# Food-Consumption Patterns Among Elderly Age Groups

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In the next decade, significant demographic changes will offer new opportunities for the food industry. We should not be surprised to find that the average consumer will be older. The number of elderly (persons aged 65 and over) is projected to grow by over 13 percent between 2000 and 2005 and over 45 percent between 2000 and 2020 (Bureau of the Census, 1996). The number of elderly will increase from 35 million in 2000 to 69 million in 2030. In 2030, when the surviving Baby Boomers become elderly, about 20 percent of the whole population will be over age 65 compared to 13 percent now. In contrast, total population growth is projected to be slightly over eight percent from 2000 to 2010 and 16 percent from 2000 to 2020.

One striking feature of this dramatic change is that the most rapidly growing age group will be aged 85 and older. Based on the 1996 U.S. population, the age 85 and older population will double by 2025 and increase fivefold by 2050. The growth in the number of centenarians (age 100 and older) is expected to increase from 72,000 in 2000, to 131,000 in 2010 (a 68 percent increase), and to 214,000 in 2020 (a 197 percent increase over 2000). Public and private policymakers need to be informed about the consumption patterns of this large and growing segment of the American population. The purpose of this paper is to provide information on elderly food-expenditure patterns and differences in expenditures within the elderly population. While previous studies focused on aggregate expenditures such as housing, health care, and aggregate food expenditures, we focus on food-at-home, food-away from-home and 17 food-at-home categories.

The objectives of the study are to quantify food expenditures by age groups and contrast elderly expenditure patterns with other age groups, test for significant differences between elderly food-expenditures and younger age groups, and test for differences in food expenditures between two elderly age groups (age 65-74 versus age 75 and over).

Most previous work has treated elderly consumers aged 65 and older as a homogeneous group. However, due to differences in educational levels, marital status, gender ratios, race, ethnicity, economic resources, attitudes, and values among the elderly, we look at two different groups of elderly persons (age 65–74 and age 75 and over).

### Previous Studies

The increase in the number of elderly households in the U.S. population and their expenditure trends has been the subject of several economic studies. These studies place considerable interest on the importance of understanding elderly households' expenditure choices.

Several previous studies have used descriptive analyses to look at elderly household expenditures Most notable are studies by Harrison (1986) and Walker and Schwenk (1991). These studies look at food and non-food expenditures for two groups— younger group of elderly heads of households and an older group of households. Harrison finds expenditure differences between households headed by an individual aged 65 to 74 and households headed by an individual 75 years and older. Walker and Schwenk also looked at two different groups of households. Differences between those aged 70 to 79 and those 80 or older were analyzed. These researchers also found expenditure differences between the defined groups. One main drawback to the study was that they only used descriptive analyses to analyze the data.

Newer studies use empirical techniques to further analyze differences between expenditures by different elderly groups. Abdel-Ghany and Sharpe published a 1997 study which looks at differences in consumption or expenditure patterns between what they call the "young-old" (aged 65–74) and the "old-old" (aged 75 and older). The authors look at a cross-section of 1990 CES data and test for differences between expenditure patterns of two

elderly groups—those aged 65 to 74 and those aged 75 and over. Differences in spending patterns were found for the expenditure categories analyzed in their study. However, only aggregate food categories (food-at-home and food-away-from-home) were analyzed.

Another recent study by Paulin (2000) focuses on consumption patterns for two elderly groups—those aged 65 to 74 and those aged 75 and over. However, the focus of his study is somewhat different than that of Abdel-Ghany and Sharpe. He analyzes expenditures for these two groups over time and examines whether underlying tastes and preferences of these population subgroups have changed. His findings indicate that older consumers do indeed purchase different amounts than younger consumers, but in most cases the time trend of expenditures is similar for older and younger consumers.

These studies have one thing in common: they examine aggregate expenditure categories rather than specific food subcategories consumed at home. One other study was found that did focus on specific food subcategories. Gallo et. al. (1979) used CES data to analyze elderly food-expenditure patterns and how they differ from other age groups. The age of household heads was found to influence family food-expenditure patterns. One drawback was that the authors did not compute income elasticities for the analysis. This study extends previous work by analyzing more recent data (1997 CES), looking at individual food subcategories in the CES, and computing income elasticities for each subgroup.

