**Food and Agricultural Commodity Consumption in the United States: Looking Ahead to 2020.** By Biing-Hwan Lin, Jayachandran N. Variyam, Jane Allshouse, and John Cromartie, Food and Rural Economics Division, Economic Research Service, U.S. Department of Agriculture, Agricultural Economic Report No. 820.

## Abstract

U.S. consumption of food commodities is projected to rise through the year 2020, mainly due to an increase in population. But the mix of commodities is expected to shift because of an older and more diverse population, rising income, higher educational attainment, improved diet and health knowledge, and growing popularity of eating out. This study analyzes data from USDA's food consumption survey to project the consumption, through the year 2020, of 25 food groups and 22 commodity groups. Per capita consumption of fish, poultry, eggs, yogurt, fruits, nuts and seeds, lettuce, tomatoes, some other vegetables, grains, and vegetable oils is predicted to rise, whereas consumption of beef, pork, other meat, milk, cheese, potatoes, and sugar is expected to fall. The growth of the at-home and away-from-home markets varies from one commodity to another. Fruit consumption is expected to lead all commodities in growth in the at-home market, and fish consumption is expected to lead in growth in the away-from-home market.

**Keywords:** Eating out, diet and health knowledge, food-commodity translation database, food consumption projections, commodity consumption projections, and Continuing Survey of Food Intakes by Individuals, 1994-96 and 1998.

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# Summary

As the American population becomes older and more racially and ethnically diverse, the volumes and types of foods preferred can be expected to shift. Older folks, for example, tend to eat out less often than younger folks, and, to some extent, prefer different foods. An increasing proportion of elderly in the population, therefore, will have implications for the types of foods demanded. Likewise, different ethnic subpopulations have some distinct food preferences.

This report examines the volumes of individual types of foods eaten by Americans in the years 1994-98, and projects those volumes to the year 2020, taking into account population and demographic change as well as trends in economics and immigration.

A two-step econometric system was specified to model food consumption. The first step was to estimate consumers' eating-out habits and their diet-health knowledge. In the second step, food consumption, both at home and away from home, was related separately to consumers' eating-out habits, knowledge, income, and their social and demographic characteristics. The Tobit procedure was utilized to deal with the fact that many consumers may not consume certain foods during a survey period. Using projected values of economic, social, and demographic factors for 2000-2020, we projected at-home and away-from-home food consumption for the same period. We then developed a food-commodity translation database to convert food consumption to commodity consumption. Twenty-five food groups and 22 commodity groups were analyzed in this study.

This study makes several contributions to the literature on food consumption. To our knowledge, no research has been conducted to model the effects of both eating out and diet-health knowledge on food consumption. Likewise, the at-home and away-from-home separation of food consumption had never been attempted in the literature. We developed a food-commodity translation database to convert food consumption to commodity consumption. This translation database contains the amounts of several hundreds of commodities in each of more than 7,000 food items.

Due to an anticipated population growth of 50 million between 2000 and 2020 in the United States, total consumption of all 22 commodities is predicted to rise, even though per capita consumption of many commodities is predicted to fall. The results suggest that fruits will lead all commodities in terms of growth in both total and per capita consumption. Certain vegetables, such as lettuce and tomatoes, are predicted to grow substantially, while per capita potato consumption (fried and other) is predicted to decline, slowing down the growth in total U.S. potato consumption. Increases in meat, poultry, and fish consumption vary. Per capita fish and poultry consumption is predicted to rise while beef, pork, and other meat per capita consumption is predicted to fall. Per capita consumption of milk and cheese is predicted to fall, while per capita consumption of yogurt and eggs is predicted to rise. The consumption of nuts and seeds and grains is also predicted to rise over the next two decades.

The consumption projections are based on expected shifts in economic, social, and demographic conditions. In addition, the consumption projections are sensitive to two underlying assumptions. First, no prices or expenditures on food consumption were reported in the surveys, so relative prices are assumed to remain constant during the survey period (1994-96 and 1998) and the projection period (2000-

2020). Second, there is an implicit assumption that as an individual moves from one demographic group to another, his/her preferences immediately take on the characteristics of the new group. A sensitivity analysis was conducted to examine the effects of assuming different eating-out habits as adults grow older between 2000 and 2020. The results suggest that the projections of some commodities, such as potatoes, are quite sensitive to the assumption about eating-out habits.

# Food and Agricultural Commodity Consumption in the United States: Looking Ahead to 2020

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## Introduction

Thanks to an efficient agricultural production system and a free trade policy, the U.S. food supply is both bountiful and full of variety. A continuous influx of immigrants provides U.S. consumers with constant exposure to new, more exotic foods and preparation methods. Dining out, once thought to be a luxury, is now a necessity for many. Constantly changing economic, social, and demographic conditions have created an insatiable appetite for new food products, new packaging, more convenience, new delivery systems, and safer and more nutritious foods.

How do changing food preferences and diets affect future consumption and spending on food? Under consumer-driven agriculture projects conducted by USDA's Economic Research Service (ERS), separate econometric modeling efforts were undertaken to project food consumption and food expenditures under changing economic, social, and demographic conditions. Some of the consumption projections were reported in the Spring 2002 issue of *FoodReview* (Blisard et al.). Two reports have been prepared to document the method and data as well as to provide a comprehensive set of the projection results and their interpretations.

This report examines food consumption using data from the USDA food consumption surveys. ERS has projected changes in the U.S. economic, social, and demographic conditions, and these projections are used to forecast food consumption. As revealed by the 2000 Census, the average age of the U.S. population has been increasing, as has the population's racial and ethnic diversity. In this study, we pay attention to the effects of the emerging changes in the U.S. demographic landscape on food consumption.

This study makes several contributions to the literature on food consumption. To our knowledge, this study represents the first attempt to model the effects of both eating out and diet-health knowledge on food consumption. The at-home and away-from-home separation of food consumption has never been attempted in the literature. We developed a first-ever food-commodity translation database to convert food consumption to commodity consumption. There are more than 7,000 food items and several hundred commodities included in the translation database. This database was made possible by the combined efforts of ERS and USDA's Agricultural Research Service (ARS). The end product of this research is a projection of commodity consumption, at home and away from home, over the next two decades.

This report begins with a discussion of the survey data used in estimating food consumption, as well as the databases from ERS and ARS that were used to develop the food-commodity translation database. The structure and specification of the econometric models are then described, followed by a discussion of the estimates. The reasoning behind the projected economic, social, and demographic conditions is presented, followed by our projections of food and commodity consumption, both at home and away from home. The contributions to the growth in consumption from economic, social, and demographic factors are also decomposed. The report concludes with a discussion of the sensitivity analysis that was conducted to examine the effects on at-home and away-from-home commodity consumption under the assumption that some adults maintain their eating-out habits as they age.

## Data

USDA has conducted periodic surveys of household and individual food consumption in the United States since the 1930s. The most recent surveys, the 1994-96 and 1998 Continuing Survey of Food Intakes by Individuals (CSFII), conducted by ARS, provide the basis for this study. Each year of the 1994-96 survey comprises a nationally representative sample of non-institutionalized persons residing in the 50 States and Washington, DC. As a supplemental survey to the 1994-96 CSFII, the 1998 CSFII was conducted to increase the 1994-96 CSFII sample for children. The 1994-96 and 1998 CSFII were conducted using the same methodology and can be combined for analysis. The CSFII data include a sample weight for each respondent, indicating the number of people the sample represents.

In the CSFII, 2 nonconsecutive days of dietary data for individuals of all ages were collected 3 to 10 days apart through in-person interviews using 24-hour recalls. The 1994-96 CSFII data set includes information on the food intakes of 15,303 individuals, while the 1998 CSFII data set includes 5,559 children up to age 9. The respondents in the CSFII provided a list of foods consumed as well as information on where and how much of each food was eaten. The locations where the food was purchased and eaten were coded into several categories. Various economic, social, and demographic characteristics were also collected for the respondent and his/her household.

After respondents in 1994-96 CSFII provided the first-day dietary data, an adult age 20 or above was randomly selected from each household to participate in the 1994-96 Diet and Health Knowledge Survey (DHKS). The DHKS questions covered a wide range of issues, including self-perceptions of the adequacy of intake levels of nutrients, awareness of diet-health relationships, perceived importance of following dietary guidance, use and perceptions of food labels, and behaviors related to fat intake and food safety. Out of 7,842 households eligible for DHKS, respondents from 5,765 households completed the survey. Since consumers' knowledge and attitudes about diet and health affect their food choices and consumption, the combined CSFII and DHKS data provide researchers a unique data set to examine the factors that affect food consumption.

In addition to food intake data, ARS also provides technical support documents, such as recipes and a Pyramid Servings Database (PSD), to support data analysis. Recently, ARS created the Food Commodity Intake Database (FCID) for the Environmental Protection Agency (EPA). The FCID provides data on the edible amount of agricultural food commodities contained in each food reported eaten in CSFII. FCID was developed for the purpose of estimating human exposure to pesticide residues through the consumption of foods and beverages. Therefore, food intakes in FCID are expressed in terms of EPA-defined agricultural food commodities. For example, a piece of apple pie is translated quantitatively into the following commodities: wheat flour, peeled apple, sugar (from sugar cane or beet), cinnamon, and the specific vegetable oils comprising shortening. There are over 500 food commodities listed in the FCID.

Some of the EPA-defined food commodities have to be modified in order to provide useful information to the agricultural community. All dairy foods are translated into milk components (fat, nonfat solids, water, and sugar) in FCID, whereas the dairy industry is more interested in knowing future consumption of dairy products, including milk, cheese, and yogurt. ARS created the PSD to express food consumption in terms of the number of servings for comparison with dietary recommendations in USDA's Food Guide Pyramid. The PSD shows, for each food consumed, the number of servings from 30 food groups, including milk, cheese, and yogurt. In this study, the three dairy commodities are expressed in terms of servings.

Many EPA-defined food commodities are different products of a commodity. For example, apple is expressed in five different product forms: apple with peel, peeled apple, dried apple, apple juice, and applesauce. In order to project total apple consumption, these apple products have to be converted to the raw weight—apple with peel. As a part of this study, a conversion-factor database was developed to convert all EPA-defined commodities to the commodities reported by ERS (Putnam and Allshouse). Using the aforementioned data sources, we created a food-commodity translation database that enabled us to convert food consumption, in edible weight, to commodity consumption at the farm or retail level.

In this study we employed econometric modeling to estimate food consumption. As such, we limited the number of food groups to a manageable size. More than 7,000 foods were reported eaten in the 1994-96 and 1998 CSFII. ARS uses a list of 71 food groups and subgroups in reporting U.S. food consumption. In this

study, we collapsed ARS's list to 25 food groups: beef, pork, poultry, fish, other meat, meat mixture (e.g., hamburger), eggs, milk, cheese, yogurt, fats and oils, fruit juice, other fruits, fried potatoes, other potatoes, tomatoes, legumes and nuts, other vegetables, breakfast cereals, grain mixture (e.g., pizza), other grain products, sweeteners, coffee and tea, fruit drinks, and soft drinks.

Given projections of food consumption, we used the food-commodity translation database to derive projections of commodity consumption. For ease in reporting commodity consumption, we aggregated commodities into 22 commodity groups: beef, pork, poultry, fish, other meat, eggs, milk, cheese, yogurt, vegetable oils, citrus fruits, apples, grapes, other fruits, nuts and seeds, fried potatoes, other potatoes, tomatoes, lettuce, other vegetables, grains, and sugar. It should be mentioned that it is possible to project consumption of an individual commodity or product form (e.g., apple juice), as reported in the FCID and PSD.

# Model Specification, Estimation, and Forecasting

The ultimate objective of the study was to project commodity consumption, both at home and away from home, for every 5 years, ending with the year 2020. Because we utilized data from the 1994-96 and 1998 CSFII, our consumption projections began with the year 2000.

The analysis involved several tasks. The first task was to model eating-out behavior and household heads' diet-health knowledge. Estimated eating-out and knowledge variables were then combined with economic, social, and demographic data to estimate the consumption of 25 food groups. Using the projected values for the economic, social, and demographic characteristics, future food consumption was predicted for the years 2000, 2005, 2010, 2015, and 2020.

The EPA's FCID and ARS's PSD were used, together with the ERS conversion-factor database, to create a food-commodity translation database so that projected food consumption could be converted to commodity consumption.

## Indirect and Direct Approaches

There are two approaches to estimating commodity consumption using food consumption data—indirect and direct. The indirect approach begins with the estimation of food consumption, then derives commodity consumption using conversion factors. The direct approach first converts foods to commodities and then estimates commodity consumption. Under the argument that consumers make food choices rather than commodity choices, we employed the indirect approach. The econometric model for ith food consumed by an individual j can be expressed as:

$$(1) \qquad F_{ij} = f(P_1, P_2, \ldots, P_n, P_{gs}, Y_j, X_j) \quad = 1, 2, \ldots n$$

where $F_{ij}$ is the amount of ith food consumed by jth individual; $P_i$ is the price of ith food; $P_{gs}$ is a price index for nonfood goods and services, $Y_j$ is income, and $X_j$ is a vector of social and demographic characteristics of the individual j.

Then the projected values of the exogenous variables (P, X, and Y) are plugged into the estimated food consumption equations to forecast food consumption. Using the food-commodity translation database (equation 2), the consumption of n foods can be converted to the consumption of m commodities (equation 3).

$$(2) \qquad Q_k = \Sigma_i T_{ki} F_i$$

where $T_{ki}$ is a translation coefficient indicating the units of the commodity $Q_k$ contained in each unit of the food $F_i$.

$$(3) \qquad Q_{kj} = g(P_1, P_2, \ldots, P_n, Y_j, X_j) \quad k = 1, 2, \ldots m.$$

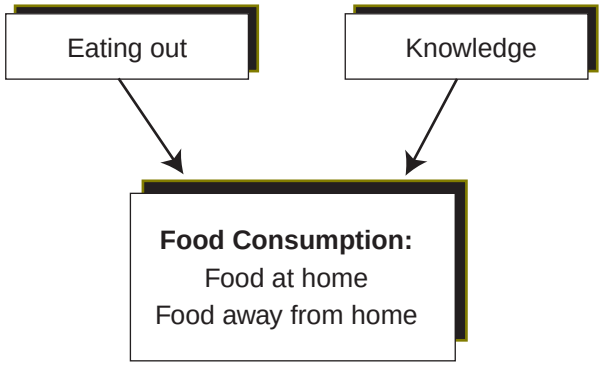
The direct approach is to apply the food-commodity translation database to derive the consumption of commodity k by individual j, $Q_{kj}$, from the consumption of food i consumed by individual j, $F_{ij}$. Then equation 3 is estimated.

## Model Structure and Specification

We specified a two-step econometric system to model consumers' food consumption (fig. 1). In the first step, we estimated consumers' eating-out habits and their diet-health knowledge. In the second step, food consumption, both at home and away from home, were related separately to consumers' eating-out habits, knowledge, income, and social and demographic characteristics.

Over the past three decades, eating out has become increasingly popular for Americans. In 2000, Americans spent 47 percent of their food expenditures away from home, up from 33 percent in 1970 (fig. 2). Americans

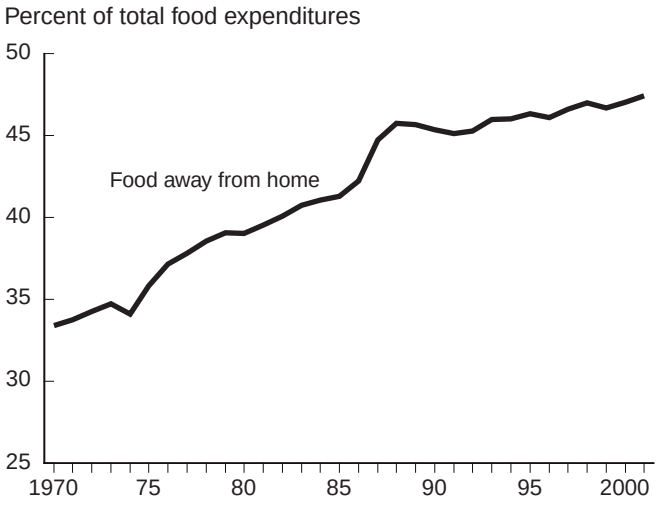
Figure 1
**Two-stage econometric modeling**




Source: Economic Research Service, USDA.

Figure 2

**U.S. expenditures for food away from home as a share of total food expenditures**




Source: Economic Research Service, USDA.

tend to eat different kinds of foods and different amounts when eating out than eating at home (Lin, Guthrie, and Frazao). If the upward trend in eating out continues, we expect food and commodity consumption will change accordingly. Therefore, we paid special attention to modeling the decision to eat out and its effect on the type and amount of food and commodities consumed at home and away from home. We also examined the growth of the at-home and away-from-home segments of the food and commodity markets.

In addition to eating out more frequently, U.S. consumers have also changed their food consumption patterns in reaction to the flood of diet and health information coming out of the Nation's laboratories and research institutions (Variyam and Golan). We therefore tried to model how diet-health knowledge and attitudes are reshaping food consumption.

To our knowledge, no research has been conducted to model the effects of both eating out and diet-health knowledge on food consumption. In this study, eating out and consumers' diet-health knowledge were modeled as two separate equations in the first step of a two-step recursive econometric system. Eating-out behavior was hypothesized to be affected by household characteristics, race and education of the household head, and individual characteristics, as shown below.

$$(4) \qquad FAFH = f(Y, Hsize, Htype, Tenancy, Region, Metro, Edu, Race, Sex, Age, School, Employ, Weekend)$$

where FAFH measures eating out by the individual (subscript is dropped for simplicity). Y is per capita household income. Hsize is the household size. Htype is the type of household structure (single or dual heads, with or without children). Tenancy is the household housing arrangement (own, rent, etc.). Region is the Census region. Metro indicates if the respondent resides in a city, suburb, or rural area. Edu is the education level of the respondent. Race is the race and ethnicity of the household head. Sex is the gender of the respondent. Age is a vector of age classes for the respondent. School indicates if the respondent was in school. Employ indicates the employment status of the respondent. Weekend indicates if the day of food intake was a Saturday or Sunday.

In the 1994-96 CSFII, an adult age 20 or above who provided the first-day intake data was randomly chosen from each household to provide information related to his/her diet-health knowledge and attitude. The data were used to construct a knowledge variable (KNOW) for household heads. This knowledge variable was hypothesized to be affected by the characteristics of the household and the household head (Variyam et al.), as shown below:

$$(5) \qquad KNOW = f(Y, Htype, Region, Metro, Edu, Race, Sex, Hhage, Hemploy)$$

where Hhage is the age of the household head and Hemploy is the percent of household heads employed; other variables were already discussed in equation 4.

The fitted values of the two dependent variables (FAFH and KNOW) from the first step were treated as exogenous variables in the second step, in which a system of food consumption was estimated. We separated food at home and food away from home and estimated two sets of food consumption equations: one set for 25 food groups at home and the other for 25 food groups away from home. By doing so, we were able to estimate the differing effects of exogenous variables (including eating out, knowledge, income, social, and demographic variables) on food consumption at home and away from home. For example, as consumers eat out more, they are likely to eat more french fries away from home but fewer french fries at home. Another advantage of separating food consumed at home and food consumed away from home is to enable us to forecast the growth in food and commodity consumption in these two market segments.

Because CSFII respondents only reported the amount of foods they ate but not the price they paid, price variables in equation 1 were dropped from equation 6.

(6) F = f(FAFH, KNOW, Y, Hsize, Htype, Season, Region, Metro, Race, Sex, Age)

where Season is the season during which the individual's food intake occurred; other variables were already discussed.

For detailed definitions of all variables as well as their descriptive statistics (weighted means and standard deviations) see table 1.

## Estimation Procedure

Food intake data in CSFII were collected for sample persons of all ages, while DHKS data were collected for those age 20 and above who completed the first-day intake recall. Therefore, the DHKS sample is a subset of the CSFII sample. The knowledge variable is included in the food consumption equation 6, which was estimated using the CSFII sample. So, the knowledge variable had to be generated for some CSFII respondents. This was accomplished by fitting the knowledge equation 5 for DHKS respondents who were also household heads. Because personal data for household heads were collected for each CSFII respondent, the data and the fitted knowledge equation were used to generate household heads' knowledge for the whole CSFII sample. The knowledge equation was estimated with the weighted ordinary-least-squares estimator, using the DHKS sample weight.

On any given day, not everyone consumed all the 25 food groups, either at home or away from home. Therefore, a cluster of zero consumption values for eating out and for various food groups was observed in the data—making it necessary to estimate a censored regression model. Any statistical procedure that does not account for zero observations produces inconsistent parameter estimates.

Tobin was the first to propose a censored normal regression model (Tobit model) to deal with censored data in regression. Since the development of Tobit, many censored regression estimators have been proposed, including the maximum-likelihood procedure of Amemiya, Lee, Wales and Wood, and the two-step procedures of Heien and Wessells, Shonkwiler and Yen, and Perali and Chavas.

In this study, we chose the Tobit procedure for its ease of estimation. The Tobit model can be expressed as:

$$(7)\qquad \begin{aligned} q_i &= x'\beta_i+\varepsilon_i \quad \text{if} \quad x'\beta_i+\varepsilon_i > 0 \\ &= 0 \qquad\quad \text{if} \quad x'\beta_i+\varepsilon_i \le 0,\ i = 1, 2, \ldots, n \end{aligned}$$

where $q_i$ denotes the endogenous variable, $x$ is the vector of exogenous variables, and $\varepsilon_i$ is the error term.

The Tobit procedure was used to estimate 50 censored consumption equations (25 food groups, at home and away from home) as well as a separate censored eating-out equation, using the CSFII sample.

**Table 1—Variables used in the two-step recursive system and their descriptive statistics**

| Variable | Definition | Mean | Standard deviation |
|---|---|---|---|
| Eating out | Percent of food consumption, in quantity terms, that was prepared away from home (%) | 22.6 | 22.8 |
| Knowledge | Scores of diet-health knowledge of the household head | 17.2 | 4.1 |
| Income | Household income, per capita (in $1,000) | 14.7 | 11.6 |
| Employment | The respondent's employment status (0, 1) | 0.47 | 0.50 |
| Hemploy | Percent of household heads employed (0, 0.5, 1) | 0.57 | 0.44 |
| Student | The respondent was attending school (0, 1) | 0.18 | 0.39 |
| Weekend | Number of intake days that fell on weekend (0, 1, 2) | 0.57 | 0.57 |
| High school | The respondent completed high school education but did not go to college (0, 1) | 0.27 | 0.44 |
| | Base = respondents who did not finish high school | | |
| Some college | The respondent went to college but did not graduate with a degree (0, 1) | 0.31 | 0.46 |
| College | The respondent completed a college degree (0, 1) | 0.22 | 0.41 |
| Male | The respondent is male (0, 1) | 0.49 | 0.50 |
| Age 0-4 | The respondent is age 0-4 (0, 1) | 0.08 | 0.27 |
| Age 5-9 | The respondent is age 5-9 (0, 1) | 0.07 | 0.26 |
| Age 10-14 | The respondent is age 10-14 (0, 1) | 0.08 | 0.26 |
| Age 15-19 | The respondent is age 15-19 (0, 1) | 0.07 | 0.25 |
| Age 20-29 | The respondent is age 20-29 (0, 1) | 0.14 | 0.35 |
| Age 30-44 | The respondent is age 30-44 (0, 1) | 0.24 | 0.43 |
| Age 45-54 | The respondent is age 45-54 (0, 1) | 0.12 | 0.33 |
| Age 55-64 | The respondent is age 55-64 (0, 1) | 0.08 | 0.27 |
| Age 65-74 | The respondent is age 65-74 (0, 1). Base = respondents age 75 and over | 0.07 | 0.25 |
| HH age 20-34 | The household head is age 20-34 (0, 1) | 0.26 | 0.44 |
| HH age 35-54 | The household head is age 35-54 (0, 1) | 0.48 | 0.50 |
| HH age 55-69 | The household head is age 55-69 (0, 1). Base = respondents age 70 and over | 0.15 | 0.35 |
| Black | The respondent is non-Hispanic Black (0, 1). Base = non-Hispanic White | 0.13 | 0.33 |
| Hispanic | The respondent is Hispanic (0, 1) | 0.11 | 0.31 |
| Asian | The respondent is Asian/Pacific Islander (0, 1) | 0.03 | 0.17 |
| Other | The respondent's race/ethnicity is none of the above nor White (0, 1) | 0.01 | 0.12 |
| HH type1 | The household is dual-headed, with children (0, 1) | 0.48 | 0.50 |
| HH type2 | The household is dual-headed, without children (0, 1) | 0.27 | 0.44 |
| HH type3 | The household is single-headed (either male or female), with children (0, 1) | 0.10 | 0.31 |
| | Base = single-headed households without children | | |
| Midwest | The respondent resides in the Midwestern States (0, 1) | 0.23 | 0.42 |
| South | The respondent resides in the Southern States (0, 1) | 0.35 | 0.48 |
| West | The respondent resides in the Western States (0, 1). Base = Northeast | 0.22 | 0.41 |
| Nonmetro | The respondent resides in a rural area (0, 1) | 0.21 | 0.41 |
| Suburb | The respondent resides in a suburb (0, 1). Base = central city | 0.47 | 0.50 |
| HH size | Number of household members | 3.42 | 1.67 |
| Tenancy | The respondents own their homes (0, 1) | 0.67 | 0.47 |
| Quarter 1 | The first day of intake falls in January - March (0, 1) | 0.25 | 0.43 |
| Quarter 2 | The first day of intake falls in April - June (0, 1) | 0.25 | 0.43 |
| Quarter 3 | The first day of intake falls in July - September (0, 1). Base = October - December | 0.25 | 0.50 |

# Estimation Results

The eating-out equation was fitted with the 1994-96 and 1998 CSFII data, and the knowledge equation was fitted with the 1994-96 CSFII and DHKS data. The results are reported in table 2.

