakdowns of some categories of mixed foods. Since this information was not available for households classified by income, it was assumed that the relationship for all households in each region and urbanization group applied to the individual income groups.

Prices used to value the quantities of each commodity as part of the total value aggregates for all foods were essentially the average retail prices for 1947-49 used in computations of the time-series index of per capita food consumption. 94/

As in the time-series index, the cross-section index was computed with changing quantities and fixed price weights, this time for commodities used by all groups of households. The value aggregates were first computed for household averages for each commodity group, then per person averages per year were calculated by dividing the household values by the average household size in terms of 21 meals per person, multiplied by 52. The U. S. average value per person (for all households) was set at 100, and values per person for each region, urbanization and income group were compared with that average to derive the index numbers.

D.2.2. Notes on Procedures for Major Commodity Groups

The following discussion of the handling of data for commodity groups includes the assumptions that were made, reference to minor items not covered, and description of adjustments that were necessary to use the price or quantity data in precisely the same way as in the time-series index.

Meat.--Product weights were assumed to be equal to the "fresh-retail-cut equivalent" basis used in the time series index. Mixed meats, such as luncheon meats, were converted to retail-cut equivalents of beef or pork so as to price them separately, and content of meat in mixtures (except soups) was approximated by means of conversion factors referred to above.

Fish.--Data for fresh fish and shellfish were put on an edible-weight basis using factors derived for each region and urbanization group from comparison of edible weight computed from unpublished 1955 survey data on the use of the several species of fish and their reported weights. Fish in mixed foods was excluded, because of the small quantities involved. Quantities used in soups could not be measured because of lack of information.

Poultry.--A similar procedure to that described for fish was used to adjust quantities of chicken and turkey to an eviscerated-weight basis. Quantities used in mixed foods (except soups) were approximated, using some unpublished data for sub-categories and conversion factors.

Eggs.--Unpublished 1955 survey records provided data in pounds for the several sizes of eggs. Quantities in salad dressings, flour mixes, and baked goods were included at the price of fresh eggs, as in the time-series index.

94/ The time-series index is described briefly in 3.1.2.3, more fully on pages 132-159 of Agr. Handb. 62 (6). To expedite computations, adjusted prices were developed for use with the mixed foods, thus saving one step in the process of calculating commodity content and then valuing the resulting commodities.

Dairy Products, Excluding Butter.--The content of dairy products in candy [derived using ingredients indicated by the Confectionery Sales and Distribution report of the Department of Commerce (75)], bakery products, and flour mixes (in terms of nonfat dry milk solids) was estimated and combined with the retail weights of each dairy product reported separately.

Fats and Oils, Including Butter.--This group includes the oil equivalent of salad dressings, bakery products, flour mixes, candy, frozen potatoes and potato chips and sticks. For pricing purposes, the uses of the several oils in these products were approximated. Based on the Confectionery Sales and Distribution report for 1955, butter was estimated to be 14 percent of the total fat used in candy, "other edible oils" the remainder; all quantities used in salad dressings and for potato products were assumed to be vegetable oils; the Census of Manufactures (19) for 1954 indicated the fats and oils used in bakery products to be 40 percent shortening, 45 percent lard, and 15 percent "other edible oils."

Fruits.--The fruit content of jams and jellies was approximated from information in recipes. Fruits in such foods as bakery products and ice cream were not included in the cross-section index calculations because of lack of information and the relatively small quantities probably involved. The fresh fruit series includes home-produced fruits, fresh fruits of minor importance commercially, and berries that are not included in the time-series index. Baby foods were omitted, as in the time-series index. The price of the fruit content of jams and jellies for the cross-section index was derived from the average price of those products by making an allowance for their sugar content, then adjusting the derived price back to 1947-49 price level. For the time-series these fruits are valued at the prices of the fresh and processed fruit items used in making jams and jellies. However, the difference between results of the two approaches is probably negligible in the fruit subindex.

