

# Planning ahead: consumer expenditure patterns in retirement

*The 'graying' of the population creates a need to examine the role that retirement plays on expenditure decisions of various demographic groups of retirees*

Geoffrey D. Paulin  
and  
Abby L. Duly

The fastest growing segment of the U. S. population is composed of those aged 65 and older. The Bureau of the Census reported that in 1994, 1 in 8 Americans was in this age group, but projects that the ratio may be as high as 1 in 5 by 2050. Furthermore, with increases in life expectancy, today's adults will live an average of 17 additional years after reaching age 65.<sup>1</sup>

As this demographic pattern shifts, an increasing demand for research and data on the older population—specifically, on retired persons and their roles on consumers—is constantly in evidence: “baby boomers,” “privatization of Social Security,” “Medicare,” and tips on financial planning are common topics of the daily print and video media. The sheer growth in numbers suggests that the spending patterns of this older population will also play an increasingly important role in the future economy, an assumption supported by recent trends in expenditure levels. A study of real (that is, inflation-adjusted) expenditures from 1984 to 1997 finds that “spending by older consumers has risen from 12.6 percent to 14.6 percent of all consumer spending.”<sup>2</sup>

In addition to the concerns these issues may raise for policymakers, especially those involved with providing adequate care and protection for older consumers, the decision to retire has major implications for individuals and families. Understanding differences in spending patterns for

preretired and retired consumers can help workers plan for the future.

Taken together, these items suggest that a study of expenditure patterns of retirees is warranted. Differences in expenditure patterns for preretirees and retirees are expected for many reasons. For example, income presumably will decline upon retirement. Given the relationship of income to expenditures, it is important to see how income differs—in level as well as in sources of receipt. Also, other demographic characteristics presumably play an important role in expenditure decisions, both before and after retirement. Therefore, examining the role these characteristics play is also important. In looking at spending patterns for families who are near retirement and comparing them with the patterns of those individuals who have actually exited from the workforce, this article provides valuable information about the impact of retirement on consumer spending.

Several issues are addressed here. First, background describing related research is presented. Second, data from the U.S. Consumer Expenditure Survey, which provide the basis for the analysis, are described. Third, demographic characteristics of “preretired” and “retired” consumers in this sample are presented and compared. Fourth, income and expenditure patterns are described for these groups. Finally, regression analysis is used to explore differences in expenditure patterns given that demographics and in-

Geoffrey D. Paulin is a senior economist, and Abby L. Duly is an economist, Division of Consumer Expenditure Surveys, Bureau of Labor Statistics.  
Email:  
Paulin\_G@bls.gov  
Duly\_A@bls.gov

come levels are different for preretired and retired consumers. (Logit and ordinary least squares results for the two groups are presented in a detailed appendix.)

## Related research

Many previous studies related to the population aged 65 and older can be divided into two groups: those that focus on age, and those that focus on retirement. Both groups are important, and both have contributed to the analyses presented here.

*Expenditure patterns by age.* Rose Rubin and Kenneth Koelin examine how elderly households spend on necessities, compared with nonelderly households.<sup>3</sup> Using data from the 1980–81 and 1989–90 Consumer Expenditure Survey, they examine expenditures for housing, food at home, and healthcare, as well as income, demographics, and receipt of cash assistance (AFDC or SSI). The methodology used to examine the relationship between their variables of interest is based on the life cycle theory of consumption, with total expenditures acting as a proxy for permanent income. Rubin and Koelin’s results indicate that, in general, older consumers spend a higher proportion of their budget on housing and healthcare than do the nonelderly, and that the receipt of financial assistance does play a role in the spending decisions of both age groups.

In a study of age groups within the older population, Mohammed Abdel-Ghany and Deanna Sharpe use Tobit analysis to determine whether tastes and preferences differ for those aged 65 to 74 and those aged 75 and older.<sup>4</sup> Using independent variables such as total expenditures (once again as a surrogate for permanent income), region of residence, education of reference person,<sup>5</sup> household size, race, and family type, the authors find differences between the “young-old” and “old-old” (as they term the groups) across all major categories of expense. Furthermore, the effect of the socioeconomic variables on spending patterns differed between the two age groups, and among spending categories.

*Studies based on retirement status.* Because this study compares retired households with those that have members nearing retirement, previous studies based on work status are discussed in more detail. Among the studies reviewed here, an article by Nancy E. Schwenk is unique in its focus on the levels and sources of income of retirees, using multiple government surveys as sources.<sup>6</sup> Schwenk provides some discussion of expenditures, specifically the fact that the allocation of total spending for retirement, pensions, and Social Security is significantly less for households in which the reference person has “reached retirement age (65 years or older)” than for those in which the reference person is aged 45 to 54. In terms of demographics, she notes that the majority of con-

sumers aged 65 years and older own their home, and that “of those who are homeowners, most owned their home free and clear (81 percent).” Finally, Schwenk finds that in 1991, income from dividends, interest, and rent provided about 20 percent of retirees’ total income.<sup>7</sup>

An earlier article by Frankie N. Schwenk uses data from the 1987 Consumer Expenditure Survey to examine whether there are differences between those who opt for “early retirement” and those who continue to work beyond the age of 65.<sup>8</sup> In this study, F. Schwenk specifically compares the two groups in terms of family characteristics, asset levels, income, and expenditures. Using Probit analysis, the author finds that age, spouse’s employment status, education, housing tenure, household size, marital status, and gender are significant factors in predicting the likelihood of being retired. Other comparisons show that “average dividend and interest [income] amounts were higher for retired than for working families,” and that “health was the only category of expenditures for which households with a retired reference person spent more than those with an employed person.”<sup>9</sup>

In a May 1990 article, Thomas Moehrle uses the Consumer Expenditure Survey to compare the average annual expenditures of elderly working and nonworking consumer units<sup>10</sup> across low, medium, and high income groups.<sup>11</sup> Moehrle finds that (1) “Nonworking elderly households spend more on food prepared at home than do working elderly households, regardless of income level,” and (2) “Regardless of income level, nonworking elderly households spend more on health care than do working elderly households.”<sup>12</sup> Note that Moehrle analyzes one age group, those with a reference person aged 62 to 74, and that the working status of the consumer unit is based solely on that of the reference person, regardless of whether any other members are working or not. Also, he does not specifically limit the nonworking households to those whose reference person is retired (for example, “nonworking” can mean the reference person is disabled, taking care of the home or family, or going to school). However, he finds that “79 percent [of the nonworking consumer units studied] had reference persons who classified themselves as retired.”<sup>13</sup>

Rose Rubin and Michael Nieswiadomy compare demographic characteristics, income, and expenditures of retirees and nonretirees aged 50 or older from the 1986 and 1987 Consumer Expenditure Survey.<sup>14</sup> Their sample consists of complete income reporters only, with the retirement status based on that of the respondent.<sup>15</sup> Rubin and Nieswiadomy also divide their sample into three household types: single men, single women, and husband-wife couple households. Using Tobit regression analysis, they find “that the retired have a higher marginal propensity to spend (than the nonretired) for food, alcohol, housefurnishings, apparel, transportation, gas and motor oil, other vehicles, public transportation, health

care, entertainment, and cash gifts.”<sup>16</sup> Also noteworthy is their conclusion that for both the retired and nonretired households, healthcare expenditures increase with educational attainment.

## About the sample

This article uses data from the 1998 and 1999 Consumer Expenditure Interview Surveys. The Interview Survey is a rotating panel survey designed to collect information on major items of expense, household characteristics, and income. The questionnaire is administered to sample consumer units once per quarter for five consecutive quarters. The main goal of the initial household interview is to collect inventory information to be used for bounding purposes, that is, to ensure that expenditures reported in subsequent interviews took place during the appropriate reference period (in most cases, this will be the 3-month period prior to the interview date). While it is primarily designed to collect large (vehicles or appliances, for example) and recurring (such as, rent or utilities) expenditures that can be easily recalled on a quarterly basis, the Interview Survey captures up to 95 percent of all expenditures.<sup>17</sup>

In order to examine the effect of retirement on consumer spending patterns, the sample is divided into two groups: a preretired group and a retired group. Ultimately, it would be most useful to have data for the same family over some period of time to observe their expenditures both before and after retirement and compare them directly. Unfortunately, as discussed, the survey is not designed to follow families for extended time periods. Even using multiple years of data, it would be difficult to find families who are “working” in at least one quarter and then “retired” for the remaining quarter(s) of their participation. The results described here, then, must be interpreted cautiously, bearing this in mind. Nevertheless, the sample has been selected in such a way as to make these comparisons as appropriately as possible, given the data constraints.

To this end, a preretired consumer unit is defined as one whose reference person is aged 55 to 64, and is earning at least one type of labor income (that is, wage and salary income or self-employment income). This age group is chosen because, for many, it is the last stage of their working lives. Although some may choose to retire prior to reaching age 65, this study excludes any consumer unit from the “preretired” category in which there is a retired person (including a spouse). In contrast, a “retired” consumer unit is defined as one whose reference person is aged 65 to 74 and who is retired; that is, when asked about the occupation for which they received the most income, they report that they are not working due to retirement. Additionally, there are no earners in the “retired” households. Excluded from both groups (preretired and retired) are families in which the spouse (if present) is not

working either due to illness or disability, or due to unemployment. This omission is made because a consumer unit with a disabled member may have some vastly different spending patterns than an otherwise similar household, such as medical expenses. Furthermore, in the case of illness or disability, the decision not to work is not necessarily a voluntary one, but rather is the result of circumstances that make work impossible.<sup>18</sup> Similarly, an unemployed person presumably would like to work, and may eventually do so; therefore, these families may not display the same consumer expenditure patterns as those in which the spouse is not working for voluntary reasons (such as retirement or taking care of the home or family).<sup>19</sup> The age groups are chosen to compare those on the verge of retirement with those consumer units who have recently retired, allowing these analyses to focus on the effect of retirement as a single discrete event. Furthermore, previous research has shown that there are significant differences between those aged 65 to 74 and those aged 75 and older in terms of household characteristics, income, and expenditures.<sup>20</sup> Therefore, the consumer units whose reference person is aged 75 or older are removed from the retired sample in order to eliminate this age effect.<sup>21</sup>

To facilitate the analysis, the sample for this study is limited in scope. First, the sample is limited to three types of households: single men, single women, and husband-and-wife couples. These groups are selected in order to reduce the effect of family size on expenditure patterns. Additionally, the effects of other family member characteristics on expenditures are eliminated. For example, preretired families with children may be spending differently than those without children, because they may be expecting to send the children to college soon. Retired families with children may be supported by these children.<sup>22</sup> In either case, expenditures would be different from those who have children of different age, future plans, and so forth.<sup>23</sup> Even so, families with children are presumably the exception, rather than the rule for these families, especially those who are retired.

The separation of single men and single women is done in order to examine the effect of gender-related differences on spending patterns. For example, in terms of income, the lifetime earnings of men and women are expected to be quite different, especially given the generation being examined. Also, marital status is affected by differences in life expectancy (that is, there are more widowed single women than there are male widowers, as shown in table 1). These factors presumably will have an influence on spending patterns.