## Eating-Out Equation

Many economic, social, and demographic variables were found to influence an individual's eating-out behavior. In this study, eating out was measured by the percent of food consumption, in terms of physical amounts, prepared away from home. Among the 20,487 individuals included in the analysis, 15,202 of them (74 percent) reported consuming foods that were prepared away from home.

As expected, eating out rose with household income. Also, an individual ate out more when he/she was employed or attending school. Eating out was found to exhibit an inverted U-shape relationship with the education level—those who did not complete high school were treated as the base. Those who went to college but did not complete a college degree ate out the most, and those who completed a college degree ate out the least. It is important to point out that eating out in this study is represented by the percent of food prepared away from home, not by the frequency of eating out or the percent of food expenditures spent away from home. The main purpose of the study is to project the consumption of food and commodities at home and away from home.

Those age 75 and above were treated as the base category for age. Eating out rose initially with age, peaked among those age 15-19, and then declined with age—an inverted U-shape relationship between eating out and age. Men ate out more than women. Compared with Whites, Blacks ate out more, and Hispanics and Asians ate out less. Dual-headed households, with or without children, ate out less than other households. Eating out declined as household sizes increased.

## Diet-Health Knowledge

In the 1994-96 CSFII, 5,765 individuals provided information about their knowledge and attitude toward diet and health. After excluding those with missing information and those who were not household heads, 5,169 respondents were included in the analysis of diet-health knowledge.

**Table 2—Estimated models for eating out and diet-health knowledge of household head**

| | Eating out | | Diet knowledge | |
|---|---|---|---|---|
| Variables | Estimated coefficient | Standard error | Estimated coefficient | Standard error |
| Intercept | -5.35 | 1.31*** | 14.06 | 0.22*** |
| Income | 0.25 | 0.02*** | 0.03 | 0.00*** |
| Employment | 12.45 | 0.55*** | ... | ... |
| Hemploy | ... | ... | 0.22 | 0.15 |
| Student | 3.82 | 1.25*** | ... | .... |
| Weekend | -0.63 | 0.34* | ... | .... |
| High school | 0.34 | 0.61 | 1.73 | 0.15*** |
| Some college | 2.56 | 0.61*** | 2.57 | 0.17*** |
| College | -2.00 | 0.69*** | 3.25 | 0.17*** |
| Male | 2.71 | 0.40*** | -1.68 | 0.11*** |
| Age 0-4 | 7.44 | 1.33*** | ... | .... |
| Age 5-9 | 20.36 | 1.72*** | ... | ... |
| Age 10-14 | 21.02 | 1.78*** | ... | ... |
| Age 15-19 | 24.36 | 1.51*** | ... | ... |
| Age 20-29 | 21.86 | 1.19*** | ... | ... |
| Age 30-44 | 14.42 | 1.17*** | ... | ... |
| Age 45-54 | 9.83 | 1.20*** | ... | ... |
| Age 55-64 | 5.24 | 1.22*** | . | ... |
| Age 65-74 | 3.40 | 1.23*** | ... | ... |
| HH age 20-34 | ... | ... | 0.86 | 0.21*** |
| HH age 35-54 | ... | ... | 1.16 | 0.19*** |
| HH age 55+ | ... | ... | 1.15 | 0.17*** |
| Black | 1.50 | 0.67** | -1.39 | 0.18*** |
| Hispanic | -1.81 | 0.71** | -1.82 | 0.21*** |
| Asian | -1.75 | 1.20 | -2.71 | 0.44*** |
| Other race | -0.55 | 1.67 | -1.26 | 0.49*** |
| HH type1 | -3.76 | 0.84*** | 0.81 | 0.16*** |
| HH type2 | -2.68 | 0.68*** | 0.71 | 0.13*** |
| HH type 3 | 0.37 | 0.96 | -0.03 | 0.24 |
| Midwest | 3.52 | 0.61*** | 0.68 | 0.16*** |
| South | 3.68 | 0.56*** | 0.10 | 0.15 |
| West | 1.21 | 0.63* | 0.01 | 0.17 |
| Nonmetro | -0.74 | 0.58 | 0.21 | 0.14 |
| Suburb | -0.27 | 0.48 | 0.18 | 0.13 |
| HH size | -0.48 | 0.18*** | ... | ... |
| Tenure | 0.78 | 0.48 | ... | ... |
| Quarter 1 | -0.48 | 0.55 | ... | ... |
| Quarter 2 | 0.07 | 0.55 | ... | ... |
| Quarter 3 | -1.87 | 0.55*** | ... | ... |
| Scale | 26.85 | 0.16 | ... | ... |
| N | 20,487 | | 5,169 | |

Note: Significance levels are denoted by *** for 1%, ** for 5%, and * for 10%.
... = variable not included.

The diet-health knowledge variable was constructed from responses to 27 questions in the DHKS. The questions tested the respondents' knowledge of the sources and occurrences of various nutrients in foods, the relationship of specific dietary components to specific diseases, and the number of servings of various food groups in a healthful diet. The number of correct answers to these questions given by a respondent provided a direct measure of his/her diet-health knowledge. The range of the diet-health knowledge scores was 0-27, with a mean of 17.2.

The diet-health knowledge equation has a reasonable fit with an R-squared of 0.23, with most variables being statistically significant at the 5-percent level. As expected, educational attainment had the largest effect among the explanatory variables, and diet-health knowledge rose with education attainment and household income. Men scored lower than women of comparable characteristics. Blacks and Hispanics scored lower than Whites.

Adults from dual-headed households (with or without children) displayed greater diet-health knowledge, compared with adults from single-headed households. Age was a significant determinant of diet-health knowledge: household heads age 70 or above (the base category) scored lower on the diet-health knowledge than younger household heads. The employment status of household heads (measured as percent of household heads being employed) had no influence on the diet-health knowledge.

## Food Consumption

There are 25 food groups classified in this study, separated into at-home and away-from-home consumption. The means and standard deviations for the percent of population consuming and the amount consumed of the 25 food groups at home and away from home are reported in table 3. The estimation involved 50 food consumption equations, using the Tobit procedure. There are 20,487 individuals included in the estimation. Tobit results are summarized in the 25 appendix tables (see pp. 34-58).

As expected, an increase in eating out (that is, a higher portion of all foods eaten out) resulted in a higher consumption of each individual food group away from home. Potatoes were the only exception (app. tables 14 and 15). While increased eating out resulted in higher consumption of fried potatoes and other potatoes away from home, it had no effect on at-home consumption of these two types of potatoes. The effect of diet-health knowledge on food consumption varied by food and source. For example, as diet-health knowledge increased, beef consumption at home and away from home declined (app. table 1), legumes and nut consumption rose both at home and away from home (app. table 17), poultry consumption rose at home but declined away from home (app. table 3), and milk consumption rose at home but stayed the same away from home (app. table 8).

In general, food consumption rose with age among children, peaked among young adults, and declined with age. There are notable exceptions. Compared with other consumers, children age 9 and under drank more milk (app. table 8) and children age 4 and under drank more juices (app. table 12). Seniors showed a strong preference for other potatoes—potatoes other than fried (app. table 15).

Race and ethnicity appear to affect food choices. For example, compared with other groups, Whites drank more milk at home and away from home (app. table 8), Blacks showed a preference for poultry, especially away from home (app. table 3), Asians liked to eat fish at home and away from home (app. table 4), and Hispanics ate more tomatoes at home (app. table 16).

**Table 3—Descriptive statistics of food consumption, at home and away from home, 1994-96 and 1998 CSFII**

| Food group | Percent of consuming population | | | | Consumption quantity | | | |
|---|---|---|---|---|---|---|---|---|
| | At home | | Away from home | | At home | | Away from home | |
| | Mean | Standard deviation | Mean | Standard deviation | Mean | Standard deviation | Mean | Standard deviation |
| | *Percent* | | | | *Grams per capita per day* | | | |
| Meats | | | | | | | | |
| Beef | 27 | 44 | 12 | 32 | 17.3 | 44.3 | 6.7 | 22.8 |
| Pork | 21 | 41 | 6 | 24 | 8.5 | 25.5 | 1.5 | 9.5 |
| Poultry | 27 | 45 | 15 | 36 | 16.8 | 38.2 | 9.3 | 28.4 |
| Fish | 10 | 29 | 6 | 23 | 6.3 | 26.8 | 4.1 | 21.6 |
| Other meat | 43 | 50 | 13 | 34 | 21.1 | 37.5 | 5.3 | 18.5 |
| Meat mixtures | 37 | 48 | 28 | 45 | 61.4 | 119.9 | 38.7 | 85.5 |
| Eggs | 24 | 43 | 7 | 26 | 12.5 | 29.2 | 4.6 | 20.7 |
| Dairy | | | | | | | | |
| Milk | 64 | 48 | 10 | 30 | 167.3 | 220.2 | 15.3 | 61.1 |
| Cheese | 40 | 49 | 15 | 36 | 12.0 | 27.5 | 3.6 | 13.0 |
| Other dairy products | 40 | 49 | 18 | 39 | 51.2 | 123.7 | 19.4 | 63.5 |
| Fats and oils | 62 | 48 | 25 | 43 | 9.6 | 15.7 | 3.9 | 10.9 |
| Fruit | | | | | | | | |
| Fruit juice | 35 | 48 | 7 | 25 | 76.1 | 148.5 | 9.1 | 42.1 |
| Other fruit | 50 | 50 | 11 | 31 | 75.0 | 126.9 | 7.3 | 30.9 |
| Vegetables | | | | | | | | |
| Fried potatoes | 22 | 42 | 27 | 44 | 9.3 | 29.1 | 13.8 | 30.1 |
| Other potatoes | 29 | 45 | 9 | 29 | 28.9 | 65.8 | 7.4 | 29.3 |
| Tomatoes | 41 | 49 | 27 | 44 | 20.9 | 48.7 | 6.9 | 19.0 |
| Legumes and nuts | 30 | 46 | 7 | 26 | 23.5 | 80.5 | 3.8 | 23.3 |
| Other vegetables | 71 | 45 | 33 | 47 | 76.6 | 105.1 | 21.3 | 52.3 |
| Grains | | | | | | | | |
| Breakfast cereals | 40 | 49 | 2 | 13 | 15.2 | 26.3 | 0.4 | 3.2 |
| Grain mixtures | 38 | 49 | 28 | 45 | 71.9 | 134.6 | 35.8 | 82.7 |
| Other grain products | 95 | 22 | 46 | 50 | 144.6 | 131.9 | 28.4 | 51.8 |
| Sweeteners | 62 | 48 | 18 | 39 | 19.7 | 39.2 | 5.1 | 22.8 |
| Coffee and tea | 54 | 50 | 22 | 42 | 301.7 | 492.9 | 77.3 | 220.5 |
| Fruit drinks | 26 | 44 | 5 | 22 | 78.5 | 199.9 | 10.9 | 61.0 |
| Soft drinks | 51 | 50 | 33 | 47 | 204.7 | 337.3 | 118.4 | 243.9 |
| Number of observations | 20,487 | | | | | | | |

# Projections of Food and Commodity Consumption, 2000-2020

The first step in forecasting food and commodity consumption is to project the values of the exogenous economic, social, and demographic variables that affect food consumption. The projected values of some variables are reported in table 4. Values of other exogenous variables that are not in table 4 are assumed to remain constant at the mean values of the sample data, the 1994-96 and 1998 CSFII. These projected exogenous variables were first used to project future values of eating out and diet-health knowledge, and then all the projected variables were used to forecast food consumption in 2000-2020. The food-commodity translation database was used to convert food consumption to commodity consumption.

**Table 4—Projected economic, social, and demographic variables, 2000-2020**

| Variables | 2000 | 2005 | 2010 | 2015 | 2020 |
|---|---|---|---|---|---|
| **Exogenous variables** | | | | | |
| Income | 15.166 | 16.125 | 17.216 | 18.685 | 20.216 |
| High school | 0.352 | 0.345 | 0.339 | 0.332 | 0.326 |
| Some college | 0.241 | 0.248 | 0.255 | 0.263 | 0.270 |
| College | 0.235 | 0.242 | 0.249 | 0.257 | 0.264 |
| No high school | 0.173 | 0.165 | 0.157 | 0.148 | 0.140 |
| Age 0-4 | 0.068 | 0.066 | 0.067 | 0.067 | 0.067 |
| Age 5-9 | 0.073 | 0.068 | 0.066 | 0.066 | 0.067 |
| Age 10-14 | 0.073 | 0.072 | 0.067 | 0.065 | 0.066 |
| Age 15-19 | 0.072 | 0.073 | 0.072 | 0.067 | 0.065 |
| Age 20-29 | 0.135 | 0.137 | 0.140 | 0.140 | 0.133 |
| Age 30-44 | 0.235 | 0.213 | 0.194 | 0.189 | 0.192 |
| Age 45-54 | 0.134 | 0.144 | 0.146 | 0.133 | 0.119 |
| Age 55-64 | 0.086 | 0.102 | 0.116 | 0.126 | 0.129 |
| Age 65-74 | 0.065 | 0.063 | 0.070 | 0.083 | 0.096 |
| Age 75+ | 0.059 | 0.060 | 0.060 | 0.061 | 0.069 |
| Midwest | 0.229 | 0.223 | 0.219 | 0.214 | 0.211 |
| South | 0.356 | 0.358 | 0.360 | 0.361 | 0.363 |
| West | 0.225 | 0.231 | 0.237 | 0.244 | 0.252 |
| Northeast | 0.190 | 0.188 | 0.184 | 0.181 | 0.174 |
| Nonmetro | 0.179 | 0.171 | 0.164 | 0.158 | 0.151 |
| Suburb | 0.493 | 0.504 | 0.514 | 0.523 | 0.532 |
| City | 0.328 | 0.325 | 0.322 | 0.319 | 0.317 |
| Black | 0.124 | 0.125 | 0.127 | 0.128 | 0.129 |
| White | 0.704 | 0.683 | 0.662 | 0.643 | 0.625 |
| Hispanic | 0.126 | 0.141 | 0.155 | 0.167 | 0.180 |
| Asian | 0.039 | 0.044 | 0.049 | 0.053 | 0.058 |
| Other race | 0.007 | 0.007 | 0.007 | 0.009 | 0.008 |
| HH type1 | 0.235 | 0.218 | 0.198 | 0.183 | 0.167 |
| HH type2 | 0.281 | 0.290 | 0.297 | 0.306 | 0.314 |
| HH type3 | 0.092 | 0.091 | 0.090 | 0.089 | 0.087 |
| **Predicted eating out and knowledge** | | | | | |
| Eating out | 22.939 | 22.978 | 23.033 | 23.148 | 23.336 |
| Knowledge | 16.954 | 16.963 | 16.974 | 17.006 | 17.041 |

Note: See table 1 for units of measurement.

## Economic, Social, and Demographic Variables, 2000-2020

We assumed that real household income would grow by 1 percent annually between 2000 and 2020, using the mean household income in the sample data, 1994-98. This growth level is conservative, compared with an observed average increase of 1.8 percent per year during 1978-88 and 1.2 percent annually during 1988-98.

The design of the 1994-96 and 1998 CSFII was based on the 1990 Census results, which were used by the U.S. Census Bureau project the current population and households. However, the 2000 Census results show the United States has been undergoing rapid demographic expansion. The prospect of a dynamic demographic future, setting the United States apart from most other industrialized countries, is the result of a high tide of immigration that began rising in the 1960s and shows no signs of diminishing in the near future. Therefore, we modified population, household, and education projections used in this study from Census projections (see box, "Modification of Census Population, Household, and Education Projections," p. 13). Over the 2000-2020 period, the proportions of Blacks, Asians, and, especially, Hispanics in the U.S. population are expected to increase, while the proportion of Whites declines (fig. 3).

Over the two decades, the Hispanic population is expected to grow by 1.2 million annually, compared with an annual growth of 500,000 among non-Hispanic Whites and 400,000 each among Blacks and Asians. Growth among Whites, Blacks, and Native Americans is expected to come largely from natural increase (births minus deaths), while growth among the Hispanic and Asian populations is expected to come from a combination of natural increase and immigration. Higher birth, death, and immigration rates all contribute to a younger age structure among minority populations and, consequently, a built-in growth momentum. We assumed that the U.S. population will grow by about 50 million, from 281.4 million in 2000 to 331.9 million in 2020.

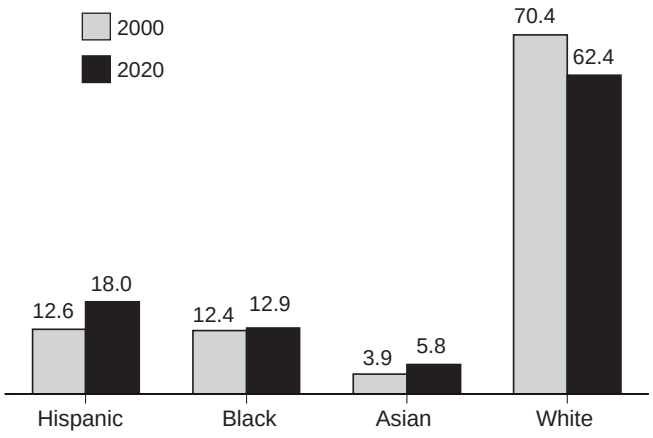
The regional population distribution will also change. The Northeast will decline from 19 percent of the

population in 2000 to 17.4 percent in 2020. Likewise, the North Central will decline from 22.9 percent in 2000 to 21.1 percent in 2020. Over the same period, the South will increase from 35.6 to 36.3 percent, while the West will increase from 22.5 to 25.2 percent.

Age distribution, expressed as a share of the total population, will change to reflect the aging of U.S. population (fig. 4). The proportion of the population age 20-29 will decline from 13.5 to 13.3 percent between 2000 and 2020, while the proportion of the population age 30-44 will decline from 23.5 to 19.2 percent. With the aging of the baby boom generation, whose members currently range in age from 37 to 55, the proportion of the population age 45-64 will increase from 22 to 24.8 percent over the next two decades. Likewise, the proportion of the population age 65-74 will increase from 6.5 to 9.6 percent and the population over age 74 will increase from 5.9 percent of the total population in 2000 to 6.9 percent in 2020. Without another baby boom, the U.S. population under age 18 will increase by 7 million by 2020 but decline as a percentage of the total.

Figure 3
**Racial and ethnic distribution of the U.S. population, 2000-2020**

Percent of population



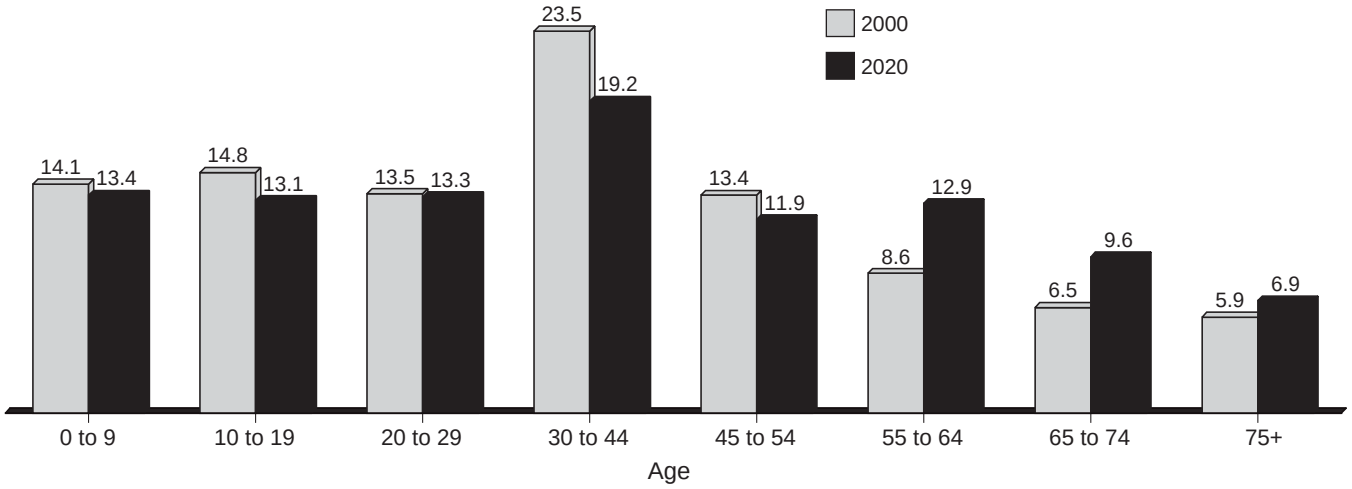

Source: U.S. Census Bureau, adjusted by ERS.

The rate of household formation in the United States has exceeded population growth for decades, resulting in a steady decrease in the average household size. At the same time, the share of U.S. households consisting of a married couple with children has declined, while the share of single-person households has risen. Average household size will continue to shrink over the next two decades, dropping below 2.4 persons by 2020 as the number of "empty nest" households rises from 28 to 31 percent. The aging of the U.S. population will also contribute to a higher proportion of single-person households.

Educational progress in the United States has been one of the demographic hallmarks of the past century, as the share of the population completing high school rose from 40 to 83 percent and the share of those with college degrees rose from 10 to 23 percent. Average educational attainment has advanced over the past

Figure 4
**Aging of the U.S. population, 2000-2020**

Percent of population




Source: U.S. Census Bureau, adjusted by ERS.

## Modification of Census Population, Household, and Education Projections

Population, household, and education projections used in this study are modified versions of projections from the U.S. Census Bureau (Hollman et al., Day, and Day and Bauman). The Census population series includes projections by single year of age, sex, race, Hispanic origin, and nativity (foreign-born or native) out to the year 2100. The number of households by type (family/non-family; with and without children; married/not married; living alone) was projected out to 2010.

Educational attainment projections by sex and race are available to 2028. These projections are not intended as forecasts or predictions, but represent the results of assumptions about future trends in population change, household formation, schooling, and the economy at large. In the case of the population series, projections are based on assumptions about fertility, mortality, and immigration.

The current population and household projections provided by the U.S. Census Bureau are based on the 1990 Census, as enumerated, and postcensal estimates up through 1999. The number of people counted in the 2000 Census was 6 million more than anticipated by the estimates (281 million versus 275 million). Various factors undoubtedly contributed to the higher count, including a more complete count in 2000 than in 1990 and a possibility of more duplications in 2000.

Any statement about the relative importance of different factors at this point is speculative. It is likely that the level of unauthorized immigration, clearly the most difficult component of the population equation to keep tabs on, was significantly higher than expected. To account for these discrepancies, population and household projections were multiplied by the ratio of the 2000 Census result and the 2000 projection. For instance, the 2000 Census showed 39.9 million people age 24 to 29, and the projection was 37.4 million, for a ratio of 1.06. Projections for that age group for 2010 and 2020 were multiplied by 1.06.

several decades, in part, because older, less educated generations have been replaced by more educated younger generations. Generational replacement effects have diminished, but it is also reasonable to assume that college attendance will continue to rise, especially among women, and that overall education levels among the rapidly increasing foreign-born population will rise toward the higher levels seen in native-born population groups of the same race and ethnic background. Thus, by 2020, a projected 86 percent of the U.S. population will have a high school degree and 26 percent will have completed college (fig. 5).

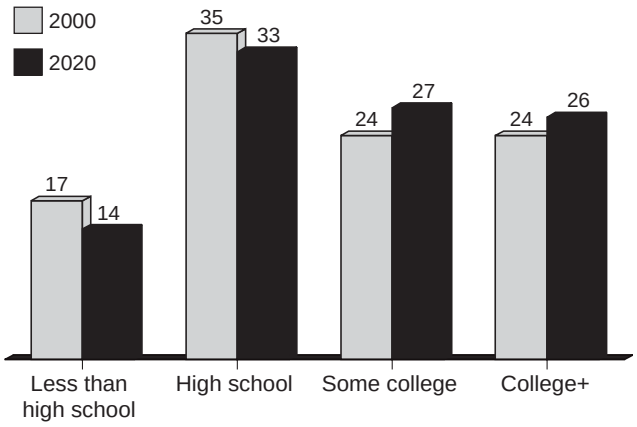
## Assumptions Underlying the Forecasts

We made two assumptions for projection purposes. First, the analysis is based on a cross-section of data collected over a short period of time. Given no price information from the survey, we had to drop prices from the consumption equations. As such, relative prices are assumed the same for all households. Thus, the observed consumption behavior is for a fixed set of food and nonfood prices. As supply and demand conditions change over time, relative prices will change and the consumption patterns suggested here could be quite different. However, with the inclusion of regional and seasonal dummy variables in the model, systematic price variations by region and season should have been captured.