Vegetables.--The relatively small quantities of vegetables in mixed foods were omitted. Pickles, catsup, and chili sauce, classified under miscellaneous foods in the survey, are included as canned vegetables, and, as in the time-series index, all soups and baby foods and frozen potatoes and sweetpotatoes are in the "other processed vegetable" category and canned potatoes and sweetpotatoes are included with "canned vegetables." "Fresh vegetables" include quantities home canned or home frozen; fresh weight equivalents of these items were estimated on basis of factors derived from unpublished detailed data for regions and urbanizations.

Potatoes and Sweetpotatoes.--Potato chips and sticks were valued in terms of fresh potatoes; canned and frozen potatoes were omitted from this category, but included in the processed vegetable groups. Minor quantities in mixed foods could not be identified so they were omitted.

Beans, Peas, Nuts.--Except for canned baked beans (valued as dry beans), peanut butter (valued in terms of shelled peanuts), and nuts in candy, this series excludes quantities in mixed foods. The quantity of treenuts and peanuts in candy was estimated on the basis of the relationship between ingredients and finished product as reported in the Confectionery Sales and Distribution report and valued at the retail prices of shelled treenuts and peanuts.

Cereal Products.--From the data on consumption of total grain products in flour equivalents, given in Reports 6-10 of the 1955 Survey of Household Food Consumption (44), quantities of cereal products reported used as such were subtracted to derive

estimates of flour content of processed foods. Quantities in mixed foods were valued at a weighted average price for flour in processed foods. ^{95/}

Sugar and Sirups.--Except for sirup used in candy, sweeteners in processed foods were valued at the price of cane and beet sugar in 1947-49 adjusted for processing costs. ^{96/} The processed foods reported in the survey for which sugar content was computed were: Bakery products, flour mixes, jams, jellies and preserves, candy, chocolate sirup, dry milk products (dry cocoa mixes), sherbet and ices, and soft drinks. Sugar in items such as ice cream, condensed milk and processed fruits and vegetables, which were included in other commodity groups, was not included here.

Beverages.--Except for quantities in candy and chocolate sirup, cocoa used in processed foods (such as bakery products and ice cream) was omitted, because of lack of data. Quantities of tea reported as purchased in a week of spring 1955 were nearly twice as high as those indicated by the average disappearance rate. Because the disappearance data for tea are considered to be quite reliable and the problem of recalling infrequent purchases of tea difficult, the whole level of the tea data was adjusted downward 50 percent. This was the only instance in which survey data were not accepted as reported.

D.2.3. Differences in Qualities of Food Consumed and in Food Marketing Service

Use of the same price for each food consumed by all groups of households in the cross-section index ignores the differences in food quality and amounts of some food marketing services bought with food among regions, urbanizations, and income groups. For example, 9 major fresh vegetable items were priced separately in the index and the remaining items were combined. Even for the 9 items there were some differences in price paid per pound by households at several income levels because of quality differences and differences in marketing services required, which were ignored. Use of a combined group of items glossed over variations in composition of the group as well as differences in prices paid for each item.

In the meat group this difference is particularly apparent because the highest income group of U. S. households used 4 times as much beef steak, for example, as the lowest income group, twice as much ground beef, and less than the lowest income group's consumption of stewing beef. But beef cuts are valued at the same average retail price in the two indexes. Because year-to-year average consumption of individual meat cuts varies directly with the number of animals of each type slaughtered, an average price for all beef is reasonably satisfactory for time-series measurements. Although a differentiated scale of prices for meat cuts, for example, appears desirable for cross-section measures, the survey data are not sufficiently detailed to permit development of a scale to take all quality differences into account.

No consumption index can be constructed to take all such variations into account, partly for lack of information, and partly because of the size of the computational problem (although this could be handled by electronic machines, at a price). The time-series index is built upon 95 separately priced food items. By its very nature, an index is supposed to be a generalization from detailed data. If one

^{95/} Described on page 155 of Agr. Handb. 62 (6).

^{96/} Ibid., page 156.

wants to study all of the details, one can study the information on over 250 food items reported separately in Survey Reports 1-5.

