CONSUMPTION DURING RETIREMENT: THE MISSING LINK IN THE LIFE CYCLE

Daniel S. Hamermesh*

Abstract—This study presents the first evidence on the relation of consumption to lifetime wealth. On average consumption by nearly 500 white, married couples ages 62–69 early in retirement exceeds by 14% the income that their financial, pension and Social Security wealth can generate. This implies that their saving, both private and through Social Security, is insufficient to sustain consumption throughout the rest of their lives. Additional evidence based on changes in spending between 1973 and 1975 shows that these households respond by reducing consumption at a rate sufficient to generate positive changes in net financial worth within a few years after retirement.

I. Introduction

Much recent empirical research has examined how wealth accumulation changes with age. The purpose of most of this work is to test the theory of life-cycle utility maximization in which consumption is the choice variable. Despite the focus of the theory on life-cycle consumption, though, empirical work using longitudinal data has been based exclusively on data on wealth and earnings. Cross-section data, on the other hand, have been used exclusively to examine the relation of consumption to income across age groups. Here I rectify this imbalance using longitudinal data on consumption and wealth late in the life cycle. By considering the issues from a different empirical perspective, this examination enables us to sort out explanations for observed behavior in a way not possible in work that infers consumption profiles from the data on assets, or that looks at "snapshots" of consumption-income relations.

Studying actual consumption of the elderly allows the direct estimation of how well Social Security retirement benefits meet one of the program’s main goals—the maintenance of consumption. Thus the analysis partly parallels my consideration (Hamermesh, 1982a) of the effects of unemployment insurance on consumption. By examining the sources of income available to finance consumption in old age, we can discover whether Social Security benefits are sufficient to sustain consumption, and how much consumption would have to be reduced without them.

II. Life-Cycle Issues and Patterns in Consumption

With certainty about earnings trends and the length of life, no bequest motive, a fixed retirement date and perfect capital markets, the life-cycle pattern of consumption depends solely on the relation between the rate of interest \( r \) and the rate of time preference \( \rho \). If \( r > \rho \), consumption will be observed to increase (decrease) with age. The less perfect are capital markets, assuming the observed inverse J-shaped age–earnings profile, the more likely it is that consumption will increase with age, and the less likely that it will decrease monotonically with age from time zero. If \( r > \rho \), we may observe consumption increasing with age until some point in the life cycle, though it decreases with age after that. Savings will be positive up to some age at or before retirement, and consumption will exceed income and be on a trajectory that will exhaust wealth on the date of death. Total wealth will decline with age during retirement.

Modifying this scenario to allow for planned bequests does not change the implications for the rate of change of consumption. This still depends on the possibilities for borrowing and the relation between time preference and the rate of interest. But the requirement that wealth be positive on the date of death entails a lower level of consumption at each age during retirement. The ratio of consumption to wealth or to an annuity out of wealth will be lower during retirement the greater is the bequest motive and will imply positive net worth at the (certain) date of death.
Information on consumption during retirement does not allow us to distinguish between a bequest motive and risk-averse behavior under uncertainty about the date of death. Uncertainty about survival produces two opposite effects (Levhari-Mirman, 1977)—increasing consumption to enjoy what one may not be around to enjoy later, decreasing consumption to provide for a possibly longer horizon. Whether the consumption profile rises or falls during retirement now also depends on whether the extent of uncertainty and/or the degree of risk aversion change systematically with age.

Empirical evidence has been adduced on a number of the implications of life-cycle theory for wealth accumulation. Physical and financial wealth—the value of non-pension assets—may not increase with age (but see Mirer, 1979), but it surely diminishes far more slowly than simple life-cycle theory predicts. (See King and Dicks-Mireaux, 1982; Blinder et al., 1981, and Hurd-Shoven, 1982.) The more recent of these studies point out on whether the total wealth of older households declines quite rapidly with age.

The evidence on age-wealth profiles is clearly inconsistent with the simple life-cycle model of Modigliani-Brumberg (1954). The very slow decline in wealth during retirement cannot be reconciled by a model that postulates a certain date of death and no planned bequests. Davies (1981) rationalizes this evidence by showing that the paths of noninvestment income and actuarial survival probabilities by age are consistent with consumption that could be generated by a highly risk-averse utility-maximizing consumer facing uncertainty about the date of death.1 If bequests form a sizable fraction of lifetime earnings (David-Menchik, 1981), the age-wealth profile can also be rationalized by a planned bequest of the principal of the (bequeathable financial) wealth accumulated at retirement, with consumption being financed by non-bequeathable pension benefits and interest on physical wealth.

