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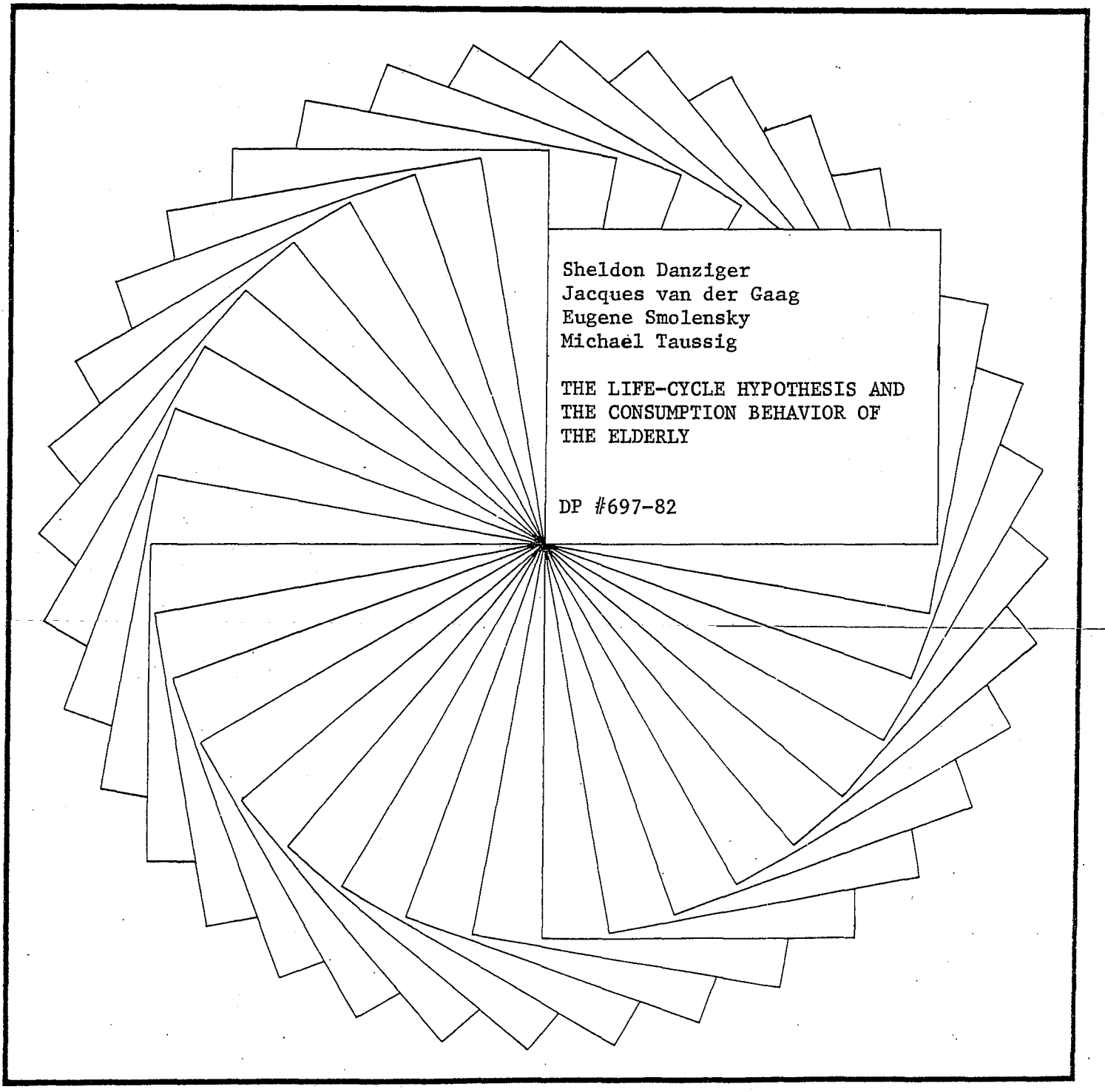

Sheldon Danziger
Jacques van der Gaag
Eugene Smolensky
Michael Taussig

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Sheldon Danziger
University of Wisconsin-Madison

Jacques van der Gaag
The World Bank

Eugene Smolensky
University of Wisconsin-Madison

Michael Taussig
Rutgers University

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Abstract

The life-cycle hypothesis (LCHO) is based on the common-sense idea that households do not make saving or dissaving decisions solely on the basis of their current income and wealth, but that they also take into account their expected future circumstances and are affected by their past experience. In particular, because people can anticipate that their incomes will fall sharply when they retire, they save when younger and dissave after retirement so as to maintain, more or less, their previous standards of living.