Second, there is an implicit assumption that as any individual moves from one demographic group to

Figure 5
**Educational attainment of the U.S. population, 2000-2020**

Percent of population




Source: U.S. Census Bureau, adjusted by ERS.

another, his/her preferences immediately take on the characteristics of the new group. For example, the eating habits of those living in the South in the year 2000 are assumed to continue into the year 2020. Similarly, younger age groups will assume the eating habits of older age groups as they age.

We made these two assumptions in forecasting food and commodity consumption for the five periods between 2000 and 2020—the base scenario. However, a sensitivity analysis can be conducted to examine the effect of relaxing the second assumption. There are many demographic characteristics incorporated in the analysis, so there are many alternative scenarios possible for conducting sensitivity analyses. In this study, we focused on the relationship between eating out and age.

As shown earlier, eating out exhibits an inverted U shape with respect to age. The popularity in eating out rises with age among children, peaks among those age 14-19, and declines with age among adults. In the sensitivity analysis, we assumed that in 2020, consumers age 45 and over will eat out as much as those in the 30-44 age group—the alternative scenario. Differences in the predicted consumption between the base and alternative scenarios would indicate how sensitive predicted consumption is to the assumption about eating out.

## Projections of Food Consumption, 2000-2020

The response of the endogenous variable in a Tobit model to changes in the exogenous variables can be decomposed into two components (McDonald and Moffitt). Using the eating-out model as an example, a change in exogenous variables will affect the probability that a respondent will eat out as well as the total amount of eating out. The forecast values of eating out after incorporating the two components are reported in table 4. The projected exogenous economic, social, and demographic variables together with the forecast eating out and diet-health knowledge were then fitted into the 50 Tobit equations to forecast food consumption at home and away from home, on a per capita basis. The projected per capita food consumption at home and away from home, in grams, is given in table 5.

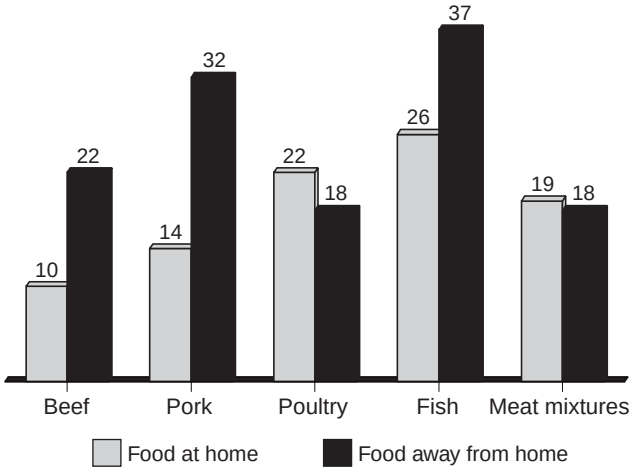
To show the projected changes in per capita food consumption, we indexed the projections, treating the 2000 consumption as the base (table 6). The per capita consumption of fish, fruit juice, other fruit, tomatoes, legumes and nuts, other vegetables, and other grain products is projected to increase both at home and away from home. But, the per capita consumption of milk, cheese, fried potatoes, and soft drinks is projected to decline both at home and away from home. The per capita consumption of beef, pork, eggs, fats and oils, other potatoes, and grain mixtures is projected to decline at home but rise away from home.

Even though the per capita consumption of some foods is projected to decline, the total U.S. consumption of all 25 food groups is projected to increase both at home and away from home. This is because the U.S. population is projected to grow from 281 million in 2000 to 332 million in 2020. Figures in table 7 show the growth of the two market components, with the 2000 figures as the base. Take the meat group as an example: the growth of the away-from-home markets for beef, pork, fish, and other meat was predicted to outpace the growth of the at-home markets (fig. 6). But, the growth of the at-home markets for poultry and meat mixtures was predicted to exceed their away-from-home counterparts.

We also report shares of the at-home and away-from-home market components for all food groups (table 8), and these shares indicate the relative growth of these two markets. For example, the growth of the away-from-home fried-potato market was predicted to outpace its at-home counterpart, so the dominance of the away-from-home market will be reinforced over time. As shown in figure 7, the market shares for the meat group were predicted to be quite stable over time, with the

Figure 6
**Total U.S. consumption of meat groups**

Percent change, 2000-2020




Source: Economic Research Service, USDA.

**Table 5—Projected per capita daily food consumption, at home and away from home, 2000-2020**

| | 2000 | | 2005 | | 2010 | | 2015 | | 2020 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Food group | At home | Away | At home | Away | At home | Away | At home | Away | At home | Away |
| | | | | | *Grams* | | | | | |
| Meats | | | | | | | | | | |
| Beef | 16.62 | 5.63 | 16.42 | 5.67 | 16.13 | 5.72 | 15.82 | 5.76 | 15.49 | 5.81 |
| Pork | 7.83 | 1.40 | 7.81 | 1.44 | 7.77 | 1.48 | 7.70 | 1.52 | 7.60 | 1.57 |
| Poultry | 16.15 | 8.58 | 16.29 | 8.55 | 16.42 | 8.53 | 16.54 | 8.54 | 16.66 | 8.58 |
| Fish | 6.16 | 3.57 | 6.26 | 3.71 | 6.37 | 3.85 | 6.49 | 4.00 | 6.58 | 4.14 |
| Other meat | 20.92 | 5.02 | 20.51 | 4.96 | 20.06 | 4.90 | 19.62 | 4.87 | 19.17 | 4.85 |
| Meat mixtures | 58.54 | 36.11 | 58.85 | 36.02 | 58.98 | 35.89 | 59.00 | 35.91 | 59.02 | 36.02 |
| Eggs | 11.22 | 3.87 | 11.29 | 3.91 | 11.31 | 3.95 | 11.21 | 3.99 | 11.05 | 4.03 |
| Dairy | | | | | | | | | | |
| Milk | 170.03 | 11.74 | 168.60 | 11.58 | 167.48 | 11.42 | 167.05 | 11.32 | 167.22 | 11.32 |
| Cheese | 12.86 | 3.45 | 12.79 | 3.40 | 12.74 | 3.35 | 12.76 | 3.32 | 12.77 | 3.32 |
| Other dairy products | 55.07 | 20.15 | 55.00 | 19.94 | 55.18 | 19.73 | 55.69 | 19.64 | 56.28 | 19.79 |
| Fats and oils | 10.42 | 3.78 | 10.38 | 3.82 | 10.32 | 3.87 | 10.29 | 3.94 | 10.25 | 4.00 |
| Fruit | | | | | | | | | | |
| Fruit juice | 75.58 | 7.89 | 77.02 | 7.91 | 78.69 | 7.94 | 80.59 | 7.95 | 82.34 | 8.02 |
| Other fruit | 73.71 | 7.30 | 75.74 | 7.35 | 78.17 | 7.44 | 81.26 | 7.57 | 84.18 | 7.75 |
| Vegetables | | | | | | | | | | |
| Fried potatoes | 8.59 | 11.77 | 8.37 | 11.56 | 8.13 | 11.34 | 7.90 | 11.11 | 7.68 | 10.99 |
| Other potatoes | 26.39 | 5.95 | 26.13 | 5.97 | 25.79 | 6.01 | 25.48 | 6.05 | 25.09 | 6.07 |
| Tomatoes | 23.58 | 7.05 | 23.85 | 7.10 | 24.12 | 7.15 | 24.46 | 7.23 | 24.72 | 7.33 |
| Legumes and nuts | 27.65 | 3.50 | 27.98 | 3.57 | 28.34 | 3.67 | 28.66 | 3.79 | 28.98 | 3.94 |
| Other vegetables | 81.97 | 22.83 | 82.73 | 23.26 | 83.46 | 23.72 | 84.33 | 24.30 | 85.00 | 24.92 |
| Grains | | | | | | | | | | |
| Breakfast cereals | 14.64 | 0.20 | 14.58 | 0.20 | 14.56 | 0.20 | 14.65 | 0.20 | 14.81 | 0.20 |
| Grain mixtures | 70.17 | 31.38 | 69.32 | 31.34 | 68.45 | 31.24 | 67.39 | 31.28 | 66.54 | 31.57 |
| Other grain products | 152.65 | 30.34 | 153.77 | 30.67 | 154.58 | 31.03 | 155.18 | 31.52 | 155.81 | 32.12 |
| Sweeteners | 22.96 | 6.13 | 22.78 | 6.12 | 22.58 | 6.11 | 22.45 | 6.12 | 22.34 | 6.14 |
| Coffee and tea | 248.17 | 50.78 | 249.83 | 52.26 | 250.08 | 53.58 | 249.86 | 55.13 | 247.16 | 56.20 |
| Fruit drinks | 73.02 | 7.77 | 71.79 | 7.79 | 70.60 | 7.78 | 69.07 | 7.74 | 67.91 | 7.75 |
| Soft drinks | 195.40 | 90.43 | 193.00 | 89.24 | 189.36 | 87.70 | 185.56 | 86.24 | 182.25 | 85.32 |

exception of fish, which was predicted to experience a surge in the share of the away-from-home market.

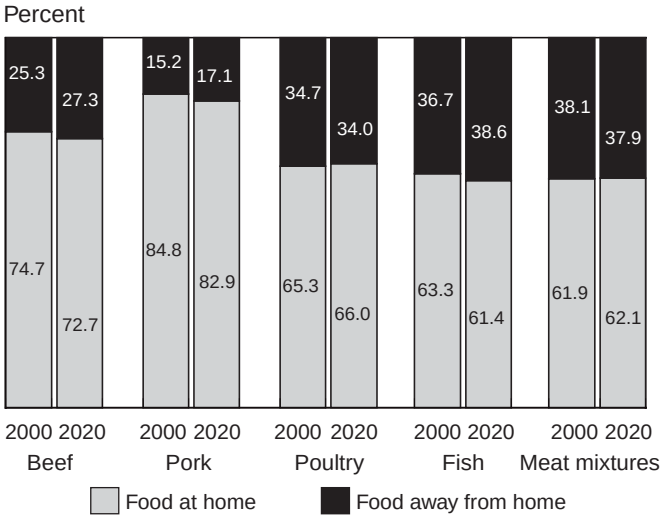
The at-home and away-from-home figures were aggregated into total food consumption, which was then indexed with the 2000 level as the base (table 9). Fish and fruits are predicted to lead the increase in total consumption, with about 30-percent growth over the next two decades. The consumption of fried potatoes, other meat, fruit drinks, and soft drinks is predicted to experience the smallest growth, no more than 10 percent over the next two decades.

## Projections of Commodity Consumption, 2000-2020

The projections of food consumption are measured in terms of edible weights, and represent the aggregated

Figure 7

**Market share of meat group, 2000-2020: At home versus away from home**




Source: Economic Research Service, USDA.

**Table 6—Index of projected per capita daily food consumption, at home and away from home, 2000-2020**

| | 2000 | | 2005 | | 2010 | | 2015 | | 2020 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Food group | At home | Away | At home | Away | At home | Away | At home | Away | At home | Away |
| | | | | | *2000=100* | | | | | |
| Meats | | | | | | | | | | |
| Beef | 100 | 100 | 99 | 101 | 97 | 102 | 95 | 102 | 93 | 103 |
| Pork | 100 | 100 | 100 | 103 | 99 | 106 | 98 | 109 | 97 | 112 |
| Poultry | 100 | 100 | 101 | 100 | 102 | 99 | 102 | 100 | 103 | 100 |
| Fish | 100 | 100 | 102 | 104 | 103 | 108 | 105 | 112 | 107 | 116 |
| Other meat | 100 | 100 | 98 | 99 | 96 | 98 | 94 | 97 | 92 | 97 |
| Meat mixtures | 100 | 100 | 101 | 100 | 101 | 99 | 101 | 99 | 101 | 100 |
| Eggs | 100 | 100 | 101 | 101 | 101 | 102 | 100 | 103 | 98 | 104 |
| Dairy | | | | | | | | | | |
| Milk | 100 | 100 | 99 | 99 | 99 | 97 | 98 | 96 | 98 | 96 |
| Cheese | 100 | 100 | 99 | 99 | 99 | 97 | 99 | 96 | 99 | 96 |
| Other dairy products | 100 | 100 | 100 | 99 | 100 | 98 | 101 | 97 | 102 | 98 |
| Fats and oils | 100 | 100 | 100 | 101 | 99 | 102 | 99 | 104 | 98 | 106 |
| Fruit | | | | | | | | | | |
| Fruit juice | 100 | 100 | 102 | 100 | 104 | 101 | 107 | 101 | 109 | 102 |
| Other fruit | 100 | 100 | 103 | 101 | 106 | 102 | 110 | 104 | 114 | 106 |
| Vegetables | | | | | | | | | | |
| Fried potatoes | 100 | 100 | 97 | 98 | 95 | 96 | 92 | 94 | 89 | 93 |
| Other potatoes | 100 | 100 | 99 | 100 | 98 | 101 | 97 | 102 | 95 | 102 |
| Tomatoes | 100 | 100 | 101 | 101 | 102 | 101 | 104 | 103 | 105 | 104 |
| Legumes and nuts | 100 | 100 | 101 | 102 | 102 | 105 | 104 | 108 | 105 | 113 |
| Other vegetables | 100 | 100 | 101 | 102 | 102 | 104 | 103 | 106 | 104 | 109 |
| Grains | | | | | | | | | | |
| Breakfast cereals | 100 | 100 | 100 | 100 | 99 | 100 | 100 | 100 | 101 | 100 |
| Grain mixtures | 100 | 100 | 99 | 100 | 98 | 100 | 96 | 100 | 95 | 101 |
| Other grain products | 100 | 100 | 101 | 101 | 101 | 102 | 102 | 104 | 102 | 106 |
| Sweeteners | 100 | 100 | 99 | 100 | 98 | 100 | 98 | 100 | 97 | 100 |
| Coffee and tea | 100 | 100 | 101 | 103 | 101 | 106 | 101 | 109 | 100 | 111 |
| Fruit drinks | 100 | 100 | 98 | 100 | 97 | 100 | 95 | 100 | 93 | 100 |
| Soft drinks | 100 | 100 | 99 | 99 | 97 | 97 | 95 | 95 | 93 | 94 |

weights of various foods classified under the same group. For example, the “meat mixtures” food group includes about 1,000 different foods reported eaten in the 1994-96 and 1998 CSFII. The “beef” food group includes different cuts of beef and beef prepared by different cooking methods. Furthermore, beef is an ingredient in many foods that are classified under meat mixtures, a group separate from the beef group. Clearly, the projections of food consumption by food groups offer limited use to those who are interested in commodity consumption.

In this study, we translated food consumption into commodity consumption, which is expressed in terms of farm- or retail-level weight. We developed the translation database using EPA’s Food Commodity Intake Database, USDA’s Pyramid Servings Database, and a conversion-factor database developed for this study. The translation database can be used to derive commodity consumption, commodity by commodity. In this study, commodities having minor shares of total farm receipts were aggregated into groups, resulting in 22 commodity groups. For each physical unit of a food group, we calculated the mean amount of each commodity included. The commodity content of food may vary by its source—at home and away from home. In an attempt to improve forecasting accuracy, we derived two sets of mean commodity

**Table 7—Index of projected total U.S. food consumption, at home and away from home, 2000-2020**

| | 2000 | | 2005 | | 2010 | | 2015 | | 2020 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Food group | At home | Away | At home | Away | At home | Away | At home | Away | At home | Away |
| | | | | | *2000=100* | | | | | |
| Meats | | | | | | | | | | |
| Beef | 100 | 100 | 103 | 105 | 106 | 111 | 108 | 116 | 110 | 122 |
| Pork | 100 | 100 | 104 | 107 | 108 | 115 | 111 | 123 | 114 | 132 |
| Poultry | 100 | 100 | 105 | 104 | 111 | 108 | 116 | 113 | 122 | 118 |
| Fish | 100 | 100 | 106 | 109 | 113 | 117 | 119 | 127 | 126 | 137 |
| Other meat | 100 | 100 | 102 | 103 | 104 | 106 | 106 | 110 | 108 | 114 |
| Meat mixtures | 100 | 100 | 105 | 104 | 110 | 108 | 114 | 113 | 119 | 118 |
| Eggs | 100 | 100 | 105 | 106 | 110 | 111 | 113 | 117 | 116 | 123 |
| Dairy | | | | | | | | | | |
| Milk | 100 | 100 | 104 | 103 | 107 | 106 | 111 | 109 | 116 | 114 |
| Cheese | 100 | 100 | 104 | 103 | 108 | 106 | 112 | 109 | 117 | 114 |
| Other dairy products | 100 | 100 | 104 | 103 | 109 | 107 | 115 | 111 | 121 | 116 |
| Fats and oils | 100 | 100 | 104 | 106 | 108 | 111 | 112 | 118 | 116 | 125 |
| Fruit | | | | | | | | | | |
| Fruit juice | 100 | 100 | 106 | 105 | 113 | 110 | 121 | 114 | 129 | 120 |
| Other fruit | 100 | 100 | 107 | 105 | 115 | 111 | 125 | 118 | 135 | 125 |
| Vegetables | | | | | | | | | | |
| Fried potatoes | 100 | 100 | 102 | 103 | 103 | 105 | 104 | 107 | 105 | 110 |
| Other potatoes | 100 | 100 | 103 | 105 | 106 | 110 | 109 | 115 | 112 | 120 |
| Tomatoes | 100 | 100 | 106 | 105 | 111 | 110 | 118 | 116 | 124 | 123 |
| Legumes and nuts | 100 | 100 | 106 | 107 | 112 | 114 | 118 | 123 | 124 | 133 |
| Other vegetables | 100 | 100 | 105 | 106 | 111 | 113 | 117 | 121 | 122 | 129 |
| Grains | | | | | | | | | | |
| Breakfast cereals | 100 | 100 | 104 | 104 | 108 | 109 | 113 | 113 | 119 | 118 |
| Grain mixtures | 100 | 100 | 103 | 104 | 106 | 108 | 109 | 113 | 112 | 119 |
| Other grain products | 100 | 100 | 105 | 106 | 110 | 111 | 115 | 118 | 120 | 125 |
| Sweeteners | 100 | 100 | 99 | 100 | 98 | 100 | 98 | 100 | 97 | 100 |
| Coffee and tea | 100 | 100 | 101 | 103 | 101 | 106 | 101 | 109 | 100 | 111 |
| Fruit drinks | 100 | 100 | 98 | 100 | 97 | 100 | 95 | 100 | 93 | 100 |
| Soft drinks | 100 | 100 | 99 | 99 | 97 | 97 | 95 | 95 | 93 | 94 |

content, one for at home and the other for away from home. Each 100 grams of at-home grain mixture, for example, contains an average of 28 grams of tomatoes, 22 grams of grain, 8 grams of other vegetables, 4 grams of beef, 4 grams of nuts and seeds, and some amounts of 17 other commodities. The mean commodity contents for all food groups are not reported here, but are available upon request.

The amount of each commodity predicted for at-home and away-from-home consumption per person per day is presented in table 10. Consumption of milk, cheese, and yogurt is expressed in terms of servings, while consumption of all other commodities is expressed in grams. Total per capita daily consumption of the 22 commodities is the sum of at-home and away-from-home consumption (table 11).

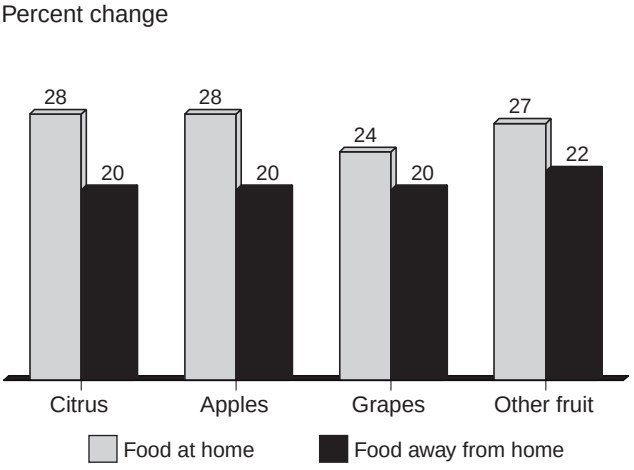
To facilitate an easier understanding of the growth of the at-home, away-from-home, and total commodity markets over the next two decades, table 12 presents only the figures for the beginning and ending years—2000 and 2020. Fruits are predicted to lead all commodities in the growth of the at-home market, with a 24-28 percent growth (fig. 8), followed by a 23-percent increase for fish, 22 percent for lettuce, and 21 percent for nuts and seeds as well as other vegetables. Fried potatoes consumed at home are predicted to grow the least, by only 5 percent. Fried potatoes consumed away from home are also predicted to experience slow growth—

**Table 8—Relative shares of projected food consumption at home and away from home, 2000-2020**

| | 2000 | | 2005 | | 2010 | | 2015 | | 2020 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Food group | At home | Away | At home | Away | At home | Away | At home | Away | At home | Away |
| | | | | | *Percent* | | | | | |
| Meats | | | | | | | | | | |
| Beef | 74.70 | 25.30 | 74.33 | 25.67 | 73.84 | 26.16 | 73.31 | 26.69 | 72.72 | 27.28 |
| Pork | 84.84 | 15.16 | 84.47 | 15.53 | 84.03 | 15.97 | 83.47 | 16.53 | 82.89 | 17.11 |
| Poultry | 65.30 | 34.70 | 65.58 | 34.42 | 65.79 | 34.21 | 65.94 | 34.06 | 65.99 | 34.01 |
| Fish | 63.33 | 36.67 | 62.81 | 37.19 | 62.32 | 37.68 | 61.87 | 38.13 | 61.36 | 38.64 |
| Other meat | 80.64 | 19.36 | 80.54 | 19.46 | 80.38 | 19.62 | 80.12 | 19.88 | 79.81 | 20.19 |
| Meat mixtures | 61.85 | 38.15 | 62.03 | 37.97 | 62.17 | 37.83 | 62.16 | 37.84 | 62.10 | 37.90 |
| Eggs | 74.36 | 25.64 | 74.30 | 25.70 | 74.10 | 25.90 | 73.73 | 26.27 | 73.30 | 26.70 |
| Dairy | | | | | | | | | | |
| Milk | 93.54 | 6.46 | 93.57 | 6.43 | 93.62 | 6.38 | 93.66 | 6.34 | 93.66 | 6.34 |
| Cheese | 78.86 | 21.14 | 79.02 | 20.98 | 79.18 | 20.82 | 79.36 | 20.64 | 79.38 | 20.62 |
| Other dairy products | 73.21 | 26.79 | 73.39 | 26.61 | 73.67 | 26.33 | 73.93 | 26.07 | 73.99 | 26.01 |
| Fats and oils | 73.40 | 26.60 | 73.07 | 26.93 | 72.71 | 27.29 | 72.34 | 27.66 | 71.93 | 28.07 |
| Fruit | | | | | | | | | | |
| Fruit juice | 90.54 | 9.46 | 90.69 | 9.31 | 90.83 | 9.17 | 91.02 | 8.98 | 91.13 | 8.87 |
| Other fruit | 90.99 | 9.01 | 91.15 | 8.85 | 91.31 | 8.69 | 91.48 | 8.52 | 91.57 | 8.43 |
| Vegetables | | | | | | | | | | |
| Fried potatoes | 42.20 | 57.80 | 41.99 | 58.01 | 41.75 | 58.25 | 41.54 | 58.46 | 41.14 | 58.86 |
| Other potatoes | 81.61 | 18.39 | 81.39 | 18.61 | 81.11 | 18.89 | 80.81 | 19.19 | 80.52 | 19.48 |
| Tomatoes | 76.97 | 23.03 | 77.06 | 22.94 | 77.14 | 22.86 | 77.19 | 22.81 | 77.12 | 22.88 |
| Legumes and nuts | 88.77 | 11.23 | 88.68 | 11.32 | 88.55 | 11.45 | 88.33 | 11.67 | 88.04 | 11.96 |
| Other vegetables | 78.21 | 21.79 | 78.05 | 21.95 | 77.87 | 22.13 | 77.63 | 22.37 | 77.33 | 22.67 |
| Grains | | | | | | | | | | |
| Breakfast cereals | 98.68 | 1.32 | 98.67 | 1.33 | 98.66 | 1.34 | 98.66 | 1.34 | 98.66 | 1.34 |
| Grain mixtures | 69.10 | 30.90 | 68.87 | 31.13 | 68.66 | 31.34 | 68.30 | 31.70 | 67.82 | 32.18 |
| Other grain products | 83.42 | 16.58 | 83.37 | 16.63 | 83.28 | 16.72 | 83.12 | 16.88 | 82.91 | 17.09 |
| Sweeteners | 78.93 | 21.07 | 78.82 | 21.18 | 78.70 | 21.30 | 78.59 | 21.41 | 78.43 | 21.57 |
| Coffee and tea | 83.01 | 16.99 | 82.70 | 17.30 | 82.35 | 17.65 | 81.92 | 18.08 | 81.47 | 18.53 |
| Fruit drinks | 90.38 | 9.62 | 90.21 | 9.79 | 90.07 | 9.93 | 89.92 | 10.08 | 89.76 | 10.24 |
| Soft drinks | 68.36 | 31.64 | 68.38 | 31.62 | 68.35 | 31.65 | 68.27 | 31.73 | 68.11 | 31.89 |

Figure 8

**Growth of fruit consumption, 2000-2020, at home versus away from home**




Source: Economic Research Service, USDA.