III. Data and Methods

To examine the relation of older workers' consumption and their ability to finance it I use the Retirement History Survey—Social Security Administration data. The Retirement History Survey (RHS) provides inter alia data on 4,000 white couples with the household head aged 58–63 in 1969 and the same spouse from 1969 through 1975. In this study I concentrate on information from the 1973 and 1975 interview waves. The RHS is the only longitudinal data set containing many older people that has information on the spending of a substantial fraction of each household's income. Social Security earnings records for 1951–1974 linked to the RHS enable one to derive the current or prospective entitlement of each household.

I exclude households containing persons whose current or most recent job was in the farm or Federal sectors or who are currently or recently self-employed. These disqualifications, and, more important, the requirement that information be given on all the available spending flows reduced the samples to 1,797 households aged 62–67 in 1973, and 1,422 households aged 64–69 in 1975. I analyze the spending of retired households, those with no earnings in the previous year and in which neither spouse is currently working. There are 426 of these, aged 62–67, in 1973, and 494, aged 65–69, in 1975.

The commodities on which the RHS provides data are not exhaustive of all spending; they represent only 3/5 of total spending in the 1972–1973 Consumer Expenditure Survey (CEX).2 However, the weighted average income elasticity of spending on these commodities was 1.01 for those on which the 1973 RHS provides data (1.12 for the 1975 RHS). Also, regressions of C/Y on C/Y, where C, is spending by older households in the CEX on commodities on which the RHS provides data, and C is total spending by those households, yielded an R² above 0.9. These considerations suggest total spending, C*, can be calculated by inflating spending in the RHS by the ratio of total CEX spending to spending on the RHS categories. This

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1 Skinner (1981) shows that uncertainty about length of life will affect the responsiveness of savings (consumption) to changes in real rates of interest. One may infer from his work that it is difficult empirically to extricate the effects of uncertainty from those of changes in \( \rho - r \).  

2 In the 1973 wave of the RHS spending is reported on food consumed at home; food consumed away from home; nonfood groceries; transportation; vacations; and cost of owned or rented dwellings (including utilities, interest and real estate taxes). Also included is an imputation for the implicit rental value of owned housing. In the 1975 wave there are no data on spending for transportation, but spending on miscellaneous items, including gifts, charity, dues to organizations and several others is included.
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Table 1.—Percentage Distributions of Nonworking Households with No Earnings

<table>
<thead>
<tr>
<th>C*/Y*</th>
<th>1973 RHS</th>
<th>1975 RHS</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 0.5</td>
<td>0.9</td>
<td>0</td>
</tr>
<tr>
<td>0.5–0.75</td>
<td>11.7</td>
<td>8.8</td>
</tr>
<tr>
<td>0.75–0.9</td>
<td>13.6</td>
<td>12.0</td>
</tr>
<tr>
<td>0.9–1.1</td>
<td>19.8</td>
<td>20.8</td>
</tr>
<tr>
<td>1.1–1.25</td>
<td>12.9</td>
<td>11.2</td>
</tr>
<tr>
<td>1.25–1.5</td>
<td>14.8</td>
<td>20.0</td>
</tr>
<tr>
<td>&gt; 1.5</td>
<td>26.3</td>
<td>27.2</td>
</tr>
<tr>
<td>Ratios of Means*</td>
<td>1.14</td>
<td>1.16</td>
</tr>
<tr>
<td>(0.028)</td>
<td>(0.047)</td>
<td>(0.033)</td>
</tr>
<tr>
<td>N</td>
<td>426</td>
<td>125</td>
</tr>
</tbody>
</table>

*Asymptotic standard errors are in parentheses.

The spending measures are compared to currently available and future resources. I have data on three sources of wealth among retired households: physical and financial, pension and Social Security. Assuming there is a market in actuarially fair annuities, I annuitize physical and financial wealth (two-thirds of which is the owner’s share of owner-occupied housing). I assume a 2% real interest rate, use the 1969–71 life tables for whites, and assume the household is buying a joint annuity. (A 3% real interest rate raises annuity income by about 10%.)