This paper presents new data on income and consumption that are more appropriate for testing the LCHO than the data used in previous studies. Then we examine the average propensities to consume of the elderly and nonelderly and show how they do not accord with the LCHO. The LCHO predicts that the elderly dissave, or at least that they have a significantly higher average propensity to consume, at a given level of income, than the nonelderly. In fact, we found strong evidence to the contrary; i.e., the elderly not only do not dissave to finance their consumption during retirement, they spend less on consumption goods and services (save significantly more) than the nonelderly at all levels of income. Moreover, the oldest of the elderly save the most at given levels of income.

After testing some adjustments that attempt to salvage the LCHO, we suggest alternative explanations for the observed higher average propensities to consume of the elderly.

The Life-Cycle Hypothesis and the Consumption Behavior of the Elderly

INTRODUCTION

Since the pioneering articles by Modigliani and Brumberg (1954) and by Ando and Modigliani (1963), the life-cycle hypothesis (LCHO) has been the centerpiece of the modern, mainstream theory of aggregate consumption and saving behavior. The LCHO is based on the common-sense idea that households do not make saving or dissaving decisions solely on the basis of their current income and wealth, but rather that they also take into account their expected future circumstances and are affected by their past experience. In particular, because people can anticipate that their incomes will fall sharply when they retire, they save when younger and dissave after retirement so as to maintain, more or less, their previous standards of living. If we abstract from all other motives for saving, the LCHO can be tested directly by examining the actual dissaving of the elderly after retirement or, for those who never retire, at some very advanced age.

This implication rests of course on a simple model of saving behavior. When we take into account other motives for saving and relax some of the LCHO's underlying assumptions, such as perfect capital markets and certainty, empirical tests of the LCHO are not at all straightforward. Our reading of the literature convinces us, however, that the simple version of the LCHO is widely accepted by economists as empirically established. In fact, the latest editions of leading macroeconomic textbooks give the impression that the LCHO is successful in accounting for age differences in observed consumption behavior.[1] In addition, a number

of economists have made strong statements supporting the validity of the "textbook" version of the LCHO. For example:

> The life-cycle model is the central idea in the modern theory of saving .... The fundamental insight of this theory, that aggregate saving is positive in a growing economy because the younger workers who save are more numerous and have higher earnings than the older retirees who dissave was presented by Sir Roy Harrod in the second lecture of his famous book Towards a Dynamic Economics (1948) .... But it was Franco Modigliani and his collaborators ... who developed Harrod's metaphor of "hump saving" into a quantitative theory and began the process of empirical verification that has made the life cycle model a central feature of our current economic understanding (Feldstein, 1976, p. 77).

Because the LCHO has been so strongly supported, it is not surprising that some economists have used it as the basis for welfare measures. For example, Moon (1977) derives a measure of economic status for the aged from a life-cycle model of saving. She adds to an elderly household's money income the life annuity value of its net worth to measure its resources available for consumption. In a different application, Laffer (1976) has argued:

> Older people, because they have shorter life spans, tend to save less and to spend more than younger people. Therefore, if real resources are transferred from younger people to older people, a distortion occurs in the system, a distortion which is against savings and in favor of consumption (p. 72).

The authors of this paper are another example. In the course of a study (Danziger, van der Gaag, Smolensky, and Taussig, 1982) on the relative living standards of the elderly, we examined microdata on the incomes and consumption levels of the elderly relative to the nonelderly.

On the basis of the LCHO, we expected to find that the elderly dissave, or at least that they have a significantly higher average propensity to consume at a given level of income than the nonelderly. In fact, we found strong evidence to the contrary; i.e., the elderly not only do not dissave to finance their consumption during retirement, they spend less on consumption goods and services (save significantly more) than the

nonelderly at all levels of income. Moreoever, the oldest of the elderly save the most at given levels of income.