## Data

The BLS Continuing Expenditure Survey (CES) was used to analyze elderly food-expenditure patterns. The CES is composed of two components, each with its own questionaire and sample. The diary survey was used in this study, which includes an interview panel of 3,000 to 5,000 households who are surveyed every three months over a one-year period. The diary survey obtains data on small frequently purchased items normally difficult to recall, including food, beverages, tobacco, housekeeping supplies, nonprescription drugs, personal-care products and services, fuels, and utilities. Two weeks of data are normally collected, although some

households report only one week. Households that reported only one week of expenditures were eliminated. Following this procedure, the data set contained over 10,000 observations on the households for 1997.

## Average Elderly Food Expenditures and Household Demographics

Out of 10,298 households in the survey, 2,150 households had heads 65 and over—1,176 households with heads aged 65–74 and 974 with heads 75 and older. The oldest group had the lowest average income and weekly food expenditures (Table 1). Weekly per-capita food expenditures averaged $13.04 for those 65 to 74 years and $9.89 for those 75 and over. Both elderly groups spent almost ten percent of average weekly income on food. The average for all households (including the elderly) was six percent. The proportion for the households under age 25 was 9 percent, while the 35–44 age group had the lowest proportion, four percent.

Average before-tax income (yearly) for all households in the survey was $34,054. Yearly income was $22,071 for the younger elderly group (65–74) and $17,510 for those over 75. Average income for the under-25 group was ($15,574). The 45–54 age group had the highest average yearly income, $43,425.

Nearly 73 percent of weekly food expenditures for the oldest group (75 and over) was spent on food-at-home. Food-away-from-home expenditures for those over 75 was 30 percent lower than the average for all households and 23 percent lower than for the 65–74 group.

Households in both elderly groups spent more on non-alcoholic beverages than for any of the other16 food categories ($5.01 weekly for those aged 65 to 74 and $5.44 for those aged 75 and over). Weekly per-capita expenditures for dairy products was second with $3.14 and $2.90, respectively. Miscellaneous and prepared food was third with $3.44 and $3.59 and bakery products was fourth with $3.00 and $2.84 per week.

## Statistical Model

The statistical model used in this analysis uses information from both consuming and non-consuming households. The censored normal regression

**Table 1. Household Characteristics and Per-Capita Weekly Food Expenditures for All Households and by Age of Household Head.**

| Item | Units | All | <25 | 25-34 | 35-44 | 45-54 | 55-64 | 65-74 | 75+ |
|---|---|---|---|---|---|---|---|---|---|
| Households | Number | 10298 | 752 | 1856 | 2288 | 1918 | 1334 | 1176 | 974 |
| Average size | Number | 2.57 | 1.98 | 2.89 | 3.34 | 2.81 | 2.18 | 1.85 | 1.51 |
| Average age | Years | 48 | 21 | 30 | 39 | 49 | 59 | 69 | 81 |
| Persons over 64 | Number | .31 | 0.01 | 0.02 | 0.02 | 0.04 | 0.09 | 1.38 | 1.33 |
| Children under 18 | Number | .71 | 0.52 | 1.12 | 1.43 | 0.63 | 0.17 | 0.09 | 0.02 |
| Income before taxes | Number | 34,054 | 15,574 | 35,854 | 42,749 | 43,425 | 36,227 | 22,071 | 17510 |
| Weekly food expenditure | Dollars | 37.97 | 28.01 | 34.85 | 35.62 | 42.67 | 43.40 | 41.44 | 36.21 |
| Food-at-home | Dollars | 23.77 | 15.20 | 19.94 | 21.42 | 25.56 | 29.44 | 29.39 | 26.31 |
| Food-away-from-home | Dollars | 14.20 | 12.80 | 14.91 | 14.20 | 17.12 | 13.96 | 13.04 | 9.89 |
| Cereal and cereal products | Dollars | 1.29 | 0.95 | 1.19 | 1.19 | 1.32 | 1.45 | 1.50 | 1.35 |
| Bakery products | Dollars | 2.50 | 1.60 | 2.19 | 2.19 | 2.72 | 3.06 | 3.00 | 2.84 |
| Dairy products | Dollars | 2.62 | 1.81 | 2.60 | 2.60 | 2.72 | 3.09 | 3.14 | 2.90 |
| Beef | Dollars | 1.72 | 1.44 | 1.53 | 1.53 | 2.03 | 2.06 | 1.97 | 1.64 |
| Pork | Dollars | 1.27 | 0.66 | 1.06 | 1.06 | 1.46 | 1.75 | 1.57 | 1.56 |
| Poultry | Dollars | 1.17 | 0.72 | 1.10 | 1.10 | 1.25 | 1.38 | 1.51 | 1.15 |
| Fish and seafood | Dollars | 0.76 | 0.35 | 0.65 | 0.65 | 0.91 | 1.04 | 0.90 | 0.76 |
| Other meats | Dollars | 0.78 | 0.47 | 0.75 | 0.75 | 0.81 | 1.02 | 0.99 | 0.81 |
| Eggs | Dollars | 0.28 | 0.20 | 0.22 | 0.22 | 0.29 | 0.35 | 0.36 | 0.36 |
| Fats and oils | Dollars | 0.70 | 0.34 | 0.56 | 0.56 | 0.70 | 0.94 | 0.89 | 0.87 |
| Fresh fruits | Dollars | 1.37 | 0.85 | 1.09 | 1.09 | 1.32 | 1.72 | 1.80 | 2.12 |
| Processed fruits | Dollars | 0.89 | 0.54 | 0.74 | 0.74 | 0.93 | 1.08 | 1.14 | 1.17 |
| Fresh vegetables | Dollars | 1.24 | 0.58 | 1.02 | 1.02 | 1.36 | 1.70 | 1.70 | 1.47 |
| Processed vegetables | Dollars | 0.66 | 0.37 | 0.57 | 0.57 | 0.73 | 0.83 | 0.84 | 0.73 |
| Non-alcoholic beverages | Dollars | 4.12 | 1.85 | 3.50 | 3.50 | 4.36 | 5.38 | 5.01 | 5.44 |
| Sugar and other sweets | Dollars | 1.01 | 0.54 | 0.87 | 0.87 | 1.10 | 1.37 | 1.34 | 1.01 |
| Miscellaneous foods | Dollars | 3.43 | 2.43 | 3.32 | 3.32 | 3.61 | 4.04 | 3.44 | 3.59 |