The type of household is determined by two pieces of information: the number of family members and the marital status of the reference person. For husband-and-wife couples, the values for these variables are obvious: that is, there are two persons in the consumer unit (one of which, by definition, must be the reference person) and the marital status of

**Table 1. Demographics of preretirees and retirees, by composition of consumer unit, Consumer Expenditure Interview Survey, 1998-99**

Characteristic	Single men			Single women			Married couples		
	Preretired	Retired	t-value <sup>1</sup>	Preretired	Retired	t-value <sup>1</sup>	Preretired	Retired	t-value <sup>1</sup>
Number of consumer units .....	260	222	-	547	725	-	1,325	1,220	-
Age of reference person .....	59	70	41.976	59	70	73.192	59	70	99.809
Average number of: Rooms:									
Renter .....	4.0	3.0	4.590	4.4	3.9	3.396	4.8	4.6	.795
Homeowner .....	5.8	5.9	.650	5.7	5.8	.823	6.9	6.4	7.494
Bathrooms (including halfbaths):									
Renter .....	1.1	1.1	.102	1.3	1.2	1.458	1.4	1.6	2.307
Homeowner .....	1.7	1.7	.113	1.8	1.7	1.261	2.2	2.0	5.020
Vehicles .....	1.9	1.9	.272	1.2	1.2	1.961	2.7	2.3	6.384
Automobiles .....	1.3	1.2	2.397	1.1	1.1	2.053	1.6	1.4	6.501
Other vehicles .....	.6	.7	.859	.1	.1	1.159	1.1	.9	3.419
Percent									
Housing tenure:									
Homeowner:									
With mortgage .....	31.9	7.7	-	40.0	11.5	-	51.6	16.6	-
With no mortgage .....	29.6	64.0	-	35.8	68.3	-	41.0	78.2	-
Renter .....	38.5	28.4	-	24.1	20.3	-	7.4	5.3	-
Occupation of reference person:									
Working for wage or salary .....	91.1	0	-	94.1	0	-	85.6	0	-
Self-employed .....	8.9	0	-	5.9	0	-	14.4	0	-
Retired .....	0	100.0	-	0	100.0	-	0	100.0	-
Marital status of reference person:									
Married .....	3.5	6.3	-	4.6	4.0	-	100.0	100.0	-
Widowed .....	11.9	43.2	-	27.4	71.7	-	0	0	-
Divorced .....	56.2	32.9	-	53.0	17.2	-	0	0	-
Separated .....	7.7	3.6	-	3.1	.7	-	0	0	-
Single (never married) .....	20.8	14.0	-	11.9	6.3	-	0	0	-
Race/ethnicity of reference person:									
Black .....	12.7	13.5	-	13.2	7.6	-	5.3	4.3	-
Hispanic .....	4.6	3.2	-	2.2	1.5	-	3.0	1.8	-
White and other .....	82.7	83.3	-	84.6	90.9	-	91.7	93.9	-
Education of reference person:									
Did not graduate high school .....	10.8	30.6	-	11.3	20.0	-	9.2	18.8	-
High school graduate .....	30.8	27.5	-	29.6	38.6	-	33.0	33.0	-
Some college (including A.A. degree) .....	23.5	16.2	-	33.6	24.7	-	26.9	22.3	-
College graduate (B.A. degree, and so forth) .....	22.3	15.3	-	14.6	10.9	-	16.2	17.9	-
Graduate/professional degree .....	12.7	10.4	-	10.8	5.9	-	14.7	8.1	-
Degree urbanization:									
Rural .....	6.9	9.5	-	10.8	11.6	-	13.2	13.9	-
Urban .....	93.1	90.5	-	89.2	88.4	-	86.8	86.1	-
Region of residence:									
Northeast .....	18.8	23.0	-	13.2	20.3	-	18.2	20.6	-
Midwest .....	17.3	28.8	-	24.5	23.2	-	29.9	25.3	-
South .....	39.2	22.1	-	39.3	36.3	-	33.4	33.5	-
West .....	24.6	26.1	-	23.0	20.3	-	18.6	20.6	-
Income distribution:									
1st quintile .....	10.2	36.4	-	17.1	50.2	-	4.1	9.2	-
2nd quintile .....	20.4	35.8	-	33.1	35.0	-	6.4	46.0	-
3rd quintile .....	27.3	13.9	-	26.3	12.1	-	16.6	28.6	-
4th quintile .....	26.9	8.1	-	16.7	2.2	-	26.9	12.4	-
5th quintile .....	15.3	5.8	-	6.8	.5	-	46.2	3.8	-

<sup>1</sup> Absolute values are displayed.

the reference person is married. For single-member consumer units, however, there are a variety of possible values for the marital status variable. A single man or woman may be widowed, divorced, separated, never married, or in a small number of cases, married. Even though a “married single person” seems oxymoronic, some plausible explanations exist. Considering that the household type is determined at the time of the interview, a married person whose spouse is living elsewhere (perhaps on a long-term work assignment, such as a military tour of duty) may be counted as a single person consumer unit. It could also be that some of these “married singles” are actually separated, though perhaps not legally so. In that case, the respondent may identify himself or herself as married, rather than separated. Either way, the spending patterns of a married person living alone for an extended period are assumed to mirror the spending patterns of a “true” single person more closely than those of a married couple.

The sample also includes only those consumer units that report ownership of at least one automobile, so that expenditures will be more comparable. The most obvious effect of automobile ownership is on transportation expenditures. Presumably, some retirees choose to sell or give away their automobiles due to a lack of need for personal transportation (for example, they are no longer going out to work every day). Maintaining an automobile can add many dollars of expenditure to the household budget. Not only are there costs for gasoline, motor oil, and the occasional repair, but automobile insurance may be expensive, and may increase as the driver grows older. Age-related health reasons may also play a part in this decision. Whatever the reason, lack of automobile ownership presumably limits mobility, and thus may affect other expenditures, such as those for food away from home, entertainment, and vacation and travel.

The above qualifications result in the following sample sizes: 260 preretired single men and 222 retired single men; 547 preretired single women and 725 retired single women; and 1,325 preretired couples and 1,220 retired couples. Note that these data are not weighted to reflect the population.

First, this article compares demographics, income, and quarterly expenditures of preretired and retired consumer units, within each household type examined (that is, single person or married couple). Some of the results of these comparisons may be expected based on the parameters set for each group. For example, the lower income levels reported for retirees are not surprising given that no one is earning labor income in those households. Thus, an important question is how retirement *itself* affects expenditure patterns: that is, whether tastes and preferences change in retirement, even if incomes are held constant. To this end, regression analysis is performed (using ordinary least squares and a modified Cragg method where necessary) to examine differences in marginal propensity to

consume and income elasticity. These analyses help to establish whether or not differences in expenditure patterns are related to retirement, per se, or to an income effect associated with retirement.

## Demographics

As previously noted, some of the household characteristics are determined by the sample selection criteria. For example, the average age of the reference person is constrained to be within the allowed ranges for the preretired group (55 to 64) and retired group (65 to 74). Across the three household types studied, the average age for preretired reference persons is 59 years, and that for retired reference persons is 70 years. (See table 1.) Additionally, because automobile ownership is a condition of the sample selection process, the average number of vehicles is greater than one in each case.

However, some findings are not so predictable. For example, contrary to the popular notion that “everyone” moves to Florida (or at least the “Sunbelt”) upon retirement, single preretirees are more likely to be located in the South than single retirees. This difference is most pronounced for single men: 39 percent of preretirees live in the South, compared with 22 percent of retirees. For single women, the difference is less pronounced: 39 percent of preretirees live in the South, compared with 36 percent of retirees. However, for married couples, almost no difference exists; about one-third of married couples studied live in the South both before and after retirement.

*Single men.* Single retired men are more likely to be homeowners (72 percent) than are single preretired men (62 percent). The difference is even more pronounced if the homeowner holds no mortgage against his property: 64 percent of single male retirees own their homes outright, compared with only 30 percent of the preretired. Regardless of work status, more than 90 percent of single men live in urban areas. Additionally, despite the large plurality of preretired single men in the South (39 percent), after retirement, single men have the most even distribution of the study sample. Ironically, the South has the lowest percentage of retired men—22 percent. It is the Midwest that claims the highest percentage of single retired men (29 percent).

There is little difference between single male retirees and single male preretirees in terms of race or ethnicity. More than 80 percent of both groups have reference persons who are white (or other race, including Asian, Pacific Islander, and others), and the least represented race for both groups is Hispanic (3 percent of retired and 5 percent of preretired single men).

For single retired men, the distributions among levels of education and among income quintiles follow the same nega-

tive slope. For example, the largest percentage of single retired men (31 percent) has attained the least education, that is, they did not graduate from high school. Similarly, the largest proportion of single male retirees are also in the lowest income quintile (36 percent). Furthermore, the highest category of educational attainment (graduate or professional degree) accounts for the smallest proportion of single retired men (10 percent), and the highest income quintile contains the smallest proportion of single retired men (6 percent). Given the expected correlation between income and education, this pattern is not surprising. The correlation also appears to hold for single preretired men, although the ordering of categories is reversed: single preretired men are more likely to have at least a high school degree than are single retired men, and they are also more likely to be in one of the top three quintiles than are single retired men. This may reflect a generational effect, as educational opportunities have become more available and more socially and economically valuable for each successive generation.

*Single women.* The housing tenure and degree of urbanization for single women follow the same patterns as those described for single men, that is, retirees are more likely to be homeowners without a mortgage than are preretirees, and regardless of work status the majority of the sample resides in urban rather than rural areas. However, unlike single men, a higher percentage of single women, both retired and working, live in the South (36 percent of single retired women and 39 percent of single preretired women) compared with other regions. It is also interesting to note that the largest difference in the proportion of retired and preretired single female residents is in the Northeast. Only 13 percent of (or about one in eight) single female preretirees live in this region, compared with 20 percent of (or one in five) single female retirees.

In terms of race, again, white and other is the predominant group for both single female retirees (91 percent) and single female preretirees (85 percent). There is, however, a notable difference in the proportion of single female retirees who are black (8 percent) and single female preretirees who are black (13 percent). Roughly 2 percent of both groups of single women are Hispanic.

Unlike single retired men, the largest percentage of single retired women have completed high school (39 percent), compared with other levels of education, but only 6 percent have obtained a graduate or professional degree. Again, those in the preretired group are more likely than retirees to have at least attended college. While the income distribution for single retired women is similar to that of single retired men, the disparity between the lowest and highest quintiles is much greater for single women. In fact, half of all single retired women fall into the lowest quintile, and less than 1 percent fall into the

highest quintile. More single preretired women are in the second income quintile (33 percent) than are in any other quintile, and a much higher percentage of preretirees (7 percent) than retirees fall into the highest income quintile.

*Husband-and-wife couples.* Once again, homeownership is more likely in the retired sample than in the preretired sample of married couples. Furthermore, there is a lower percentage of renters in the married couple sample (5 percent of retirees and 7 percent of the preretired households) than in the singles samples. Roughly one-third of husband-and-wife consumer units live in the South, regardless of work status, and the Midwest is the only region in which the proportion of retired married couples (25 percent) is smaller than that of preretired married couples (30 percent).

There is little difference between retired married couples and preretired married couples in the percentage of reference persons who are white or other races, which is once again the most represented category in the sample.

Approximately one-third of the reference persons in both retired and preretired husband/wife consumer units are high school graduates. The largest differences between the two groups are found at the lowest and highest levels of educational attainment. While 19 percent of the retirees in this sample did not graduate from high school, the same is true for only 9 percent of the preretired married couples. At the other end of the scale, only 8 percent of reference persons in retired couples have earned a graduate or professional degree, compared with 15 percent of preretired couples.

