Changes in Consumption and Activities in Retirement

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Abstract

The simple one-good model of life-cycle consumption requires "consumption smoothing." According to previous results based on partial spending and on synthetic panels, British and U.S. households apparently reduce consumption at retirement. The reduction cannot be explained by the simple one-good life-cycle model, so it has been referred to as the retirement-consumption puzzle. An interpretation is that at retirement individuals discover they have fewer economic resources than they had anticipated prior to retirement, and as a consequence reduce consumption. This interpretation challenges the life-cycle model where consumers are assumed to be forward looking. Using panel data on anticipated consumption changes at retirement and on recollected consumption changes following retirement, we find that the median recollected change in spending at retirement is zero and that the recollections are broadly consistent with anticipations. Based on a measure of total spending in true panel we find that the actual mean and median changes are slightly positive. Therefore, we find no retirement-consumption puzzle

Authors' Acknowledgements

1. Introduction

The simple one-good model of life-cycle consumption requires "consumption smoothing:" the trajectory of consumption by an individual should be continuous in time.   If the trajectory is not continuous, a reallocation of consumption so as to reduce the size of the discontinuity will increase lifetime utility without an increase in the use of resources. However, British households apparently reduce consumption at the ages associated with retirement, and the reduction cannot be explained by the life-cycle model (Banks, Blundell and Tanner, 1998). Households in the Panel Study of Income Dynamics (PSID) sharply reduced several components of consumption at retirement (Bernheim, Skinner and Weinberg, 2001). The observed drop in consumption at retirement is the retirement-consumption puzzle.

The explanation for the drop in consumption has important implications for economic theory. Banks, Blundell and Tanner interpret the drop to be the result of "unanticipated shocks occurring around the time of retirement (p. 784)." Bernheim, Skinner and Weinberg take the decline (as well as patterns of wealth holdings) to be evidence against models of behavior in which agents are rational and forward looking. "If households follow heuristic rules of thumb to determine saving prior to retirement, and if they take stock of their financial situation and make adjustments at retirement (so that the adequacy of saving is "news"), then one would expect to observe the patterns documented in this paper (p. 855)."   If these interpretations of the retirement-consumption puzzle are correct, they cast doubt on models of rational forward-looking economic behavior such as the life-cycle model.

There are, however, other interpretations of the retirement-consumption puzzle. The most obvious interpretation has to do with work-related expenses, but it appears that such expenses are not large enough to explain the observed drops in consumption at retirement (Banks, Blundell and Tanner). A second obvious explanation is that retired households have considerably more leisure. The increased leisure can be used to purchase goods more efficiently or to substitute home-produced goods for purchased goods, but it could also lead to increases in purchased goods because of complementarities.   If some uses of time are substitutes for market-purchased goods and some are complements, the overall effect is an empirical matter, but we would *expect* consumption to change at retirement, not that it be smooth. A third explanation is that the timing of retirement is uncertain. Some workers retire earlier than anticipated because of

a health event or unemployment, resulting in an unexpected reduction in lifetime resources, and the reduction leads to a concurrent reduction in consumption. Such a reduction in consumption is well within the spirit of the life-cycle model.

Several recent papers have addressed the retirement-consumption puzzle. Smith (2004) divided retirees as observed in the British Household Panel Survey into four groups and found that some 57% experienced no decline in food spending at retirement. About 24% had a decline but their retirement was involuntary, often associated with unemployment or poor health. This group likely suffered a wealth shock due to early retirement and so would be expected to reduce spending within the framework of the life-cycle model. There remained a group comprising about 19% of retirees who left the labor force at the normal retirement age, yet experienced a decline in spending on food. Thus, among the group that retired voluntarily, about 75% experienced no decline in food spending. These findings suggest that any unexplained decline in food spending at retirement is fairly small and not the norm in the population.

Aguiar and Hurst (2004) used data on the fine details of food consumption as well as on food spending. They found that although spending on food declines at retirement, actual consumption as measured by caloric or vitamin intake, or by the quality of food did not decline. Their interpretation is that the extra leisure associated with retirement is used to produce the same food consumption levels but using smaller inputs of market purchased goods.

Based on synthetic cohorts in Italy, Miniaci, Monfardini and Weber (2003) found a decline in spending at retirement due to the cessation of work-related expenses and due to the increased use of leisure in home production. They conclude that there is not a retirement-consumption puzzle in Italy.

Haider and Stephens (2004) found in the PSID and in the Retirement History Survey that people reduce spending on food when they retire, but in the Health and Retirement Study they found no reduction. There is no apparent explanation for this difference. Haider and Stephens address the issue of the effect of unexpected retirement on food spending by asking whether the decline could be explained by the difference between expected and actual retirement. Controlling for the difference between them, they find that the decline in food spending is reduced by about 1/3, still leaving an unexplained reduction.

Our summary of these papers is that food spending declines at retirement but not over all populations at all times. An unanswered question is what causes the variation. We also note that

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the papers do not address the issue of whether any spending changes were anticipated, which is an important part of the retirement-consumption puzzle.

The most direct way to address whether retirement is associated with an unexpected drop in consumption, as argued by Banks, Blundell and Tanner or by Bernheim, Skinner Weinberg, would be to ask workers prior to retirement whether and by how much they expect their consumption to change when they retire; and ask retired workers how their spending did change when they retired. In Hurd and Rohwedder (2003) we provided such evidence. We found that most workers anticipate a drop.