model, commonly referred to as the Tobit model, is used to obtain expenditure estimates when some households purchase and others do not purchase in a given time period.

For a typical household the Tobit model can be expressed as

(1)  $Y_i = X_iB + \varepsilon_i$ if $X_iB + \varepsilon_i > 0$;
      $Y_i = 0$ if $X_iB + \varepsilon i > 0$.

Where $i = 1, 2. ..., n$; n is the number of households; $Y_i$ is item expenditure; X is a vector of explanatory variables; B is a vector of coefficients; and $\varepsilon_i$ is an independently and normally distributed random-disturbance term with a mean of zero and constant variance, $\sigma^2$. The level of expenditures for the $i^{th}$ household is determined by the combination of a non-stochastic component, $X_i\beta$, and a stochastic component, $\varepsilon_i$. The determinate or non-stochastic portion of the model is a linear function of household characteristics and their respective response parameters. Expenditures differ among households due to both the determinate portion of the model and the stochastic element, which embodies the unobserved factors and idiosyncrasies of individual households. For a more detailed discussion of the Tobit technique see Blaylock and Smallwood, 1986.

The Tobit model is used to estimate the impact of income and selected sociodemographic variables on expenditures of all food, food-at-home, food-away-from-home, and 17 categories of food consumed at home. Tobit was used because there were significant numbers of zero expenditures in several food categories.

## Variables

The expenditure categories used as dependent variables included all food, food-at-home, and food-away-from-home. Meats included beef, pork, poultry, fish and seafood, and other meats. Other categories include cereal and cereal products, bakery products, dairy products, eggs, fats and oils, fresh fruits, processed fruits, fresh vegetables, processed vegetables, non-alcoholic beverages, sugar and other sweets, and miscellaneous and prepared foods. Per-capita weekly expenditures were used in each case.

The independent variables include income, region, family size, rural-versus-urban, education, race, sex, and marital status. To test for significant differences between age groups (and between the two elderly age groups) a dummy variable for each age group was added to the tobit model. The dummy variable is used to test for differences between spending patterns while controlling for sociodemographic differences.

The first variable, income, is used to capture income effects. As income rises, food expenditures are expected to increase. That is, higher-income households spend more for food and lower-income families spend less.

Climate and cultural differences in different regions of the country and location in urban areas influence expenditure patterns. Regional effects are represented by a dummy variable depicting Northeast, South, West, and Mid-west. The Mid-west is used as the base; differences in the first three regions are measured relative to the Mid-west. Rural-versus-urban is likewise measured by a dummy variable, where urban is used as the base of measurement.