10 percent over the next two decades (fig. 9). Fish is predicted to lead in the growth of the away-from-home commodity market, with a 30-percent increase (fig. 10).

Table 12 also shows the shares of at-home and away-from-home markets for the 22 commodities for 2000 and 2020. In general, the shifts between at-home and away-from-home market shares are quite small. For meats, only poultry is predicted to have a shrinking away-from-home market, although the decrease is quite small. A small decline in the away-from-home market share is also predicted for citrus fruits and apples. No change in the distribution of market shares is predicted for all dairy products, grapes, other fruits, nuts and seeds, other potatoes, tomatoes, other vegetables, grains, and sugar.

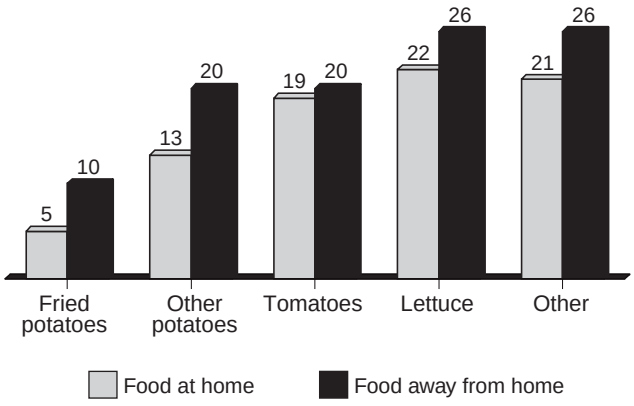
**Table 9—Index of projected total food consumption, 2000-2020**

| Food group | 2000 | 2005 | 2010 | 2015 | 2020 |
|---|---|---|---|---|---|
| | | | *2000=100* | | |
| Meats | | | | | |
| Beef | 100 | 104 | 107 | 110 | 113 |
| Pork | 100 | 105 | 109 | 113 | 117 |
| Poultry | 100 | 105 | 110 | 115 | 120 |
| Fish | 100 | 107 | 114 | 122 | 130 |
| Other meat | 100 | 103 | 105 | 107 | 109 |
| Meat mixtures | 100 | 105 | 109 | 114 | 118 |
| Eggs | 100 | 105 | 110 | 114 | 118 |
| Dairy | | | | | |
| Milk | 100 | 104 | 107 | 111 | 116 |
| Cheese | 100 | 104 | 107 | 112 | 116 |
| Other dairy products | 100 | 104 | 108 | 114 | 119 |
| Fats and oils | 100 | 104 | 109 | 114 | 118 |
| Fruit | | | | | |
| Fruit juice | 100 | 106 | 113 | 120 | 128 |
| Other fruit | 100 | 107 | 115 | 124 | 134 |
| Vegetables | | | | | |
| Fried potatoes | 100 | 102 | 104 | 106 | 108 |
| Other potatoes | 100 | 104 | 107 | 111 | 114 |
| Tomatoes | 100 | 106 | 111 | 117 | 123 |
| Legumes and nuts | 100 | 106 | 112 | 118 | 125 |
| Other vegetables | 100 | 106 | 111 | 118 | 124 |
| Grains | | | | | |
| Breakfast cereals | 100 | 104 | 108 | 113 | 119 |
| Grain mixtures | 100 | 104 | 107 | 110 | 114 |
| Other grain products | 100 | 105 | 110 | 116 | 121 |
| Sweeteners | 100 | 104 | 107 | 111 | 116 |
| Coffee and tea | 100 | 106 | 111 | 116 | 120 |
| Fruit drinks | 100 | 103 | 106 | 108 | 110 |
| Soft drinks | 100 | 103 | 106 | 108 | 110 |

Figure 9

**Growth of vegetable consumption, 2000-2020, at home versus away from home**

Percent change

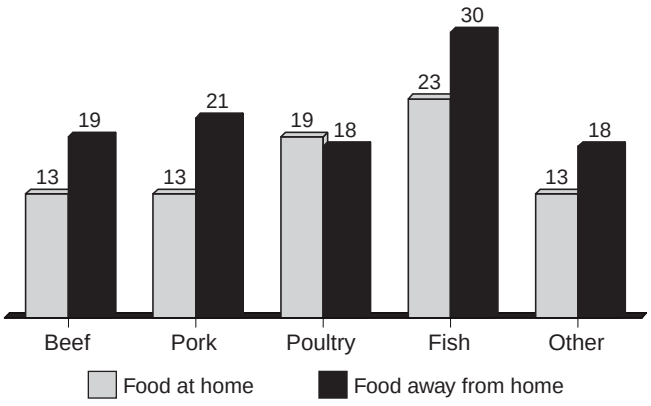



Source: Economic Research Service, USDA.

Figure 10

**Growth of meat consumption, 2000-2020, at home versus away from home**

Percent change




Source: Economic Research Service, USDA.

**Table 10—Projected per capita daily commodity consumption, at home and away from home, 2000-2020**

| | 2000 | | 2005 | | 2010 | | 2015 | | 2020 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Commodity group | At home | Away | At home | Away | At home | Away | At home | Away | At home | Away |
| Meats (grams)[1] | | | | | | | | | | |
| Beef | 33.55 | 16.88 | 33.28 | 16.88 | 32.89 | 16.88 | 32.45 | 16.92 | 32.00 | 17.01 |
| Pork | 18.35 | 4.96 | 18.19 | 4.98 | 17.99 | 4.99 | 17.76 | 5.04 | 17.51 | 5.09 |
| Poultry | 25.81 | 11.93 | 25.89 | 11.89 | 25.93 | 11.86 | 25.95 | 11.86 | 25.97 | 11.91 |
| Fish | 7.96 | 4.15 | 8.06 | 4.26 | 8.15 | 4.36 | 8.25 | 4.48 | 8.32 | 4.59 |
| Other meat | 1.02 | 0.31 | 1.01 | 0.31 | 1.00 | 0.31 | 0.99 | 0.31 | 0.98 | 0.31 |
| Eggs (grams) | 15.61 | 4.35 | 15.69 | 4.39 | 15.72 | 4.44 | 15.63 | 4.49 | 15.49 | 4.54 |
| Dairy (servings) | | | | | | | | | | |
| Milk | 0.88 | 0.13 | 0.88 | 0.13 | 0.87 | 0.13 | 0.87 | 0.13 | 0.87 | 0.13 |
| Cheese | 0.29 | 0.17 | 0.29 | 0.17 | 0.29 | 0.17 | 0.29 | 0.17 | 0.29 | 0.17 |
| Yogurt | 0.03 | [2] | 0.03 | [2] | 0.03 | [2] | 0.03 | [2] | 0.03 | [2] |
| Vegetable oils (grams) | 19.42 | 9.27 | 19.43 | 9.29 | 19.40 | 9.31 | 19.38 | 9.37 | 19.35 | 9.46 |
| Fruit (grams)[3] | | | | | | | | | | |
| Citrus | 924.06 | 112.20 | 939.84 | 112.43 | 958.26 | 112.90 | 979.34 | 113.02 | 998.95 | 113.99 |
| Apples | 224.46 | 21.15 | 228.41 | 21.20 | 233.00 | 21.30 | 238.34 | 21.35 | 243.31 | 21.56 |
| Grapes | 92.89 | 9.18 | 93.91 | 9.19 | 95.11 | 9.22 | 96.59 | 9.24 | 98.00 | 9.31 |
| Other fruit | 161.53 | 18.33 | 163.83 | 18.40 | 166.63 | 18.51 | 170.15 | 18.66 | 173.54 | 18.92 |
| Nuts and seeds (grams) | 18.45 | 4.55 | 18.56 | 4.59 | 18.67 | 4.63 | 18.77 | 4.70 | 18.88 | 4.79 |
| Vegetables (grams)[3] | | | | | | | | | | |
| Fried potatoes[4] | 12.86 | 13.56 | 12.53 | 13.32 | 12.17 | 13.06 | 11.82 | 12.80 | 11.49 | 12.66 |
| Other potatoes | 29.95 | 6.39 | 29.72 | 6.41 | 29.41 | 6.45 | 29.12 | 6.50 | 28.74 | 6.52 |
| Tomatoes | 74.98 | 23.85 | 75.24 | 23.90 | 75.42 | 23.94 | 75.59 | 24.09 | 75.72 | 24.35 |
| Lettuce | 9.71 | 7.38 | 9.80 | 7.48 | 9.88 | 7.59 | 9.98 | 7.74 | 10.06 | 7.90 |
| Other vegetables | 113.45 | 27.85 | 114.32 | 28.21 | 115.11 | 28.58 | 116.01 | 29.10 | 116.72 | 29.69 |
| Grains (grams) | 122.42 | 36.53 | 122.81 | 36.71 | 123.06 | 36.89 | 123.27 | 37.22 | 123.60 | 37.72 |
| Sugar (grams) | 81.18 | 24.49 | 80.84 | 24.42 | 80.37 | 24.31 | 79.93 | 24.26 | 79.57 | 24.33 |

[1]Boneless, trimmed equivalent. Includes fat. [2]Greater than zero but less than one hundredth of a serving. [3]Fresh equivalent. [4]Includes french-fried potatoes, potato chips, potato sticks, hash browns, and other potato-based snacks.

**Table 11—Projected per capita daily commodity consumption, 2000-2020**

| Commodity group | 2000 | 2005 | 2010 | 2015 | 2020 |
|---|---|---|---|---|---|
| Meats (grams) | | | | | |
| Beef | 50.43 | 50.17 | 49.77 | 49.38 | 49.02 |
| Pork | 23.31 | 23.17 | 22.98 | 22.80 | 22.59 |
| Poultry | 37.74 | 37.78 | 37.78 | 37.82 | 37.89 |
| Fish | 12.12 | 12.32 | 12.51 | 12.72 | 12.91 |
| Other meat | 1.34 | 1.32 | 1.31 | 1.30 | 1.29 |
| Eggs (grams) | 19.97 | 20.09 | 20.16 | 20.12 | 20.03 |
| Dairy (servings) | | | | | |
| Milk | 1.01 | 1.00 | 1.00 | 1.00 | 1.00 |
| Cheese | 0.46 | 0.46 | 0.46 | 0.45 | 0.45 |
| Yogurt | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 |
| Vegetable oils (grams) | 28.69 | 28.72 | 28.72 | 28.75 | 28.81 |
| Fruit (grams) | | | | | |
| Citrus | 1,036.27 | 1,052.27 | 1,071.17 | 1,092.36 | 1,112.95 |
| Apples | 245.61 | 249.61 | 254.31 | 259.69 | 264.87 |
| Grapes | 102.07 | 103.11 | 104.33 | 105.83 | 107.31 |
| Other fruit | 179.86 | 182.24 | 185.14 | 188.81 | 192.46 |
| Nuts and seeds (grams) | 22.99 | 23.14 | 23.30 | 23.47 | 23.67 |
| Vegetables (grams) | | | | | |
| Fried potatoes | 26.43 | 25.84 | 25.23 | 24.62 | 24.15 |
| Other potatoes | 36.34 | 36.14 | 35.86 | 35.62 | 35.26 |
| Tomatoes | 98.83 | 99.14 | 99.36 | 99.67 | 100.07 |
| Lettuce | 17.09 | 17.28 | 17.47 | 17.72 | 17.96 |
| Other vegetables | 141.31 | 142.53 | 143.70 | 145.12 | 146.41 |
| Grains (grams) | 158.94 | 159.51 | 159.94 | 160.49 | 161.32 |
| Sugar (grams) | 105.66 | 105.26 | 104.67 | 104.19 | 103.89 |

See footnotes in table 10.

**Table 12—Growth of commodity markets and shares of at-home and away-from-home markets, 2000 and 2020**

| Commodity group | Market growth: 2000 to 2020 | | Commodity market share | | | |
|---|---|---|---|---|---|---|
| | | | 2000 | | 2020 | |
| | At home | Away | At home | Away | At home | Away |
| | | | *Percent* | | | |
| Meats | | | | | | |
| Beef | 13 | 19 | 67 | 33 | 65 | 35 |
| Pork | 13 | 21 | 79 | 21 | 77 | 23 |
| Poultry | 19 | 18 | 68 | 32 | 69 | 31 |
| Fish | 23 | 30 | 66 | 34 | 64 | 36 |
| Other meat | 13 | 18 | 77 | 23 | 76 | 24 |
| Eggs | 17 | 23 | 78 | 22 | 77 | 23 |
| Dairy | | | | | | |
| Milk | 17 | 18 | 87 | 13 | 87 | 13 |
| Cheese | 18 | 18 | 63 | 37 | 63 | 37 |
| Yogurt | 18 | 0 | 97 | 3 | 97 | 3 |
| Vegetable oils | 18 | 20 | 68 | 32 | 67 | 33 |
| Fruit | | | | | | |
| Citrus | 28 | 20 | 89 | 11 | 90 | 10 |
| Apples | 28 | 20 | 91 | 9 | 92 | 8 |
| Grapes | 24 | 20 | 91 | 9 | 91 | 9 |
| Other fruit | 27 | 22 | 90 | 10 | 90 | 10 |
| Nuts and seeds | 21 | 24 | 80 | 20 | 80 | 20 |
| Vegetables | | | | | | |
| Fried potatoes | 5 | 10 | 49 | 51 | 48 | 52 |
| Other potatoes | 13 | 20 | 82 | 18 | 82 | 18 |
| Tomatoes | 19 | 20 | 76 | 24 | 76 | 24 |
| Lettuce | 22 | 26 | 57 | 43 | 56 | 44 |
| Other vegetables | 21 | 26 | 80 | 20 | 80 | 20 |
| Grains | 19 | 22 | 77 | 23 | 77 | 23 |
| Sugar | 16 | 17 | 77 | 23 | 77 | 23 |

See footnotes in table 10.

# Decomposition and Sensitivity Analyses

As shown in the econometric results, commodity consumption is affected by a host of economic, social, and demographic factors. The change in commodity consumption between 2000 and 2020 was decomposed into individual effects. Some of the factors affect commodity consumption directly and indirectly. For example, household income affects commodity consumption directly through the consumption equation, and also affects eating out and diet-health knowledge, which in turn affect commodity consumption. The income effect can be decomposed into direct and indirect effects.

In addition to being affected by changes in income, social, and demographic factors, the consumption projections are also affected by the underlying assumptions (see "Assumptions Underlying the Forecasts," p. 13). A sensitivity analysis was conducted to examine the changes under an alternative assumption about eating-out behavior.

## Effects of Economic, Social, and Demographic Factors

We conducted a decomposition analysis on the expected changes in commodity consumption between 2000 to 2020. The decomposition was also conducted for food consumption; while those results are not reported here, they are available from the authors. Because the Tobit model is nonlinear, the individual effects have to be adjusted so that they sum to the total change. The individual and total effects are expressed in terms of percent change from the 2000 projected consumption, at home, away from home, and total.

The total change and individual effects are reported in table 13 for commodity consumption at home, in table 14 for away-from-home consumption, and in table 15 for total consumption. The first column in the three tables, total effect, shows the percent change between 2000 and 2020 for the total U.S. market, incorporating projected population growth. Numbers in other columns measure the percent change from 2000 to 2020 on a per capita basis, with the column "net" showing net change in per capita consumption, followed by changes attributable to individual variables.

For the at-home market, per capita consumption is predicted to increase between 2000 and 2020 for poultry, fish, yogurt, all fruits, nuts and seeds, tomatoes, lettuce, other vegetables, and grains. Per capita consumption of beef, pork, other meat, eggs, milk, cheese, fried potatoes, other potatoes, and sugar is predicted to fall. As expected, income plays an important role in commodity consumption. For example, growth in income dampens at-home beef, pork, and egg consumption directly and indirectly. As income rises, Americans eat less at home and accumulate more diet-health knowledge, both of which have negative effects on at-home consumption of beef, pork, and eggs (see the Tobit results in the appendix tables, p. 34-58). The aging of the U.S. population will increase per capita consumption of fish, eggs, fruits, other potatoes, lettuce, and other vegetables at home. The changing racial composition of the U.S. population affects eating out and diet-health knowledge, and hence directly and indirectly affects consumption of several commodities at home—positive effects for poultry, fish, eggs, and fruits; negative effects for dairy and potato products. As household heads become more educated and their diet-health knowledge improves, per capita at-home consumption of fruits is expected to rise but consumption of beef, pork, and eggs is expected to decline.

With respect to effects on away-from-home consumption, income and the aging of the population dominate other factors (table 14). Per capita consumption of the 22 commodities away from home is expected to rise with income as rising income drives an increase in eating out. On the other hand, the aging of the population negatively affects eating out and, hence, the away-from-home consumption of all commodities, except fish and other potatoes.

Changes in the aggregated at-home and away-from-home commodity consumption are shown in table 15. The total U.S. consumption of fruits and fish will lead the commodity market in growth over the next two decades, while potatoes, beef, pork, other meat, milk, cheese, and sugar will show the smallest growth. The growth in fruit consumption comes mainly from the at-home segment and is greatly influenced by rising income, the changing racial composition, and diet-health knowledge from higher educational achievement. Income and educational achievement are also the main drivers for rising per capita yogurt consumption. Income also affects per capita fish consumption, but to a lesser degree than the aging of the population and the changing racial composition.

**Table 13—Changes in at-home commodity consumption under the base scenario, 2000 to 2020**

| Commodity group | Total | Per capita effects | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Net | Income | Age | Region | Urbanization | Race | Household type | Education |
| | | *Percent change from 2000 projected consumption* | | | | | | | |
| Meats | | | | | | | | | |
| Beef | 12.52 | -4.61 | -2.49 | -0.08 | -0.22 | -0.33 | 0.52 | -1.27 | -0.73 |
| Pork | 12.55 | -4.58 | -2.39 | 0.73 | -0.69 | -0.48 | -0.20 | -0.70 | -0.86 |
| Poultry | 18.69 | 0.63 | -0.85 | 0.33 | -0.33 | 0.02 | 1.95 | -0.54 | 0.04 |
| Fish | 23.25 | 4.49 | -0.79 | 2.17 | 0.12 | 0.35 | 2.32 | 0.51 | -0.19 |
| Other meat | 12.51 | -4.61 | -1.99 | -0.16 | -0.35 | -0.09 | -0.80 | -0.65 | -0.58 |
| Eggs | 17.05 | -0.77 | -3.31 | 2.08 | 0.02 | -0.34 | 2.57 | -0.82 | -0.97 |
| Dairy | | | | | | | | | |
| Milk | 16.67 | -1.09 | -0.39 | -0.17 | 0.02 | 0.37 | -1.22 | -0.27 | 0.57 |
| Cheese | 15.88 | -1.76 | 0.36 | -0.50 | -0.13 | 0.09 | -1.88 | -0.55 | 0.85 |
| Yogurt | 20.55 | 2.20 | 1.38 | 0.57 | -0.16 | 0.50 | -1.57 | 0.41 | 1.06 |
| Vegetable oils | 17.51 | -0.38 | -0.71 | 0.65 | -0.12 | -0.07 | -0.09 | -0.19 | 0.16 |
| Fruit | | | | | | | | | |
| Citrus | 27.51 | 8.10 | 1.72 | 1.24 | -0.66 | 0.45 | 2.64 | 0.32 | 2.40 |
| Apples | 27.86 | 8.40 | 1.84 | 1.56 | -0.57 | 0.48 | 2.51 | 0.23 | 2.35 |
| Grapes | 24.43 | 5.49 | 1.07 | 1.14 | -0.48 | 0.41 | 1.42 | 0.09 | 1.85 |
| Other fruit | 26.72 | 7.43 | 1.31 | 2.61 | 0.05 | 0.53 | 1.42 | -0.19 | 1.70 |
| Nuts and seeds | 20.72 | 2.34 | -0.61 | 1.06 | 0.29 | -0.22 | 1.85 | -0.30 | 0.27 |
| Vegetables | | | | | | | | | |
| Fried potatoes | 5.38 | -10.66 | -1.26 | -3.40 | -0.03 | -0.78 | -2.11 | -1.59 | -1.49 |
| Other potatoes | 13.18 | -4.04 | -3.09 | 3.18 | -0.77 | -0.55 | -1.94 | -1.16 | 0.29 |
| Tomatoes | 19.12 | 0.99 | -0.22 | 0.69 | 0.03 | -0.03 | 1.00 | -0.47 | -0.01 |
| Lettuce | 22.18 | 3.58 | -0.38 | 2.59 | -0.22 | 0.12 | 0.48 | 0.35 | 0.65 |
| Other vegetables | 21.35 | 2.88 | -0.48 | 2.19 | -0.18 | 0.07 | 0.61 | 0.15 | 0.51 |
| Grains | 19.09 | 0.97 | -0.40 | 0.27 | -0.14 | 0.04 | 0.93 | -0.07 | 0.34 |
| Sugar | 15.61 | -1.99 | -0.58 | -0.56 | -0.14 | 0.08 | -0.88 | -0.09 | 0.19 |

See footnotes in table 10.

## Effects of Eating Out and Diet-Health Knowledge on Commodity Consumption

Tables 13-15 show the effects of exogenous variables on future commodity consumption. The effects include those channeled through eating out and diet-health knowledge. It is also useful to assess the effects of increases in eating out and diet-health knowledge between 2000 and 2020 on commodity consumption.

As eating out rises over the next two decades, the away-from-home consumption of all 22 commodities will also rise, whereas the at-home consumption of all commodities, except fried and other potatoes, will fall (table 16). As eating out increases, the rise in away-from-home beef consumption will outpace the fall in at-home beef consumption, resulting in an increase in per capita beef consumption of 0.2 percent. Similarly, potatoes, cheese, vegetable oils, lettuce, and sugar are predicted to have positive growth due to an increase in eating out. It should be noted that the total effects are the sum of effects at home and away from home, weighted by their market shares.