D.2.4. Relative Importance
in Overall U. S. Totals

The relative importance in total food consumption was about the same in both the cross-section index for all U. S. households and the time-series index for meats, eggs, dairy products, fats and oils, and beverages -- which combined made up about 57 percent of the food consumed in 1955. In the spring, vegetables except potatoes, at 10 percent of the total, were equal in importance with the annual retail index data because the larger quantity of canned vegetables consumed in the spring made up for the slightly less than average rate of fresh vegetable consumption. Lower potato consumption in the spring resulted from seasonally lower supplies. The lower-than-average rate for the bean, pea, and nut group is explained by the exclusion of all nuts used in processed foods except peanut butter and candy from the cross-section index, for lack of data. Because a relatively greater proportion of sugar is eaten outside the home than for many other foods, this item was significantly lower in the cross-section total than in the 1955 annual index. Consumption rates of fish, poultry, and fruit groups were relatively more important in the spring household data than in 1955 civilian averages.

D.2.5. Notes on Use of the
Cross-Section Index With
the Time-Series Index

Three major factors must be kept in mind as the survey-based cross-section index is used with the annual time-series index: (1) The possible effects of seasonality on spring consumption patterns; (2) the cross-section indexes pertain only to food eaten by housekeeping households at home, whereas the time-series index reflects total civilian consumption; and (3) differences in coverage of minor items. Although it is generally believed that spring is the season in which consumption of all food combined is closest to the annual average, some items are affected. It is not necessary to go into details of these differences here because they are discussed in chapter 3 and wherever they are pertinent to other sections.

D.3. Cross-Section Index of Food Consumption Per Person, All Commodities
At Retail Level, Spring 1942 97/

This index matches the index for spring 1955 described in D. 2. The all-food index is given in table 3.12. Subindexes for all foods and major food groups are not published because of lack of sufficient detail for their construction. As mentioned in chapter 3, the spring 1942 food data are available only for household population subdivided by urbanization and income, not by region.

D.3.1. Data Used

Quantities of individual foods consumed per person were derived from data in Misc. Pub. 550, Family Food Consumption in the United States (40), except for eggs. Information was available for only 105 items in this survey report as compared with 250 items in Reports 1-5 of the 1955 Survey. While some of the additional items in the later survey resulted from the development of new food products (such as the

97/ By Helen M. Eklund, Economic and Statistical Analysis Division.

frozen fruits and vegetables), much of the item increase reflects a more detailed breakdown of combined food groups. Because of lack of detailed data for spring 1942, a number of general assumptions had to be made in matching quantity and price information. In several instances relationships derived from the 1955 data were applied. No attempt was made to include the ingredients of such miscellaneous items as canned, cooked food mixtures, packaged desserts, and other proprietary foods because these items were of relatively minor importance in 1942. Revised data on eggs used in urban households in spring 1942 were obtained from revised tabulations given in table 55, Agr. Inf. Bul. 132 (33).

The prices used in computing the index were average retail prices in 1947-49, the same as those used for the time-series index and for the 1955 cross-section index. Wherever several commodities were combined in an unidentified total, the combined price estimated from more detailed information for spring 1955 was used. Such a procedure implies, for example, that any change in proportions of shortening, lard, and vegetable oils used in bakery products would not affect their combined price relative to prices of other foods. The necessity for frequent use of combined prices and lack of knowledge of identity and relative importance of commodities in certain grouped categories rendered greater precision useless.

D.3.2. Special Procedure for Beverages

The only departure from methods used in the 1955 cross-section index was in the cases of coffee, tea, and cocoa. For spring 1942 these items were reported in terms of value of quantities purchased rather than poundage. These expenditures data appeared to be too high on the basis of indications from time-series data. Therefore, a U. S. average value per person for the 3 items was approximated from 1942 per capita data and 1947-49 retail prices. Variations among urbanizations and income groups shown by the survey expenditure data were applied to this calculated average.

Appendix E. GUIDE TO SOME RELATED TIME SERIES OF ECONOMIC AND SOCIAL STATISTICS 98/

This appendix is a reference to the major time series of economic and social statistics used in analysis of historical changes in food consumption. These statistics include information on population from the Bureau of Census, on national income and expenditures for major categories of consumption from the Office of Business Economics of the Department of Commerce, on farm income developed by the Agricultural Marketing Service, and price data assembled by the Bureau of Labor Statistics and the Agricultural Marketing Service.