The comparison of income distribution among retired and preretired married couples is different from that of single men and that of single women. First, the highest percentage of married retirees (46 percent) fall into the second quintile, not the first quintile as is the case for single male and single female retirees. In fact, only 9 percent of retired husband-and-wife households are in the lowest quintile. For the preretired married couples, the income distribution is more concentrated, that is, only 4 percent of the sample are in the lowest quintile and 46 percent are in the highest income quintile.

## Income

Before discussing the comparative results, it is important to provide a more detailed definition of some of the income sources examined in this study. For example, with income as with demographics, there are some results that are determined by the sample selection criteria. Specifically, no retired households have labor income, including wages and salaries and self-employment income. For this reason, a new income category is created in order to make the total income for retirees and preretirees more comparable (income before taxes, which

is commonly used as a measure of total income, includes labor income). The components of comparable income are those income sources that are available to both retired and preretired consumer units: that is, comparable income includes interest and property income, unemployment insurance and workers' compensation, public assistance, and several other sources, but it excludes wages and salaries, self-employment income, or income from Social Security, and private and government retirement. It should be noted that more than 20 percent of preretirees in all three household types report some retirement income, which could be explained by early retirement. (See table 2.) Specifically, some persons may choose to retire from a career before age 65, but continue to earn some labor income from another job; in this event, they are classified as

preretired in this study.<sup>24</sup> Even so, retirement income is not included in the comparable measure, because it may be a supplemental source for the preretired, but it is the main (or perhaps sole) source of income for retirees, and thus it is not comparable. Another important consideration regarding the income analysis is that the figures presented are for average annual income per consumer unit. To ensure more meaningful comparisons, only incomes from complete income reporters are shown.

*Single men.* Not surprisingly, single male retirees have significantly lower *total* incomes (\$24,738) than do preretired single men (\$42,033). Approximately 77 percent of the preretirees' income is from wages and salaries (\$32,196), while

**Table 2. Percent reporting and average annual income, preretirees and retirees, by composition of consumer unit, Consumer Expenditure Interview Survey, 1998-99 (complete income reporters only)**

Category	Single men			Single women			Married couples		
	Preretired	Retired	t-value <sup>1</sup>	Preretired	Retired	t-value <sup>1</sup>	Preretired	Retired	t-value <sup>1</sup>
Percent reporting income source:									
Income before taxes .....	100.0	100.0	-	100.0	100.0	-	99.9	100.0	-
Wages and salaries .....	89.4	0	-	92.7	0	-	94.1	0	-
Self-employment income .....	14.8	0	-	6.1	0	-	19.9	0	-
Social Security, private, and government retirement .....	25.9	98.3	-	22.8	99.3	-	25.1	100.0	-
Interest, dividends, rental income, and other property income .....	37.5	35.3	-	31.2	27.4	-	32.3	36.9	-
Unemployment, workers' compensation, and veterans' benefits .....	5.6	3.5	-	3.8	.3	-	3.1	2.7	-
Public assistance, supplemental security income, and food stamps .....	.5	6.4	-	1.2	5.2	-	.8	1.7	-
Regular contributions for support (including child support and alimony) .....	.5	0	-	2.8	2.1	-	.2	.3	-
Other income .....	3.2	1.7	-	.2	.2	-	1.6	.8	-
Comparable income <sup>2</sup> .....	42.6	41.6	-	36.4	34.3	-	36.0	39.8	-
Annual means:									
Income before taxes .....	\$42,033	\$24,738	5.137	\$30,443	\$15,690	10.919	\$74,816	\$27,570	15.669
Wages and salaries .....	32,196	0	14.929	25,376	0	21.736	59,068	0	30.893
Self-employment income <sup>3</sup> .....	-	0	3.833	-	0	3.453	-	0	4.232
Social Security, private, and government retirement .....	3,482	17,815	10.722	2,177	13,758	24.149	4,533	25,038	33.288
Interest, dividends, rental income, and other property income .....	1,321	5,813	3.127	840	1,678	2.164	1,939	2,285	.878
Unemployment, workers' compensation, and veterans' benefits .....	392	172	.817	106	37	1.574	62	80	.607
Public assistance, supplemental security income, and food stamps .....	2	106	2.027	14	60	2.243	44	94	0.888
Regular contributions for support (including child support and alimony) .....	5	0	1.000	425	156	1.553	57	51	.093
Other income .....	1,894	832	.929	0	1	.948	40	21	1.157
Comparable income <sup>2</sup> .....	3,614	6,923	1.662	1,386	1,932	1.285	2,142	2,532	.961

<sup>1</sup> Absolute values are displayed.

<sup>2</sup> Income before taxes less wages and salaries; self-employment income; and Social Security, private and government retirement income.

<sup>3</sup> Mean incomes from this source are less than \$1.

retirement income (\$17,815) contributes 72 percent of the retirees' income. However, when considering only *comparable* income sources, the relationship between preretired and retired single men reverses. From those sources that are available to both groups, retirees earn more (\$6,923) than do preretirees (\$3,614). Yet, the percentage of single men reporting these sources of comparable income is similar for the retired sample (42 percent) and the preretired sample (43 percent). Nevertheless, this "reversal of fortune" can be at least partially explained by the higher income earned by retired single men from dividends, interest, rental and other property—\$5,813 compared with \$1,321 earned by preretired single men. In fact, the average member of the single-male-retiree group earns more income from this source than does any other demographic group in the study. Interestingly, there is no great difference in the percent reporting this source of income (35 percent of single retired men and 37 percent of preretired single men). Presumably, the retirees have had their investments longer and are thus enjoying the time value of money. In addition, retirees may have different types of investments than preretirees based on their needs and goals: income generating investments versus growth funds, for example. Finally, retired single men are much more likely to receive public assistance, which includes supplemental security income and food stamps (6 percent report income from this source), than are preretired single men (less than 1 percent receive this type of income).

*Single women.* As with single male households, *total* income before taxes is significantly higher for the preretired single women (\$30,443) than for the single retired women (\$15,690), but *comparable* income is higher, albeit less so, for retirees: \$1,932 compared with \$1,386. Also, a higher percentage of retired single women report income from public assistance (5 percent) than do preretired single women (1 percent). Single women in both groups derive a higher proportion of their income from one primary source than do single men. In the case of female retirees, 88 percent of their income comes from retirement sources, while 83 percent of preretirees' earnings come from wages and salaries. In addition, single women, regardless of work status, are the only household type of which more than 1 percent of the sample reports income from alimony and child support.

*Husband-and-wife couples.* Income before taxes is \$74,816 for preretired married couples and \$27,570 for retired married couples. Wages and salaries account for 79 percent of the preretirees' income, while 91 percent of retirees' income comes from retirement sources. The figures for comparable income show the same inverse relationship as those in the single households discussed above. Married couples, however, differ from the singles in that the difference between the re-

tired and preretired couples' income from interest and dividends is not significant. Another difference is that where the percent reporting income from public assistance is substantially higher for retirees in the single samples, 2 percent of retired couples and 1 percent of preretired couples report this source of income.

## Outlays

As with the analysis of income, there are some important methodological distinctions that should be discussed before the comparison of outlays is presented. First and foremost is the decision to use an outlays approach, which differs from the average annual expenditures shown in the standard Bureau of Labor Statistics publications of the Consumer Expenditure Survey data. Specifically, in these publications, certain items of expense are excluded, such as mortgage principal which is listed as a reduction of liabilities, not an expenditure. The housing expenditures do include the mortgage interest paid by the consumer unit. The same is true for vehicle payments made during the reference period on financed vehicles (only the interest is included as an expenditure). However, if a vehicle is purchased during the reference period, the total price (less any trade-in value) is recorded as an expenditure. As a result of this approach, the mean vehicle expenditure value will approximate the average annual payments made by those who finance their vehicles because, presumably, there will be a relatively small number of actual vehicle purchases during any one quarter, and these will balance out vehicle payments for those individuals who are still making them. However, this method is not suitable when regression analysis involving outlays is employed, as it is in this study. The reason is that those consumer units that happened to purchase during the interview period will have a huge expenditure imputed to them, even if they financed the automobile. Those who are still making payments on their automobile will have their expenditures artificially deflated, because the principal payments will not be counted as expenditures. Therefore, in this study, the actual amounts paid out by consumer units are examined, including regular mortgage and vehicle principal payments. Although, technically, this may be called an "outlays approach," in this text, the terms "outlay" and "expenditure" are used interchangeably for convenience.

For these analyses, it is particularly important to include mortgage principal payments in the comparison of housing expenditures. As previously noted in the demographics section, the majority of retirees in all three household types are homeowners without mortgages, while a higher proportion of preretirees are still making payments on their homes. Therefore, in order to allow for an accurate comparison of housing expenditures in pre- and post-retirement families, the "true" housing payment must be examined. In addition, the outlay

for housing in this study is comprised of shelter (mortgage principal and interest, rental payments, property taxes, and maintenance and repair) and utilities. Presumably, some renters may have utility costs included in their regular rental payment. Therefore, utilities are included so that homeowners and renters have comparable housing expenses.

In addition to housing, some other spending categories have been modified from their standard publication formats to better fit this study. For instance, marketers and advertisers often promote the notion that travel is a popular pastime for retired persons. Presumably this is because of the free time that retirees would have spent working, and perhaps because they now have fewer familial and financial obligations (for example, any children they have are grown, and any home mortgage is likely to be paid off). In order to capture these vacation and trip outlays, a new category is created, which includes such items as housing expenses for a vacation property, and food, alcoholic beverages, lodging and transportation on trips.

Also, it is important to note that expenditures for pensions and Social Security (that is, payroll deductions and other deposits to government, railroad, or private retirement plans) are excluded from this analysis. This omission allows for a more comparable measure of total outlays, as these expenditures are negligible for post-retirement households. The reason is that for preretirees, these “expenditures” are actually a form of “savings,” which are then a source of “dissavings” for retirees. That is, rather than contributing to a pension fund, a retiree is more likely to “draw it down.” In other words, the same pension plans to which a family contributes *prior* to retirement will likely be the main source of income for that family *after* retirement. In addition, no other forms of savings are included as “expenditures” in this analysis.<sup>25</sup> Therefore, for the same reason that retirement sources are omitted from “comparable” income (as previously discussed), contributions to pension plans are omitted as a category of expenditure. Finally, note that the analyses presented here use average quarterly outlays per consumer unit.

In general, the results indicate that the preretired and retired households do spend differently, across all family types examined. (See table 3.) For the majority of spending categories within each household type (single male, single female, and married couple), the differences are statistically significant. In fact, the following categories are significant for all three groups: total quarterly outlays, food away from home, shelter and utilities, total transportation, private transportation, apparel and services, total healthcare, health insurance, prescription drugs, education, alcoholic beverages, tobacco, and life and other insurance. Many of these differences are easily intuited: for instance, one expects significant differences in total outlays due to the significant differences in total income (as measured by income before taxes). Also,

given the homeownership rates and mortgage status comparisons, it is not surprising that preretired consumer units spend more than retirees on shelter and utilities. Additionally, private transportation (expenses for the consumer unit’s owned vehicles) is significantly higher for preretired singles and couples than for retirees. Even though the sample has been restricted to those households who own at least one vehicle, retirees may have paid off their vehicles, and may have lower maintenance and gasoline expenditures due to less use of the vehicle than preretirees, who may be driving to work every weekday.