The goal of this paper is to compare our previous findings about anticipated and recollected changes in consumption at retirement, which were based on cross-section data, with new results based on panel data. Using cross-section data from the Consumption and Activities Mail Survey (CAMS), we found that prior to retirement households anticipate reducing consumption at retirement, and that the anticipations are fully consistent with the reductions that households report having made when they did retire (Hurd and Rohwedder, 2003). That is, the *ex ante* and the *ex post* reductions in consumption are on average consistent with rational anticipatory behavior. We also found that the pattern of time-use by the retired is qualitatively consistent with models where consumption and leisure are not separable. In such a model we would expect that the volume of purchased goods would change in a discontinuous manner when the volume of leisure changes in a discontinuous manner as it does at retirement. We found that retirees use some of the additional leisure time in ways that are suggestive of home production and that could reduce spending significantly. Unfortunately we do not have good information on activities that are complementary to spending.

These results are direct evidence against the interpretation of Banks, Blundell and Tanner and of Bernheim, Skinner and Weinberg for any decline in consumption at retirement. In that interpretation, prior to retirement workers did not correctly forecast their low levels of economic resources, and had to reduce consumption in accommodation. They would not have anticipated the decline in consumption. In contrast, our cross-section results suggest that on average people are not surprised at retirement by the decline in spending and we should look for mechanisms associated with retirement that would allow for a reduction in consumption. These mechanisms would include the cessation of work-related expenses and changes in spending as a result of the

large discontinuous change in leisure time. They would also include stochastic events that precipitate earlier-than-expected retirement, and which result in a reduction in life-time resources.

In this paper we use data from CAMS waves 1 and 2. We compare anticipations of spending change at retirement with recollections of spending change following retirement in a sample of workers who retired between waves, and we compare spending levels and time-use before and after retirement in the same sample. We calculate the spending levels from the detailed consumption data collected in CAMS where households report their spending in 32 categories. We refer to this measure as "actual spending."

Our first main result is that anticipations and recollections of spending change at retirement reported by workers who retired between the waves are approximately the same as what we have previously found in cross-section and that changes in the pattern of time-use before and after retirement are similar to our previous findings based on cross-section. In panel fewer than half of those who retired between the waves recollect a spending decline. Our second main result is that actual spending change, on average or at the median, does not decline at retirement. Our conclusion is that we find no evidence for a lack of forward-looking behavior: anticipations are broadly consistent with recollections, and the median actual spending change is approximately zero. There is no retirement-consumption puzzle based on our direct measure of spending change at retirement.

2. Theoretical Background

In its simplest form the life-cycle model (LCM) with one consumption good specifies that individuals choose a consumption path to maximize expected lifetime utility, and that the instantaneous utility function is unchanging over time. The shape of the optimal consumption path is partially or wholly determined by utility function parameters, the interest rate and mortality risk. The level of the path is determined by the lifetime budget constraint, and the difference between the level of consumption and income determines the saving rate and the equation of motion of wealth. Auxiliary assumptions, which are not controversial, are that the marginal utility is continuous in consumption and that marginal utility declines in consumption. A condition for lifetime utility maximization is that marginal utility be continuous in time: were it not continuous a reallocation of consumption across the discontinuity from the low marginal

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utility state to the high marginal utility state would increase total utility without a greater use of resources. Such a reallocation should continue until there no longer is a discontinuity in marginal utility. Because consumption is monotonic and continuous in marginal utility, an implication is that consumption must be continuous in time. That is, consumption must be smooth over time in a model where utility only depends on consumption.

In a more general model, which recognizes uncertainty, individuals or households experience unanticipated windfall gains or losses to wealth, earnings or annuities, and then re-optimize to a new consumption path, causing a discontinuity in the consumption path. However, wealth, earnings or annuity changes which are foreseeable should cause no change in the consumption path because the lifetime budget constraint has not changed. In particular consumption should not change at retirement if retirement occurs as planned.[1] But if retirement occurs sooner than expected, lifetime resources will be less than expected so that consumption will have to be adjusted downward. The obvious example is a stochastic health event that causes early retirement. Negative health shocks leading to early retirement are undoubtedly empirically important, so that we should expect to observe some unanticipated decline in consumption at retirement from these shocks alone.

A second generalization of the LCM specifies that utility depends on more than one good, in particular leisure as well as consumption. Suppose that the within-period utility function is $u(c,l)$. The implications for consumption at retirement depend on whether the utility function is separable; that is, whether the marginal utility of consumption u_c depends on l. If the utility function is separable, u_c should be continuous in time and consumption will also be continuous. If the utility function is not separable, but retirement is gradual so that l increases slowly, consumption will also change in a continuous manner. But for most workers l increases abruptly by about 2,000 hours per year. A condition of utility maximization is that u_c be the same immediately before and immediately after retirement: the argument is the same as we gave earlier in the context of a single good model of the LCM. Now, however, because of nonseparability and because of the sudden change in l, the LCM *requires* a discontinuous change in consumption.

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[1] If some of measured consumption is, in fact, work-related expenses, consumption as measured by spending would drop at retirement, but utility-producing spending would not. This is a measurement issue.

Some types of leisure are substitutes for the consumption of market purchased goods such as home repairs, some are complements with consumption such as travel, and some are neutral such as watching television. Everyday observation and introspection say that we have all types, and it is an empirical question as to which dominates. But the main point is that we would not expect consumption to be smoothed over retirement.

Because of differences in tastes and differences in economic resources we expect heterogeneity across households in whether substitution or complementarity dominates. For example, someone with high wealth may continue to purchase home repairs as before retirement, but spend more on travel with a net effect of an increase in spending. Someone with a high wage rate may have purchased home repairs before retirement but will do them himself after retirement for a net reduction in spending.

To the extent that retirement is planned and anticipated, and that before retirement workers can imagine their activities and spending after retirement, they should be able to state how spending will change at retirement, and on average the actual changes should match the anticipated changes. However, it is more realistic to think that workers who are far from retirement will have some difficulty imagining what their activities and spending will be after retirement.[2] Therefore we should expect some discrepancy between anticipations and realizations when the time to retirement is substantial.