Among the more convenient general references for such statistics are Historical Statistics of the United States, Colonial Times to 1957 (15); Statistical Abstract of the United States (17); Agricultural Statistics (23); Agriculture Handbook 118 (24); Survey of Current Business (26) and its supplements such as U. S. Income and Output (27) and Regional Trends in the United States Economy (31); the National Food Situation (13); the Farm Income Situation (7); and the Marketing and Transportation Situation (10). 99/

E.1. Population Data

The Bureau of the Census is the principal collector and reporter of population data, but the Agricultural Marketing Service maintains a series on farm population. A key to the publications providing pertinent major types of population statistics is given in table E.1. Characteristics of the population closely related to the kinds and amounts of food and food services used are: Urbanization category of the family; income, both per person and per family; region; occupation of the head of the family; and age and sex distributions of population classified by these categories.

Measures of changes in many of these characteristics in the past are needed for any analysis of changes in food consumption. The most comprehensive sources of this information for the U. S. as a whole, for regions and divisions, for individual States, standard metropolitan areas, counties, and for some central cities are the decennial census reports. In addition, yearly estimates of some of these measures are available from 1944 on in the Current Population Reports (14), which bring some of the decennial measures up to date for the intercensal periods. Unfortunately, not all of these measures are available for each of the sections of the population mentioned.

The Bureau of Census also makes projections of the population from time to time. Sources of these data are indicated in table E.1.

Another very useful measure of population for consumption analysis is the series of estimates of the population eating out of civilian food supplies. This is developed by the AMS from Census data and is published annually in the Supplement to Agr. Handb. 62, table 53 (6).

E.2. Income and Expenditure Data

The National Income Division of the Office of Business Economics, Department of Commerce, prepares the official estimates of national income and expenditures as part of its work on the national income accounts. The periodic publication on national

98/ By Marguerite C. Burk and Robert J. Lavell, Economic Research Service.

99/ A list of recent publications related to food consumption carried in each issue of the National Food Situation announces new reference materials as soon as they are issued by the Federal Government.

income, of which the latest edition was entitled U. S. Income and Output (27), contains data for selected years on total and per capita disposable personal income for the United States, regions, and States. The complete per capita series for the United States can be calculated from the published aggregates from this and earlier editions entitled National Income (25). State data on personal income are published in Personal Income by States Since 1929 (4), a supplement to the Survey of Current Business, issued in 1956 but brought to date in the Survey each year, usually the August issue. The Commerce series for the United States on disposable income per capita in current dollars, in 1947-49 dollars, and related indexes (developed by AMS) are published regularly in table 49 of the Supplement to Agr. Handb. 62 (6).

Estimates of the distribution of families and unattached individuals by size of income for selected years, 1944-56, were published in U. S. Income and Output, table II-11 (27).

The Agricultural Marketing Service regularly prepares and publishes estimates of farm income for the United States and for individual States. Such information includes statistics on cash receipts by type of commodity. These data are published regularly in the Farm Income Situation (7).

Time series of U. S. aggregate expenditures by type of product, 1946-57, were published in table II-4 of U. S. Income and Output. The Commerce total consumption expenditure series is also published for reference purposes in terms of aggregates and per capita averages in current dollars, 1947-49 dollars, and related indexes (developed by AMS) in table 50 of Agr. Handb. 62 (6).

E.3. Price Data

The Bureau of Labor Statistics collects urban retail price data and calculates the official Consumer Price Index. The Consumer Price Index is published regularly in the Monthly Labor Review (21), and in monthly press releases issued by that Bureau. A monthly report, Retail Food Prices by Cities (22), carries the average prices for the cities and indexes. For reference use, the food subindexes and the CPI are reprinted in the last table of the National Food Situation each quarter. These indexes and the nonfood index are published in table 52 of Agr. Handb. 62 (6).

Farm price data are collected by the Agricultural Marketing Service. The current information is published in the monthly report, Agricultural Prices (5). Time series of prices received and paid by farmers are summarized annually in Agricultural Statistics (23).