I treat the resources currently available from Social Security as the benefits generated by the household’s earnings history and assume they remain constant in real terms over the household’s life. Pension benefits are based on actual or expected benefits and the characteristics of the plan’s provisions for benefits for spouses. Since few pensions are indexed, I assume they would decline in real terms at 6% per year. The available resources, Y*, thus consist of the annuitized real value of financial wealth, indexed Social Security benefits, and pension benefits fixed nominally. I assume these are the only resources available to these older households, and that all income flows are untaxed.3

IV. Can the Elderly Sustain Consumption?

Table 1 presents information on the ratio of current consumption to income currently available from annuitized physical and financial wealth, and from pension and Social Security benefits. Ratios of average consumption to average income and their asymptotic standard errors are also shown. The most striking finding in this information on non-working households is the very high value of C*/Y* a year or more after retirement. Current consumption is not sustainable given the financial resources that are on average available to the retired couples in the RHS samples.4 As the distributions show, this finding does not result from a few outliers; 54% of the retired households in the 1973 RHS (53% in 1975) have values of C*/Y* greater than 1.1.

Pensions make up enough of retirement income, and the projected decline in their real values is so rapid, that current consumption would quickly become even more difficult to sustain. If they maintained spending, roughly two-thirds of the households in each sample would have C*/Y* > 1.1 at age 75 (76 in the 1975 sample). (These ages are those at which half the couples can expect both partners still to be alive.) Clearly, current consumption is inconsistent with available resources. If people in the sample intend to maintain consumption, the evidence in other studies of assets that rise with age is inconsistent with this evidence on consumption.

3 Among married couples 65 or over in 1976, income from sources other than earnings, Social Security, pensions and assets was only 2% of the total. (Social Security Administration, Office of Research and Statistics, Income and Resources of the Aged, 1980.) A household with average Social Security benefits, but other income twice that of the average, and with only two exemptions would have paid Federal income taxes equal only to 6% of Y*.

4 Excluding the annuitized value of the owned portion of owner-occupied housing from Y* and the imputed rent from C*, and inflating C* accordingly corresponding to spending in the CEX, the ratio of average C* to average Y* is 1.12 in both samples.
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TABLE 2.—MEANS FROM 1973 AND 1975 RHS UNDER VARYING ASSUMPTIONS ABOUT SOCIAL SECURITY’S EFFECTS ON SAVING

<table>
<thead>
<tr>
<th></th>
<th>1973</th>
<th>1975</th>
</tr>
</thead>
<tbody>
<tr>
<td>$C^{<em>}$ if $Y^{</em>}$</td>
<td>1.51</td>
<td>1.54</td>
</tr>
<tr>
<td>$\partial W^{LTH}/\partial SS^{*} = .5$</td>
<td>2.25</td>
<td>2.29</td>
</tr>
<tr>
<td>$C^{<em>}$ if $Y^{</em>}$</td>
<td>0.495</td>
<td>0.494</td>
</tr>
<tr>
<td>$SS^{*}$</td>
<td>0.313</td>
<td>0.331</td>
</tr>
</tbody>
</table>

As the penultimate row of table 2 shows, Social Security benefits form nearly half of retirement income in this sample.\(^5\) Even if one assumes that Social Security displaces half of private saving, row (1) of table 2 shows that the ratios of average $C^{*}$ to average $Y^{*}$ would be far greater than the unsustainable values presented in table 1.\(^6\) Assuming 50% displacement of other wealth, 58% of the households in the 1973 and 1975 samples for which $C^{*}/Y^{*} < 1.1$ would have $C^{*}/Y^{*} > 1.1$ if there were no Social Security. If Social Security benefits displace no private saving, this conclusion is still stronger: The averages in row (2) are outlandishly high. Indeed, in the majority of households spending on items reported in the RHS exceeds the resources available from sources other than Social Security benefits.

Social Security benefits clearly are very important in maintaining consumption among retirees, even under the strong assumption that they displace private savings on a one-for-two basis. They may (Kotlikoff et al., 1982) be sufficient to allow households to achieve a rate of real consumption during retirement equal to the average sustainable during their working lives. They are not, however, sufficient for most households to maintain real consumption throughout retirement. The evidence suggests (see, e.g., Ghez-Becker, 1975, p. 60) that consumption during the work life follows the inverse J-shaped age-earnings profile quite closely. It may thus be more sensible to evaluate the adequacy of Social Security by comparing its ability to sustain consumption during retirement to consumption just before retirement rather than to the average lifetime consumption.

V. Responses to Insufficient Savings

One way for households to respond to their inability to sustain real consumption is for one or more household members to reenter the labor force. Of the households in the 1973 sample, though, only 9% chose this route (had positive earnings in 1974). The mean 1974 earnings (in 1973 dollars) among all households was $93; this would have added only 1.3% to $Y^{*}$, hardly affecting $C^{*}/Y^{*}$. Either most of the human capital this sample possesses is fully depreciated, or leisure has a very high value.