*Single men.* Preretired single men spend more overall (\$6,804)—and for most categories of interest—than do single male retirees (\$5,050 total quarterly outlays). The only exceptions are healthcare, for which retirees spend almost twice as much (\$560) as the preretired households spend (\$293), and cash contributions, for which retired men spend \$649 compared with \$268 spent by preretirees. Within the category of healthcare, outlays are higher by retirees for each component, but are only significantly so for insurance and prescription drugs.

Interestingly, expenditures for food at home are not significantly different for retired and preretired single men, but preretirees spend significantly more for food away from home (\$372) than retired single men spend (\$224). Concomitantly, retired single men (73 percent) report food-away-from-home purchases less frequently than preretirees (90 percent). Thus, even the average expenditure for retired single men who purchase food away from home is substantially smaller (\$305) than the average expenditure for similar preretired single men (\$415).<sup>26</sup> The most obvious explanation is, once again, the difference in income for these groups. But perhaps this is a mobility issue, as retirees are older and may have health-related barriers to going out. This would seem to be supported by their significantly smaller outlays for vacations and trips, contrary to the proposed notion of increased leisure and travel after retirement. Furthermore, retirees spend significantly less on entertainment items and services (\$178) than do preretirees (\$311)—entertainment expenditures also include some items related to mobility, such as tickets to sporting and cultural events (theater, concerts, and so forth).

Outlays for apparel and services are also significantly lower in the post-retirement single male households: \$123 compared with \$208 spent by preretirees. Presumably, at least part of the preretired male’s purchases will be for work clothing, a cost no longer applicable to the retirees. Also, deductions for employer-sponsored plans may account for some of the relatively higher outlays for life insurance by the preretired sample—\$94 compared with \$40 spent by retired single men.

**Table 3. Quarterly outlays and t-values, preretirees and retirees, by composition of consumer unit, Consumer Expenditure Interview Survey, 1998-99**

Item	Single men			Single women			Married couples		
	Preretired	Retired	t-value <sup>1</sup>	Preretired	Retired	t-value <sup>1</sup>	Preretired	Retired	t-value <sup>1</sup>
Total quarterly outlays .....	\$6,804	\$5,050	2.941	\$6,222	\$4,911	3.941	\$10,482	\$7,705	8.471
Food at home .....	580	536	1.139	513	559	2.384	961	880	3.448
Food away from home .....	372	224	4.249	182	110	6.357	449	245	5.770
Shelter and utilities .....	2,250	1,286	7.795	2,283	1,496	6.730	3,082	1,831	10.592
Transportation .....	1,145	643	2.666	809	530	3.916	1,700	1,131	4.478
Private transportation .....	1,135	639	2.640	802	528	3.855	1,685	1,130	4.373
Public transportation .....	9	4	1.241	7	2	2.565	15	2	5.682
Vacation/trips .....	387	212	2.219	271	211	1.485	623	577	.791
Apparel and services .....	208	123	2.973	297	217	2.613	428	231	9.195
Healthcare .....	293	560	3.214	333	542	6.986	617	970	8.453
Health insurance .....	149	271	5.337	132	294	11.340	293	542	14.735
Medical services .....	100	201	1.340	123	127	.177	206	204	.046
Prescription drugs .....	33	58	2.284	61	101	4.537	89	187	8.626
Medical supplies .....	12	31	1.140	17	21	.765	30	37	1.033
Entertainment .....	311	178	3.910	238	196	2.325	572	435	1.146
All other outlays .....	940	1,050	.255	917	721	.976	1,331	947	2.915
Housing while attending school <sup>2</sup> ....	-	-	1.409	-	-	1.635	25	1	2.881
Personal care .....	33	30	.845	70	65	.874	98	84	4.169
Reading .....	36	28	1.661	45	43	.514	67	55	4.074
Education .....	123	6	2.453	108	17	2.239	155	17	3.742
Alcoholic beverages .....	86	46	3.347	37	20	3.156	90	51	6.394
Tobacco .....	91	58	2.622	49	30	3.424	83	39	7.795
Cash contributions .....	268	649	.948	365	328	.220	428	484	.514
Life and other insurance .....	94	40	3.649	79	36	3.266	201	120	5.517
Miscellaneous expenditures <sup>3</sup> .....	244	222	.253	209	224	0.221	275	153	2.110

<sup>1</sup> Absolute values are displayed.

<sup>2</sup> Mean outlays for this category are less than \$1.

<sup>3</sup> Includes legal fees; accounting fees; miscellaneous fees, parimutuel losses; funeral expenses; cemetery lots, vaults, maintenance fees; safe

deposit box rental; checking accounts, other bank service charges; finance charges excluding mortgage and vehicle; credit card memberships; miscellaneous personal services; occupational expenses; expenses for other property; interest paid, home equity line of credit (other property);

*Single women.* The comparisons of outlays by pre- and post-retirement women are similar to those of men described above. Preretired single women spend significantly more than retired women on food away from home, shelter and utilities, transportation (both private and public), apparel and services, entertainment, education, alcoholic beverages, tobacco, and life and other insurance. Retirees, on the other hand, generally have higher outlays for healthcare.

Unlike in the analysis of single men, however, single female retirees spend significantly more than their preretired counterparts for food at home—\$559 versus \$513, and they spend less for cash contributions (although this difference is not statistically significant). Also notable is the lack of significance in the difference between vacation spending by female retirees (\$211) and that spent by female preretirees (\$271).

*Husband-and-wife couples.* The analysis of outlays by married couples yields some interesting results that are different than the previous discussions of single men and women. For example, the difference in entertainment spending is not significant, with preretired couples spending \$572 and retired couples spending \$435. There are also a few categories of outlays for which the differences are significant in the couples sample, but are not so in the singles samples, namely, all other outlays and its components—housing while attending school, personal care, reading, and miscellaneous expenditures. It is also interesting to note that like the single female results, spending by married retirees for food at home is significantly different from that spent by preretired consumer units. However, in the case of married couples, preretirees spend more (\$961) than do retirees (\$880), the opposite as is seen in the single female comparison.

**Table 4. Percent reporting expenditures that are analyzed using regression analysis**

Outlay category	Single men		Single women		Married couples	
	Preretired	Retired	Preretired	Retired	Preretired	Retired
Food at home .....	99.2	100.0	99.8	99.9	99.9	99.9
Food away from home .....	89.6	73.4	80.1	73.1	89.4	80.7
Shelter and utilities (owners) .....	100.0	100.0	100.0	100.0	100.0	100.0
Shelter and utilities (renters) .....	100.0	100.0	100.0	100.0	99.0	100.0
Apparel and services .....	81.5	68.5	86.3	77.0	88.3	79.5
Healthcare less insurance <sup>1</sup> .....	49.6	60.4	73.1	75.0	80.1	84.8
Transportation .....	98.9	98.7	99.8	97.7	99.6	99.5
Entertainment .....	89.6	73.9	88.1	84.7	95.3	90.8
Out-of-town trips .....	40.8	32.4	41.7	36.4	55.6	48.0

NOTE: These figures are calculated from the full sample. Therefore, the values for percent reporting may differ slightly from those observations actually used in the regression. Missing values for some independent variables cause a few observations to be removed from the regressions, as described in the main text.

<sup>1</sup> Percent reporting positive values only. Those reporting net reimbursements—that is, negative values—and those reporting no

expenditure are treated as “nonexpenditures.” Reimbursements are rare, however. The largest percentage occurs for retired single males, and accounts for 3.6 percent of the group. Reimbursements are reported for 1.5 percent of preretired single males, and 1.4 percent of preretired married couples. For all others, reimbursements account for percentages greater than 0.9 but less than 1.0 percent.

## Regression analysis and results

Thus far, the results presented have examined differences between the preretired and retired groups in general ways. For example, retirees may spend differently on certain goods or services than might preretirees. But how much of this effect is due to the lifestyle differences (such as additional free time) that accompany retirement, and how much is due to other differences, such as lower income or other factors? To help discern the effect that retirement has, regression analysis is useful.

In this study, two types of regressions are performed: logistic regressions, or “logits,” and ordinary least squares (OLS) regressions.<sup>27</sup> Each has a different purpose. The logits are used to ascertain the probability that an event (such as a particular expenditure) will occur, given characteristics of the consumer unit. The logits are only necessary for expenditures that are not universally made. The OLS regressions describe how expenditure levels are related to certain characteristics. (For example, most expenditures are expected to increase with income, but by how much?) Table 4 shows the percent reporting expenditures that are used for regression analysis, and table 5 shows the number of observations used for ordinary least squares regressions.

The expenditures selected for study are either those that are basic goods and services (food at home, shelter and utilities, apparel and services, healthcare less insurance, and transportation) or items that might be expected *a priori* to differ with retirement (food away from home, entertainment, and out-of-town trips) due to the increased availability of leisure time. All categories are examined using OLS. Of the basic goods, only apparel and services requires a logit analysis. However, the “leisure” expenditures all require logit analysis.

Healthcare is the one basic expenditure group that requires special consideration. Only the “out-of-pocket” expenditures for actual medical goods and services are examined, because the quality of health insurance coverage can differ so much for these groups. Presumably, all the retirees in our sample are eligible for Medicare coverage. This is not true of the preretirees. Thus, the utility of comparing probability of coverage is limited. However, even if one only examines expenditures for actual drugs, medical supplies, and services, the results are still unclear: if the expenditures for “noninsurance” healthcare are higher for retirees, is this due to health reasons, or to less adequate coverage? The analysis in this study shall not attempt to answer these questions; even so, because healthcare is an important factor in maintaining quality of life, the results are reported for those who may find its inclusion useful (such as those who only want to see the “bottom line”—that is, the expected difference in spending associated with retirement, whatever the reason may be).

The independent variables for each of the regression models are similar. For the logistic regressions, the independent variables used describe occupation of the reference person (retired or preretired, self-employed); marital status for singles (divorced, separated, or never married); race (black) and ethnicity (Hispanic) of the reference person; educational attainment of the reference person (high school graduate, some college, college graduate, attended graduate school); degree of urbanization for the consumer unit (that is, urban or rural location); region of residence of the consumer unit; housing tenure (home owned without mortgage or renter); and total outlays that are used as a proxy for “permanent” income. (Also, an interaction term is included to see if the relationship of expenditure to “permanent” income differs in retirement.) This study uses “permanent” instead of “current” (that is,

**Table 5. Number of observations for ordinary least squares regressions**

Outlay category	Single men	Single women	Married couples
Food at home .....	480	1,270	2,542
Food away from home .....	396	968	2,168
Shelter and utilities (owners) .....	317	985	2,354
Shelter and utilities (renters) .....	160	279	153
Apparel and services .....	364	1,030	2,139
Healthcare, less insurance .....	263	944	2,096
Transportation .....	476	1,254	2,532
Entertainment .....	397	1,096	2,370
Out-of-town trips .....	161	467	1,206

NOTE: The married couple regressions are missing one observation due to one negative observation for permanent income; presumably, this couple had a relatively large reimbursement for healthcare that overwhelmed their other expenditures in the quarter in which it was received.

annual) income because, according to the “permanent income hypothesis,” expenditures are often made with expectations of future earnings in mind.<sup>28</sup> In this study, it is particularly important to use “permanent income” as opposed to “current income,” because table 2 shows current income is vastly different for the preretired and retired groups. This is because the retiree by definition has ceased working, and so he or she must live off of savings and other assets that have been accumulated. Any income received will presumably be based on these assets (such as interest or dividends), or will be from some source related to previous labor (such as Social Security or pension income). Even so, these income sources by themselves may not be enough to sustain a comfortable living situation for most consumers (retired or otherwise), and would be an unrealistic measure of the consumer unit’s actual economic status.<sup>29</sup> Expenditures reflect rational decisions based on levels of wealth (rather than income alone) that are available to the consumer unit, and therefore serve as a better indicator of the consumer unit’s tastes and preferences for particular goods and services. (Additionally, by using “permanent income” instead of “current income,” there is no need to distinguish “complete” and “incomplete” reporters, as virtually all respondents provide some information on outlays.)