The AMS series on farm and retail value and the marketing cost for the market basket for farm food commodities purchased by urban consumers are published currently in the Marketing and Transportation Situation (10) and summarized in Misc. Pub. 741 and its supplements (9).

Table E.1.--Key to population data 1/

Information on:	Segment	Dates	Published in: 2/	
Total population (excludes armed forces serving overseas)	U. S. - Total (all urbaniza- tions combined)	Decennial 1950-1790	(a) Table 6	
		Annual 1940 to date	(b)	
		Projections 1960, '65, '70, '75, '80	(b) No. 187	
	- by urbanization 3/ (urban and rural only)	Decennial 1950-1790	(a) Table 15	
	- by urbanization (urban, rural non- farm and farm)	Decennial 1950; 1940, '30, '20, '10	(a) Table 58; (c) Table 5	
	Regions - Total (all urbanizations combined)	Decennial 1950-1790	(a) Table 6	
		Annual 1940 to date	(b)	
		Projection 1960, '65, '75	(b) No. 160	
	- by urbanization (urban and rural only)	Decennial 1950-1790	(a) Table 15	
	- by urbanization (urban, rural non- farm, and farm)	Decennial 1950, '40; 1940, '30	(a) Table 58; (c) Table 21	
Farm population 4/	U. S. - Farm population	Annual 1920 to date	(d)	
	Regions - Farm population	Annual 1920 to date	(d)	
Number of households, families 5/	U. S. - Total (all urbaniza- tions combined)	Decennial 1950; 1940, '30; 1930	(a) Table 47; (e) Table 1; (f) Table 1	
		Annual 1950 to date 6/	(g)	
		Projection 1960	(g) No. 42	
	U. S. - by urbanization (urban, rural non- farm and farm)	Decennial 1950; 1940, '30; 1930, '20	(a) Table 47; (e) Table 1; (f) Table 42	
		Annual 1950 to date 6/	(g)	
	Regions - Total (all urbanizations combined)	Decennial 1950; 1940, '30; 1930, '20	(a) Table 69; (e) Table 1; (f) Table 40	
		- by urbanization (urban, rural non- farm, and farm)	Decennial 1950; 1940, '30; 1930, '20	(a) Tables 148 and 149 (e) Table 1; (f) Table 42
	Population by country of birth of foreign born	U. S. - Total (all urbaniza- tions combined)	Decennial 1950, '40, '30 '20, '10	(a) Table 49
			Decennial 1950; 1940, '30	(a) Table 49; (c) Table 14
		Regions - Total (all urbanizations combined)	Decennial 1950; 1940; 1930	(a) Table 71; (c) Table 36; (h) Table 5, p. 234
- by urbanization (urban, rural non- farm and farm)			Decennial 1950-1880	(a) Table 39
Annual 1900 to date			(b) No. 98 and 114.	
Age distribution of popu- lation by sex	U. S. - Total (all urbaniza- tions combined)	Projections 1960, '65, '70, '75, '80	(b) No. 187	
		Decennial 1950, '40; 1940, '30	(a) Table 38; (c) Table 7	
		Decennial 1950; 1940; 1930	(a) Table 61; (c) Table 26; (h) Table 24, p. 603	
	Regions - Total (all urbanizations combined)	Annual 1946 to date	(b)	
		Projections 1960, '65, '70	(b) No. 160 (no sex break)	

See footnotes at the end of table.