Family size is the number of individuals living in the household. This variable is used to capture the effect of family size on expenditures. As family size increases, expenditures on food are expected to increase.

Educational level is measured by three variables—high school, college, and post-graduate. Higher levels of education influence tastes, preferences, and time allocations of households, which influence expenditures for time-related goods and services. Expenditure differences are measured relative to a high school education.

A dummy variable for race was introduced to capture variances in expenditures due to differences in taste and preferences among races. Two variables were used, one for white households and one for non-white. White was used as the base for measurement. Sex and marital status were also included. Marital status was included to capture its effects on expenditures, especially for the elderly, where tastes and preferences for widows and widowers may differ.

## Differences Between Elderly Groups and Between Age Groups

Estimated differences in expenditure levels between the elderly and other age groups are shown in Table 2. Differences are measured relative to the 75-and-

over age group. The results present differences in expenditure levels after controlling for sociodemographics. Estimates are shown for differences in expenditure levels between the elderly age groups and younger groups for all food, food-at-home, food-away-from-home, and 17 food categories. Due to the size and length of the demographic results, they are not present in this paper. These results are presented in Harris and Blisard, 2001.

Differences were found among all age groups including the elderly (Table 2). All age groups except those 35 and under had larger expenditures for all food than the 75-and-over group. Weekly per-capita expenditures by the 55–64 group were $6.57 more than the 75-and-over group, and expenditures for the 65-74 group were $6.49 more. Food-at-home expenditures for the 55–64 and 65–74 age groups also exceeded the 75-and-over group by $2.85 and $2.61, respectively. Most striking were

the differences in expenditures for food-away-from home. The difference was greatest for those in the 45–54 age group, who spend $17.21 more per week per capita on food-away than the 75-and-over group.

Significant differences exist between the two elderly groups for most food categories. Differences in all food, food-at-home, and food-away-from-home expenditures were significant. Significant differences exist between expenditures for 10 food categories. In most of the categories, the age 65–74 group spent more; the largest difference was for non-alcoholic beverages ($1.29). The younger elderly group also spent more on poultry ($.78), sugar and other sweets ($.49), dairy products ($.41), and processed vegetables ($.41). In 4 categories, the 75-and-over group spent more; however, only one category was statistically significant. The older group spent $.53 more per week per capita on fresh fruits than the 65–74 group.

**Table 2. Estimated Differences in Weekly Per-Capita Food Expenditures Measured Relative to the 75-and-Over Age Group Based on Age of Head of Household).**

| Product category | <25 | 25-34 | 35-44 | 45-54 | 55-64 | 65-74 |
|---|---|---|---|---|---|---|
| All food | - 5.82 | 0.65* | 4.14 | .33 | 6.57 | 6.49 |
| Food-at-home | - 12.09 | - 6.40 | - 3.59 | - 0.73* | 2.85 | 2.61 |
| Food-away-from-home | 16.02 | 15.64 | 17.15 | 17.21 | 8.80 | 7.33 |
| Cereal and cereal products | 1.01 | - 0.30 | - 0.29 | - 0.15* | 0.09* | 0.21* |
| Bakery products | - 1.78 | - 1.09 | - 0.62 | - 0.17* | 0.23* | 0.31 |
| Dairy products | - 1.47 | - 0.71 | - 0.33 | - 0.17* | 0.19* | 0.41 |
| Beef | - 2.40 | - 1.03 | - 0.89 | 0.12* | 0.23* | 0.23* |
| Pork | - 3.57 | - 1.98 | - 1.46 | - 0.55* | 0.16* | - 0.18* |
| Poultry | - 1.50 | - 0.33* | - 0.45* | 0.18* | 0.46 | 0.78 |
| Fish and seafood | - 2.46 | - 1.24 | - 0.68 | - 0.03* | 0.55* | 0.29* |
| Other meats | - 1.14 | - 0.54 | - 0.04* | 0.07* | 0.41 | 0.38 |
| Eggs | - 0.47 | - 0.34 | - 0.26 | - 0.10 | - 0.01* | 0.10* |
| Fats and oils | - 1.44 | - 0.75 | - 0.52 | - 0.36 | 0.15* | 0.02* |
| Fresh fruits | - 3.07 | - 2.47 | - 2.01 | - 1.72 | - 0.98 | - 0.53 |
| Processed fruits | - 1.50 | - 0.98 | - 0.81 | - 0.57 | - 0.29 | - 0.12* |
| Fresh vegetables | - 0.92 | - 0.43 | - 0.23 | 0.01* | 0.16* | 0.20 |
| Processed vegetables | - 2.11 | - 1.09 | - 0.69 | - 0.32 | 0.16* | 0.41 |
| Non-alcoholic beverages | 0.02* | 0.34 | 0.34 | 0.85 | 1.04 | 1.29 |
| Sugar and other sweets | - 1.53 | - 0.77 | - 0.34* | - 0.04* | 0.31* | 0.49 |
| Miscellaneous foods | - 2.03 | - 0.66 | - 0.26* | - 0.14* | 0.43* | -0.19* |