The other response is to change $C^{*}$. Comparing columns (2) and (3), and (5) and (6) within table 1, we see that households with older heads in each subsample have a lower ratio $C^{*}/Y^{*}$ than households with younger heads. However, the rate of decline in this ratio with age is only 0.01 per year in the 1973 RHS, and slightly less than 0.02 per year in the 1975 RHS. The former is not quite consistent with a consumption profile that is sustainable under the actuarial survival probabilities facing households in the sample; the latter is.

The comparison of $C^{*}/Y^{*}$ across cohorts provides some evidence that retired households cut their real consumption as they age, but its magnitude is too small to explain planned bequests or reductions in consumption consistent with risk-averse behavior in the face of uncertain lifetime.

\(^5\) This is slightly above the share of Social Security in the incomes of couples 65+ from Social Security Administration, op cit., footnote 3, once earnings are excluded from the calculation. $PEN^{*}/Y^{*}$ is somewhat above the share of pension income reported in that source. These differences probably arise from my exclusion of Federal workers and the self-employed.

\(^6\) Feldstein’s (1980) most completely specified and carefully estimated model based on micro data yields an estimate of displacement quite close to 0.5.
To examine the issue further consider all 171 households that were in the RHS nonworking subsamples in both 1973 and 1975 and reported the same size household in both years. I redefine consumption to exclude those components of spending that are not reported in both years.7

Changes in real spending between 1973 and 1975 are reported in table 3.8 Real spending in this longitudinal data set declined by over 9%: almost half the households cut real spending by more than 10%. The decrease in real spending was not merely a reflection of the general slowdown in the growth of real incomes that occurred after 1973. Real spending per capita on a weighted average of these commodities grew nationwide by 3% during this two-year period. Table 3 shows that the decreases in consumption compared to per-capita spending in the United States are pronounced: 53% of the households reduced spending by more than 10% relative to the average change in real spending.

People in this sample cannot sustain real consumption and respond by reducing spending by 5% per year on the items covered in the RHS samples. While too much should not be made of evidence based only on two years of data, the findings lend strong support to the notion that retired households' age-consumption profile is negatively sloped. The size of the decline in consumption is consistent with a profile of real physical and financial wealth that increases during most of the retirement years.

VI. Conclusions and Explanations

This study has demonstrated two hitherto undiscovered phenomena describing life-cycle behavior. First, I have shown that the resources available to retirees are insufficient to allow them to sustain the level of real consumption enjoyed early in their retirement. Second, both cross-section and longitudinal data demonstrate they respond to this insufficiency by reducing their real consumption as they age. I also find Social Security benefits are essential to maintain older persons’ consumption, even under the assumption that they displace 50 cents of private savings for each dollar of benefits. Whether they are fully expected in people’s lifetime consumption plans is unclear. One might instead argue that many households cannot save sufficiently for retirement, and that Social Security benefits partly offset this insufficiency.9 My evidence suggests this offset is only partial; it is not enough to enable older households to maintain their consumption.

Let us consider three sets of possible explanations for the findings: (1) problems of mismeasurement or misspecification in the empirical results; (2) an inability to plan optimally for consumption during retirement because of imperfections in the information available for planning; and (3) perfect information, with a consumption path either arising from optimal planning under uncertainty or from a bequest motive.

None of the potential data problems provides a good explanation. Missing income sources are not a problem. Data on older households in the CEX suggest income other than from pensions, Social Security benefits and assets is only 8% of retirees’

7 Transportation is excluded from C* in this comparison from the 1973 RHS for this group, while miscellaneous expenses are excluded from the 1975 RHS.

8 The correspondence between RHS spending categories and components of the PCE deflator used to form real measures is vacations, recreation; imputed rent, owner-occupied dwellings; rent, renter-occupied dwellings; utilities, household utilities; food, off-premise food consumption; non-food groceries, toilet articles; and food away from home, purchased meals and beverages.

9 Sobol (1979) shows that blacks’ accumulation of physical and financial assets shortly before retirement is far less relative to their lifetime earnings than that of whites. If they were in covered employment, progressive Social Security benefit formulae will offset some of the greater inadequacy of savings by blacks than by the whites I examine here.
total income.\textsuperscript{10} Wealth holdings may be underreported; but the annuitized value of reported financial wealth in the samples is only 7\% of $Y^*$, and a weighted average of the amount of underreporting of financial assets (Lebergott, 1976, p. 218) suggests 3/4 of such assets are reported.