In this discussion we have simplified the problem by assuming that retirement is given exogenously. Whether retirement is chosen does not affect the discontinuity in consumption when leisure and consumption are not separable provided the increase in leisure is discontinuous. As an empirical matter a substantial majority of retirement is from full-time to completely out of the labor force (Rust, 1990) and there are good reasons for such a sharp transition.[3]

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[2] In fact, individuals far from retirement will also need to form expectations about their living standards immediately before retirement in order to state how they expect their spending to change at retirement.

[3] For example, a defined benefit pension plan can have such strong incentives to retire that workers within a wide range of tastes for retirement will all retire. Most firms will not allow a gradual reduction in work hours, so that a worker who would like to retire gradually will be forced to change employers and possibly occupations (Hurd, 1996).

3. Data

Our data come from the Health and Retirement Study (HRS) and from a supplemental survey to the HRS, the Consumption and Activities Mail Survey (CAMS). The HRS is a biennial panel. Its first wave was conducted in 1992. The target population was the cohorts born in 1931-1941 (Juster and Suzman, 1995). Additional cohorts were added in 1993 and 1998 so that in 2000 it represented the population from the cohorts of 1947 or earlier. The HRS interviewed about 20,000 subjects in the year 2000 wave. In October, 2001, wave 1 of CAMS was sent to 5,000 persons in 5,000 households, a random sub-sample of the HRS.[4] In married households it was sent to one of the spouses. There were 3,866 responses.[5]

In October, 2003, CAMS wave 2 was sent to the same households. The structure of the questionnaire was almost the same so as to facilitate panel analysis. In this paper we will use cross-section data from CAMS wave 1 and data from both waves for panel comparisons.

CAMS has three main topics: Part A is about activities or uses of time; Part B collects data on spending, including anticipations and realizations about changes in spending at retirement; and Part C asks information about labor market status and prescription drug usage.

The focus of this paper is on anticipated, recollected and actual changes in spending at retirement, and time-use as it varies with retirement status. We will make limited use of the information in Part C about labor force status, and we will link to the HRS core data to obtain data on income, wealth, health and other personal characteristics. Our analyses about anticipated and recollected spending change will be based on data from the following question sequence.

Excerpt from the CAMS Questionnaire:

Question B38.[6]

We would like to understand more about spending in retirement.

<div align="center">

Are you retired?

_____   Yes ➔ **Complete BOX A**   No ➔ **Complete BOX B**

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[4] See Hurd and Rohwedder (2005) for a more extensive description of CAMS.
[5] Although the response rate was high there was some differential non-response by demographic characteristics. HRS has supplied weights to account for non-response, and most of our analyses will use them. Because our main variables are about household spending we will use the household weights. We have conducted parallel analyses using unweighted data and the results are very little different.
[6] In the second wave of CAMS this question is B44.

BOX A – Retired:	BOX B – Not Retired:
a. How did your TOTAL spending change with retirement? _____ Stayed the same ➔ **Go to c** _____ Increased _____ Decreased	**d**. How do you expect your TOTAL spending to change with retirement? _____ Stay the same ➔ **Go to f** _____ Increase _____ Decrease
b. By how much? _____%	**e**. By how much? _____%
c. For the items below, check (✓) whether the spending increased, decreased or stayed the same in retirement:	**f**. For the items below, check (✓) whether you expect spending to increase, decrease or stay the same in retirement:

B39.	Increase(d)	Decrease(d)	Stay(ed) the same
a. Trips, travel, or vacations			
b. Clothing			
c. Eating out / food and beverages			
d. New home, home repairs, or household items			
e. Entertainment, sports, and hobbies			
f. Automobile expenses			

4. Cross-section Results from CAMS Wave 1: Change in Spending

According to the answers in wave 1 to B38, 64.5% of the sample in the raw data classified themselves as retired, 29.4% as not retired and 6.2% did not respond to this question.[7]

To arrive at our analytical sample we make some minimal selections. We require valid responses to anticipated and recollected changes in spending at retirement (B38a and B38d); a successful match to the HRS core survey; and that respondents are not in the extreme tails of the age distribution among the retired and the not-retired.[8]

Table 1 shows that about 68% of the not-retired in our sample anticipate a reduction in spending at retirement and about 52% of the retired recollected a reduction at retirement.[9]

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[7] Some respondents might have found this routing question simplistic. Take for example a person who is a homemaker or who is disabled. We have studied how respondents of different labor market status answered this question. See Hurd and Rohwedder (2003) for a detailed analysis.

[8] See Hurd and Rohwedder (2003) for details.

[9] These percentages are almost identical to those based on the complete sample (before selections for age and matching to the HRS core).

Therefore, on average any decline in spending is not a surprise. These findings do not support the interpretation that the decline is evidence that the population failed to anticipate economic resources at retirement. If anything there seems to be a suggestion of a positive surprise in that among the not-retired a larger fraction anticipates a decline than is reported by the retired.

These results are similar to those of Ameriks, Caplin and Leahy (2002). They found in a sample of TIAA-CREF participants that among those not retired 55% expect lower spending in retirement, 35% expect the same and 10% expect an increase in spending. Among those already retired 36% experienced lower spending, 44% had the same spending, and 20% had an increase in spending. The most important difference between the TIAA-CREF sample and our sample is that the TIAA-CREF sample is much wealthier and does not represent the entire population.

Based on the responses to B38b and B38e, which give the percentage change in spending at retirement, we found that among not-retired singles the average anticipated decline in spending is about 19% compared with an average recollected decline of about 12%. Among couples the averages are about 19% and 9% (Table 2). These reductions are similar to those reported in Bernheim, Skinner and Weinberg, who estimate a mean reduction of 14%.