* Not statistically significant.

## Income Elasticities

Expenditure elasticities for the two elderly groups for all food, food-at-home, food-away-from-home, and 17 food categories are shown in Table 3. Elasticities were estimated for the combined elderly groups (households 65 and over), the 65–74 age group, and the 75-and-over age group.

For both groups combined, the income elasticity for food-away-from-home (.16) was slightly higher than for food-at-home (.12), while the 75-and-over group had higher elasticities for food-at-home and food-away-from-home (.22 and .15, respectively). The income elasicity for the 75-and-over group for food-at-home was double that of the 65–74 group.

Income elasticities for the combined groups are shown in the first column of Table 3. Income was not significant for cereal and cereal products, poultry, eggs, and fats and oils. Where significant differences existed between the elderly groups, income elasticities were computed. In some cases where significant differences existed between groups, income was not significant for one of the groups.

## Summary

The proportion of elderly in the population is increasing, and many Americans are living to an advanced age. These trends are expected to increase as large numbers of the Baby Boomer generation age and enter the elderly population. These trends make analysis of expenditure patterns by the elderly increasingly important. A good starting point is examining current expenditure patterns.

Nearly 73 percent of weekly food expenditures for the oldest elderly group (75 and over) were for food-at-home. Food-away-from-home for those over 75 was 30 percent lower than the average for all households and 23 percent lower than the 65–74 group.

Households in both elderly groups spent more on non-alcoholic beverages than on any other food category ($5.01 weekly for those aged 65–74 and $5.44 for those aged 75 and over). Weekly expenditures for dairy products were second with $3.14 and $2.90, respectively. Miscellaneous and prepared foods were third with $3.44 and $3.59, respectively, and bakery products were fourth with $3.00 and $2.84 per week, respectively.

## Table 3. Income Elasticities for Elderly Age Groups.

| Category | Age 65 and over | Age 65-74 | Age 75 and over |
|---|---|---|---|
| All food | .14 | .12 | .21 |
| Food-at-home | .12 | .11 | .22 |
| Food-away-from-home | .16 | .17 | .15 |
| Cereal and cereal products | —[1] | —[2] | —[2] |
| Bakery products | .05 | .02 | .10 |
| Dairy products | .04 | .03 | .10 |
| Beef | .21 | —[2] | —[2] |
| Pork | .08 | —[2] | —[2] |
| Poultry | —[1] | .01 | —[1] |
| Fish and seafood | .36 | —[2] | —[2] |
| Other meats | .12 | —[2] | —[2] |
| Eggs | —[1] | —[2] | —[2] |
| Fats and oils | —[1] | —[2] | —[2] |
| Fresh fruits | .07 | —[1] | .20 |
| Processed fruits | .09 | —[2] | —[2] |
| Fresh vegetables | .09 | —[1] | .10 |
| Processed vegetables | .03 | —[1] | .24 |
| Non-alcoholic beverages | .06 | —[1] | .08 |
| Sugar and other sweets | .13 | —[1] | .25 |
| Miscellaneous foods | .09 | —[2] | —[2] |

[1] Income is not significant.

[2] No significant difference between groups.

Significant differences in expenditures exist between the younger (65 to 74) and the older elderly group (75 and over). Differences existed for 10 of the 17 food categories identified and for both food-at-home and food-away-from-home.

Income had a larger effect on category expenditures for the 75-and-over group. Income was significant for seven of the expenditure categories for the oldest group, but for only four categories for the younger elderly group. Despite some income effects, most marginal propensities to consume are zero for most categories in both groups. Increases in income have little effect on food expenditures for individual food categories.

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