Spending may be mismeasured. But the calculations in footnote 4 showed that the people are not "house poor." $C^*$ contains little work-related consumption, for the couples had not been working for at least one year before most of the spending data were recorded. Also, it is unlikely that real consumption rises even though real spending falls. I have included consumption of housing services in my measure, and it is unlikely that consumption is rising while spending is falling as rapidly as the data indicate.

Retired households may have much shorter than average horizons, so that resources are in fact adequate to maintain consumption (Wolfe, 1983). Any bias, though, must be small: It affects only annuity income from the 20\% of available resources represented by financial and physical wealth. Even with this effect, and thus a higher annuity from assets, consumption cannot be maintained.\textsuperscript{11}

An insoluble data problem is that the 1973–75 period may have been atypical. Households may have extrapolated the real increases in Social Security benefits and been forced to cut back spending in 1974 when they realized that real benefits were to remain constant. A similar argument might be made about the effect of unanticipated inflation during this period on pension and financial wealth. Tests of these possibilities must await additional data from different times.

We can rule out imperfect information about life expectancy as a cause of unsuccessful planning. Longevity did increase very rapidly during the lifetimes of households in the RHS sample. However, people are aware of their current life expectancy, and they even extrapolate secular changes in longevity (Hamermesh, 1982b). Another possibility is that people did not expect the unprecedented growth in real incomes that occurred during the years of peak earnings in the RHS cohorts. But if not, they would have saved a disproportionate fraction of their earnings. Their insufficient savings suggest they were not maximizing utility from lifetime consumption according to a plan dictated by a small absolute value of $\rho - r$.

Assuming information about income flows and horizons is sufficient to allow life-cycle planning, we could reconcile the findings by an ad hoc claim that the bequest motive increases in importance as the household's horizon shortens. The rapid rate of decrease in consumption during retirement could also be rationalized by relative risk aversion and uncertainty about length of life in a world of perfect annuities only if each increases with age. This form of uncertainty decreases with age, though (Hamermesh, 1982b). Thus, in the absence of evidence on the relation of relative risk aversion to age, uncertainty about lifetimes alone cannot rationalize the findings. Another possibility is that annuities markets are imperfect, the change in survival probabilities increases with age, so consumption decreases even if $\rho - r$ is small. This may be important in late old age, but the percentage change in the probability of survival is small in the age bracket 62–69. Also, 80\% of $Y^*$ in the samples is actually annuity income—Social Security and pension benefits.

The findings can be rationalized by a combination of a bequest motive, or uncertainty about length of lifetime, coupled with a rate of time preference far greater than the real rate of interest. Substantial independent evidence shows that real rates of time preference are at least 10\% (Heckman, 1976; Hamermesh-Soss, 1974; Kurz et al., 1973). With a fixed amount of financial and physical assets, virtually certain real Social Security benefits up to any horizon, and pension benefits that are known, retired households optimize by consuming beyond their means early in retirement and reducing consumption rapidly as they age. They do this because of their tastes, not because health limitations restrict their ability to spend. Indeed, since we exclude from the 1973 sample

\textsuperscript{10}Calculated for households with a head aged 65 or over in the 1972–73 CEX (BLS, Consumer Expenditure Series: Interview Survey, 1972–73, Report No. 455-4, 1977). Half of this small fraction was composed of rental income and income from royalties and roomers, which presumably stem from physical assets included in the RHS measures of assets.

\textsuperscript{11}Wolfe (1983) estimates that men who retire on Social Security at age 62 have a mortality rate roughly one-third above that of men who retire at 65. Using this higher rate raises the payout on a joint annuity starting at ages 65 and 62 for husband and wife only by 11\%. For the average household in the RHS this increases $Y^*$ by only 2\%.
people who died between 1973 and 1975, our sample may be healthier than average.12

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12 There is little evidence of declining ability to consume goods because of sharply decreasing efficiency in household production early in retirement. Among persons aged 55–64 the number of days of restricted activity per year were 28.0; days of bed disability were 9.3 per year. Comparable figures for persons 65–74 were 34.0 and 10.3. Only among persons 75+ do these statistics increase substantially, to 46.2 and 17.4, respectively. (National Center for Health Statistics, Vital Statistics, Series 10, No. 118, p. 20.)
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