The purpose of regressions, as noted earlier, is to allow “ceteris paribus” comparisons. That is, given that two consumer units are identical except for the issue in question (in this case, retirement), how does this issue influence the expected outcome for the affected consumer? To aid comparisons, a control group is selected, and its characteristics are used with the regression coefficients to predict the outcomes for each consumer unit (that is, preretired or retired). In this study, the control group consists of consumer units who are: currently working for a wage or salary; widowed (if single); neither black nor Hispanic; lacking a high school degree; living in an urban area of the South; and homeowners with a mortgage. In a few of the OLS regressions, additional controls are applied. For example, it is assumed that single homeowners

live in a dwelling with six rooms (including bedrooms) and two bathrooms (including half baths), compared to four rooms and one bathroom for single renters. For couples, owners are assumed to have seven rooms and two bathrooms, while renters are assumed to have five rooms and one bathroom. It is also assumed for all consumer units that they own one automobile and no other vehicles. These characteristics play roles in different models; for example, outlays for shelter and utilities will obviously vary with the size of the dwelling; transportation outlays will depend on number of vehicles owned (automobile or otherwise). Some other outlays, such as entertainment, may also depend on numbers of vehicles. One entertainment expenditure category specifically accounts for expenditures on vehicles like boats or motorcycles. In some cases, the consumer unit owns these vehicles (such as a boat) specifically for recreational purposes; in other cases, having access to certain vehicles (such as motorcycles) may make access to certain areas a greater possibility, and the opportunity may drive the expenditure.

Also, before performing the regressions, all expenditure values (including permanent income) were transformed by taking their natural log. This was done to minimize heteroscedasticity, which can be a problem in regression models. However, it has a convenient side-effect in that the marginal propensities to consume (MPC) and income elasticities have special properties: For all the basic goods (except apparel and services), the MPC becomes proportional to the expected budget share for the item under study; the elasticities simply equal the coefficient on natural log of permanent income. (For more information, see the appendix.)

Before examining the results, two caveats are in order: First, for the “ceteris paribus” analysis, note that average total outlays are used as the “control” amount, and that the average for preretired consumers is the operative value. This may not seem realistic, since the tables clearly show that outlays decline with retirement. There are several reasons for this: Even if tastes and preferences do not change in retirement, retirees are more likely to have paid off their mortgage, which would substantially reduce outlays. Additionally, as noted earlier, because the Consumer Expenditure Survey is not longitudinal, it is impossible to obtain a large sample whereby the act of retirement may be observed, let alone one where several years (or at least time periods) of expenditures both prior to and after retirement may be observed. Given the method used to define the sample, then, it could be that some selection bias is introduced into the data; that is, perhaps a substantial amount of the “preretirees” are consumers who plan to continue to work during retirement, though not necessarily at their original career job. These consumers may have different characteristics (including tastes) than those who retire completely, and thus they “select” themselves out of the retiree sample. However, assuming this problem is minimal, the issue still remains that

expenditures decline in retirement for those in the sample. The “ceteris paribus” results are concerned with the effect of the retirement decision itself, so in this discussion there is no problem. (See tables 6 and 7.) However, some readers may be interested in learning how expenditures differ in reality as a total result of retirement and its concomitant decisions that result in lower total outlays. For that purpose, tables are included in Appendix A that show the “total effect” of retirement. (That is, most characteristics, such as region of residence, are held constant, but permanent income is allowed to decrease.)

Second, one other factor cannot be separated out from the retirement decision: by definition, the retirees in this sample are older than the preretirees. Therefore, some of the retirement effect may be increased or decreased by an age effect. (This may be especially true for an expenditure such as healthcare less insurance.)

Finally, the number of observations differs from the full sample size in a few cases. This is generally due to missing data; for example, occasionally a consumer unit does not provide information on number of rooms or bathrooms in the household, and those records are deleted from the regression. Also, in the case of healthcare less insurance, the expenditure can be reported as negative because of reimbursements made by insurance companies. If a consumer unit made an expenditure for healthcare in one quarter and received reimbursement in a subsequent quarter, the healthcare expenditure during the “reimbursement” quarter will appear as a negative value. Although on average the reimbursements and the expenditures will cancel each other out, in the

regression results they can be problematic.<sup>30</sup> Fortunately, these occurrences are infrequent.

Table 5 shows the total number of observations used in the OLS regressions.<sup>31</sup> For apparel and services and the “leisure” regressions, observations are less than the total sample size because only those who had positive outlays are included in the OLS stage, as explained in the appendix.

*Single men.* In the case of single men, retirement status appears to play an indirect role in expenditure patterns. Although MPCs and elasticities appear to differ in several of the “basic” goods cases, none of these is associated with a statistically significant retirement effect, either for retirement in general or for the interaction of retirement and income, except for transportation. In this case, the predicted expenditure is significantly related both to the “event” of retirement and to a change in the income/expenditure relationship. Outlays are predicted to drop significantly both in economic and statistical terms. (The difference is \$265 per quarter.) The MPC declines substantially—from less than \$0.18 to more than \$0.09. The decrease in elasticity indicates that this good falls from “luxury” status for preretirees to “necessity” status for retirees. This may indicate that before retirement, single men, if given more income, will buy vehicles more frequently or more expensive vehicles than they would upon retirement. Again, retirees may also have less need to drive (therefore, they pay less for gasoline and other travel expenditures), as they do not have to go to work every day. (Note that single women and married couples also experience declines in predicted expenditures for transportation in retirement, although in those cases the difference is not statistically significant.)

As for the “leisure” goods tested, two show a difference related to the probability of purchase. In the first case, food away from home, the overall difference in predicted probability is not meaningful—falling from less than 95 percent for preretirees to 93 percent for retirees; the bottom line is most single men are predicted to purchase food away from home at least once every few months in retirement. Nor is the effect on MPC meaningful; it remains under \$0.02 regardless of retirement status. However, for out-of-town trips, the results are more interesting. The probability of purchase declines 3 percentage points, due both to the retirement effect and a difference in the income/probability relationship after retirement. The predicted expenditure for actual buyers

Ceteris paribus criteria	Probability of purchase		Significance indicator	
	Preretired	Retired	Retirement	Income
<b>Single men:</b>				
Food away from home .....	94.6	93.0	( <sup>1</sup> )	–
Apparel and services .....	60.6	70.3	–	–
Healthcare .....	39.8	71.6	–	–
Entertainment .....	90.7	88.2	–	–
Out-of-town trips .....	33.2	29.6	–	–
<b>Single women:</b>				
Food away from home .....	81.4	83.6	–	–
Apparel and services .....	82.0	74.1	–	–
Healthcare .....	84.2	87.8	–	–
Entertainment .....	92.8	90.2	–	–
Out-of-town trips .....	33.8	27.5	–	–
<b>Married couples:</b>				
Food away from home .....	92.7	86.9	–	–
Apparel and services .....	90.5	85.6	–	–
Healthcare .....	89.1	93.4	–	–
Entertainment .....	96.7	93.8	–	–
Out-of-town trips .....	45.4	46.6	–	–

**Table 7. Elasticities, and so forth under "ceteris paribus"**

[Probabilities in percent]

Ceteris paribus criteria	Single men		Single women		Married couples	
	Preretired	Retired	Preretired	Retired	Preretired	Retired
Variables:						
Permanent income .....	\$6,804	\$6,804	\$6,222	\$6,222	\$10,482	\$10,482
Log income .....	8.825266	8.825266	8.735847	8.735847	9.257415	9.257415
Owners:						
Rooms/bedrooms .....	6	6	6	6	7	7
Bathrooms/halfbaths .....	2	2	2	2	2	2
Renters:						
Rooms/bedrooms .....	4	4	4	4	5	5
Bathrooms/halfbaths .....	1	1	1	1	1	1
Food at home:						
Probability of purchase .....	100.0	100.0	100.0	100.0	100.0	100.0
Predicted expenditure (buyers only) .....	\$536	\$503	\$470	<sup>12</sup> \$546	\$897	\$878
Marginal propensity to consume .....	.014	.024	.019	.034	.020	.022
Elasticity .....	.18	.32	.26	.39	.24	.27
Food away from home:						
Probability of purchase .....	94.6	<sup>1</sup> 93.0	81.4	83.6	92.7	86.9
Predicted expenditure (buyers only) .....	\$193	\$162	\$169	\$119	\$305	<sup>12</sup> \$252
Marginal propensity to consume .....	.013	.015	.017	.012	.022	.014
Elasticity .....	.45	.65	.64	.63	.76	.57
Shelter and utilities (owners):						
Probability of purchase .....	100.0	100.0	100.0	100.0	100.0	100.0
Predicted expenditure (buyers only) .....	\$2,509	\$2,005	\$2,185	\$1,947	\$3,090	\$2,972
Marginal propensity to consume .....	.216	.137	.246	.206	.166	.148
Elasticity .....	.59	.46	.70	.66	.56	.52
Shelter and utilities (renters):						
Probability of purchase .....	100.0	100.0	100.0	100.0	100.0	100.0
Predicted expenditure (buyers only) .....	\$1,523	\$1,769	\$2,088	\$1,923	\$1,992	\$1,570
Marginal propensity to consume .....	.096	.147	.240	.248	.103	.068
Elasticity .....	.43	.57	.71	.80	.54	.45
Apparel and services:						
Probability of purchase .....	60.6	70.3	82.0	74.1	90.5	85.6
Predicted expenditure (buyers only) .....	\$111	\$99	\$142	<sup>2</sup> \$99	\$253	<sup>12</sup> \$183
Marginal propensity to consume .....	.012	.013	.024	.013	.024	.015
Elasticity .....	.73	.92	1.08	.83	1.00	.83
Healthcare (less insurance):						
Probability of purchase .....	39.8	71.6	84.2	87.8	89.1	93.4
Predicted expenditure (buyers only) .....	\$226	\$370	\$158	<sup>12</sup> \$218	\$228	\$336
Marginal propensity to consume .....	.012	.045	.014	.033	.016	.020
Elasticity .....	.35	.82	.55	.95	.72	.61
Transportation:						
Probability of purchase .....	100.0	100.0	100.0	100.0	100.0	100.0
Predicted expenditure (buyers only) .....	\$1,018	<sup>12</sup> \$753	\$476	\$373	\$1,197	\$889
Marginal propensity to consume .....	.175	.094	.052	.043	.110	.083
Elasticity .....	1.17	.85	.68	.71	.96	.98
Entertainment:						
Probability of purchase .....	90.7	88.2	92.8	90.2	96.7	93.8
Predicted expenditure (buyers only) .....	\$188	\$155	\$139	\$134	\$284	\$236
Marginal propensity to consume .....	.021	.014	.015	.015	.026	.021
Elasticity .....	.76	.63	.67	.69	.95	.91
Out-of-town trips:						
Probability of purchase .....	33.2	29.6	33.8	27.5	45.4	46.6
Predicted expenditure (buyers only) .....	\$98	\$96	\$157	<sup>12</sup> \$155	\$435	\$530
Marginal propensity to consume .....	.012	.006	.012	.012	.030	.047
Elasticity .....	.82	.43	.48	.49	.73	.92

<sup>1</sup> Retirement coefficient is statistically significant at the 95-percent confidence level.<sup>2</sup> Coefficient for retired income term is statistically significant at the 95-percent confidence level.

does not differ much, but the MPC is cut in half—from \$0.012 to \$0.006, as is the income elasticity—from 0.82 to 0.43.<sup>32</sup>

*Single women.* The probabilities of purchase are not significantly affected by retirement for single women, according to the logit results. However, in several cases, retirement is directly and indirectly related to differences in expenditures for those who purchase. Food at home, healthcare (less insurance), and out-of-town trips all exhibit such differences, and apparel and services exhibits an indirect difference (that is, the income coefficient is statistically significant, but not the retirement variable itself). For food at home, a sizable increase in expenditures is predicted—about \$76 per quarter. Although not statistically significant, food away from home also shows a decline in predicted expenditure for single female retirees (\$50). It is interesting to note that the table in the appendix, in which retirees are assumed to have lower permanent incomes than preretirees, shows that the situation reverses. Although food-at-home expenditures are predicted to rise (by \$28), the difference is less than the predicted decrease in food-away-from-home expenditures (\$65).