As consumers accumulate better diet-health knowledge, they are predicted to consume, both at home and away from home, less beef, pork, other meats, and fried potatoes, but consume more grains, tomatoes, and nuts and seeds (table 16). With increased knowledge, consumers are predicted to consume less poultry but more fish

**Table 14—Changes in away-from-home commodity consumption under the base scenario, 2000 to 2020**

| Commodity group | Total | Per capita effects | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Net | Income | Age | Region | Urbanization | Race | Household type | Education |
| | | *Percent change from 2000 projected consumption* | | | | | | | |
| Meats | | | | | | | | | |
| Beef | 18.90 | 0.80 | 2.94 | -3.91 | 0.25 | 0.01 | 0.70 | 0.80 | 0.02 |
| Pork | 20.92 | 2.52 | 3.35 | -2.28 | 0.19 | 0.34 | 0.33 | 0.58 | 0.01 |
| Poultry | 17.79 | -0.14 | 3.42 | -4.72 | 0.04 | 0.71 | -0.13 | 0.51 | 0.03 |
| Fish | 30.44 | 10.59 | 4.76 | 0.98 | 0.64 | 0.24 | 1.88 | 0.95 | 1.14 |
| Other meat | 16.80 | -0.98 | 3.14 | -3.82 | -0.17 | 0.52 | -0.85 | 0.59 | -0.40 |
| Eggs | 23.02 | 4.29 | 3.24 | -0.69 | 0.46 | 0.40 | -1.19 | 1.67 | 0.41 |
| Dairy | | | | | | | | | |
| Milk | 15.69 | -1.92 | 1.49 | -4.57 | -0.52 | 0.07 | -0.97 | 2.27 | 0.31 |
| Cheese | 16.90 | -0.89 | 3.91 | -6.57 | 0.25 | 0.51 | -0.53 | 0.73 | 0.81 |
| Yogurt | 15.84 | -1.80 | 1.71 | -5.18 | -0.68 | 0.14 | -1.19 | 3.23 | 0.19 |
| Vegetable oils | 20.34 | 2.03 | 3.90 | -3.79 | 0.26 | 0.42 | -0.38 | 1.07 | 0.55 |
| Fruit | | | | | | | | | |
| Citrus | 19.83 | 1.59 | 3.12 | -5.77 | -0.33 | 0.43 | 1.19 | 3.01 | -0.06 |
| Apples | 20.23 | 1.93 | 2.90 | -5.50 | -0.24 | 0.37 | 1.43 | 3.11 | -0.13 |
| Grapes | 19.64 | 1.43 | 2.81 | -4.93 | -0.11 | 0.37 | 0.73 | 2.48 | 0.08 |
| Other fruit | 21.72 | 3.20 | 3.07 | -3.74 | 0.12 | 0.25 | 0.52 | 2.23 | 0.76 |
| Nuts and seeds | 24.29 | 5.37 | 4.61 | -3.41 | 0.94 | 0.10 | 0.89 | 0.95 | 1.30 |
| Vegetables | | | | | | | | | |
| Fried potatoes | 10.11 | -6.65 | 1.56 | -8.01 | 0.14 | 0.10 | -1.35 | 1.09 | -0.19 |
| Other potatoes | 20.41 | 2.08 | 3.91 | 3.17 | -0.75 | -0.26 | -3.37 | 0.08 | -0.69 |
| Tomatoes | 20.42 | 2.09 | 4.30 | -5.31 | 0.35 | 0.43 | 0.50 | 1.07 | 0.75 |
| Lettuce | 26.31 | 7.08 | 5.42 | -1.83 | 0.53 | 0.46 | 0.21 | 1.50 | 0.79 |
| Other vegetables | 25.75 | 6.61 | 5.29 | -2.14 | 0.51 | 0.45 | 0.24 | 1.44 | 0.81 |
| Grains | 21.80 | 3.26 | 4.12 | -4.16 | 0.30 | 0.56 | 0.69 | 0.95 | 0.80 |
| Sugar | 17.18 | -0.66 | 3.41 | -4.98 | 0.22 | 0.39 | -0.58 | 0.48 | 0.40 |

See footnotes in table 10.

away from home and consume fewer eggs but more fruits and dairy products, mainly at home.

## Direct and Indirect Effects of Income

Household income affects eating out and diet-health knowledge, and hence indirectly affects commodity consumption. The total effects of rising household income over the next two decades are decomposed into three components: direct effect, indirect effect through eating out, and indirect effect through diet-health knowledge (fig. 11 and table 17, p. 28).

All three income-induced effects will contribute to a lower per capita consumption of pork and other meat, but contribute to a higher consumption of cheese and lettuce. Eating out favors beef consumption, but the other two effects outweigh eating out and result in lower per capita beef consumption. On the other hand, income has a positive direct effect, as well as a positive indirect effect through diet-health knowledge, but a negative indirect effect through eating out on the consumption of fish, milk, yogurt, all fruits, nuts and seeds, tomatoes, other vegetables, and grains.

**Table 15—Changes in total commodity consumption under the base scenario, 2000 to 2020**

| Commodity group | Total | Per capita effects | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Net | Income | Age | Region | Urbanization | Race | Household type | Education |
| | | *Percent change from 2000 projected consumption* | | | | | | | |
| Meats | | | | | | | | | |
| Beef | 14.65 | -2.80 | -0.67 | -1.36 | -0.06 | -0.22 | 0.58 | -0.58 | -0.48 |
| Pork | 14.33 | -3.07 | -1.17 | 0.09 | -0.50 | -0.30 | -0.09 | -0.42 | -0.67 |
| Poultry | 18.41 | 0.38 | 0.50 | -1.26 | -0.21 | 0.24 | 1.29 | -0.21 | 0.03 |
| Fish | 25.71 | 6.58 | 1.11 | 1.76 | 0.30 | 0.31 | 2.17 | 0.66 | 0.26 |
| Other meat | 13.52 | -3.76 | -0.79 | -1.01 | -0.30 | 0.05 | -0.81 | -0.36 | -0.54 |
| Eggs | 18.35 | 0.33 | -1.89 | 1.48 | 0.12 | -0.18 | 1.75 | -0.28 | -0.67 |
| Dairy | | | | | | | | | |
| Milk | 16.54 | -1.19 | -0.15 | -0.73 | -0.05 | 0.34 | -1.19 | 0.05 | 0.54 |
| Cheese | 16.26 | -1.44 | 1.67 | -2.73 | 0.01 | 0.24 | -1.38 | -0.08 | 0.83 |
| Yogurt | 20.41 | 2.08 | 1.39 | 0.40 | -0.18 | 0.49 | -1.56 | 0.50 | 1.04 |
| Vegetable oils | 18.42 | 0.40 | 0.77 | -0.78 | 0.00 | 0.09 | -0.19 | 0.21 | 0.29 |
| Fruit | | | | | | | | | |
| Citrus | 26.68 | 7.40 | 1.87 | 0.48 | -0.62 | 0.45 | 2.48 | 0.61 | 2.13 |
| Apples | 27.20 | 7.84 | 1.93 | 0.95 | -0.55 | 0.47 | 2.42 | 0.47 | 2.14 |
| Grapes | 24.00 | 5.13 | 1.23 | 0.59 | -0.45 | 0.40 | 1.35 | 0.31 | 1.69 |
| Other fruit | 26.21 | 7.00 | 1.48 | 1.96 | 0.06 | 0.50 | 1.33 | 0.06 | 1.61 |
| Nuts and seeds | 21.43 | 2.94 | 0.42 | 0.18 | 0.42 | -0.16 | 1.67 | -0.05 | 0.47 |
| Vegetables | | | | | | | | | |
| Fried potatoes | 7.81 | -8.60 | 0.19 | -5.76 | 0.06 | -0.33 | -1.72 | -0.21 | -0.82 |
| Other potatoes | 14.45 | -2.97 | -1.86 | 3.18 | -0.76 | -0.50 | -2.19 | -0.94 | 0.12 |
| Tomatoes | 19.43 | 1.25 | 0.86 | -0.75 | 0.11 | 0.08 | 0.88 | -0.10 | 0.18 |
| Lettuce | 23.96 | 5.09 | 2.12 | 0.68 | 0.10 | 0.26 | 0.37 | 0.84 | 0.71 |
| Other vegetables | 22.21 | 3.61 | 0.65 | 1.34 | -0.04 | 0.14 | 0.54 | 0.41 | 0.57 |
| Grains | 19.72 | 1.49 | 0.63 | -0.74 | -0.04 | 0.16 | 0.88 | 0.16 | 0.45 |
| Sugar | 15.98 | -1.68 | 0.34 | -1.58 | -0.06 | 0.15 | -0.81 | 0.04 | 0.24 |

See footnotes in table 10.

## Sensitivity Analysis of Eating Out and Age

Eating out increases with age among children, peaks among those age 14-19, then declines with age among adults (table 2). The parameter estimates suggest that consumers age 45-54 eat out less than those age 30-44 by 4.6 percentage points (subtracting 9.8 from 14.4), in terms of the percent of food eaten out (fig. 12). This eating out-age relationship is maintained in the forecasting analyses discussed so far, and this is termed the base scenario.

In the sensitivity analysis, we assumed that those age 45 and over in 2020 will eat out as much as those age 30-44 (fig. 13). Under this alternative scenario, eating out is predicted to rise much higher than the base scenario. Under the base scenario, eating out is predicted to represent 23.3 percent of total food consumption in 2020, compared with 38 percent under the alternative scenario. Clearly, the extent to which young adults will retain their eating-out habits as they grow older will greatly influence the growth of eating out, which in turn affects the type and amount of foods and commodities consumed by Americans.

In the interest of brevity, we report only the change in total and per capita consumption, combining at-home and away-from-home consumption. Under the alternative scenario, the consumption of some commodities

**Table 16—Changes in per capita commodity consumption due to increases in eating out and diet-health knowledge, 2000 to 2020**

| | Effects of eating out | | | Effects of diet-health knowledge | | |
|---|---|---|---|---|---|---|
| Commodity group | Total | Food at home | Food away from home | Total | Food at home | Food away from home |
| | *Percent change from 2000 projected consumption* | | | | | |
| Meats | | | | | | |
| Beef | 0.20 | -0.47 | 1.52 | -0.34 | -0.41 | -0.22 |
| Pork | -0.03 | -0.43 | 1.44 | -0.45 | -0.50 | -0.27 |
| Poultry | -0.02 | -0.53 | 1.09 | -0.04 | 0.06 | -0.25 |
| Fish | -0.21 | -0.81 | 0.93 | 0.06 | -0.14 | 0.46 |
| Other meat | -0.17 | -0.47 | 0.80 | -0.38 | -0.34 | -0.54 |
| Eggs | -0.22 | -0.73 | 1.61 | -0.33 | -0.45 | 0.12 |
| Dairy | | | | | | |
| Milk | -0.46 | -0.74 | 1.43 | 0.35 | 0.39 | 0.09 |
| Cheese | 0.02 | -0.69 | 1.23 | 0.46 | 0.56 | 0.28 |
| Yogurt | -0.49 | -0.53 | 1.10 | 0.67 | 0.69 | -0.02 |
| Vegetable oils | 0.10 | -0.48 | 1.33 | 0.15 | 0.16 | 0.13 |
| Fruit | | | | | | |
| Citrus | -0.97 | -1.26 | 1.39 | 1.34 | 1.52 | -0.13 |
| Apples | -0.99 | -1.22 | 1.41 | 1.34 | 1.48 | -0.17 |
| Grapes | -0.77 | -1.00 | 1.58 | 1.07 | 1.19 | -0.07 |
| Other fruit | -0.67 | -0.90 | 1.32 | 1.00 | 1.07 | 0.38 |
| Nuts and seeds | -0.35 | -0.85 | 1.70 | 0.34 | 0.27 | 0.60 |
| Vegetables | | | | | | |
| Fried potatoes | 0.73 | 0.04 | 1.38 | -0.61 | -1.00 | -0.24 |
| Other potatoes | 0.28 | 0.05 | 1.35 | 0.15 | 0.32 | -0.66 |
| Tomatoes | -0.01 | -0.43 | 1.34 | 0.08 | 0.02 | 0.27 |
| Lettuce | 0.10 | -0.66 | 1.10 | 0.38 | 0.48 | 0.24 |
| Other vegetables | -0.26 | -0.60 | 1.14 | 0.36 | 0.39 | 0.25 |
| Grains | -0.15 | -0.58 | 1.27 | 0.28 | 0.28 | 0.27 |
| Sugar | 0.17 | -0.38 | 1.98 | 0.13 | 0.16 | 0.02 |

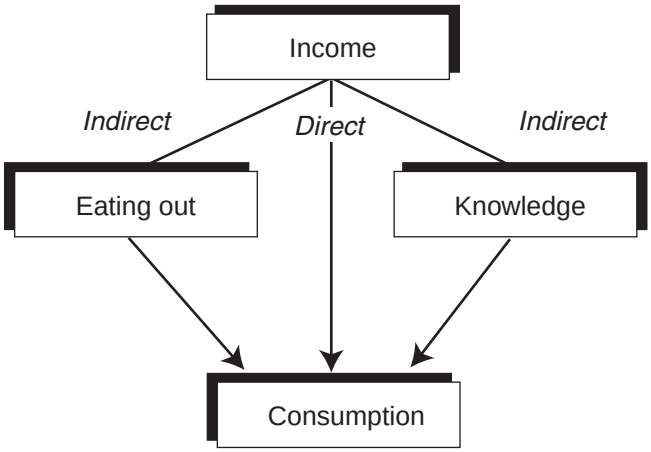
See footnotes in table 10.

rises while the consumption of other commodities declines, compared with the base scenario (table 18).

As expected, the most affected commodity is fried potatoes (fig. 14 and table 19), the only commodity for which the away-from-home market exceeds the at-home market. Over the next two decades, total consumption of fried potatoes is predicted to grow by 7.81 percent under the base scenario and by 10.38 percent under the alternative scenario. Total consumption of other potatoes is also noticeably affected by the eating-out habits of the older age groups over time.

The differences between the base and alternative scenarios are affected by the relative size of the at-home and away-from-home market components. The market for fried potatoes is a case in point. However, other factors appear to affect the differences between the base and alternative scenarios. This is evident from the changes in beef and pork consumption. In 2000, at-home consumption was predicted to represent 67 percent of total beef consumption, while 79 percent of pork was predicted to be consumed at home. The rates of change between the two scenarios (the level under the alternative scenario over the level under the base scenario) are quite similar for beef and pork.

Figure 11
**Income effects—direct and indirect**




Source: Economic Research Service, USDA.

Compared with younger adults, older adults tend to eat more beef and pork when eating out, and they favor pork over beef (app. tables 1 and 2).

Compared with the base projections, the total consumption of several commodities is predicted to fall under the alternative scenario. Fruit is the major commodity that is predicted to fall in total consumption if older age groups eat out as much in 2020 as they did in 2000. This alternative assumption about eating out also dampens the consumption of milk and yogurt, but not cheese. Among the three dairy commodities, cheese has the highest portion of consumption away from home-37 percent in 2000, compared with 13 percent for milk and 3 percent for yogurt.

**Table 17—Total, direct, and indirect effects of rising income on per capita commodity consumption, 2000-2020**

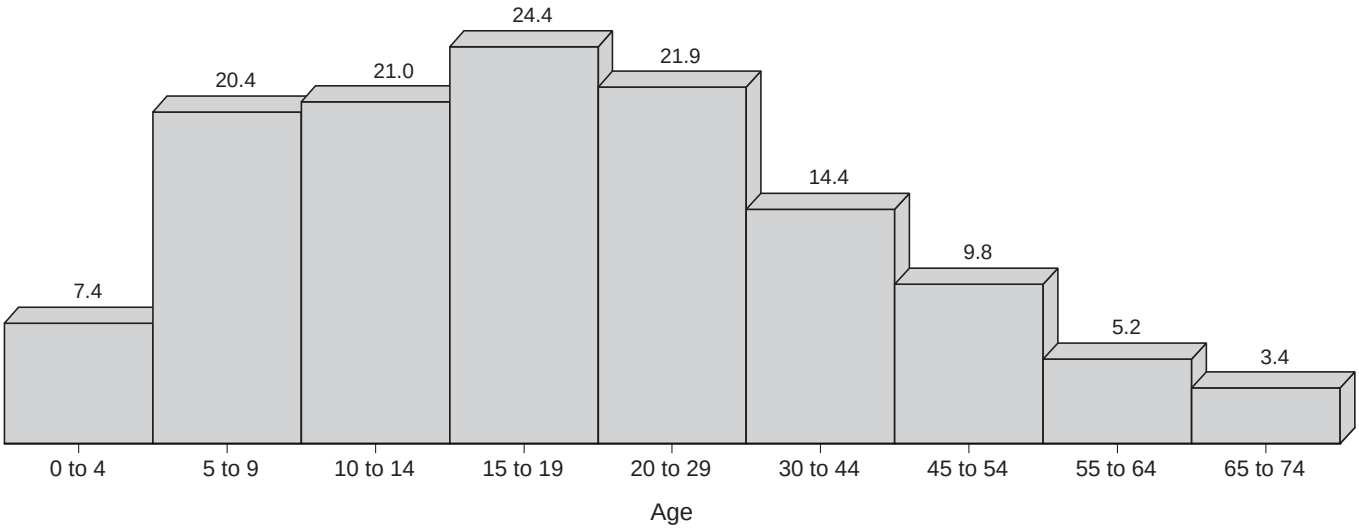
| Commodity group | Total income effect | Direct income effect | Indirect income effect | |
|---|---|---|---|---|
| | | | Eating out | Knowledge |
| | *Percent change from 2000 projected consumption* | | | |
| Meats | | | | |
| Beef | -0.67 | -0.59 | 0.32 | -0.41 |
| Pork | -1.17 | -0.57 | -0.04 | -0.55 |
| Poultry | 0.50 | 0.59 | -0.02 | -0.05 |
| Fish | 1.11 | 1.42 | -0.41 | 0.09 |
| Other meat | -0.79 | -0.07 | -0.27 | -0.46 |
| Eggs | -1.89 | -1.07 | -0.40 | -0.44 |
| Dairy | | | | |
| Milk | -0.15 | 0.12 | -0.60 | 0.33 |
| Cheese | 1.67 | 1.00 | 0.03 | 0.62 |
| Yogurt | 1.39 | 1.38 | -0.84 | 0.85 |
| Vegetable oils | 0.77 | 0.37 | 0.19 | 0.20 |
| Fruit | | | | |
| Citrus | 1.87 | 1.85 | -1.77 | 1.83 |
| Apples | 1.93 | 1.95 | -1.81 | 1.81 |
| Grapes | 1.23 | 1.21 | -1.42 | 1.48 |
| Other fruit | 1.48 | 1.36 | -1.22 | 1.36 |
| Nuts and seeds | 0.42 | 0.58 | -0.55 | 0.40 |
| Vegetables | | | | |
| Fried potatoes | 0.19 | -0.47 | 1.75 | -1.08 |
| Other potatoes | -1.86 | -2.53 | 0.49 | 0.19 |
| Tomatoes | 0.86 | 0.76 | -0.01 | 0.11 |
| Lettuce | 2.12 | 1.42 | 0.18 | 0.50 |
| Other vegetables | 0.65 | 0.63 | -0.46 | 0.47 |
| Grains | 0.63 | 0.53 | -0.27 | 0.36 |
| Sugar | 0.34 | -0.18 | 0.34 | 0.19 |

See footnotes in table 10.

Figure 12

**The estimated coefficients for age groups in the eating-out equation—the base scenario**

Percent of food eaten out

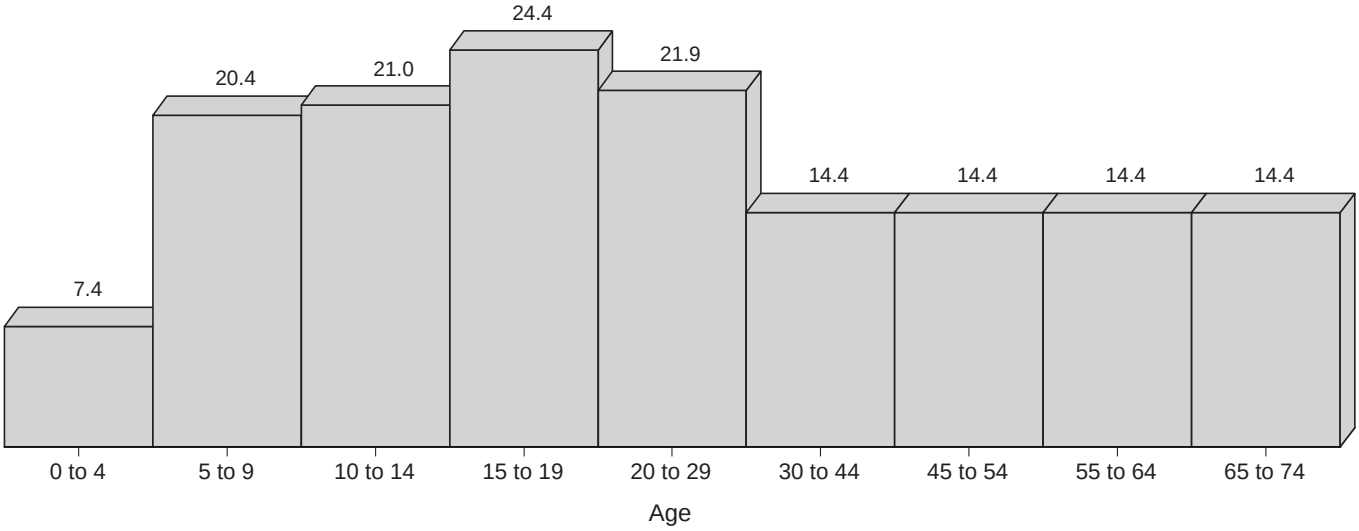



Source: Economic Research Service, USDA.

Figure 13

**The assumed coefficients for age groups in the eating-out equation—the alternative scenario**

Percent of food eaten out




Source: Economic Research Service, USDA.

**Table 18—Changes in total commodity consumption under alternative scenario, 2000-2020**

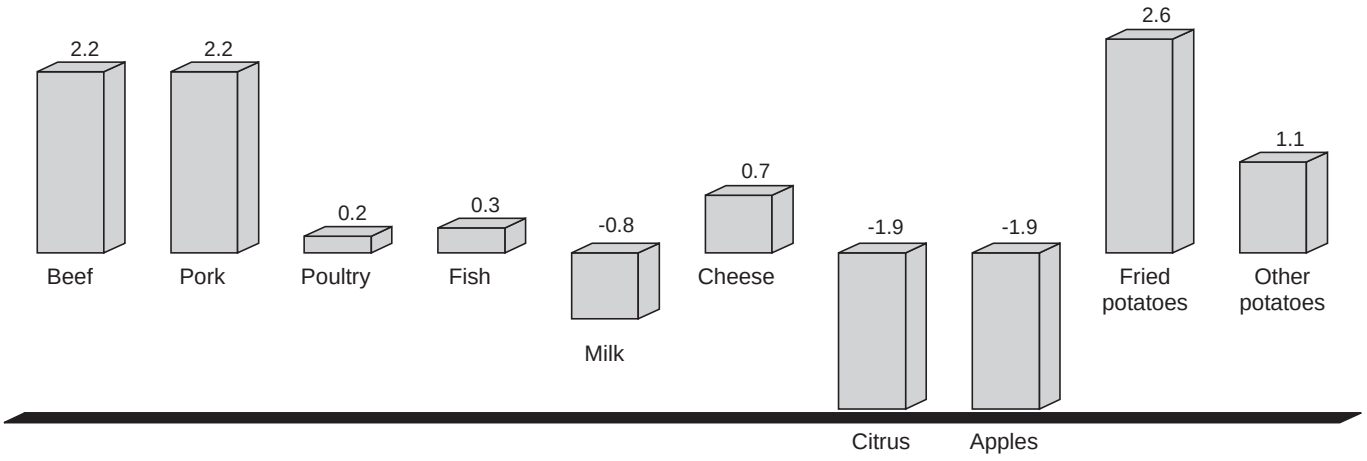
| Commodity group | Total | Per capita effects | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Net | Income | Age | Region | Urbanization | Race | Household type | Education |
| | | *Percent change from 2000 projected consumption* | | | | | | | |
| Meats | | | | | | | | | |
| Beef | 16.82 | -0.96 | 0.22 | -1.10 | 0.02 | -0.18 | 0.67 | -0.23 | -0.36 |
| Pork | 16.48 | -1.25 | -0.44 | 0.40 | -0.36 | -0.23 | 0.18 | -0.28 | -0.52 |
| Poultry | 18.63 | 0.58 | 0.96 | -1.55 | -0.15 | 0.31 | 1.08 | -0.10 | 0.04 |
| Fish | 26.04 | 6.86 | 1.73 | 1.49 | 0.36 | 0.27 | 2.03 | 0.60 | 0.38 |
| Other meat | 13.89 | -3.45 | -0.44 | -1.32 | -0.26 | 0.10 | -0.71 | -0.30 | -0.51 |
| Eggs | 19.34 | 1.17 | -1.00 | 1.28 | 0.18 | -0.07 | 1.18 | 0.08 | -0.47 |
| Dairy | | | | | | | | | |
| Milk | 15.77 | -1.85 | -0.12 | -1.47 | -0.11 | 0.32 | -1.23 | 0.21 | 0.54 |
| Cheese | 16.91 | -0.88 | 2.09 | -3.13 | 0.07 | 0.30 | -1.14 | 0.10 | 0.82 |
| Yogurt | 19.45 | 1.27 | 1.30 | -0.26 | -0.21 | 0.49 | -1.62 | 0.52 | 1.06 |
| Vegetable oils | 19.17 | 1.03 | 1.30 | -0.89 | 0.05 | 0.14 | -0.24 | 0.35 | 0.32 |
| Fruit | | | | | | | | | |
| Citrus | 24.76 | 5.77 | 1.83 | -1.21 | -0.65 | 0.45 | 2.50 | 0.86 | 1.99 |
| Apples | 25.35 | 6.27 | 1.84 | -0.63 | -0.57 | 0.47 | 2.48 | 0.66 | 2.03 |
| Grapes | 22.06 | 3.48 | 1.08 | -0.63 | -0.43 | 0.39 | 1.15 | 0.41 | 1.52 |
| Other fruit | 24.79 | 5.79 | 1.40 | 0.90 | 0.07 | 0.48 | 1.22 | 0.17 | 1.54 |
| Nuts and seeds | 22.02 | 3.45 | 1.12 | -0.34 | 0.54 | -0.13 | 1.51 | 0.10 | 0.66 |
| Vegetables | | | | | | | | | |
| Fried potatoes | 10.38 | -6.42 | 0.64 | -4.82 | 0.09 | -0.21 | -1.55 | 0.07 | -0.64 |
| Other potatoes | 15.59 | -2.00 | -1.33 | 3.56 | -0.74 | -0.47 | -2.26 | -0.83 | 0.07 |
| Tomatoes | 19.77 | 1.54 | 1.27 | -1.11 | 0.14 | 0.12 | 0.84 | 0.03 | 0.24 |
| Lettuce | 24.80 | 5.80 | 2.74 | 0.53 | 0.19 | 0.31 | 0.34 | 0.97 | 0.73 |
| Other vegetables | 22.34 | 3.72 | 1.04 | 0.87 | 0.01 | 0.17 | 0.54 | 0.49 | 0.60 |
| Grains | 19.96 | 1.70 | 0.97 | -1.13 | 0.00 | 0.20 | 0.96 | 0.23 | 0.48 |
| Sugar | 17.10 | -0.72 | 0.92 | -1.39 | 0.01 | 0.19 | -0.78 | 0.09 | 0.24 |

See footnotes in table 10.