A possible objection to our comparing anticipated spending change to recollected spending change is that our comparison is cross-sectional: we are comparing the anticipations and experiences of different people. Some workers anticipate retiring in the distant future and some retired many years earlier. We address this issue by studying the age-pattern of responses. We fit the percent change in spending at retirement to age, and separately to the expected retirement age in the case of the not-retired, and to the actual retirement age in the case of the retired.[10] Figure 1 shows the fitted values from these estimations, evaluated at age 63. Whether fitted to age or to years before or since retirement, the pattern is the same. At age 50 or 13 years before retirement workers anticipate a 23-24% reduction in spending at retirement. This figure decreases until at age 63 or at retirement the reduction is between 16.7% and 17.7%. At age 63 or immediately following retirement the recollected reduction is between 14.4% and 15.9%, and the recollected reduction declines somewhat with increasing age. Thus the estimated difference between anticipated and recollected changes in spending at retirement obtained from the age trends is about two percentage points, but the difference points to smaller reductions among the

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[10] The data on expected and actual retirement age were taken from the HRS core instrument.

retired, not larger ones. The figure shows that the rather large difference between average anticipations and realizations in Table 2 is due to the differences in the ages of the not-retired and retired populations. Once age has been taken into account there is little difference.[11]

One reason for a spending decline at retirement has to do with stochastic events that cause people to retire sooner than expected. For example, a health event can lead to early retirement and the associated reduction in lifetime resources should lead to a decline in spending. The entire population is at some risk for a health shock and so should with some probability anticipate a reduction, but those in worse health are at greater risk (McClellan, 1998). Thus in the working population bad health should be associated with a greater anticipated decline in spending at retirement. In the retired population those in worse health are more likely to have had a health shock and to have retired earlier than expected, so they should have experienced a larger decline in spending.

Table 3 shows the percent of those retired who experienced a decline in spending as a function of whether health was an important reason for retiring. Thus among those who give health as an important reason (21.9% of the sample), 68% had a decline in spending and the average magnitude was about 25%. This contrasts with those who said health was not an important reason at all (about 68%): their reduction in spending was about 11%. While these results do not directly address the issue of a health shock (because some of those whose health was an important cause of retirement were probably always in bad health), they are supportive of the view that at least some of the decline in spending is due to a health shock causing early and unexpected retirement. This interpretation is consistent with studies of the effects of health shocks on actual retirement (McClellan, 1998).

5. Cross-section Results from CAMS Wave 1: Time-use Before and After Retirement

If leisure and consumption are not separable then a discontinuous change in leisure should lead to a discontinuous change in consumption in order to smooth the marginal utility of consumption. In section A of CAMS, the respondent was asked about his or her use of time. Many of these categories of time-use would neither be complements nor substitutes with market purchased goods. For example, "walking," or "watching TV" would seem to interact very little

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[11] The age gradient leading up to retirement may reflect respondents' uncertainty about future events that would affect their future resources and spending. This uncertainty is gradually resolved as they approach retirement.

with market purchased inputs. We chose seven activities as shown in Table 4 that might be substitutes for market purchased goods or services and one that might be a complement.[12] If home production is partly responsible for any drop in spending, the amount of time spent on activities such as cooking, cleaning, home maintenance and the like should increase at retirement.

Because time-use changes rather sharply with age we have limited our analysis to narrow age bands.[13] The table compares hours spent per week among those 60-64 classified by retirement status and by sex. Thus, not-retired men spent 2.9 hours per week on house cleaning while retired men spent 3.2 hours per week. Women spent much more time on house cleaning and the difference between the not-retired and the retired is greater than among men. For men the not-retired spent about 14.3 hours per week on the possible substitutes and the retired spent about 19.5 hours.

The reported hours of work show a difference of about 29 hours for men and 30 for women.

We performed a similar analysis for the age band 65-69, and Table 5 summarizes these hours differences by retirement status for both age bands 60-64 and 65-69. The last line of the table gives a rough guess of the dollar savings in market purchases when we evaluate an hour at $10. We emphasize that this valuation is merely to gain some sense of whether the time amounts are approximately large enough to explain the anticipated and recollected change in spending. If we add the possible dollar savings for men and women and compare them with total household spending in the relevant age bands as found in the CEX, we calculate that the saving due to reduced market purchases is approximately 15.4% for 60-64 year-olds and 15.0% for 65-69 year-olds. We conclude that the time spent on possible substitutes is large enough that in principle it could explain a large part of the recollected drop in spending at retirement. Of course, work-related expenses could also account for 5-10% of total spending.

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[12] Section A of CAMS has 31 categories of time-use, but they were not chosen for an analysis of how activities interact with spending, which is the reason they are so lacking in complements.
[13] The sample has the additional restriction that the same person answered parts A and B of CAMS. We imposed this restriction because we want to observe time-use for the same person who reported retirement status and spending change, which could not be assured if different persons answered A and B. This selection reduced the sample by 77 observations out of 1294 (both age bands combined).

6. Panel Results from CAMS Wave 1 to Wave 2:
Anticipated and Recollected Spending Change at Retirement

With a few minor exceptions CAMS wave 2 was sent to the same persons who were sent CAMS wave 1. The structure of the questionnaire was almost identical. Our main objective in the panel analysis of this section is to find whether we can verify the results from cross-section. The importance is that the cross-section analysis compares answers across people whereas the panel is a within person analysis. The results will respond to a possible criticism of the cross-section results that the time between retirement and the CAMS 1 survey response can be substantial, resulting in large recollection error in the case of those already retired and in large forecast error in the case of those not yet retired.