An interesting difference occurs for apparel and services for this group. After retirement, the MPC for this item is cut in half. As a result, the elasticity falls substantially as well. Before retirement, apparel and services are treated as “luxury” goods for single women; afterward, they become “necessity” goods, although they still have a higher elasticity than most of the other expenditure items. It is also interesting to note that although preretired single women are predicted to spend more (\$142) than preretired single men (\$111) each quarter, male and female retirees have the same predicted expenditure (\$99) for apparel and services. This is also roughly true when incomes are assumed to decline for retirees—both single male and female retirees are predicted to spend about \$80 on apparel and services. (See appendix.)

*Married couples.* As with singles, married couples appear to have some substantial differences either in probability of purchase or level of purchase, but not many are statistically significant. The only two expenditures that show significant differences are food away from home and apparel and services. Both show decreases in the predicted expenditure due to the direct retirement effect and changes in the income effect. The apparent difference in probability for food away from home is the largest of the three groups studied, falling nearly 13 percentage points. Similarly, the expenditure for those who report purchases falls by \$85 per quarter. Nevertheless, the difference in MPC is not even noticed when rounded to the full cent (that is, \$0.02 before and after retirement). The elasticity declines somewhat, from 0.76 to 0.62, but still remains in the moderately high level of inelastic expenditures.

Apparel and services, though, show a pattern very similar to single women. Although all groups show declines in predicted expenditures, probably because of less need for work attire or uniforms as noted before, apparel and services fall from unitary elasticity for preretired couples to inelasticity (0.83) for retirees. The MPC is also substantially reduced (from \$0.024 to \$0.015). Predicted expenditures fall by \$70 for this group.

THIS STUDY HAS ANALYZED EXPENDITURE PATTERNS BY PRERETIREES AND RETIREES to help understand how expenditure patterns differ upon retirement for single men, single women, and married couples. Many differences have been found. Some of these are undoubtedly due to differences that are to be expected upon retirement. For example, retirees have lower incomes than preretirees, and therefore would naturally be expected to spend less on many items. However, preretirees are found to have different demographic characteristics than retirees, even when examining carefully selected groups (single men, single women, and married couples with no children). Again, some of these are expected; age is by definition greater for retirees than preretirees, and retirees are more likely to own their home outright (that is, the mortgage is paid off) than are preretirees. Others are not necessarily predictable *a priori*, such as differences in proportions of each group that are located in various regions of the country. Nevertheless, each of these characteristics could have an effect on expenditure patterns. To control for these differences, and to attempt to ascertain whether income differences are solely responsible for expenditure differences or whether tastes and preferences differ in retirement, regression analyses are performed.

From the regression results, it is difficult to draw general conclusions about the role of retirement in expenditure decisions. For example, the results for single men showed few statistically significant differences in probability of reporting expenditures or in the predicted outlay for items. However, more were significant for single women and married couples. Nevertheless, some interesting findings are presented. For example, in each group studied, both the probability of purchase and predicted expenditure for food away from home are lower for retirees than preretirees. Because these results are calculated assuming income is equal for the pre- and post-retirees, it may indicate that the “utilitarian” purpose of food away from home outweighs the “recreational” purpose of food away from home. That is, the preretirees may be purchasing more food away from home more frequently because they do not have the same amount of leisure time as the retirees. However, given the lack of statistical significance of many of the parameters used to compute these results, this interpretation should be viewed with caution.

Retirement is a major event in a working person’s life, accompanied by many lifestyle changes, such as a reduc-

tion in labor income and an increase in leisure time. This article documents some of the potential consequences of these changes. These issues are particularly important today with the “graying” of the population; it is only a few years until the “baby boomers” reach retirement age. This

analysis should be useful not only to professionals and policymakers who study the effects of changing demographics on the economy at large, but also to retirement planners and counselors, as well as to those who plan to retire soon themselves. □

## Notes

NOTE: Additional tables can be obtained on the Internet version of this article at <http://www.bls.gov/cex/csxtart.htm>

<sup>1</sup> See *65+ in the United States*, Current Population Reports, Special Studies (U.S. Bureau of the Census, 1996), pp 23–190.

<sup>2</sup> Geoffrey D. Paulin, “Expenditure patterns of older Americans, 1984–97,” *Monthly Labor Review*, May 2000, pp. 3–28.

<sup>3</sup> Rose M. Rubin and Kenneth Koelin, “Elderly and nonelderly expenditures on necessities in the 1980s,” *Monthly Labor Review*, September 1996, pp. 24–31.

<sup>4</sup> Mohammed Abdel-Ghany and Deanna L. Sharpe, “Consumption Patterns Among the Young-Old and Old-Old,” *Journal of Consumer Affairs*, Summer 1997, pp. 90–112.

<sup>5</sup> The reference person is the first person mentioned by the survey respondent when asked: “Start with the name of the person or one of the persons who owns or rents this home.”

<sup>6</sup> Nancy E. Schwenk, “Trends in the Economic Status of Retired People,” *Family Economic Review*, 1994, 7(2), pp. 19–27.

<sup>7</sup> *Ibid.*, pp. 24–25.

<sup>8</sup> Frankie N. Schwenk, “A Comparison of Households Headed by Persons 55 to 65 Years of Age: Retired and Employed,” *Family Economic Review*, 1990, 3(3), pp. 19–25.

<sup>9</sup> *Ibid.*, pp. 22, 24.

<sup>10</sup> A consumer unit is defined as members of a household related by blood, marriage, adoption, or other legal arrangement; a single person living alone or sharing a household with others but who is financially independent; or two or more persons living together who share responsibility for at least two out of three major types of expenses—food, housing, and other expenses. In this article, *consumer unit* and *household* are used interchangeably.

<sup>11</sup> Thomas Moehrl, “Expenditure patterns of the elderly: workers and nonworkers,” *Monthly Labor Review*, May 1990, pp. 34–41.

<sup>12</sup> *Ibid.*, p. 34.

<sup>13</sup> *Ibid.*, p. 36.

<sup>14</sup> Rose M. Rubin and Michael Nieswiadomy, “Expenditure patterns of retired and nonretired persons,” *Monthly Labor Review*, April 1994, pp. 10–21.

<sup>15</sup> A complete income reporter is a consumer unit that provides values for at least one of the major sources of its income, such as wages and salaries, self-employment income, and Social Security income. A complete reporter may not provide a full accounting of all income from all sources, however.

<sup>16</sup> Rubin and Nieswiadomy, “Expenditure patterns...,” p. 36.

<sup>17</sup> The 1996–97 Consumer Expenditure Survey 2-year report notes that the “Interview survey collects detailed data on an estimated 60 to 70 percent of total household expenditures. In addition, global estimates—that is, expense patterns for a 3-month period—are obtained for food and other select items. These global estimates account for an additional 20 to 25 percent of total expenditures.” Source: Bureau of Labor Statistics, *Consumer Expenditure Survey, 1996–97*, Report 935 (U.S. Department of Labor, September 1999), p. 256.

<sup>18</sup> It is important to note that some retirees in our sample may be “retired due to disability.” However, in the Consumer Expenditure Survey, there is no way to identify those who are both retired and disabled.

Respondents may select only one of the categories—“retired” or “not working due to disability.”

<sup>19</sup> The other possible occupational statuses for the spouse are “working without pay” or “not working” because they are either going to school or doing something else (that is, not working for a reason not already described).

<sup>20</sup> Beth Harrison highlights the differences in expenditure levels and shares between these two age groups from the 1984 Consumer Expenditure Interview Survey, finding them to be distinct in most major categories. (See “Spending patterns of older persons revealed in expenditure survey,” *Monthly Labor Review*, October 1986, p. 15–17.) In addition, in a study following up on Harrison’s findings, Pamela Hitschler (p. 3) finds that “consumer units in the younger group spent, on average, a significantly larger amount on every major expenditure category except housing and healthcare in both years [1980 and 1990 are compared].” (“Spending by older consumers: 1980 and 1990 compared,” *Monthly Labor Review*, May 1993, pp. 3–13.)

<sup>21</sup> This “age effect” is assumed to include differences by age in health status. Although health status can be an important influence on the expenditures of older consumers, there are no concrete measures of health status available in the Consumer Expenditure Survey.

<sup>22</sup> As described previously, the definition of “preretired” and “retired” depends on the occupational status of the reference person and spouse, in the case of married couples. It is possible that one of the parents owns the home, and is therefore the reference person, but the child moves back in with them to provide economic support.

<sup>23</sup> Even eliminating families with children does not guarantee that the couple is childless. College students, when living in university-sponsored housing, are considered to be separate consumer units from their parents. Additionally, children may have reached the age of majority, and may have moved out to establish consumer units of their own. However, the survey does not collect information in such a way as to allow the selection of singles or couples who do not have children at all. Therefore, although it is possible that some of these families purchase items for their children that those without children would not, it is not possible to identify those families with the possibility of such additional spending.

<sup>24</sup> Recall that the definition of retirement in this study is based on the self-reported occupation of the reference person. Thus, it is possible to retire from one’s life-long work and to pursue other avenues of employment. The “retiree” may choose to work for pay in a field that was previously a hobby, or perhaps may seek a low-wage job to keep active, but not for income, *per se*.

<sup>25</sup> While it is true that some “expenditures,” such as mortgage principal, may be considered an “investment” in some cases, most homeowners do not own their home solely for investment purposes, as they might a stock or bond; they also consume the housing services the home provides. Similarly, some consumers may own life insurance policies that pay annuities at some point; however, the policy is not merely a savings vehicle; it is primarily a purchase of protection of one’s estate in case of unexpected events.

<sup>26</sup> Calculated by dividing the average expenditure for the whole group (\$372 for preretirees, and \$224 for retirees) by the percent reporting, shown in table 6 (89.6 percent for preretirees, and 73.4 percent for retirees).

<sup>27</sup> See the Technical Notes section for a detailed explanation of the regression methodology, including the model specifications.

<sup>28</sup> See Milton Friedman, *A Theory of the Consumption Function* (Princeton, NJ: Princeton University Press, 1957).