Figure 14

**Change in per capita commodity consumption between the base and alternative scenarios**

Percent change




Source: Economic Research Service, USDA.

**Table 19—Comparison of growth in commodity markets under the base and alternative scenarios, 2000-2020**

| Commodity group | Base scenario (A) | Alternative scenario (B) | (B)-(A) |
|---|---|---|---|
| | *Percent change from 2000 projected consumption* | | |
| Meats | | | |
| Beef | 14.65 | 16.82 | 2.17 |
| Pork | 14.33 | 16.48 | 2.15 |
| Poultry | 18.41 | 18.63 | 0.22 |
| Fish | 25.71 | 26.04 | 0.33 |
| Other meat | 13.52 | 13.89 | 0.37 |
| Eggs | 18.35 | 19.34 | 0.99 |
| Dairy | | | |
| Milk | 16.54 | 15.77 | -0.77 |
| Cheese | 16.26 | 16.91 | 0.65 |
| Yogurt | 20.41 | 19.45 | -0.96 |
| Vegetable oils | 18.42 | 19.17 | 0.75 |
| Fruit | | | |
| Citrus | 26.68 | 24.76 | -1.92 |
| Apples | 27.20 | 25.35 | -1.85 |
| Grapes | 24.00 | 22.06 | -1.94 |
| Other fruit | 26.21 | 24.79 | -1.42 |
| Nuts and seeds | 21.43 | 22.02 | 0.59 |
| Vegetables | | | |
| Fried potatoes | 7.81 | 10.38 | 2.57 |
| Other potatoes | 14.45 | 15.59 | 1.14 |
| Tomatoes | 19.43 | 19.77 | 0.34 |
| Lettuce | 23.96 | 24.80 | 0.84 |
| Other vegetables | 22.21 | 22.34 | 0.13 |
| Grains | 19.72 | 19.96 | 0.24 |
| Sugar | 15.98 | 17.10 | 1.12 |

Base scenario = eating out declines with age according to table 2. Alternative scenario = increased eating out for adults age 45 and over. See footnotes in table 10.

# Conclusions

The objective of this study was to project U.S. commodity consumption for the period 2000-2020, using data from USDA's 1994-96 and 1998 Continuing Survey of Food Intakes by Individuals. An econometric system was estimated (1) to explain consumers' eating-out habits as well as their diet-health knowledge, and (2) to relate food consumption, both at home and away from home separately, to consumers' eating-out habits, diet-knowledge knowledge, income, and their social and demographic characteristics. Using projected values of economic, social, and demographic factors for 2000-2020, we projected at-home and away-from-home food consumption for the same period. Then we used a unique food-commodity translation database to convert food consumption to commodity consumption. Twenty-five food groups and 22 commodity groups were analyzed in this study.

The total consumption of all 22 commodities is predicted to rise during the period 2000-2020, mainly due to the projected addition of 50 million consumers in the Nation. But, the per capita consumption of many commodities is predicted to fall. The results suggest that fruits will lead all commodities in terms of growth in both total and per capita consumption. Certain vegetables, such as lettuce and tomatoes, are predicted to grow substantially, while per capita potato consumption (fried and other) is predicted to decline, retarding the growth in total U.S. potato consumption. The increase in meat, poultry, and fish consumption varies. Per capita fish and poultry consumption is predicted to rise while per capita consumption of beef, pork, and other meat is predicted to fall. Per capita consumption of milk and cheese is predicted to fall, while per capita consumption of yogurt and eggs is predicted to rise. The consumption of nuts and seeds and grains is also predicted to rise over the next two decades.

Both at-home and away-from-home fruit consumption are predicted to grow substantially over the 2000-2020 period, with at-home growth ranging between 24 and 28 percent and away-from-home growth between 20 and 22 percent. Fish consumption is expected to grow by 30 percent away from home and 23 percent at home. The growth of away-from-home fish consumption exceeds the growth of at-home consumption for other commodities, including beef, pork, other meat, eggs, milk, vegetable oils, nuts and seeds, all vegetables, grains, and sugar. The separation of at-home and away-from-home consumption in our analysis points out that food and commodity consumption is affected by a host of economic, social, and demographic factors. Some of the factors, such as income, have opposite effects on these two market segments. In addition to its direct, positive effect on fruit consumption, for example, rising income boosts eating out and hence dampens fruit consumption away from home. But, rising income also contributes to improved diet-health knowledge and hence results in more fruit consumption at home.

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# Appendix tables: Tobit Results of Food Consumption Equations

**Appendix table 1—Tobit results of beef consumption at home and away from home**

| | At home | | Away from home | |
|---|---|---|---|---|
| Variables | Estimated coefficient | Standard error | Estimated coefficient | Standard error |
| Intercept | -18.56 | 14.90 | -165.22 | 18.29*** |
| Eating out | -1.04 | 0.27*** | 2.74 | 0.33*** |
| Knowledge | -4.52 | 0.93*** | -3.11 | 1.10*** |
| Income | -0.33 | 0.15 ** | 0.01 | 0.16 |
| Male | 15.59 | 2.69*** | 18.24 | 3.23*** |
| Age 0-4 | -28.42 | 6.81*** | -23.80 | 9.58** |
| Age 5-9 | 10.85 | 7.68 | -0.03 | 9.84 |
| Age 10-14 | 29.91 | 7.70*** | 0.76 | 9.92 |
| Age 15-19 | 33.17 | 8.67*** | 2.34 | 11.04 |
| Age 20-29 | 25.29 | 7.91*** | 3.47 | 10.11 |
| Age 30-44 | 43.86 | 6.78*** | 11.15 | 8.89 |
| Age 45-54 | 34.91 | 6.44*** | 17.04 | 8.44** |
| Age 55-64 | 36.08 | 6.09*** | 25.62 | 8.10*** |
| Age 65-74 | 15.47 | 6.02 ** | 18.42 | 8.14** |
| Black | 3.69 | 3.66 | -4.85 | 4.39 |
| Hispanic | 6.57 | 4.07 | 6.75 | 4.91 |
| Asian | -27.49 | 6.79*** | 12.59 | 7.47* |
| Other | 20.55 | 8.09 ** | 14.54 | 9.81 |
| HH type1 | 19.01 | 4.54*** | -0.15 | 5.28 |
| HH type2 | 6.93 | 3.64 * | 5.76 | 4.17 |
| HH type 3 | 3.65 | 4.95 | -4.37 | 5.81 |
| Midwest | 12.64 | 3.25*** | 9.21 | 3.93** |
| South | -0.38 | 2.97 | 4.72 | 3.61 |
| West | 2.38 | 3.21 | -0.63 | 3.96 |
| Nonmetro | 12.76 | 2.91*** | 20.44 | 3.40*** |
| Suburb | 3.06 | 2.45 | -1.97 | 2.91 |
| HH size | -1.71 | 0.89 * | 0.85 | 1.09 |
| Quarter 1 | 1.83 | 2.85 | 1.05 | 3.33 |
| Quarter 2 | 9.19 | 2.83*** | -4.27 | 3.36 |
| Quarter 3 | 14.68 | 2.82*** | 5.26 | 3.36 |
| Sigma | 110.75 | 1.21 | 104.56 | 1.84 |

Note: Significance levels are denoted by *** for 1%, ** for 5%, and * for 10%.

**Appendix table 2—Tobit results of pork consumption at home and away from home**

| | At home | | Away from home | |
|---|---|---|---|---|
| Variables | Estimated coefficient | Standard error | Estimated coefficient | Standard error |
| Intercept | -6.59 | 10.72 | -113.05 | 13.03*** |
| Eating out | -0.25 | 0.20 | 1.81 | 0.24*** |
| Knowledge | -3.67 | 0.67*** | -0.50 | 0.79 |
| Income | -0.13 | 0.10 | -0.07 | 0.11 |
| Male | 7.00 | 1.97*** | 3.29 | 2.30 |
| Age 0-4 | -29.44 | 4.74*** | -39.30 | 6.41*** |
| Age 5-9 | -18.86 | 5.49*** | -41.88 | 6.76*** |
| Age 10-14 | -9.38 | 5.51* | -47.30 | 6.93*** |
| Age 15-19 | -18.91 | 6.32*** | -42.01 | 7.60*** |
| Age 20-29 | -13.94 | 5.66** | -38.65 | 6.87*** |
| Age 30-44 | -4.01 | 4.78 | -25.49 | 5.78*** |
| Age 45-54 | 1.90 | 4.45 | -17.29 | 5.34*** |
| Age 55-64 | 9.40 | 4.11** | -4.64 | 4.92 |
| Age 65-74 | -0.43 | 4.03 | -3.71 | 4.85 |
| Black | 25.12 | 2.53*** | -0.79 | 3.16 |
| Hispanic | -1.59 | 3.07 | 9.23 | 3.56*** |
| Asian | -2.54 | 4.89 | 14.42 | 5.23*** |
| Other | 8.52 | 6.21 | 16.11 | 6.81** |
| HH type1 | 13.28 | 3.36*** | 6.47 | 3.77* |
| HH type2 | 16.18 | 2.61*** | 3.93 | 2.85 |
| HH type 3 | 4.08 | 3.63 | -1.13 | 4.29 |
| Midwest | 16.01 | 2.37*** | 7.84 | 2.84*** |
| South | 3.31 | 2.18 | 6.84 | 2.63*** |
| West | -7.91 | 2.44*** | 3.95 | 2.88 |
| Nonmetro | 12.87 | 2.10*** | 7.84 | 2.43*** |
| Suburb | -0.04 | 1.79 | 2.53 | 2.06 |
| HH size | -0.71 | 0.66 | -0.93 | 0.82 |
| Quarter 1 | -2.28 | 2.06 | -1.75 | 2.38 |
| Quarter 2 | 0.31 | 2.05 | -0.17 | 2.36 |
| Quarter 3 | -0.33 | 2.05 | 2.41 | 2.38 |
| Sigma | 75.32 | 0.95 | 60.09 | 1.45 |

Note: Significance levels are denoted by *** for 1%, ** for 5%, and * for 10%.

**Appendix table 3—Tobit results of poultry consumption at home and away from home**

| | At home | | Away from home | |
|---|---|---|---|---|
| Variables | Estimated coefficient | Standard error | Estimated coefficient | Standard error |
| Intercept | -79.91 | 13.24*** | -134.17 | 18.11*** |
| Eating out | -1.03 | 0.24*** | 1.50 | 0.32*** |
| Knowledge | 2.05 | 0.82** | -2.22 | 1.10** |
| Income | 0.08 | 0.13 | 0.36 | 0.17** |
| Male | 15.69 | 2.38*** | -2.12 | 3.21 |
| Age 0-4 | -17.16 | 5.73*** | 26.11 | 8.43*** |
| Age 5-9 | -4.98 | 6.71 | 40.79 | 9.42*** |
| Age 10-14 | -3.11 | 6.81 | 22.36 | 9.67** |
| Age 15-19 | 4.85 | 7.65 | 34.63 | 10.74*** |
| Age 20-29 | 4.62 | 6.91 | 31.20 | 9.81*** |
| Age 30-44 | 11.59 | 5.91** | 19.60 | 8.59** |
| Age 45-54 | 9.78 | 5.58* | 17.53 | 8.20** |
| Age 55-64 | -0.93 | 5.30 | 0.23 | 8.04 |
| Age 65-74 | 7.13 | 5.12 | -3.84 | 8.09 |
| Black | 40.68 | 3.11*** | 26.72 | 4.10*** |
| Hispanic | 27.60 | 3.61*** | -9.29 | 5.07* |
| Asian | 23.66 | 5.55*** | -11.52 | 7.99 |
| Other | 12.98 | 7.43* | 1.01 | 10.20 |
| HH type1 | 5.39 | 4.05 | 5.77 | 5.29 |
| HH type2 | 13.16 | 3.17*** | 5.69 | 4.21 |
| HH type 3 | 13.53 | 4.31*** | -7.20 | 5.72 |
| Midwest | -9.89 | 2.84*** | 10.68 | 3.86*** |
| South | -10.62 | 2.56*** | 6.94 | 3.52** |
| West | -13.37 | 2.79*** | -7.11 | 3.93* |
| Nonmetro | -9.02 | 2.61*** | -7.07 | 3.54** |
| Suburb | -4.08 | 2.11* | 1.25 | 2.85 |
| HH size | -0.63 | 0.79 | -2.65 | 1.08** |
| Quarter 1 | -8.70 | 2.47*** | -2.95 | 3.30 |
| Quarter 2 | -5.72 | 2.46** | -9.19 | 3.33*** |
| Quarter 3 | -9.13 | 2.48*** | -5.19 | 3.35 |
| Sigma | 98.41 | 1.08 | 112.40 | 1.74 |

Note: Significance levels are denoted by *** for 1%, ** for 5%, and * for 10%.

**Appendix table 4—Tobit results of fish consumption at home and away from home**

| | At home | | Away from home | |
|---|---|---|---|---|
| Variables | Estimated coefficient | Standard error | Estimated coefficient | Standard error |
| Intercept | -108.58 | 24.28*** | -361.57 | 35.45*** |
| Eating out | -1.91 | 0.45*** | 1.21 | 0.60** |
| Knowledge | -0.53 | 1.53 | 5.24 | 2.12** |
| Income | 0.22 | 0.23 | 0.63 | 0.29** |
| Male | 9.04 | 4.42** | 24.97 | 6.02*** |
| Age 0-4 | -24.36 | 10.64** | -91.45 | 16.43*** |
| Age 5-9 | 8.30 | 12.29 | -80.03 | 17.71*** |
| Age 10-14 | 2.10 | 12.55 | -66.90 | 17.45*** |
| Age 15-19 | 1.73 | 14.21 | -71.37 | 19.84*** |
| Age 20-29 | 3.60 | 12.53 | -44.23 | 17.27** |
| Age 30-44 | 22.52 | 10.50** | -34.82 | 14.68** |
| Age 45-54 | 14.18 | 9.93 | -6.30 | 13.54 |
| Age 55-64 | 25.95 | 9.14*** | -4.86 | 12.67 |
| Age 65-74 | 13.51 | 8.90 | 3.52 | 12.35 |
| Black | 44.78 | 5.73*** | 19.53 | 8.21** |
| Hispanic | -13.65 | 7.23* | 14.62 | 9.76 |
| Asian | 98.82 | 8.76*** | 78.18 | 12.66*** |
| Other | 33.16 | 13.00** | -13.22 | 22.63 |
| HH type1 | -16.22 | 7.42** | -3.76 | 9.99 |
| HH type2 | -3.62 | 5.57 | 7.48 | 7.42 |
| HH type 3 | -10.40 | 7.98 | -1.06 | 11.38 |
| Midwest | -41.23 | 5.34*** | -17.10 | 7.35** |
| South | -30.71 | 4.66*** | 11.33 | 6.44* |
| West | -19.94 | 4.99*** | -7.66 | 7.21 |
| Nonmetro | -17.03 | 5.03*** | 4.73 | 6.51 |
| Suburb | -3.32 | 3.90 | -3.47 | 5.35 |
| HH size | -3.79 | 1.52** | 0.29 | 2.13 |
| Quarter 1 | 5.48 | 4.71 | 6.64 | 6.24 |
| Quarter 2 | 14.12 | 4.64*** | 1.57 | 6.29 |
| Quarter 3 | -1.75 | 4.76 | 4.19 | 6.31 |
| Sigma | 135.66 | 2.63 | 156.13 | 3.98 |

Note: Significance levels are denoted by *** for 1%, ** for 5%, and * for 10%.

**Appendix table 5—Tobit results of other meat consumption at home and away from home**

| | At home | | Away from home | |
|---|---|---|---|---|
| Variables | Estimated coefficient | Standard error | Estimated coefficient | Standard error |
| Intercept | 27.10 | 8.16*** | -33.32 | 12.71*** |
| Eating out | -0.78 | 0.15*** | 0.28 | 0.23 |
| Knowledge | -2.62 | 0.51*** | -4.94 | 0.78*** |
| Income | -0.18 | 0.08** | 0.38 | 0.12*** |
| Male | 18.00 | 1.48*** | 11.34 | 2.29*** |
| Age 0-4 | -0.44 | 3.59 | 12.91 | 6.31** |
| Age 5-9 | 20.73 | 4.14*** | 40.42 | 6.81*** |
| Age 10-14 | 25.45 | 4.19*** | 38.49 | 6.90*** |
| Age 15-19 | 20.30 | 4.76*** | 32.90 | 7.75*** |
| Age 20-29 | 19.73 | 4.30*** | 38.59 | 7.02*** |
| Age 30-44 | 26.99 | 3.67*** | 41.68 | 6.14*** |
| Age 45-54 | 20.32 | 3.48*** | 29.20 | 5.87*** |
| Age 55-64 | 16.69 | 3.30*** | 32.72 | 5.59*** |
| Age 65-74 | 7.58 | 3.23** | 15.07 | 5.64*** |
| Black | 10.20 | 1.97*** | 1.79 | 3.03 |
| Hispanic | -20.50 | 2.33*** | -21.89 | 3.71*** |
| Asian | -35.02 | 3.86*** | -28.22 | 6.02*** |
| Other | -6.82 | 4.66 | -30.23 | 8.54*** |
| HH type1 | 4.63 | 2.50* | 2.14 | 3.79 |
| HH type2 | 5.29 | 1.96*** | 0.04 | 2.97 |
| HH type 3 | 5.53 | 2.70** | -11.81 | 4.21*** |
| Midwest | 4.02 | 1.76** | 8.52 | 2.71*** |
| South | -3.06 | 1.61* | -6.60 | 2.51*** |
| West | -7.07 | 1.76*** | -9.75 | 2.78*** |
| Nonmetro | 9.94 | 1.60*** | 1.38 | 2.49 |
| Suburb | 7.57 | 1.34*** | 0.93 | 2.05 |
| HH size | -1.64 | 0.50*** | -2.60 | 0.80*** |
| Quarter 1 | -6.47 | 1.55*** | -7.03 | 2.36*** |
| Quarter 2 | 0.83 | 1.53 | -4.66 | 2.33** |
| Quarter 3 | -4.08 | 1.55*** | -12.56 | 2.42*** |
| Sigma | 67.78 | 0.57 | 77.07 | 1.27 |

Note: Significance levels are denoted by *** for 1%, ** for 5%, and * for 10%.

**Appendix table 6—Tobit results of meat mixture consumption at home and away from home**

| | At home | | Away from home | |
|---|---|---|---|---|
| Variables | Estimated coefficient | Standard error | Estimated coefficient | Standard error |
| Intercept | 11.60 | 30.39 | -264.46 | 28.75*** |
| Eating out | -0.39 | 0.56 | 4.28 | 0.50*** |
| Knowledge | -6.23 | 1.89*** | -0.61 | 1.75 |
| Income | 0.03 | 0.29 | -0.01 | 0.26 |
| Male | 15.87 | 5.49*** | 42.59 | 5.08*** |
| Age 0-4 | -92.09 | 13.34*** | -8.42 | 13.84 |
| Age 5-9 | -69.70 | 15.50*** | 10.77 | 15.18 |
| Age 10-14 | -38.15 | 15.63** | 26.01 | 15.30* |
| Age 15-19 | -20.86 | 17.63 | 56.71 | 16.90*** |
| Age 20-29 | -25.86 | 15.95 | 81.39 | 15.42*** |
| Age 30-44 | -6.78 | 13.66 | 79.27 | 13.54*** |
| Age 45-54 | 1.97 | 12.90 | 52.62 | 12.98*** |
| Age 55-64 | 15.60 | 12.13 | 24.64 | 12.66* |
| Age 65-74 | 13.90 | 11.81 | 7.97 | 12.76 |
| Black | -30.94 | 7.57*** | 16.53 | 6.76** |
| Hispanic | -0.32 | 8.40 | -12.02 | 7.94 |
| Asian | 109.51 | 12.33*** | 40.47 | 11.84*** |
| Other | -57.38 | 18.00*** | 26.20 | 15.63* |
| HH type1 | 35.66 | 9.28*** | 10.58 | 8.30 |
| HH type2 | 23.81 | 7.28*** | 2.51 | 6.64 |
| HH type 3 | 40.04 | 10.00*** | -0.57 | 9.05 |
| Midwest | 4.93 | 6.59 | 14.42 | 6.19** |
| South | -13.60 | 6.03** | 17.10 | 5.62*** |
| West | 20.49 | 6.42*** | 15.97 | 6.13*** |
| Nonmetro | 19.15 | 5.95*** | -13.70 | 5.51** |
| Suburb | 10.86 | 4.92** | -7.42 | 4.49* |
| HH size | 3.30 | 1.81* | -8.27 | 1.74*** |
| Quarter 1 | 3.35 | 5.62 | -5.68 | 5.27 |
| Quarter 2 | -37.18 | 5.72*** | 1.04 | 5.23 |
| Quarter 3 | -25.82 | 5.74*** | -1.99 | 5.32 |
| Sigma | 243.77 | 2.23 | 208.27 | 2.25 |

Note: Significance levels are denoted by *** for 1%, ** for 5%, and * for 10%.

**Appendix table 7—Tobit results of egg consumption at home and away from home**

| | At home | | Away from home | |
|---|---|---|---|---|
| Variables | Estimated coefficient | Standard error | Estimated coefficient | Standard error |
| Intercept | 29.05 | 11.07*** | -252.32 | 27.09*** |
| Eating out | -1.06 | 0.21*** | 2.72 | 0.48*** |
| Knowledge | -4.36 | 0.70*** | -0.29 | 1.62 |
| Income | -0.27 | 0.11** | -0.15 | 0.23 |
| Male | 6.27 | 2.05*** | 14.01 | 4.69*** |
| Age 0-4 | -21.08 | 4.77*** | -54.69 | 13.00*** |
| Age 5-9 | -19.21 | 5.69*** | -61.13 | 14.00*** |
| Age 10-14 | -12.10 | 5.75** | -85.90 | 14.87*** |
| Age 15-19 | -16.38 | 6.54** | -54.08 | 15.55*** |
| Age 20-29 | -0.82 | 5.81 | -33.61 | 13.98** |
| Age 30-44 | -8.63 | 4.98* | -7.52 | 11.80 |
| Age 45-54 | 5.19 | 4.66 | -6.29 | 11.06 |
| Age 55-64 | 4.55 | 4.35 | 15.67 | 10.27 |
| Age 65-74 | -0.09 | 4.23 | 2.89 | 10.32 |
| Black | 15.86 | 2.66*** | 1.00 | 6.32 |
| Hispanic | 14.86 | 3.03*** | -18.03 | 7.81** |
| Asian | 5.66 | 4.71 | -20.08 | 12.36 |
| Other | 1.61 | 6.31 | -28.40 | 17.94 |
| HH type1 | 7.79 | 3.45** | -8.42 | 7.60 |
| HH type2 | 6.81 | 2.72** | 4.03 | 5.74 |
| HH type 3 | 9.85 | 3.70*** | -26.91 | 8.96*** |
| Midwest | 7.19 | 2.51*** | 7.98 | 5.76 |
| South | 8.87 | 2.26*** | 16.70 | 5.23*** |
| West | 10.10 | 2.43*** | 11.90 | 5.79** |
| Nonmetro | -1.15 | 2.21 | 12.90 | 5.08** |
| Suburb | -1.41 | 1.83 | 12.32 | 4.22*** |
| HH size | 0.93 | 0.65 | 2.47 | 1.63 |
| Quarter 1 | -1.76 | 2.14 | -2.36 | 4.87 |
| Quarter 2 | -1.28 | 2.14 | -0.23 | 4.82 |
| Quarter 3 | -0.12 | 2.14 | 2.11 | 4.89 |
| Sigma | 82.20 | 0.97 | 130.69 | 2.96 |

Note: Significance levels are denoted by *** for 1%, ** for 5%, and * for 10%.