Between waves 1 and 2, two hundred twenty eight respondents retired: these respondents stated they were not retired in wave 1 and were retired in wave 2. We deleted households in which the respondent was less than 52 or greater than 71 in 2002 which reduced the sample to 201. Table 6 shows that 116 of the 201 stated in wave 1 that they anticipated a decline in spending at retirement which is 59% of the responses excluding the "missing." In wave 2, eighty nine respondents stated that spending had declined which is 46% of the responses excluding the "missing." These percentages are fairly close to the cross-section percentages of 68% and 52% as shown in Table 1. Because of differences in samples, particularly the distance from retirement, we would expect the anticipations and recollections in cross-section and panel to differ.

There is individual-level variation in anticipations compared with recollections as shown in the rows of the table. For example, among those anticipating a decline, just 54% recollected a decline after retirement. Nonetheless, the wave 1 responses have considerable discriminatory power for predicting a subsequent self-reported decline: the risk of a decline for someone who anticipated that spending would decline relative to the risk of a decline for someone who anticipated that spending would remain the same is 1.81.

Table 7 shows anticipated and recollected spending amounts calculated from the reported percentage changes that were anticipated or recollected. We converted them to amounts by applying the percentages to CAMS wave 1 total spending as measured by the 26 non-durable spending categories collected in part B of CAMS. The average anticipated spending reduction

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was about $5.6 thousand; the average recollected spending reduction was about $3.8 thousand.[14] The difference ($1.8 thousand) amounts to about 5.3% of total spending among the 148 households. The median recollected change was zero and about 55% either had no change or an increase in spending. Thus any retirement-consumption puzzle with respect to changes in spending at retirement is not a population-wide phenomenon.

Table 8 shows evidence from the panel for the average anticipated and recollected percentage changes in spending for those who retired between wave 1 and 2. The difference between them is about 4.6 percentage points. This compares closely with the gap between the age-adjusted anticipations and recollections at retirement in cross-section which is shown in Figure 1. There the gap is approximately 2 percentage points at age 63 or at the age of retirement.

7. Panel Results from CAMS Wave 1 to Wave 2: Change in Time-use at Retirement

Table 9 shows the change in hours spent on activities that we have classified as possible substitutes for market purchased goods. The changes are calculated as wave 2 hours spent in the activities minus wave 1 hours. For example, the individuals who retired between the waves spent 1.46 hours more per week in yard work and gardening at wave 2 than they did in wave 1. Overall the time spent in market substitutes increased by about 5.5 hours per week. This is in close agreement with the cross-section comparisons. For example, in Table 4, men aged 60-64 who were retired spent 5.2 more hours on market substitutes than men who were not retired and women spent 5.1 hours more. Even the components of market substitutes show close agreement between panel and cross-section. For example, yard work/gardening and meal preparation increased the most in panel and they increased the most in cross-section.

Men had a larger reduction in hours of work than women and also a larger increase in hours spent on market substitutes (Table 10). We can calculate a rate of substitution of time spent in these activities for time spent in employment from the differences by sex. Thus men increased time in market substitutes by 0.87 hours more than women and decreased their time

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[14] The reduction in sample size compared to Table 6 is due to item nonresponse to the query about the anticipated or recollected percentage change in spending (Question B38 in wave 1, Box A, b or Box B,e).

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spent in employment by 3.83 hours more than women. These figures imply a rate of substitution of 0.23 (0.87/3.83).

We conclude that the cross-section results are similar to the panel results. The magnitudes of the anticipated declines in spending and the recollected declines in cross-section and panel are closely comparable, and both show that recollected declines are smaller than anticipated declines. The majority of households observed in panel recollect no decline in spending.   The change in time spent in possible market substitutes as observed in panel following retirement is approximately the same as found in cross-section from a comparison of those retired with those not retired.

8. Panel Changes in Actual Spending

In this section we will use the detailed spending data from CAMS, part B to define our measure of "actual" spending change: the change in spending on nondurables. We believe that respondents have in mind the rather immediate spending change that is associated with retirement, not the long-run consequences of retirement on spending. Changes in durable spending would take place over a considerably longer time period.[15]   Nondurable spending is measured by 24 spending items as shown in Table 11.[16] The table also shows item response rates in CAMS wave 1. The response rates are high compared with response to items such as the components of income or wealth, and they are even higher in CAMS wave 2 (not shown). We imputed missing values. When we had good information in HRS about the true value imputations were based on HRS 2000 for wave 1 and on HRS 2002 for wave 2.[17] For other imputations we used the mean of each item. We also have identified some outliers in the data

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[15] Nondurables account for about 92% of total spending.

[16] Table 11 shows 26 nondurable spending categories. For our analyses we will exclude spending on vehicle finance charges because in CAMS wave 2 the question was changed to include payments on principle as well as interest charges. The change resulted in a very large increase between waves 1 and 2. For a similar reason we also exclude spending on vehicle maintenance where the data show a large decrease from wave 1 to wave2. This is due to a change in the choice of reference period offered to respondents. We adjust mortgage payments to only count mortgage interest as part of nondurable spending.

[17] For example, among those not reporting a spending amount for rent, 83% were homeowners in HRS 2000, so we can fairly confidently impute zero rent to those households.

some of which are due to respondents entering an amount in the field of the wrong reference period. In obvious cases we performed some data cleaning.[18]

In our analyses we will make a number of comparisons. We will compare wave 1 anticipations of spending change with actual changes as measured by the difference between wave 2 and wave 1 spending, and we will compare wave 2 recollections with actual changes. We will study actual change and its relationship to covariates such as health and education.

We use the same sample of 201 respondents as in the previous panel analyses, that is respondents who retired between the two waves of CAMS and were aged 52 to 71 in 2002.