<sup>29</sup> There are also empirical reasons for using “permanent” income in this case. Respondents do not always provide information on “current” income, and even those who do may not provide a full accounting of all income from all sources. Furthermore, data regarding assets and liabilities are only collected on a limited basis in the Interview survey. However, the primary goal of the Interview Survey is to collect expenditures.

<sup>30</sup> One possible solution is to use four complete quarters for each consumer unit, rather than treat each quarter independently as is done in this article. However, even this solution does not provide a balanced treatment of medical expenditures and reimbursements. For example, a reimbursement reported in the second interview (the first interview during which these data are collected) will have no matching expenditure because that expense would have been incurred by the consumer unit prior to its participation in the survey. Likewise, a medical expenditure reported in the fifth and final interview may very well be reimbursed afterward, when the consumer unit is no longer a survey participant. There is no way to capture these prior expenses or future reimbursements.

<sup>31</sup> Because the logit models share the same specification, and because they predict the probability of an expenditure occurring, nearly all of them have the same number of observations as the sample size for the group under study. The exception is the set of healthcare less insurance models. The logit models have fewer observations than the sample for the group under study in this case, because the negative

healthcare outlays are omitted from the sample before running the regression. (For single men, the total is 470 observations; for single women, it is 1,260 observations; and for married couples, it is 2,515 observations.)

<sup>32</sup> At first glance, the predicted value for out-of-town trips may appear low, but there are at least two reasons for this. First, out-of-town trips are defined in the survey either as trips that last at least overnight for recreation purposes, or “day trips” in which the participant travels at least 75 miles from home. Therefore, they may be short in duration and not costly. Second, this phenomenon may be due to the econometrics underlying the model. The specification may be inaccurate due to omitted variables, improper transformation of the dependent or independent variables, or other reasons. However, the standard errors of the relative coefficients are wide enough to encompass an extremely large range of predicted values. This is because, as noted,  $E(\ln Y)$  is the predicted value resulting from the regression, and  $\exp[E(\ln Y)]$  is the predicted value for the expenditure. A very small deviation in  $E(\ln Y)$  can lead to a very large difference in  $\exp[E(\ln Y)]$ . For example, as shown in the table, the current predicted value for pretirees is \$98. This is based on  $E(\ln Y)$  of approximately 4.58. However, if  $E(\ln Y)$  increases by 1 to 5.58,  $\exp[E(\ln Y)]$  increases to \$265. Even at the 90-percent confidence level, an estimate of 5.58 is plausible; if all relevant parameters are evaluated at the lowest level in the 90-percent confidence interval,  $E(\ln Y)$  is approximately -3.88; if all are evaluated at the highest level in the 90-percent confidence interval,  $E(\ln Y)$  is approximately 12.99. The same reasoning applies to travel expenditures for single women. Applying the confidence intervals to their parameters yields an estimated range from 0.51 to 9.59 for  $E(\ln Y)$ .

## APPENDIX A: Results of regression analysis

In tables 6 and 7, results were shown assuming “ceteris paribus.” That is, all characteristics (including permanent income) except retirement were assumed to be constant for the groups compared and the results were computed on that basis. In reality, permanent income declines substantially in retirement. For the reader’s convenience, the following

tables show the “full effect” of retirement as estimated from the regressions discussed in the text. Only characteristics that are not explicitly related to retirement (such as whether one lives in an urban or rural area) are held constant. However, permanent income is evaluated at its mean for retirees in the following calculations. (See tables A-1 and A-2.)

Consumer type	Probability of purchase		Significance indicator	
	Pre-retired	Retired	Retirement	Income
<b>Single men:</b>				
Food away from home .....	94.6	89.3	1	–
Apparel and services .....	60.6	57.3	–	–
Healthcare (less insurance) .	39.8	63.6	–	–
Entertainment .....	90.7	83.2	–	–
Out-of-town trips .....	33.2	23.7	–	–
<b>Single women:</b>				
Food away from home .....	81.4	79.9	–	–
Apparel and services .....	82.0	68.6	–	–
Healthcare (less insurance) .	84.2	86.1	–	–
Entertainment .....	92.8	87.6	–	–
Out-of-town trips .....	33.8	23.2	–	–
<b>Couples:</b>				
Food away from home .....	92.7	80.1	–	–
Apparel and services .....	90.5	77.9	–	–
Healthcare (less insurance) .	89.1	89.7	–	–
Entertainment .....	96.7	89.3	–	–
Out-of-town trips .....	45.4	34.9	–	–

**Table A-2. Predicted outcomes given full retirement effect**

Variables	Single men		Single women		Couples	
	Preretired	Retired	Preretired	Retired	Preretired	Retired
Variables:						
Permanent income .....	\$6,804	\$5,050	\$6,222	\$4,911	\$10,482	\$7,705
Log income .....	8.825266	8.527144	8.735847	8.499233	9.257415	8.949625
Owners:						
Rooms/bedrooms .....	6	6	6	6	7	7
Bathrooms/halfbaths .....	2	2	2	2	2	2
Renters: .....						
Rooms/bedrooms .....	4	4	4	4	5	5
Bathrooms/halfbaths .....	1	1	1	1	1	1
Food at home:						
Probability of purchase (percent) .....	100.0	100.0	100.0	100.0	100.0	100.0
Predicted expenditure .....	\$536	\$457	\$470	<sup>12</sup> \$498	\$897	\$809
Marginal propensity to consume .....	0.014	0.029	0.019	0.040	0.020	0.028
Elasticity .....	0.18	0.32	0.26	0.39	0.24	0.27
Food away from home:						
Probability of purchase (percent) .....	94.6	<sup>2</sup> 89.3	81.4	79.9	92.7	80.1
Predicted expenditure (buyers only) .	\$193	\$136	\$169	\$104	\$305	<sup>12</sup> \$220
Marginal propensity to consume .....	0.013	0.018	0.017	0.013	0.022	0.018
Elasticity .....	0.45	0.68	0.64	0.63	0.76	0.62
Shelter and utilities (owners):						
Probability of purchase (percent) .....	100.0	100.0	100.0	100.0	100.0	100.0
Predicted expenditure .....	\$2,509	\$1,746	\$2,185	\$1,666	\$3,090	\$2,531
Marginal propensity to consume .....	0.216	0.161	0.246	0.223	0.166	0.171
Elasticity .....	0.59	0.46	0.70	0.66	0.56	0.52
Shelter and utilities (renters):						
Probability of purchase (percent) .....	100.0	100.0	100.0	100.0	100.0	100.0
Predicted expenditure .....	\$1,523	\$1,494	\$2,088	\$1,591	\$1,992	\$1,365
Marginal propensity to consume .....	0.096	0.167	0.240	0.260	0.103	0.081
Elasticity .....	0.43	0.57	0.71	0.80	0.54	0.45
Apparel and services:						
Probability of purchase (percent) .....	60.6	57.3	82.0	68.6	90.5	77.9
Predicted expenditure (buyers only) .	\$111	\$79	\$142	<sup>2</sup> \$81	\$253	<sup>12</sup> \$146
Marginal propensity to consume .....	0.012	0.014	0.024	0.013	0.024	0.016
Elasticity .....	0.73	0.89	1.08	0.81	1.00	0.86
Healthcare less insurance:						
Probability of purchase (percent) .....	39.8	63.6	84.2	86.1	89.1	89.7
Predicted expenditure (buyers only) .	\$226	\$292	\$158	<sup>12</sup> \$172	\$228	\$284
Marginal propensity to consume .....	0.012	0.046	0.014	0.033	0.016	0.023
Elasticity .....	0.35	0.79	0.55	0.94	0.72	0.64
Transportation:						
Probability of purchase (percent) .....	100.0	100.0	100.0	100.0	100.0	100.0
Predicted expenditure .....	\$1,018	<sup>12</sup> \$584	\$476	\$316	\$1,197	\$659
Marginal propensity to consume .....	0.175	0.098	0.052	0.046	0.110	0.083
Elasticity .....	1.17	0.85	0.68	0.71	0.96	0.98
Entertainment:						
Probability of purchase (percent) .....	90.7	83.2	92.8	87.6	96.7	89.3
Predicted expenditure (buyers only) .	\$188	\$132	\$139	\$115	\$284	\$182
Marginal propensity to consume .....	0.021	0.017	0.015	0.016	0.026	0.022
Elasticity .....	0.76	0.65	0.67	0.69	0.95	0.95
Out-of-town trips:						
Probability of purchase (percent) .....	33.2	<sup>12</sup> 23.7	33.8	23.2	45.4	34.9
Predicted expenditure (buyers only) .	\$98	\$77	\$157	<sup>12</sup> \$120	\$435	\$373
Marginal propensity to consume .....	0.012	0.005	0.012	0.010	0.030	0.037
Elasticity .....	0.82	0.35	0.48	0.42	0.73	0.76

<sup>1</sup> Coefficient for retired income term is statistically significant at the 95-percent confidence level; retirement coefficient is statistically significant at the 95-percent confidence level.

<sup>2</sup> Retirement coefficient is statistically significant at the 95-percent confidence level.

## APPENDIX B. Regression techniques

Some expenditures, such as food at home, or shelter and utilities, are reported by virtually all participants in the Consumer Expenditure Survey. For these items, the choice of regression technique is straightforward: Ordinary least squares (OLS) suits them well. However, many expenditures are not universal. These purchases may not be made because of tastes and preferences (for example, tobacco and smoking supplies) or because of durability of the item (for example, vehicle purchases). In this study, four such variables are examined. Three (food away from home, entertainment, and out-of-town trips) are probably examples of the first situation (tastes and preferences dissuade some consumers from purchase) while the fourth may be an example of the second situation (perhaps the consumer had sufficient amounts of apparel during the last quarter, and did not need services, such as dry cleaning or repair). These kinds of expenditures require special treatment in their analysis.

One set of models designed to handle these situations is called the “double hurdle” set of models. The set gets its name because the consumer must first decide whether to purchase the item, and then how much to purchase. In these models, the hurdles are modeled in two stages: stage one models the probability of purchase; and stage two models the level of purchase for those who buy the good. Results of the two stages are used together to predict the expenditure for a given consumer.

One popular form of double hurdle model is the Tobit model. In this model, the “hurdles” are estimated with the same independent variables. The stages are estimated in such a way that one set of parameter estimates is produced, and these parameters can be used to estimate probability of purchase (using the cumulative density function, as with probit) and the marginal propensity to consume (as with OLS). The predicted expenditure is equivalent to the predicted expenditure for those who purchase weighted by the probability of purchase.<sup>1</sup> However, a major drawback of Tobit is the restrictions it makes on the results. First, because one set of independent variables is used, the model is only useful when the exact same set of variables predicts both the probability of purchase and the level of expenditure. This is not always the case. For example, the probability of purchasing health insurance may depend on the size of one’s family. However, if a particular policy charges one premium for “family” coverage, regardless of the number of members of the family, the Tobit model has a weakness in predicting expenditures for that policy. Furthermore, the Tobit model assumes that the “direction” of each variable is the same for the probability and for the level of consumption. This may not be true. For example, an article describing wine consumption by U.S. men finds that those who have at least a high school education are more likely to drink wine than men who have lower levels of education; however, they also find that men with at least a high school education drink less wine than those who have lower levels of education.<sup>2</sup>

Other models have been proposed, however, to handle the “double hurdle” situation. The models used in this study are based on a type described by John G. Cragg.<sup>3</sup> In Cragg’s method, the probability of purchase is estimated separately from the level of expenditures. Cragg’s approach has many advantages over the Tobit. The ability to separate the probability of purchase and level of expenditure equations allows differences in variables and signs across the two stages of the analysis, providing Cragg’s approach with a “considerable interpretational advantage” over the Tobit model, according to Mohamed Abdel-Ghany and J. Lew Silver.<sup>4</sup> Additionally, “Tobit ... forces zero observations to represent corner solutions,” according to other researchers, who go on to discuss a weakness in Tobit already

addressed—namely, that it “presumes that the same set of variables and parameter estimates determine both the discrete probability of a nonzero outcome and the level of positive expenditures...”<sup>5</sup>

Although Cragg’s models use probit to predict the probability of purchase, he notes that logit can be used instead.<sup>6</sup> Many standard econometric textbooks point out that logit, when applied, produces probability estimates that are nearly identical to probit estimates. However, logit is much easier to use and interpret. The equation for predicting probability of purchase ( $P$ ) is:

$$P = \exp(a + bX) / [1 + \exp(a + bX)]$$

where

$a$  is the intercept of the logit equation

$b$  is a vector of parameter estimates

$X$  is a vector of independent variables.