**Appendix table 8—Tobit results of milk consumption at home and away from home**

| | At home | | Away from home | |
|---|---|---|---|---|
| Variables | Estimated coefficient | Standard error | Estimated coefficient | Standard error |
| Intercept | 13.72 | 32.87 | -461.72 | 54.31*** |
| Eating out | -5.55 | 0.60*** | 6.04 | 1.07*** |
| Knowledge | 11.09 | 2.05*** | 3.59 | 3.29 |
| Income | 0.23 | 0.31 | -1.13 | 0.52** |
| Male | 81.03 | 5.92*** | 12.77 | 9.43 |
| Age 0-4 | 152.60 | 14.13*** | 131.20 | 23.93*** |
| Age 5-9 | 190.19 | 16.57*** | 207.91 | 27.78*** |
| Age 10-14 | 167.15 | 16.84*** | 146.60 | 28.35*** |
| Age 15-19 | 121.38 | 19.15*** | -11.55 | 33.14 |
| Age 20-29 | 35.73 | 17.26** | -126.24 | 31.23*** |
| Age 30-44 | 12.06 | 14.79 | -84.68 | 26.65*** |
| Age 45-54 | -26.18 | 13.99* | -51.34 | 25.05** |
| Age 55-64 | -36.45 | 13.20*** | -58.19 | 24.24** |
| Age 65-74 | -0.90 | 12.78 | -61.09 | 24.28** |
| Black | -104.05 | 8.28*** | -30.41 | 13.13** |
| Hispanic | -9.87 | 9.14 | 1.72 | 14.46 |
| Asian | -63.17 | 14.43*** | 2.17 | 23.39 |
| Other | -56.60 | 18.75*** | 50.18 | 25.95* |
| HH type1 | -11.85 | 10.03 | -36.48 | 16.50** |
| HH type2 | -24.44 | 7.85*** | -32.15 | 13.47** |
| HH type 3 | -5.03 | 10.84 | 22.18 | 16.91 |
| Midwest | 21.73 | 7.05*** | -77.61 | 11.01*** |
| South | -22.62 | 6.45*** | -94.97 | 10.25*** |
| West | 29.18 | 6.93*** | -56.03 | 10.68*** |
| Nonmetro | -52.79 | 6.47*** | 7.41 | 10.27 |
| Suburb | -10.89 | 5.28** | -1.78 | 8.43 |
| HH size | -7.49 | 1.98*** | 0.49 | 3.07 |
| Quarter 1 | -2.76 | 6.14 | -6.75 | 9.62 |
| Quarter 2 | -16.67 | 6.17*** | -8.96 | 9.63 |
| Quarter 3 | -25.95 | 6.22*** | -33.66 | 10.06*** |
| Sigma | 292.35 | 1.93 | 285.94 | 5.34 |

Note: Significance levels are denoted by *** for 1%, ** for 5%, and * for 10%.

**Appendix table 9—Tobit results of cheese consumption at home and away from home**

| | At home | | Away from home | |
|---|---|---|---|---|
| Variables | Estimated coefficient | Standard error | Estimated coefficient | Standard error |
| Intercept | -53.98 | 6.45*** | -81.22 | 8.03*** |
| Eating out | -0.73 | 0.12*** | 0.60 | 0.13*** |
| Knowledge | 2.79 | 0.40*** | 0.35 | 0.47 |
| Income | 0.20 | 0.06*** | 0.12 | 0.07* |
| Male | 9.76 | 1.14*** | 3.46 | 1.35** |
| Age 0-4 | -1.15 | 2.79 | 17.05 | 4.30*** |
| Age 5-9 | 9.73 | 3.24*** | 29.19 | 4.52*** |
| Age 10-14 | 10.98 | 3.29*** | 37.06 | 4.52*** |
| Age 15-19 | 17.31 | 3.70*** | 38.89 | 4.94*** |
| Age 20-29 | 16.55 | 3.35*** | 36.52 | 4.59*** |
| Age 30-44 | 12.99 | 2.88*** | 34.01 | 4.16*** |
| Age 45-54 | 5.20 | 2.73* | 25.10 | 4.04*** |
| Age 55-64 | 3.70 | 2.59 | 18.07 | 4.01*** |
| Age 65-74 | 5.66 | 2.52** | 13.78 | 4.05*** |
| Black | -18.38 | 1.67*** | -1.89 | 1.85 |
| Hispanic | 0.51 | 1.75 | -7.08 | 2.14*** |
| Asian | -34.09 | 3.23*** | -10.99 | 3.47*** |
| Other | -1.78 | 3.55 | -26.16 | 5.54*** |
| HH type1 | -2.24 | 1.91 | -2.09 | 2.19 |
| HH type2 | -5.57 | 1.51*** | -5.51 | 1.77*** |
| HH type 3 | 1.50 | 2.09 | -8.66 | 2.41*** |
| Midwest | -1.61 | 1.34 | -3.37 | 1.60** |
| South | -8.61 | 1.24*** | -8.57 | 1.47*** |
| West | -1.35 | 1.32 | -3.53 | 1.58** |
| Nonmetro | -0.68 | 1.24 | -2.16 | 1.45 |
| Suburb | 0.07 | 1.02 | -3.73 | 1.19*** |
| HH size | -0.72 | 0.39* | -1.94 | 0.47*** |
| Quarter 1 | -1.58 | 1.19 | -1.14 | 1.37 |
| Quarter 2 | 0.72 | 1.19 | -2.81 | 1.38** |
| Quarter 3 | 1.32 | 1.19 | -5.99 | 1.43*** |
| Sigma | 51.01 | 0.44 | 46.53 | 0.69 |

Note: Significance levels are denoted by *** for 1%, ** for 5%, and * for 10%.

**Appendix table 10—Tobit results of other dairy consumption at home and away from home**

| | At home | | Away from home | |
|---|---|---|---|---|
| Variables | Estimated coefficient | Standard error | Estimated coefficient | Standard error |
| Intercept | -217.77 | 28.83*** | -235.28 | 31.25*** |
| Eating out | -2.09 | 0.53*** | 3.02 | 0.57*** |
| Knowledge | 12.2 | 1.79*** | -0.21 | 1.90 |
| Income | 0.63 | 0.27** | -0.09 | 0.28 |
| Male | 24.55 | 5.12*** | 2.97 | 5.49 |
| Age 0-4 | 135.52 | 11.98*** | 25.65 | 14.98* |
| Age 5-9 | 21.69 | 14.34 | 177.25 | 15.95*** |
| Age 10-14 | -1.30 | 14.68 | 166.50 | 16.19*** |
| Age 15-19 | -40.03 | 16.81** | 92.35 | 18.55*** |
| Age 20-29 | -43.75 | 15.11*** | 3.24 | 17.21 |
| Age 30-44 | -12.17 | 12.74 | 39.90 | 14.69*** |
| Age 45-54 | -31.67 | 12.04*** | 31.76 | 13.94** |
| Age 55-64 | -33.35 | 11.29*** | 13.14 | 13.42 |
| Age 65-74 | -11.66 | 10.88 | 20.62 | 13.16 |
| Black | -30.84 | 7.20*** | -8.88 | 7.58 |
| Hispanic | -2.02 | 8.06 | -12.81 | 8.66 |
| Asian | -28.56 | 12.78** | -26.19 | 13.90* |
| Other | -5.52 | 16.16 | -44.26 | 19.01** |
| HH type1 | -13.55 | 8.75 | -40.22 | 9.37*** |
| HH type2 | 4.95 | 6.78 | -1.91 | 7.26 |
| HH type 3 | -19.94 | 9.58*** | -42.85 | 10.00*** |
| Midwest | -25.37 | 6.04*** | -12.45 | 6.40* |
| South | -32.58 | 5.53*** | -49.63 | 5.98*** |
| West | -16.74 | 5.94*** | -30.84 | 6.42*** |
| Nonmetro | -27.00 | 5.62*** | -10.87 | 6.01* |
| Suburb | -2.19 | 4.55 | -10.09 | 4.91** |
| HH size | 0.72 | 1.73 | -2.89 | 1.90 |
| Quarter 1 | -3.40 | 5.32 | 0.71 | 5.70 |
| Quarter 2 | -11.99 | 5.35** | 0.98 | 5.67 |
| Quarter 3 | 0.99 | 5.34 | -7.84 | 5.81 |
| Sigma | 227.83 | 1.97 | 200.94 | 2.72 |

Note: Significance levels are denoted by *** for 1%, ** for 5%, and * for 10%.

**Appendix table 11—Tobit results of fat and oil consumption at home and away from home**

| | At home | | Away from home | |
|---|---|---|---|---|
| Variables | Estimated coefficient | Standard error | Estimated coefficient | Standard error |
| Intercept | -2.83 | 2.41 | -43.70 | 4.04*** |
| Eating out | -0.26 | 0.04*** | 0.66 | 0.07*** |
| Knowledge | 1.01 | 0.15*** | 0.52 | 0.25** |
| Income | -0.01 | 0.02 | 0.11 | 0.04*** |
| Male | 3.93 | 0.43*** | 1.81 | 0.71** |
| Age 0-4 | -13.76 | 1.06*** | -14.77 | 2.03*** |
| Age 5-9 | -5.14 | 1.21*** | -9.51 | 2.11*** |
| Age 10-14 | -3.85 | 1.23*** | -10.03 | 2.14*** |
| Age 15-19 | -3.28 | 1.39** | -4.13 | 2.35* |
| Age 20-29 | -2.99 | 1.26** | 0.96 | 2.12 |
| Age 30-44 | 2.90 | 1.07*** | 2.29 | 1.84 |
| Age 45-54 | 1.75 | 1.01* | 3.21 | 1.74* |
| Age 55-64 | 3.25 | 0.95*** | 5.07 | 1.65*** |
| Age 65-74 | 2.07 | 0.92** | 2.91 | 1.65* |
| Black | -2.80 | 0.60*** | -2.49 | 0.99** |
| Hispanic | -6.18 | 0.69*** | -3.98 | 1.16*** |
| Asian | -13.45 | 1.15*** | -5.04 | 1.82*** |
| Other | -4.84 | 1.39*** | -7.43 | 2.54*** |
| HH type1 | -2.40 | 0.73*** | -1.69 | 1.16 |
| HH type2 | -1.35 | 0.56** | -1.44 | 0.90 |
| HH type 3 | -1.69 | 0.79** | -0.31 | 1.28 |
| Midwest | -1.49 | 0.52*** | 0.98 | 0.85 |
| South | -4.23 | 0.47*** | -1.94 | 0.78** |
| West | 0.43 | 0.51 | 0.62 | 0.85 |
| Nonmetro | -0.53 | 0.47 | 0.05 | 0.77 |
| Suburb | 0.06 | 0.39 | 0.05 | 0.64 |
| HH size | -0.20 | 0.15 | -0.09 | 0.25 |
| Quarter 1 | -0.66 | 0.45 | 1.23 | 0.73* |
| Quarter 2 | -0.41 | 0.45 | -1.09 | 0.74 |
| Quarter 3 | -0.63 | 0.45 | -0.21 | 0.75 |
| Sigma | 21.17 | 0.14 | 28.11 | 0.32 |

Note: Significance levels are denoted by *** for 1%, ** for 5%, and * for 10%.

**Appendix table 12—Tobit results of fruit juice consumption at home and away from home**

| | At home | | Away from home | |
|---|---|---|---|---|
| Variables | Estimated coefficient | Standard error | Estimated coefficient | Standard error |
| Intercept | -572.38 | 41.02*** | -435.84 | 60.07*** |
| Eating out | -7.21 | 0.75*** | 4.48 | 1.15*** |
| Knowledge | 40.01 | 2.55*** | -4.87 | 3.63 |
| Income | 1.29 | 0.38*** | 0.29 | 0.56 |
| Male | 91.37 | 7.28*** | 13.15 | 10.61 |
| Age 0-4 | 104.71 | 16.96*** | 160.55 | 28.41*** |
| Age 5-9 | 70.40 | 20.37*** | 168.24 | 32.29*** |
| Age 10-14 | 77.43 | 20.68*** | 129.24 | 32.86*** |
| Age 15-19 | 75.97 | 23.62*** | 88.83 | 37.02** |
| Age 20-29 | 56.13 | 21.18*** | 23.44 | 34.67 |
| Age 30-44 | -41.64 | 18.26** | -2.43 | 30.36 |
| Age 45-54 | -40.33 | 17.19** | 19.41 | 29.05 |
| Age 55-64 | -66.23 | 16.20*** | -30.07 | 29.37 |
| Age 65-74 | -13.19 | 15.48 | -12.81 | 29.00 |
| Black | 74.25 | 9.94*** | 79.64 | 13.24*** |
| Hispanic | 153.67 | 11.13*** | 24.02 | 15.93 |
| Asian | 130.31 | 17.18*** | -1.56 | 25.95 |
| Other | 122.29 | 21.73*** | 5.64 | 32.45 |
| HH type1 | -66.39 | 12.31*** | -66.89 | 17.68*** |
| HH type2 | -65.93 | 9.61*** | -40.84 | 14.64*** |
| HH type 3 | -22.36 | 13.25* | -30.15 | 18.22* |
| Midwest | -91.15 | 8.52*** | -61.85 | 12.78*** |
| South | -93.59 | 7.75*** | -58.64 | 11.44*** |
| West | -100.06 | 8.40*** | -46.09 | 12.32*** |
| Nonmetro | -72.59 | 8.04*** | -18.72 | 11.88 |
| Suburb | -37.93 | 6.42*** | -3.54 | 9.37 |
| HH size | -6.41 | 2.43*** | 5.18 | 3.27 |
| Quarter 1 | 1.27 | 7.55 | -12.41 | 10.76 |
| Quarter 2 | -1.24 | 7.55 | -32.06 | 11.02*** |
| Quarter 3 | -23.92 | 7.63*** | -38.69 | 11.27*** |
| Sigma | 316.00 | 3.02 | 287.14 | 6.90 |

Note: Significance levels are denoted by *** for 1%, ** for 5%, and * for 10%.

**Appendix table 13—Tobit results of other fruit consumption at home and away from home**

| | At home | | Away from home | |
|---|---|---|---|---|
| Variables | Estimated coefficient | Standard error | Estimated coefficient | Standard error |
| Intercept | -241.80 | 24.24*** | -302.37 | 25.92*** |
| Eating out | -3.60 | 0.44*** | 1.84 | 0.48*** |
| Knowledge | 20.84 | 1.51*** | 5.14 | 1.55*** |
| Income | 1.35 | 0.22*** | -0.03 | 0.23 |
| Male | 24.18 | 4.31*** | 6.23 | 4.42 |
| Age 0-4 | -77.20 | 10.03*** | 25.95 | 11.27** |
| Age 5-9 | -70.40 | 11.98*** | 79.18 | 12.80*** |
| Age 10-14 | -107.59 | 12.27*** | 38.54 | 13.15*** |
| Age 15-19 | -133.26 | 14.10*** | -36.27 | 15.57** |
| Age 20-29 | -116.08 | 12.58*** | -34.54 | 14.00** |
| Age 30-44 | -98.53 | 10.65*** | -22.60 | 12.00* |
| Age 45-54 | -80.01 | 9.99*** | -13.41 | 11.31 |
| Age 55-64 | -37.69 | 9.22*** | -15.09 | 10.77 |
| Age 65-74 | 7.02 | 8.86 | -5.96 | 10.58 |
| Black | 2.76 | 6.06 | -7.64 | 6.27 |
| Hispanic | 62.19 | 6.70*** | 23.56 | 6.80*** |
| Asian | 106.64 | 10.05*** | 25.31 | 10.45** |
| Other | 38.87 | 13.42*** | 39.46 | 12.52*** |
| HH type1 | -0.83 | 7.33 | -33.38 | 7.55*** |
| HH type2 | -18.71 | 5.63*** | -14.41 | 5.94** |
| HH type 3 | -15.28 | 8.06 * | -8.16 | 8.00 |
| Midwest | -10.42 | 5.11** | 6.04 | 5.42 |
| South | -25.00 | 4.70*** | 1.52 | 4.99 |
| West | 35.27 | 4.97*** | 14.19 | 5.26*** |
| Nonmetro | -36.60 | 4.74*** | -1.14 | 4.81 |
| Suburb | -2.05 | 3.82 | -4.85 | 3.96 |
| HH size | -2.98 | 1.46** | 2.38 | 1.46 |
| Quarter 1 | 12.50 | 4.52*** | 8.63 | 4.57* |
| Quarter 2 | 26.57 | 4.50*** | 3.15 | 4.62 |
| Quarter 3 | 34.65 | 4.52*** | -3.38 | 4.77 |
| Sigma | 201.20 | 1.53 | 141.06 | 2.53 |

Note: Significance levels are denoted by *** for 1%, ** for 5%, and * for 10%.

**Appendix table 14—Tobit results of fried potato consumption at home and away from home**

| | At home | | Away from home | |
|---|---|---|---|---|
| Variables | Estimated coefficient | Standard error | Estimated coefficient | Standard error |
| Intercept | -45.21 | 11.84*** | -117.96 | 10.95*** |
| Eating out | 0.05 | 0.22 | 1.59 | 0.19*** |
| Knowledge | -5.20 | 0.73*** | -1.28 | 0.65* |
| Income | -0.01 | 0.11 | -0.08 | 0.10 |
| Male | 1.49 | 2.11 | 15.55 | 1.89*** |
| Age 0-4 | 37.47 | 5.58*** | 43.42 | 5.42*** |
| Age 5-9 | 52.45 | 6.33*** | 47.94 | 5.99*** |
| Age 10-14 | 55.71 | 6.41*** | 57.52 | 6.03*** |
| Age 15-19 | 35.38 | 7.22*** | 63.42 | 6.65*** |
| Age 20-29 | 40.56 | 6.63*** | 51.21 | 6.18*** |
| Age 30-44 | 41.98 | 5.81*** | 42.92 | 5.51*** |
| Age 45-54 | 36.98 | 5.56*** | 29.08 | 5.32*** |
| Age 55-64 | 33.79 | 5.33*** | 16.47 | 5.27*** |
| Age 65-74 | 15.43 | 5.38*** | 3.85 | 5.44 |
| Black | -6.32 | 2.84** | 4.81 | 2.50* |
| Hispanic | -22.64 | 3.30*** | -7.04 | 2.92** |
| Asian | -26.94 | 5.29*** | -19.75 | 4.82*** |
| Other | 4.68 | 6.25 | -5.63 | 6.03 |
| HH type1 | 16.67 | 3.59*** | -2.35 | 3.13 |
| HH type2 | 10.81 | 2.95*** | 0.22 | 2.58 |
| HH type 3 | 19.76 | 3.81*** | -4.94 | 3.37 |
| Midwest | 13.34 | 2.53*** | 18.46 | 2.33*** |
| South | 1.02 | 2.34 | 14.70 | 2.13*** |
| West | 6.48 | 2.53** | 8.15 | 2.33*** |
| Nonmetro | 23.97 | 2.26*** | 7.22 | 2.04*** |
| Suburb | 8.75 | 1.93*** | 4.41 | 1.69*** |
| HH size | -0.02 | 0.69 | -0.28 | 0.62 |
| Quarter 1 | 7.53 | 2.21*** | -4.31 | 1.95** |
| Quarter 2 | 7.44 | 2.21*** | -5.14 | 1.95*** |
| Quarter 3 | 7.99 | 2.23*** | -1.12 | 1.96 |
| Sigma | 81.53 | 0.98 | 76.06 | 0.85 |

Note: Significance levels are denoted by *** for 1%, ** for 5%, and * for 10%.

**Appendix table 15—Tobit results of other potato consumption at home and away from home**

| | At home | | Away from home | |
|---|---|---|---|---|
| Variables | Estimated coefficient | Standard error | Estimated coefficient | Standard error |
| Intercept | -118.70 | 21.67*** | -140.85 | 29.95*** |
| Eating out | 0.24 | 0.40 | 2.52 | 0.56*** |
| Knowledge | 4.48 | 1.35*** | -6.22 | 1.87*** |
| Income | -1.18 | 0.21*** | 0.51 | 0.27* |
| Male | 19.91 | 3.89*** | -0.68 | 5.43 |
| Age 0-4 | -96.62 | 9.29*** | -96.45 | 14.20*** |
| Age 5-9 | -97.42 | 10.89*** | -82.37 | 15.36*** |
| Age 10-14 | -75.99 | 10.94*** | -102.45 | 15.99*** |
| Age 15-19 | -81.53 | 12.51*** | -107.70 | 18.11*** |
| Age 20-29 | -81.33 | 11.25*** | -64.95 | 15.73*** |
| Age 30-44 | -47.91 | 9.45*** | -51.60 | 13.27*** |
| Age 45-54 | -44.76 | 8.86*** | -26.95 | 12.25** |
| Age 55-64 | -11.00 | 8.16 | -2.76 | 11.16 |
| Age 65-74 | -16.61 | 7.93** | -10.99 | 10.97 |
| Black | -46.39 | 5.58*** | -40.96 | 7.78*** |
| Hispanic | -11.88 | 6.14* | -35.73 | 9.19*** |
| Asian | -36.25 | 10.22*** | -80.05 | 17.31*** |
| Other | 1.87 | 12.37 | -42.57 | 20.77** |
| HH type1 | 18.77 | 6.61*** | 14.26 | 9.04 |
| HH type2 | 13.80 | 5.08*** | 9.95 | 6.79 |
| HH type 3 | 17.91 | 7.24** | 6.99 | 10.24 |
| Midwest | 20.74 | 4.62*** | 24.05 | 6.53*** |
| South | 6.92 | 4.26 | 20.04 | 6.03*** |
| West | -12.25 | 4.71*** | -21.63 | 7.04*** |
| Nonmetro | 22.90 | 4.18*** | 21.03 | 5.82*** |
| Suburb | 5.33 | 3.53 | 4.10 | 4.99 |
| HH size | -1.72 | 1.35 | 0.92 | 1.94 |
| Quarter 1 | -9.75 | 4.02** | -0.80 | 5.60 |
| Quarter 2 | -10.80 | 4.02*** | -2.60 | 5.59 |
| Quarter 3 | -9.07 | 4.05** | -16.19 | 5.83*** |
| Sigma | 161.60 | 1.72 | 163.47 | 3.34 |

Note: Significance levels are denoted by *** for 1%, ** for 5%, and * for 10%.

**Appendix table 16—Tobit results of tomato consumption at home and away from home**

| | At home | | Away from home | |
|---|---|---|---|---|
| Variables | Estimated coefficient | Standard error | Estimated coefficient | Standard error |
| Intercept | -11.30 | 10.91 | -72.42 | 6.60*** |
| Eating out | -1.02 | 0.20*** | 0.90 | 0.12*** |
| Knowledge | 0.23 | 0.68 | 0.45 | 0.40 |
| Income | 0.46 | 0.10*** | 0.20 | 0.06*** |
| Male | 7.75 | 1.97*** | 5.59 | 1.16*** |
| Age 0-4 | -37.50 | 4.86*** | -2.79 | 3.29 |
| Age 5-9 | -8.21 | 5.54 | 8.18 | 3.52** |
| Age 10-14 | -6.85 | 5.62 | 14.12 | 3.54*** |
| Age 15-19 | 5.55 | 6.30 | 19.40 | 3.92*** |
| Age 20-29 | 10.48 | 5.68* | 18.58 | 3.60*** |
| Age 30-44 | 12.11 | 4.85** | 15.50 | 3.18*** |
| Age 45-54 | 8.15 | 4.60* | 10.49 | 3.06*** |
| Age 55-64 | 13.87 | 4.33*** | 8.03 | 2.96*** |
| Age 65-74 | 12.68 | 4.22*** | 6.97 | 2.97** |
| Black | -16.08 | 2.73*** | -2.53 | 1.58 |
| Hispanic | 12.10 | 3.01*** | 3.80 | 1.78** |
| Asian | -12.30 | 4.84** | -5.63 | 2.89* |
| Other | 10.46 | 6.17* | 8.86 | 3.57** |
| HH type1 | -3.30 | 3.28 | -5.43 | 1.89*** |
| HH type2 | -3.52 | 2.56 | -2.83 | 1.51* |
| HH type 3 | -4.50 | 3.59 | -3.54 | 2.06* |
| Midwest | -5.52 | 2.34** | -0.90 | 1.40 |
| South | -12.06 | 2.14*** | 1.19 | 1.27 |
| West | -3.56 | 2.29 | -1.62 | 1.39 |
| Nonmetro | -7.22 | 2.14*** | -1.38 | 1.25 |
| Suburb | -4.22 | 1.76*** | -3.20 | 1.03*** |
| HH size | -0.62 | 0.67 | 0.19 | 0.39 |
| Quarter 1 | -4.48 | 2.08** | -1.77 | 1.20 |
| Quarter 2 | 2.40 | 2.06 | -0.55 | 1.20 |
| Quarter 3 | 16.11 | 2.05*** | -0.59 | 1.21 |
| Sigma | 88.72 | 0.75 | 46.76 | 0.51 |

Note: Significance levels are denoted by *** for 1%, ** for 5%, and * for 10%.