Table 12 has the mean and median spending levels in waves 1 and 2 classified by anticipated spending change as reported in wave 1 (top panel) and by recollected spending change as reported in wave 2 (bottom panel). For the population, median spending increased from $26.7 thousand to $27.5 thousand, an increase of 3% and mean spending increased from $33.0 thousand to $34.8 thousand, an increase of 5%. On the basis of the measure of actual spending, whether at the mean or median, at the population level we do not observe a decrease in spending at retirement.

Among those anticipating that spending would remain the same, spending increased whether measured by the median or mean. The increase was about the same among those who anticipated a decrease. Only 10 households reported a decrease.

Changes in actual spending are qualitatively in accordance with recollections: at the median among those who recollected an increase, spending increased by 39%; among those who recollected no change, spending increased by 8%; and among those who recollected a decrease, spending decreased by 6%. As far as levels are concerned, the median in wave 1 among those who recollected an increase was $31.8 thousand which is about six thousand more than the medians of the other groups. However, because of very small samples it would be premature to base any conclusions on this difference.

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[18] For example, some respondents entered an annual amount in the field for "amount spent monthly" and vice versa. In spending categories that reflect regular expenses like utilities these errors are relatively straightforward to identify. The full details about cleaning of the spending data and imputations are available upon request from the authors.

We observe no consistent relationship between anticipations and actual change. Because of stochastic events like a health shock one would expect the relationship between anticipations and actual change to be weaker than the relationship between recollections and actual change. Future waves of CAMS will show whether a larger sample size or longer panel observations reveal a discernable pattern between anticipations and actual spending change.

To calculate anticipated and recollected changes in spending *levels* we used the answer to question b in Box A or to question e in Box B depending on retirement status for the percent change in spending, and then we applied the percent change to actual nondurable spending in wave 1. For example for someone who anticipates in wave 1 a spending decline of 10% at retirement, was observed to be not retired in wave 1, and was spending $30,000 in wave 1, our estimate of the anticipated spending change would be $3,000. Similarly for someone who recollects a spending decline in wave 2 of 10% at retirement and was spending $30,000 in wave 1, our estimate of the recollected spending decline would be $3,000. Table 13 shows the distribution of anticipated, recollected and actual spending change. The median anticipated spending change was about -$1,660; the median recollected spending change was zero and the median actual spending change was $660. Thus by this measure of central tendency, the median actual spending change was about $2,300 greater than what had been anticipated.

The distribution of actual spending change is reasonably symmetric; but the recollected distribution is shifted somewhat to lower values and the anticipated distribution shifted further to lower values. We have noted some rather large values for actual spending increases. These are due to outliers in a few of the spending categories. We believe the outliers are mainly caused by a mix-up in the interval for measurement: in some categories of spending respondents were allowed to choose the reporting interval as between a month and a year, and we think that some respondents reported an annual amount as a monthly amount. When converted to an annual amount the error is very large in absolute terms. The symmetric error of reporting a monthly amount as an annual amount also causes substantial error, but it is much smaller in absolute amount. For this reason we emphasize changes in medians or median changes.

Blau (2004) explains a decrease in spending at retirement by a health shock that causes earlier-than-anticipated retirement and consequently a reduction in lifetime resources. The

reduction in resources causes a decline in consumption that is associated with retirement, but not really due to retirement itself. We use as an indicator for the risk of a health shock self-reported health status in HRS 2000.[19] Because of small samples we divide our sample into three groups: health is very good or excellent; health is good; health is fair or poor. Overall there is little change in median spending (Table 14). As would be expected those in better health had higher spending in wave 1. But in addition their median spending level increased by about 11%. Among those in good health median spending in wave 1 was lower and it declined by about 9%. Among those in worse health median spending in wave 1 was lower still and it declined by about 15%.

Table 15 shows the variation in spending and spending change by education category. As expected, spending increases with education. At the median spending declines rather substantially (16%) in the lowest education band between waves 1 and 2. In the other bands spending is either approximately constant or increases from wave 1 to wave 2.

Table 16 shows the variation by wealth quartile.[20] In cross-section spending increases sharply with wealth quartile. At the median, spending declines in the lowest quartile by 12%. It is approximately constant in the second quartile and increases substantially (+20%) in the highest quartile.

The variation by education and by wealth quartile shows that the more well-to-do increase spending at retirement as measured by averages or medians. The least educated, which comprise about 17% of the sample, and those in the lowest wealth quartile had declines in spending. A possible explanation is that the more well-to-do engage in activities that are complementary with spending such as travel while the less well-to-do engage in activities that are substitutes for spending such as efficient shopping or home production. An additional explanation is that the less well-to-do are at greater risk of a health shock.

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[19] Those in worse health are more likely to have a health event that will cause their withdrawal from the labor force (McClellan, 1998).
[20] The wealth quartiles are defined separately for singles and couples.

9. Conclusions

In a life-cycle model where the utility function is not separable in leisure and consumption, we would expect consumption to change at retirement, but the magnitude and direction of the change depend on utility function parameters. In this study we have used data on anticipated changes in consumption at retirement and compared them with recollected changes, both in cross-section and panel. The cross-section results show that before retirement 68% of the population anticipate a decline in spending at retirement, but that only 52% recollected a reduction. In panel, 59% of those retiring between waves 1 and 2 of CAMS anticipated a decline, yet just 46% recalled a decline. Thus, both in cross-section and in panel the fraction of respondents anticipating a decline is larger than the fraction of respondents reporting a decline in spending once retired, and also the relative difference between anticipations and recollections is about the same: 13-16 percentage points.