After obtaining these unexpected results, we surveyed the empirical evidence on the LCHO. We found that evidence to be mixed and, on the whole, ambiguous. Mirer (1979) has documented the conflicting studies to date and we will not repeat his summary here. Mirer himself (1979 and 1980) finds that the wealth of the aged increases rather than decreases over time and that even the retired do not dissave as fast as would be expected by the LCHO. Ture (1976) has observed that U.S. estate tax return data show that estate size increases with the age of decedent. Other recent studies--Darby (1979), Kotlikoff and Summers (1981), Menchik and David (1979), and White (1978)--raise further doubts about the ability of the LCHO to explain the bulk of personal saving.

The next section describes some new data on income (Y) and consumption (C) that are more appropriate for testing the LCHO than the data used in previous studies. Then we examine the average propensities to consume of the elderly and nonelderly and show how they do not accord with the LCHO. After proposing some adjustments that attempt to salvage the LCHO, we suggest alternative explanations for the observed higher average propensities of the elderly to consume.

THE DATA

The data used in this study are from the 1972-73 Consumer Expenditure Survey (CEX). Full discussions of the CEX data are given in U.S. Department of Labor, Bureau of Labor Statistics (1977) and in King (1978). We discuss here only a few aspects of the CEX of special relevance to this paper.

We restricted our analysis to all consumer units interviewed for the CEX in 1973, eliminating problems associated with relative price changes from 1972 to 1973. Also, we eliminated consumer units which were not full-year survey participants and units for which income records were incomplete. After these restrictions, our sample consisted of 9494 consumer units.[2] Persons in institutions were not included in the survey. Consequently, elderly persons living in nursing homes, many of them belonging to the poorest part of the population, had to be excluded from our study.

The quality of the income data on the CEX is difficult to assess. Underreporting of income is a serious problem in any household survey. Factor payments as reported in the CEX are only 91 percent of the amount in the National Income Accounts. The shortfall differs by income source. Ninety-two percent of wages and salaries are reported, but only 78 percent of federal public assistance transfers and 54 percent of state and local transfers (Dalrymple, 1980). Whether this biases our C/Y comparisons by age is uncertain. The elderly are more likely to receive transfers and less likely to receive wage income than the nonelderly, but the elderly receive a much larger share of federal transfers as compared with state-local transfers than do the nonelderly. Also, Radner (1981) reports that the elderly underreported their money income considerably more than the nonelderly in the 1973 Current Population Survey, and the same bias is likely to hold in the CEX. Finally, the CEX does not include most types of government-provided in-kind income, most of which are received by the elderly, or employer-provided fringe benefits, most of which are received by the nonelderly. Thus, neither the direction nor magnitude of the bias by age is known.

Consumption expenditures as measured in the CEX are defined as out-of-pocket expenditures on food, housing, clothing, transportation and other goods and services.[3] This definition differs from that in the National Income Accounts, especially with regard to durable purchases. If, for instance, a household buys a new car and pays in cash, the total expenditure appears in consumption. However, if the household makes a down payment and borrows the rest, only the down payment plus the monthly finance charges are counted as consumption. If the down payment consists of an old car, only the finance charges are counted. Since it is likely that older households own a more extensive stock of durables than young households, ignoring the contribution of durables (including owner-occupied housing) to both income and consumption would bias comparisons across age groups.

To deal with this problem we combined data from the Inventory of Consumer Durables (CD) with the CEX so as to obtain consumption and income measures that are more closely related to the consumption and income flow concepts of economic theory. The Inventory of Consumer Durables public use tape provides information on the presence of major durables, minor durables, vehicles and furnishings in all households on the 1972-73 CEX. We matched the information on the CD tape with the expenditure data on the CEX tape to obtain a measure of household consumption that excludes expenditures on durables made during the year of the survey, but includes the value of consumption flows (service flows; i.e., the flow of consumption through the life of the durable) from all durables (including owner-occupied housing) present in the household (for a complete description, see van der Gaag et al., 1981). We included service flows from major durables and vehicles only. The value of most minor durables (toaster, mixer, hair dryer, etc.) is small enough to

warrant treatment as a nondurable. The CD tape does not contain information on the value of house furnishings, which prevents us from calculating service flows from furniture.