The formula can be entered into a standard spreadsheet to estimate probabilities of purchase for different consumers. Furthermore, the equation is easily differentiated to find the marginal relationship of probability to a particular variable. (For example, if income rises by \$1, how much does the probability of purchase change?) With probit, an equation must be estimated, and the results must be looked up in a statistical table to find out the overall probability of an event occurring, as well as the marginal effect on probability from changing a variable.

In the version of the Cragg model used in this paper, the probability of purchase is estimated as suggested with a logistic regression. Separately, OLS is used to estimate expenditures for those who purchase the item.<sup>7</sup> To get the final results, the predicted probability of purchase obtained from the first stage is multiplied by the predicted expenditure for those who purchase. This essentially produces an average predicted expenditure, weighted by the probability of purchase. To illustrate the intuition behind obtaining this weighted average predicted expenditure, suppose that a large sample of consumers is selected randomly. Suppose that 25 percent of the participants purchased a particular item. Suppose that this item sold for \$100. The average expenditure for all consumers is then \$25, or 25 percent multiplied by \$100. If a smaller sample is randomly selected from this large group, the expected value of the average of that smaller sample is also \$25. This is because if a large number of random samples were pulled from the total sample, and each time the average expenditure was recorded, then the “grand average” (that is, the average of the averages) is expected to be \$25.

When estimating the marginal propensity to consume and elasticity for the Cragg models, the logit results are taken into account. This is because income is assumed to influence expenditures both directly (through level of expenditure) and indirectly (by changing the probability of purchase). The mathematical details are provided in the following sections (“Marginal Propensity to Consume (MPC)” and “Elasticities.”)

As a final point, there are some expenditures for which Tobit may be appropriate, in that this technique assumes that, given enough time, all consumers will eventually purchase the given item. For example, less than 100 percent of all consumer units report expenditures for apparel and services every quarter, but given enough time, it is reasonable to assume that 100 percent will eventually purchase some. However, Tobit still suffers the weaknesses described earlier, and for convenience, the Cragg model is used for all variables analyzed in this study. Further examination of the Tobit model will be left for future research.

*Marginal Propensity to Consume (MPC).* The marginal propensity to consume (MPC) is defined as the change in expenditure given a unit change in income. In this case, “permanent income” is the relevant variable for change.

The “OLS only” regressions described in the text (for food at home; shelter and utilities; and transportation) have the following specification:

$$E(\ln Y) = a + b \ln I + cX$$

where

$E(\ln Y)$  is the predicted (or “expected”) value of the dependent variable

$a$  is the intercept

$b$  is a parameter estimate

$\ln I$  is the natural log of permanent income

$cX$  represents all other independent variables multiplied by their regression coefficients.

In this case, the MPC is calculated by finding the change in the predicted expenditure given a \$1 increase in permanent income, or  $\partial E(Y)/\partial I$ . Although the model is specified to calculate  $E(\ln Y)$ , the desired result is easily obtained:

$$\begin{aligned} \partial E(\ln Y)/\partial I &= \partial(a + b \ln I + cX)/\partial I \\ 1/[E(Y)] * \partial E(Y)/\partial I &= b*(1/I) = b/I \\ \partial E(Y)/\partial I &= b*[E(Y)/I] \end{aligned}$$

This result has an interesting property in that the MPC is proportional to the budget share (that is, specific outlay divided by total outlays), with the proportion equal to the parameter estimate for  $\ln I$ .

This still leaves one question: If the model predicts  $E(\ln Y)$ , what is  $E(Y)$ ? This also is easily solved, in that:

$$E(Y) = \exp[E(\ln Y)]$$

Using this formulation, one need only select a group of interest, use the regression results to determine  $E(\ln Y)$ , and then follow the procedures indicated. In this study, the “group of interest” is the control group described in the text.

The Cragg-based models have a more complicated specification, but it is nevertheless solvable to yield the MPC. The MPC is still defined the same way and is still represented the same way mathematically; that is,

$$MPC = \partial E(Y)/\partial I.$$

However, the initial formulation is more complicated. The desired result is actually

$$E(Y) = P * \exp[E(\ln Y)]$$

where  $P$  is the probability of observing an expenditure.

To find  $\partial E(Y)/\partial I$ , the product rule of calculus is used. That is:

$$\partial E(Y)/\partial I = P' * \exp[E(\ln Y)] + P * \exp'[E(\ln Y)]$$

Recall that:

$$P = \exp(a + b \ln I + IX) / [1 + \exp(a + b \ln I + IX)]$$

where  
 $IX$  is a vector of all independent variables except income, each multiplied by their parameter estimates.

Therefore, to find  $P'$ , the quotient rule is used:

$$\begin{aligned} P' &= (f'g - fg')/g^2 \\ \text{where} \\ f &= \exp(a + b \ln I + IX) \\ g &= 1 + \exp(a + b \ln I + IX) \\ f' &= g' = (b/I) \exp(a + b \ln I + IX) \end{aligned}$$

Because  $f'$  and  $g'$  are equal in this case, this simplifies algebraically to:

$$P' = [f'(g - f)]/g^2;$$

and, because  $g$  equals  $(f + 1)$ , this reduces even further to:

$$P' = [f'(f + 1 - f)]/g^2 = f'/g^2.$$

Now, with the much simplified result, it can be shown that:

$$P' = [(b/I) \exp(a + b \ln I + IX)] / [1 + \exp(a + b \ln I + IX)]^2.$$

Again, by substitution, this reduces to:

$$P' * \{ [b/I] / [1 + \exp(a + b \ln I + IX)] \}.$$

Therefore,

$$\begin{aligned} MPC &= P' * \{ [b/I] / [1 + \exp(a + b \ln I + IX)] \} * \exp[E(\ln Y)] \\ &+ P * \exp'[E(\ln Y)]; \\ \exp'[E(\ln Y)] &= \exp[E(\ln Y)] * E'(\ln Y); \\ \exp[E(\ln Y)] &= E(Y); \\ E'(\ln Y) &= \partial E(\ln Y)/\partial I = 1/E(Y) * \partial E(Y)/\partial I \\ &= 1/E(Y) * [b * E(Y)/I] = b/I; \end{aligned}$$

Alternatively, because  $E(\ln Y)$  equals  $a + b \ln I + cX$ ,

$$\begin{aligned} E'(\ln Y) &= \partial E(\ln Y)/\partial I = \partial(a + b \ln I + cX)/\partial I = b*(1/I) = b/I; \\ \therefore MPC &= P' * \{ [b/I] / [1 + \exp(a + b \ln I + IX)] \} * E(Y) + P * [E(Y) * (b/I)]; \\ \text{or} \\ MPC &= P * E(Y) * \{ [b/I] / [1 + \exp(a + b \ln I + IX)] \} + \\ &P * b[E(Y)/I] \end{aligned}$$

Because the terms  $P$  and  $E(Y)$  are common to both pieces of the complicated right-hand side of this equation, mathematically, the MPC can be simplified by factoring these terms out, and multiplying them by the sum of the remaining pieces. However, the formula is left in this form for the moment, to illustrate an intuitive point: Note that the MPC is derived from the predicted value of the expenditure for those who purchase as weighted by the probability of purchase. Note that the second term on the right-hand side, that is,  $P * b[E(Y)/I]$ , is the same MPC as was found before, except that it is weighted by the probability of purchase. The remaining term is a result of the fact that the predicted expenditure is affected indirectly because probability of purchase changes as a result of income change.

*Elasticities.* Income elasticity (or more properly in this case, permanent income elasticity) is the percent change in expenditure for a specific good (such as food at home) given a 1-percent increase in (permanent) income. For example, for retired single males, the income elasticity for food at home is estimated to be 0.32, meaning that for every 1-percent increase in permanent income, these men are predicted to increase food-at-home expenditures by about one-third of 1 percent.

The equation for calculating elasticity ( $h$ ) is:

$$h = MPC * I/E(Y)$$

In the case of the “OLS only” regressions, the elasticity in this case is constant, and equal to the parameter estimate for permanent income. To show this mathematically, recall that MPC in this case is proportional to the predicted expenditure share; that is, MPC equals  $b[E(Y)/I]$ . It is easy to see that multiplying MPC by  $I/E(Y)$  yields  $b$ , which is the parameter estimate for log of income, as stated.

For the Cragg-based models, the full formula is much more complicated, due to the complexity of the MPC equation. However, once the value of the MPC is obtained, multiplying this value by the inverse of the predicted expenditure share still yields the elasticity estimate. Recall that part of the MPC equation involved the probability-weighted expenditure share. The elasticity will also be similar to the “OLS only” results in that, if the formula is specified, it contains the probability-weighted income coefficient. That is,

$$MPC * [I/E(Y)] = P * \{ b / [1 + \exp(a + b \ln I + IX)] \} + P * b$$

The second term on the right-hand side,  $P * b$ , is the probability-weighted coefficient just mentioned.

## Footnotes to APPENDIX B

<sup>1</sup> See John McDonald and Robert A. Moffitt, “The Uses of Tobit Analysis,” *The Review of Economics and Statistics*, May 1980, pp. 318–21, especially p. 318.

<sup>2</sup> J.R. Blaylock and W.N. Blisard, “Wine consumption by us men,” *Applied Economics*, May 1993, pp. 645–51, especially p. 649.

<sup>3</sup> John G. Cragg, “Some Statistical Models for Limited Dependent Variables with Application to the Demand for Durable Goods,” *Econometrica*, September 1971, pp. 829–44.

<sup>4</sup> Mohamed Abdel-Ghany and J. Lew Silver, “Economic and Demographic Determinants of Canadian Households’ Use of and Spending on Alcohol,” *Family and Consumer Sciences Research Journal*, September 1998, pp. 62–90, especially p. 65.

<sup>5</sup> Deanna L. Sharpe, Mohamed Abdel-Ghany, Hye-Yeon Kim, and Gong-Soog Hong, “Alcohol Consumption Decisions in Korea,” *Journal of Family and Economic Issues*, Spring 2001, pp. 7–24, especially p. 14.

<sup>6</sup> See footnotes 5 (p. 830) and 6 (p. 832).

<sup>7</sup> To reduce heteroscedasticity, the OLS model actually predicts the natural log of the expenditure for those with positive expenditures. Coincidentally, Cragg shows this as one of the possible specifications for the second stage model. (See Cragg, p. 831, eq. 10.)