Actual spending changes in panel, calculated from the detailed spending data in CAMS, were approximately balanced between increases and reductions, although both median and mean spending increased. Most other studies in this literature which have found a decline in spending at retirement were based either on food spending or on synthetic panels. Our true panel on total spending should more accurately reflect actual spending change. However, our panel period is fairly short so that for some households our data may not yet reflect the full adjustment to the new level of post-retirement spending. Furthermore, our sample size of observed retirements between the two waves of CAMS is small resulting in an imprecise measure of the actual change. For example, the wave 1 median spending in thousands is $27.6 with 95% confidence interval (25.3, 30.2) and the wave 2 median is 28.1 with confidence interval (25.4, 32.1). The confidence intervals accommodate actual declines that would be consistent with the anticipations and recollections. But they exclude declines of such large magnitudes as to suggest economic distress at the population level: Taking the extremes of 30.2 in wave 1 and 25.4 in wave 2 leads to a 15.9% decline. This decline probably could be explained by a combination of the cessation of work-related expenses and the substitution of time for spending.

Because panel changes can be affected by macro shocks over short time periods, we calculated changes in spending by those who did not retire between the waves. If that group had much larger increases in spending than did the group that retired, it would suggest that retirement is indeed associated with a decline in spending when measured as a deviation from the average in

the larger population. The medians of the household level changes in spending between the waves were +2.2% among households not retired in both waves, +1.8% among households that retired between the waves and +1.2% among households retired in both waves. The pattern is suggestive of age-related variation in spending change, not retirement related.

At the population level we found no evidence for unanticipated declines. In fact realizations whether recollected or actual were toward more spending following retirement rather than less. At the individual level, poor or fair health is associated with actual declines suggesting that health shocks may be responsible for some reductions.

An extended version of the life-cycle model will allow for nonseparabilities between time-use and consumption, and differing categories of time-use could either be complements or substitutes for market purchased goods. The previous literature found a decline in spending implying that substitutions dominate. In support of the importance of substitutes, we found that time spent on seven categories of home-production activities did increase at retirement. Unfortunately the CAMS time-use data do not include many possible complements, but the fact that those in the upper part of the wealth distribution increased spending at retirement suggests that the more well-to-do use their increased leisure time in a different way than the less well-to-do. Such heterogeneity in time-use is not surprising.

The recollections of spending change are similar to but not exactly the same as actual change. We can think of at least two reasons for this difference. The period of measurement for spending can be as much as a year preceding CAMS so that some of the retired when queried in October may have still been working during part of the spending year. To the extent that spending did drop shortly after retirement our measurement would only cover part of the year over which the lower level prevailed. We will be able to make an adjustment for this when we have HRS 2004 because we will be able to date retirement precisely.

A related issue concerns the time lag for making the spending adjustments following retirement. A reduction in spending for some nondurables which are purchased infrequently such as clothing will only become apparent over several years. To detect such a change we will need additional waves of CAMS.

Although on average we see no contradictions to forward-looking behavior, there is considerable heterogeneity in the population. It is likely that some households with little wealth anticipate a reduction in consumption at retirement. To the extent that they anticipate a decline

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in work-related expenses and that the use of time for home production will compensate for the decline in income, their behavior is consistent with a life-cycle model. But some households may anticipate that a reduction in consumption will be required by a reduction in income at retirement and may understand that overall they would be better off by immediately reducing consumption; yet they lack the control to reduce consumption. Whether this group is numerically important cannot be determined by our data, but it is not the dominant group simply because for more than half of the households spending stayed the same or increased, whether based on recollections or on actual spending data.

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Table 1
Anticipated and Recollected Changes in Spending at Retirement, CAMS 1 cross-section.

Retirement Status	N	Change in Spending			
		Decrease	Same	Increase	Total
Not retired	1,094	67.6	27.4	4.9	100.0
Retired	2,407	51.5	37.1	11.4	100.0
Missing	93	47.3	40.9	11.8	100.0

Source: Authors' calculations

Table 2
Anticipated and recollected percent change in spending at retirement,
CAMS 1 cross-section.

	Couples			Singles
	Males	Females	All	
Anticipated	-18.5	-19.9	-19.3	-19.2
Recollected	-9.7	-9.0	-9.3	-12.1

Source: Authors' calculations

Table 3
Importance of Poor Health as a Reason for Retirement, CAMS 1 cross-section.

Importance of Poor Health for retirement	Distribution	Percent who experienced a decline	Average change (%)
Very important	21.9	67.5	-24.5
Moderately important	5.9	65.8	-15.5
Somewhat important	4.7	60.9	-13.7
Not important at all	67.6	48.4	-11.4
All	100.0	54.2	-14.5
Observations	*1212*	*1212*	*1007*

Note: Based on HRS 2000 question G138a-1: "I am going to read you a list of reasons why some people retire. Please tell me whether, for you, these were very important reasons for retirement, moderately important, somewhat important, or not important at all.
Source: Authors' calculations

Table 4

Importance of home production: Evidence from Time-Use Data for Respondents aged 60-64, CAMS 1 cross-section

| | Hours per week | | | |
| | Males 60-64 | | Females 60-64 | |
	Not retired	Retired	Not retired	Retired
Possible substitutes				
House cleaning	2.88	3.16	5.80	7.25
Washing/ironing	1.03	1.14	3.56	3.91
Yard work/gardening	2.10	4.07	1.48	2.10
Shopping	3.16	3.41	3.86	4.74
Meal preparation	3.46	4.51	7.42	9.34
Money management	0.78	0.84	0.89	0.86
Home improvements	0.88	2.32	0.75	0.74
Total	14.29	19.45	23.76	28.94
Possible complement				
Concerts/movies	0.72	0.32	0.27	0.25
Work for pay	34.62	5.65	31.73	1.73
Observations	*88-90*	*176-179*	*153-155*	*250-255*