**Appendix table 17—Tobit results of legume and nut consumption at home and away from home**

| | At home | | Away from home | |
|---|---|---|---|---|
| Variables | Estimated coefficient | Standard error | Estimated coefficient | Standard error |
| Intercept | -157.47 | 23.47*** | -456.54 | 30.21*** |
| Eating out | -3.20 | 0.43*** | 3.51 | 0.49*** |
| Knowledge | 3.58 | 1.45** | 10.09 | 1.71*** |
| Income | 0.39 | 0.22* | -0.15 | 0.23 |
| Male | 31.91 | 4.21*** | 10.40 | 4.70** |
| Age 0-4 | 14.79 | 9.93 | -8.85 | 13.67 |
| Age 5-9 | 23.26 | 11.75** | -13.23 | 14.87 |
| Age 10-14 | 6.21 | 12.01 | -28.75 | 15.22* |
| Age 15-19 | -8.58 | 13.75 | -48.86 | 17.20*** |
| Age 20-29 | 10.21 | 12.27 | -24.73 | 15.55 |
| Age 30-44 | 11.42 | 10.51 | -7.31 | 13.69 |
| Age 45-54 | 15.50 | 9.87 | 0.71 | 13.05 |
| Age 55-64 | 0.23 | 9.36 | -1.70 | 12.75 |
| Age 65-74 | 15.98 | 9.00* | 12.04 | 12.74 |
| Black | -10.52 | 5.93* | 13.96 | 6.46** |
| Hispanic | 62.78 | 6.28*** | 47.41 | 7.05*** |
| Asian | 45.84 | 9.53*** | 40.57 | 10.60*** |
| Other | 19.62 | 12.68 | -18.63 | 17.05 |
| HH type1 | -4.91 | 7.12 | 0.50 | 7.75 |
| HH type2 | 0.08 | 5.61 | 0.22 | 6.07 |
| HH type 3 | -8.98 | 7.83 | -0.87 | 8.52 |
| Midwest | 14.50 | 5.17*** | 9.23 | 6.14 |
| South | 23.81 | 4.67*** | 20.98 | 5.61*** |
| West | 36.49 | 4.93*** | 48.11 | 5.79*** |
| Nonmetro | -6.19 | 4.54 | 0.54 | 4.84 |
| Suburb | -12.01 | 3.73*** | -22.42 | 4.11*** |
| HH size | 3.82 | 1.38*** | -0.60 | 1.62 |
| Quarter 1 | -3.07 | 4.36 | 5.59 | 4.73 |
| Quarter 2 | 1.50 | 4.36 | -5.52 | 4.85 |
| Quarter 3 | -8.84 | 4.40** | -0.48 | 4.91 |
| Sigma | 175.01 | 1.73 | 128.33 | 2.78 |

Note: Significance levels are denoted by *** for 1%, ** for 5%, and * for 10%.

**Appendix table 18—Tobit results of other vegetable consumption at home and away from home**

| | At home | | Away from home | |
|---|---|---|---|---|
| Variables | Estimated coefficient | Standard error | Estimated coefficient | Standard error |
| Intercept | 10.63 | 14.39 | -134.35 | 14.45*** |
| Eating out | -2.11 | 0.26*** | 1.86 | 0.26*** |
| Knowledge | 7.04 | 0.90*** | 2.26 | 0.89** |
| Income | 0.07 | 0.14 | 0.75 | 0.13*** |
| Male | 21.84 | 2.59*** | 10.12 | 2.57*** |
| Age 0-4 | -88.72 | 6.23*** | -59.30 | 6.89*** |
| Age 5-9 | -68.13 | 7.29*** | -25.28 | 7.38*** |
| Age 10-14 | -56.70 | 7.38*** | -27.12 | 7.48*** |
| Age 15-19 | -58.20 | 8.35*** | -26.18 | 8.41*** |
| Age 20-29 | -42.68 | 7.52*** | -7.56 | 7.56 |
| Age 30-44 | -4.98 | 6.41 | -0.33 | 6.52 |
| Age 45-54 | -6.91 | 6.05 | 3.87 | 6.17 |
| Age 55-64 | -2.53 | 5.69 | -2.32 | 5.89 |
| Age 65-74 | 8.22 | 5.55 | -1.73 | 5.82 |
| Black | 22.13 | 3.52*** | 6.35 | 3.49* |
| Hispanic | 6.08 | 4.04 | -1.20 | 4.07 |
| Asian | 57.75 | 6.20*** | 17.43 | 6.17*** |
| Other | 19.19 | 8.17** | 9.45 | 8.17 |
| HH type1 | -11.58 | 4.34*** | -12.94 | 4.25*** |
| HH type2 | 4.04 | 3.39 | -3.56 | 3.29 |
| HH type 3 | -15.77 | 4.74*** | -7.11 | 4.64 |
| Midwest | -14.08 | 3.10*** | 3.76 | 3.10 |
| South | -9.66 | 2.81*** | 6.23 | 2.83** |
| West | -13.09 | 3.05*** | 4.02 | 3.09 |
| Nonmetro | -11.30 | 2.81*** | -1.91 | 2.78 |
| Suburb | -2.77 | 2.31 | -2.26 | 2.29 |
| HH size | 0.04 | 0.87 | -0.08 | 0.88 |
| Quarter 1 | -8.22 | 2.70*** | -0.47 | 2.66 |
| Quarter 2 | -6.76 | 2.69** | -5.75 | 2.66** |
| Quarter 3 | -1.65 | 2.71 | -5.00 | 2.70* |
| Sigma | 129.46 | 0.80 | 109.92 | 1.05 |

Note: Significance levels are denoted by *** for 1%, ** for 5%, and * for 10%.

**Appendix table 19—Tobit results of breakfast cereal consumption at home and away from home**

| | At home | | Away from home | |
|---|---|---|---|---|
| Variables | Estimated coefficient | Standard error | Estimated coefficient | Standard error |
| Intercept | -52.43 | 6.47*** | -124.93 | 18.46*** |
| Eating out | -1.04 | 0.12*** | -0.11 | 0.34 |
| Knowledge | 3.57 | 0.40*** | -0.41 | 1.03 |
| Income | 0.26 | 0.06*** | 0.34 | 0.16** |
| Male | 12.75 | 1.15*** | -0.35 | 2.98 |
| Age 0-4 | 7.56 | 2.73*** | 42.19 | 9.26*** |
| Age 5-9 | 31.49 | 3.21*** | 54.18 | 10.51*** |
| Age 10-14 | 30.26 | 3.27*** | 49.17 | 10.60*** |
| Age 15-19 | 21.32 | 3.74*** | 30.32 | 11.75*** |
| Age 20-29 | 6.54 | 3.37* | 19.95 | 11.04* |
| Age 30-44 | -3.83 | 2.90 | 6.67 | 10.00 |
| Age 45-54 | -10.08 | 2.75*** | 5.57 | 9.69 |
| Age 55-64 | -11.62 | 2.58*** | 13.83 | 9.04 |
| Age 65-74 | -0.20 | 2.45 | -2.39 | 10.07 |
| Black | -9.06 | 1.62*** | 7.86 | 3.84** |
| Hispanic | -5.64 | 1.81*** | 5.38 | 4.23 |
| Asian | -16.61 | 2.98*** | -50.18 | 19.25*** |
| Other | -8.82 | 3.71** | -1.82 | 8.54 |
| HH type1 | -8.08 | 1.97*** | -3.57 | 5.75 |
| HH type2 | -4.19 | 1.54*** | 2.84 | 4.82 |
| HH type 3 | 0.67 | 2.11 | 9.54 | 5.71* |
| Midwest | -0.09 | 1.37 | -5.29 | 3.71 |
| South | -2.53 | 1.25** | -2.95 | 3.27 |
| West | 0.59 | 1.35 | 3.34 | 3.37 |
| Nonmetro | -11.79 | 1.27*** | 9.19 | 3.17*** |
| Suburb | -4.10 | 1.02*** | 2.65 | 2.74 |
| HH size | -0.38 | 0.39 | 0.17 | 0.91 |
| Quarter 1 | 0.20 | 1.20 | -3.27 | 2.98 |
| Quarter 2 | -0.15 | 1.20 | -5.28 | 3.08* |
| Quarter 3 | -1.46 | 1.21 | -6.35 | 3.12** |
| Sigma | 51.68 | 0.46 | 49.37 | 2.33 |

Note: Significance levels are denoted by *** for 1%, ** for 5%, and * for 10%.

**Appendix table 20—Tobit results of grain mixture consumption at home and away from home**

| | At home | | Away from home | |
|---|---|---|---|---|
| Variables | Estimated coefficient | Standard error | Estimated coefficient | Standard error |
| Intercept | -227.89 | 34.15*** | -472.91 | 29.40*** |
| Eating out | -1.82 | 0.61*** | 4.18 | 0.50*** |
| Knowledge | 7.00 | 2.10*** | 7.58 | 1.71*** |
| Income | -1.16 | 0.33*** | 0.32 | 0.26 |
| Male | 43.70 | 6.06*** | 25.52 | 4.92*** |
| Age 0-4 | 89.47 | 15.06*** | 91.86 | 15.01*** |
| Age 5-9 | 112.54 | 17.46*** | 130.43 | 16.27*** |
| Age 10-14 | 118.03 | 17.70*** | 161.69 | 16.35*** |
| Age 15-19 | 147.27 | 19.89*** | 163.79 | 17.92*** |
| Age 20-29 | 125.92 | 18.10*** | 142.65 | 16.72*** |
| Age 30-44 | 98.12 | 15.72*** | 119.62 | 15.11*** |
| Age 45-54 | 57.99 | 15.05*** | 83.26 | 14.67*** |
| Age 55-64 | 32.27 | 14.53** | 47.48 | 14.57*** |
| Age 65-74 | 34.06 | 14.21** | 34.33 | 14.86** |
| Black | 5.03 | 8.27 | -16.33 | 6.76** |
| Hispanic | 19.33 | 9.25** | 32.08 | 7.36*** |
| Asian | 57.47 | 14.14*** | 41.96 | 11.42*** |
| Other | -52.52 | 19.53*** | 39.84 | 14.77*** |
| HH type1 | -7.77 | 10.14 | -2.12 | 8.15 |
| HH type2 | -34.44 | 8.21*** | 4.28 | 6.73 |
| HH type 3 | -3.63 | 10.96 | 14.74 | 8.73* |
| Midwest | -0.72 | 7.25 | -6.05 | 5.94 |
| South | -40.51 | 6.68*** | -3.92 | 5.40 |
| West | 17.34 | 7.08** | 0.84 | 5.78 |
| Nonmetro | -12.34 | 6.59* | -26.99 | 5.40*** |
| Suburb | -7.34 | 5.41 | -3.43 | 4.31 |
| HH size | 0.65 | 1.98 | -0.32 | 1.63 |
| Quarter 1 | 13.60 | 6.25** | 15.18 | 5.04*** |
| Quarter 2 | -13.79 | 6.32** | 5.99 | 5.07 |
| Quarter 3 | -16.95 | 6.38*** | -11.41 | 5.22** |
| Sigma | 271.00 | 2.45 | 199.68 | 2.15 |

Note: Significance levels are denoted by *** for 1%, ** for 5%, and * for 10%.

**Appendix table 21—Tobit results of other grain consumption at home and away from home**

| | At home | | Away from home | |
|---|---|---|---|---|
| Variables | Estimated coefficient | Standard error | Estimated coefficient | Standard error |
| Intercept | 118.42 | 14.00*** | -95.80 | 10.69*** |
| Eating out | -2.36 | 0.26*** | 2.01 | 0.19*** |
| Knowledge | 4.18 | 0.87*** | 2.00 | 0.65*** |
| Income | 0.17 | 0.13 | 0.37 | 0.10*** |
| Male | 48.85 | 2.53*** | 15.00 | 1.89*** |
| Age 0-4 | -84.70 | 6.12*** | -9.68 | 4.99* |
| Age 5-9 | -10.43 | 7.13 | 18.26 | 5.51*** |
| Age 10-14 | 3.83 | 7.23 | 14.32 | 5.59** |
| Age 15-19 | 8.09 | 8.16 | 17.63 | 6.28*** |
| Age 20-29 | -2.93 | 7.38 | 13.76 | 5.72** |
| Age 30-44 | 5.12 | 6.33 | 17.66 | 4.97*** |
| Age 45-54 | 6.52 | 5.99 | 20.02 | 4.72*** |
| Age 55-64 | -1.34 | 5.67 | 12.04 | 4.53*** |
| Age 65-74 | 0.70 | 5.54 | 12.62 | 4.47*** |
| Black | 10.43 | 3.43*** | 2.82 | 2.58 |
| Hispanic | 18.79 | 3.91*** | 5.62 | 2.95* |
| Asian | 133.56 | 6.08*** | 21.85 | 4.56*** |
| Other | 16.69 | 7.96** | 10.50 | 5.97* |
| HH type1 | -11.86 | 4.24*** | -7.78 | 3.13** |
| HH type2 | -9.73 | 3.33*** | -7.75 | 2.47*** |
| HH type 3 | -9.80 | 4.59** | -14.03 | 3.42*** |
| Midwest | -12.32 | 3.04*** | -1.28 | 2.26 |
| South | -15.53 | 2.76*** | -5.81 | 2.07*** |
| West | -10.48 | 2.99*** | -4.50 | 2.25** |
| Nonmetro | -14.14 | 2.74*** | -6.11 | 2.05*** |
| Suburb | -6.86 | 2.26*** | -4.09 | 1.68** |
| HH size | 2.19 | 0.84*** | -2.39 | 0.65*** |
| Quarter 1 | -5.62 | 2.63** | -1.05 | 1.95 |
| Quarter 2 | -5.68 | 2.63** | -6.55 | 1.95*** |
| Quarter 3 | -13.18 | 2.65*** | -7.95 | 1.98*** |
| Sigma | 132.09 | 0.68 | 87.18 | 0.69 |

Note: Significance levels are denoted by *** for 1%, ** for 5%, and * for 10%.

**Appendix table 22—Tobit results of sugar and sweets consumption at home and away from home**

| | At home | | Away from home | |
|---|---|---|---|---|
| Variables | Estimated coefficient | Standard error | Estimated coefficient | Standard error |
| Intercept | -19.92 | 6.09*** | -98.48 | 10.71*** |
| Eating out | -0.37 | 0.11*** | 1.89 | 0.19*** |
| Knowledge | 2.17 | 0.38*** | 0.53 | 0.65 |
| Income | -0.16 | 0.06*** | -0.19 | 0.10** |
| Male | 5.84 | 1.10*** | -1.61 | 1.88 |
| Age 0-4 | -11.22 | 2.64*** | -6.06 | 5.09 |
| Age 5-9 | 15.88 | 3.06*** | 6.76 | 5.50 |
| Age 10-14 | 12.92 | 3.11*** | -3.02 | 5.63 |
| Age 15-19 | -4.99 | 3.57 | -6.86 | 6.35 |
| Age 20-29 | -9.08 | 3.21*** | -15.47 | 5.83*** |
| Age 30-44 | -4.59 | 2.73* | 0.64 | 4.99 |
| Age 45-54 | -5.11 | 2.57** | 8.67 | 4.72* |
| Age 55-64 | -1.71 | 2.42 | 4.74 | 4.55 |
| Age 65-74 | -1.53 | 2.35 | 0.95 | 4.57 |
| Black | -4.80 | 1.50*** | 7.49 | 2.52*** |
| Hispanic | -4.81 | 1.70*** | -3.47 | 2.97 |
| Asian | -12.78 | 2.74*** | -3.56 | 4.59 |
| Other | -4.35 | 3.43 | -1.69 | 5.98 |
| HH type1 | 0.01 | 1.86 | 0.02 | 3.12 |
| HH type2 | -1.28 | 1.45 | -1.90 | 2.43 |
| HH type 3 | -2.24 | 2.01 | -13.50 | 3.40*** |
| Midwest | 6.16 | 1.30*** | -3.29 | 2.22 |
| South | -2.85 | 1.20** | -10.74 | 2.05*** |
| West | 2.43 | 1.29* | 0.52 | 2.19 |
| Nonmetro | -4.88 | 1.20*** | -1.60 | 2.03 |
| Suburb | -0.08 | 0.98 | -1.15 | 1.67 |
| HH size | -0.16 | 0.37 | -1.53 | 0.66** |
| Quarter 1 | -0.14 | 1.14 | -3.19 | 1.91* |
| Quarter 2 | -0.75 | 1.14 | -5.54 | 1.92*** |
| Quarter 3 | -1.46 | 1.15 | -7.17 | 1.96*** |
| Sigma | 53.48 | 0.35 | 68.18 | 0.89 |

Note: Significance levels are denoted by *** for 1%, ** for 5%, and * for 10%.

**Appendix table 23—Tobit results of coffee and tea consumption at home and away from home**

| | At home | | Away from home | |
|---|---|---|---|---|
| Variables | Estimated coefficient | Standard error | Estimated coefficient | Standard error |
| Intercept | 772.37 | 80.50*** | -871.39 | 88.61*** |
| Eating out | 4.18 | 1.45*** | 30.23 | 1.59*** |
| Knowledge | -28.63 | 5.05*** | 9.15 | 5.50* |
| Income | -2.01 | 0.74*** | -2.17 | 0.76*** |
| Male | -60.54 | 14.72*** | 50.38 | 15.76*** |
| Age 0-4 | -1219.90 | 41.04*** | -892.31 | 61.83*** |
| Age 5-9 | -1105.30 | 43.65*** | -1079.20 | 57.64*** |
| Age 10-14 | -953.50 | 42.69*** | -943.63 | 52.11*** |
| Age 15-19 | -839.95 | 47.15*** | -871.08 | 53.94*** |
| Age 20-29 | -467.60 | 40.97*** | -567.41 | 46.13*** |
| Age 30-44 | -53.83 | 34.43 | -222.87 | 38.58*** |
| Age 45-54 | 113.25 | 32.13*** | -65.50 | 35.84* |
| Age 55-64 | 161.79 | 29.94*** | 36.13 | 33.44 |
| Age 65-74 | 144.10 | 28.97*** | 32.02 | 32.96 |
| Black | -408.61 | 21.15*** | -126.11 | 22.24*** |
| Hispanic | -203.82 | 23.14*** | -39.84 | 25.89 |
| Asian | -141.31 | 35.48*** | 115.75 | 37.26*** |
| Other | -99.90 | 48.32** | -12.12 | 54.78 |
| HH type1 | 99.73 | 24.23*** | 70.79 | 25.67*** |
| HH type2 | 70.71 | 18.22*** | 4.00 | 18.79 |
| HH type 3 | -2.74 | 27.40 | -14.58 | 29.62 |
| Midwest | -63.04 | 17.47*** | -106.62 | 18.55*** |
| South | -46.74 | 15.80*** | -88.60 | 16.87*** |
| West | -87.46 | 17.32*** | -77.95 | 18.56*** |
| Nonmetro | 121.87 | 15.86*** | 19.76 | 16.97 |
| Suburb | 16.30 | 13.23 | -8.81 | 13.98 |
| HH size | -0.38 | 5.17 | -9.35 | 5.92 |
| Quarter 1 | 11.95 | 15.36 | -37.25 | 16.10** |
| Quarter 2 | 37.43 | 15.30** | -58.06 | 16.10*** |
| Quarter 3 | 57.30 | 15.38*** | -2.09 | 16.18 |
| Sigma | 674.77 | 4.83 | 574.97 | 6.84 |

Note: Significance levels are denoted by *** for 1%, ** for 5%, and * for 10%.

**Appendix table 24—Tobit results of fruit drink consumption at home and away from home**

| | At home | | Away from home | |
|---|---|---|---|---|
| Variables | Estimated coefficient | Standard error | Estimated coefficient | Standard error |
| Intercept | -705.22 | 70.63*** | -1691.30 | 135.85*** |
| Eating out | -4.00 | 1.28*** | 5.51 | 2.11*** |
| Knowledge | 10.48 | 4.33** | 27.66 | 7.39*** |
| Income | -2.54 | 0.70*** | 1.16 | 1.07 |
| Male | 78.20 | 12.50*** | 58.32 | 20.76*** |
| Age 0-4 | 330.28 | 31.72*** | 287.31 | 67.03*** |
| Age 5-9 | 509.34 | 36.39*** | 270.49 | 73.34*** |
| Age 10-14 | 463.65 | 36.99*** | 337.43 | 73.65*** |
| Age 15-19 | 451.17 | 41.44*** | 336.52 | 80.18*** |
| Age 20-29 | 317.86 | 38.27*** | 242.92 | 76.06*** |
| Age 30-44 | 170.09 | 33.41*** | 103.41 | 69.75 |
| Age 45-54 | 133.87 | 32.16*** | 127.78 | 67.48* |
| Age 55-64 | 54.91 | 31.44* | 68.45 | 67.42 |
| Age 65-74 | 54.33 | 30.89* | -4.40 | 71.93 |
| Black | 262.15 | 16.00*** | 201.55 | 26.08*** |
| Hispanic | 87.56 | 18.75*** | 65.35 | 32.44** |
| Asian | -180.33 | 33.77*** | -228.74 | 76.52*** |
| Other | -0.57 | 39.16 | -35.78 | 73.96 |
| HH type1 | -58.29 | 21.10*** | -37.22 | 34.58 |
| HH type2 | -27.45 | 17.41 | -31.51 | 29.23 |
| HH type 3 | -56.88 | 22.35** | -2.16 | 36.52 |
| Midwest | 52.50 | 15.06*** | -33.49 | 23.96 |
| South | -11.11 | 13.84 | -75.79 | 22.21*** |
| West | 64.69 | 14.77*** | -66.50 | 24.67*** |
| Nonmetro | -13.98 | 13.55 | 9.37 | 23.16 |
| Suburb | -5.46 | 11.12 | 35.07 | 18.54* |
| HH size | -4.46 | 4.01 | 6.70 | 6.62 |
| Quarter 1 | -21.80 | 13.30 | -24.16 | 22.24 |
| Quarter 2 | 62.26 | 12.97*** | 51.84 | 21.07** |
| Quarter 3 | 59.38 | 13.04*** | 21.36 | 21.78 |
| Sigma | 500.10 | 5.55 | 496.96 | 13.97 |

Note: Significance levels are denoted by *** for 1%, ** for 5%, and * for 10%.

**Appendix table 25—Tobit results of soft drink consumption at home and away from home**

| | At home | | Away from home | |
|---|---|---|---|---|
| Variables | Estimated coefficient | Standard error | Estimated coefficient | Standard error |
| Intercept | -191.25 | 62.46*** | -906.91 | 70.74*** |
| Eating out | -1.24 | 1.10 | 19.84 | 1.17*** |
| Knowledge | -20.60 | 3.82*** | -12.25 | 4.07*** |
| Income | 1.44 | 0.58** | -0.64 | 0.61 |
| Male | 40.77 | 11.12*** | 40.87 | 11.77*** |
| Age 0-4 | -18.15 | 30.32 | 173.67 | 39.22*** |
| Age 5-9 | 234.85 | 33.18*** | 144.16 | 41.63*** |
| Age 10-14 | 506.22 | 33.05*** | 293.02 | 41.54*** |
| Age 15-19 | 599.94 | 36.78*** | 417.59 | 44.75*** |
| Age 20-29 | 567.42 | 33.76*** | 421.35 | 42.17*** |
| Age 30-44 | 526.20 | 29.50*** | 375.83 | 38.66*** |
| Age 45-54 | 413.09 | 28.24*** | 310.65 | 37.63*** |
| Age 55-64 | 337.66 | 27.14*** | 228.53 | 37.39*** |
| Age 65-74 | 164.76 | 27.19*** | 131.95 | 38.72*** |
| Black | -125.77 | 15.26*** | -100.74 | 16.03*** |
| Hispanic | -85.37 | 17.09*** | -10.67 | 17.85 |
| Asian | -349.85 | 28.88*** | -92.85 | 28.83*** |
| Other | -22.46 | 35.04 | 9.91 | 36.42 |
| HH type1 | 45.51 | 18.45** | 116.91 | 19.23*** |
| HH type2 | 39.10 | 14.73*** | 31.39 | 15.95** |
| HH type 3 | 55.90 | 20.01*** | 90.87 | 20.81*** |
| Midwest | 159.90 | 13.45*** | 76.23 | 14.40*** |
| South | 99.20 | 12.27*** | 65.09 | 13.11*** |
| West | 46.05 | 13.38*** | 54.47 | 14.23*** |
| Nonmetro | 50.04 | 12.04*** | 10.38 | 12.72 |
| Suburb | 43.26 | 9.98*** | 9.05 | 10.43 |
| HH size | -4.95 | 3.73 | -8.73 | 3.92** |
| Quarter 1 | 14.57 | 11.60 | 10.28 | 12.27 |
| Quarter 2 | 35.36 | 11.58*** | 38.21 | 12.15*** |
| Quarter 3 | 42.59 | 11.68*** | 59.90 | 12.35*** |
| Sigma | 521.92 | 3.93 | 492.38 | 4.75 |

Note: Significance levels are denoted by *** for 1%, ** for 5%, and * for 10%.