Continued -

Table E.1.--Key to population data 1/ - Continued

Information on:	Segment	Dates	Published in: 2/
Age distribution of population by sex - Continued:	Regions - by urbanization (urban, rural non-farm and farm)	Decennial 1950	(a) Table 61
Distribution of population by major occupation groups	U. S. - Total (all urbanizations combined)	Decennial 1950; 1940; 1930, '20, '10; Annual 1948 to date	(a) Table 76 & 79; (i) Table 58 & 61; (j) Table 2
	- by urbanization (urban, rural non-farm and farm)	Decennial 1950; 1940	(a) Table 53; (i) Table 59
	Regions - Total (all urbanizations combined)	Decennial 1950; 1940; 1930	(a) Table 76 & 79; (i) Table 58 & 61; (j) Table 10
Distribution of population by major industry groups	U. S. - Total (all urbanizations combined)	Decennial 1950; 1940; Annual 1948 to date	(a) Table 80 & 83; (i) Table 74
	- by urbanization (urban, rural non-farm and farm)	Decennial 1950	(a) Table 55
	Regions - Total (all urbanizations combined)	Decennial 1950; 1940	(a) Table 80 & 83; (i) Table 74
Distribution of families by size of family income (total money income before taxes) 1/	U. S. - Total (all urbanizations combined)	Decennial 1949; 1939; Annual 1944 to date	(a) Table 57; (m) Table 1
	- by urbanization (urban, rural non-farm, and farm)	Decennial 1949; 1939; Annual 1944 to date	(a) Table 57; (m) Table 1
	Regions - Total (all urbanizations combined)	Decennial 1949; 1939; Annual 1954 to date	(a) Table 84 & 85; (m) Table 1
	- by urbanization (urban, rural non-farm and farm)	Decennial 1939	(m) Table 1

1/ Other than those obtained in connection with income and consumption surveys. Region refers to the four Census of Population regions.

2/ Titles of published sources referred to by letters in parentheses.

Letter	Publication
(a)	1950 Census of Population, Volume II, Characteristics of the Population. Part 1, United States Summary (20).
(b)	Current Population Reports, Population Estimates, Series P-25 (14).
(c)	1940 Census of Population, Volume II, Characteristics of the Population. Part 1, United States Summary (20).
(d)	Farm Population, AMS-80. U. S. Agricultural Marketing Service (8).
(e)	Sixteenth Census - 1940 - Housing, Volume II, General Characteristics, Part 1, United States Summary (20).
(f)	Fifteenth Census of the United States, 1930, Population Bulletin, Families, United States Summary (20).
(g)	Current Population Reports, Population Characteristics, Series P-20 (14).
(h)	Fifteenth Census of the United States, 1930, Population, Volume II, General Report, Statistics by Subject.
(i)	1940 Census of Population, Volume III, The Labor Force, Part 1, United States Summary.
(j)	Fifteenth Census of the United States, 1930, Population, Volume V, General Report on Occupation.
(k)	Current Population Reports, Labor Force, Series P-50 (14). } Carried in Monthly Report on the Labor Force.
(l)	Current Population Reports, Labor Force, Series P-57 (14). } beginning July 1959. U. S. Dept. of Labor (28).
(m)	Sixteenth Census of the United States, 1940, Population, Families (20). Family Wage or Salary Income in 1939.
(n)	Current Population Reports, Consumer Income, Series P-60 (14).

3/ Definition of "urban" category changed in 1950. Some tables present data under both definitions.

4/ The series on farm population has a different definition than either "rural farm" or "rural" used in other series.

5/ Definition of "household" changed in 1950. "Dwelling units" in 1940 and "private families" in 1930 are the same.

6/ 1947-49 annual data not comparable with data from 1950 on.

7/ Definition of income changes slightly for each series; user must check definitions in each source closely.

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A. Sources of Time-Series Data

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- (5) U. S. Agricultural Marketing Service. Agricultural Prices. U. S. Agr. Mktg. Serv. Monthly. (Issued by Statistical Reporting Service beginning April 1961.)
- (6) U. S. Agricultural Marketing Service. Consumption of Food in the United States, 1909-52. (Issued by U. S. Bur. Agr. Econ., predecessor of U. S. Agr. Mktg. Serv.) U. S. Dept. Agr. Agr. Handb. 62, 249 pp., illus., Sept. 1953.

Data superseded by Supplement for 1956, issued by U. S. Agr. Mktg. Serv., 120 pp., Sept. 1957, and by annual supplements thereafter. Some data published currently in The National Food Situation (13). Agr. Handb. 62 superseded Misc. Pub. 691 Consumption of Food in the United States, 1909-48.

- (7) U. S. Agricultural Marketing Service. The Farm Income Situation. U. S. Agr. Mktg. Serv. (Currently published four times each year.)
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- (14) U. S. Bureau of the Census. Current Population Reports. U. S. Bur. Census (issued since Feb. 1944).

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