Source: Authors' calculations

Table 5

Change in hours per week associated with retirement, CAMS 1 cross-section

	Males		Females	
	60-64	65-69	60-64	65-69
Substitutes	5.16	9.20	5.18	0.89
Complement	-0.40	0.23	-0.02	0.08
Work for pay	-28.97	-30.04	-30.00	-24.24
Possible dollar saving	*2,683*	*4,784*	*2,694*	*463*

Note: "dollar saving" (annual) from evaluating substitute hours at $10 per hour.
Total household spending for this age group from CEX: about $35,000.
Source: Authors' calculations

Table 6

Anticipated and recollected change in spending at retirement, panel, percent distribution

Anticipated in wave 1 while working	Recollected in wave 2 (following retirement)					
	Decrease	Same	Increase	Missing	All	N
Decrease	54.3	32.8	9.5	3.5	100.0	116
Same	30.0	62.9	5.7	1.4	100.0	70
Increase	40.0	30.0	30.0	0.0	100.0	10
Missing	40.0	0.0	40.0	20.0	100.0	5
All	44.3	42.8	10.0	3.0	100.0	
N	*89*	*86*	*20*	*6*		*201*

Source: Authors' calculations

Table 7

Anticipated and recollected change in actual spending, panel

	Anticipated	Recollected
Mean	-5,646	-3,778
20th percentile	-12,100	-9,203
45th	-3,714	0
50th	-1,661	0
85th	0	0
90th	0	0
95th	2,227	6,584

Source: Authors' calculations. N=148

Table 8

Percent change in spending at retirement, panel

	Singles	Couples	All
Anticipated	-18.7	-15.2	-16.2
Recollected	-13.3	-10.9	-11.6

Source: Authors' calculations

Table 9

Changes in hours per week at retirement, panel

House cleaning	0.68	Washing, ironing	0.14
Yard work/gardening	1.46	Shopping	0.82
Food preparation	1.42	Finances	0.10
Home improvements	0.79		

Total substitutes 5.48 hours per week

Source: Authors' calculations

Table 10
Changes in hours per week at retirement, panel

	Market substitutes	Work
Male	6.02	-21.25
Female	5.15	-17.42

Source: Authors' calculations

Table 11
Response rates (%)

Payments	
Mortgage	92.2
Homeowner's or renter's insurance	88.7
Property tax	88.8
Rent	86.7
Electricity	92.4
Water	89.7
Heating fuel for the home	86.3
Telephone, cable, internet	93.9
Vehicle finance charges	86.2
Vehicle insurance	92.0
Health insurance	91.1
Spending	
Housekeeping, yard supplies	93.8
Home repairs and maintenance	93.9
Food and beverages	94.8
Dining/drinking out	94.8
Clothing and apparel	94.2
Gasoline	93.4
Vehicle maintenance	93.3
(Non-)Prescription medications	94.5
Health care services	93.7
Medical Supplies	92.1
Trips and Vacations	94.7
Tickets to movies, events etc.	95.0
Hobbies	94.2
Contributions	94.5
Cash or gifts to family/friends	94.2

Source: Authors' calculations

Table 12
Median and mean actual spending (thousands). Retirees between waves 1 and 2

		Median		Mean	
	N	Wave 1	Wave 2	Wave 1	Wave 2
Anticipated spending change Wave 1					
same	69	24.1	25.8	29.1	30.8
increase	10	23.5	19.3	28.0	27.9
decrease	112	28.9	31.5	35.9	37.8
All	191	26.7	27.5	33.0	34.8
Recollected spending change Wave 2					
same	86	25.3	27.3	31.6	32.8
increase	18	31.8	45.2	41.9	49.3
decrease	87	26.9	25.6	32.5	33.7
All	191	26.7	27.5	33.0	34.8

Source: Authors' calculations

Table 13: Distribution of household-level spending changes (thousands) at retirement

	Spending Change		
Percentile	actual	anticipated	recollected
20	-10.0	-12.1	-9.2
40	-1.8	-4.4	-2.9
50	0.7	-1.7	0.0
60	4.4	0.0	0.0
80	12.0	0.0	0.0

Source: Authors' calculations. N=148.

Table 14: Spending in wave 1 and wave 2 (thousands) by self-rated health

Self-rated health	Wave	N	Mean	Median
excellent/very good	1	108	36.9	29.2
	2	108	38.6	32.7
Good	1	57	31.5	27.6
	2	57	29.3	24.9
fair/poor	1	36	28.1	24.2
	2	36	33.9	20.5
All	1	201	33.8	27.6
	2	201	35.1	28.1

Source: Authors' calculations

Table 15: Spending in wave 1 and wave 2 (thousands) by education

Education	Wave	N	Mean	Median
less than HS	1	35	25.0	20.4
	2	35	21.4	17.2
HS graduate & eq	1	78	30.3	26.0
	2	78	32.4	25.4
Some college	1	47	35.7	27.6
	2	47	39.6	32.1
college +	1	41	45.6	37.3
	2	41	47.0	37.3
All	1	201	33.8	27.6
	2	201	35.1	28.1

Source: Authors' calculations

Table 16: Spending in wave 1 and wave 2 (thousands) by wealth quartiles

Wealth quartile	Wave	N	Mean	Median
Lowest	1	51	27.1	24.2
	2	51	26.4	21.3
Second	1	50	29.5	25.7
	2	50	28.1	25.2
Third	1	51	34.2	30.8
	2	51	39.0	33.1
Highest	1	49	44.6	31.0
	2	49	47.3	37.3
All	1	201	33.8	27.6
	2	201	35.1	28.1

Source: Authors' calculations
Notes: Wealth quartiles defined separately for singles and couples households.

Figure 1
Spending change at retirement (%)

Legend: Age before · Age after · Years until · Years after