We define the service flow, S, in year t from a durable good as

$$S_t = r_t p_t + (p_t - p_{t+1}),$$

where r_t is the interest rate in year t, and p_t is the price of the durable at the beginning of year t. Thus, S_t equals the sum of the market rate of return on the sum invested in the durable as valued at the beginning of the year, plus the economic depreciation of the durable during the year. The economic depreciation rate, δ, is based on the life expectancy of the durable and the durable-specific price change. In symbols,

$$\delta = \delta_1 - \delta_2,$$

with δ_1 the depreciation rate based on the life expectancy of the durable, and δ_2 the durable-specific price change.

Let p_o be the value of the durable at the time of acquisition. We now have, for a durable that has been acquired s years ago:

$$p_t = (1 - \delta)^s p_o,$$

so
$$S_t = r_t p_t + (p_t - p_{t+1})$$

$$= r_t(1 - \delta)^s p_o + p_o (1 - \delta)^s \delta$$

$$= (r_t + \delta) (1 - \delta)^s p_o.$$

The service flows from durables and vehicles were imputed using this formula. We set $\delta_1 = 0.10$ per year for all durables and vehicles, and

r = .07. The results proved robust when we experimented with other rates.

The CEX provides an estimate of the rental value of owner-occupied housing. Owners of durables and homeowners were treated as if they rented the property to themselves. Thus, the calculated service flows from durables and the rental value of owner-occupied housing were added both to income and consumption expenditures. Outlays for durables were then subtracted from the consumer expenditures to obtain a measure of yearly consumption closer to the theoretical concept.

Table 1 provides a comparison of the adjusted and unadjusted consumption and income data for consumer units headed by persons over, and under, the age of 65. It shows the mean value of these variables for units in each quintile of income after direct taxes, the mean for all units, and the ratios of adjusted to reported data for after-tax income and for consumption. After all our imputations have been made, reported consumer expenditure from the CEX ($9824) is revealed as a good proxy for total consumption ($9817) by nonelderly households. The corrections for owner-occupied housing, durables and vehicles tend to cancel. For elderly households, however, the results are quite different. Their reported mean consumer expenditures ($4963) underestimate their total mean consumption ($5798) by 17 percent.

Income after state and federal taxes changes considerably, <u>both</u> for the elderly and for all other consumer units, after we add to reported CEX income the estimated rental value of durables, vehicles and owner-occupied housing (net of the expenditures on these items made during the survey year 1973). For example, for elderly households in the first quintile of the size distribution of income for the whole sample, the change is as large as 40 percent; for the nonelderly in the same quin-

Table 1

Comparison of Consumption and Income Data as Reported in 1973 Consumer Expenditure Survey, with Authors' Estimates that Adjust for Rental Value of Owner-Occupied Housing and Service Flows from Durables and Vehicles

Age of Head of Consumer Unit	Mean by Quintile of Income After Taxes					Mean of All Units
	1	2	3	4	5	
Income Data						
After-Tax Income (reported)						
< 65	$2,706	$6,281	$9,565	$13,453	$23,645	$12,282
≥ 65	2,616	5,949	9,396	13,272	25,611	6,471
After-Tax Income (adjusted)						
< 65	3,344	7,213	11,126	15,842	27,074	14,239
≥ 65	3,659	7,436	11,451	15,737	29,222	8,011
Ratio of Adjusted to Reported Consumption						
< 65	1.24	1.15	1.16	1.18	1.15	1.16
≥ 65	1.40	1.25	1.22	1.19	1.14	1.24
Consumption Data						
Consumption (reported)						
< 65	4,607	6,708	8,673	10,514	15,536	9,824
≥ 65	3,064	5,138	6,623	8,484	11,803	4,963
Consumption (adjusted)						
< 65	4,690	6,619	8,604	10,668	15,441	9,817
≥ 65	3,760	5,896	7,624	9,532	13,441	5,794
Ratio of Adjusted to Reported Consumption						
< 65	1.02	0.99	0.99	1.02	0.99	1.00
≥ 65	1.23	1.15	1.15	1.12	1.14	1.17

tile, it is 24 percent. On average, our corrected income measure is 16 percent higher than the reported measure for consumer units under age 65 and 24 percent higher for the elderly.

The results show that the reported measures of income and consumption are quite different from the adjusted, and theoretically more appropriate, ones. This bias cannot be assumed away as being randomly distributed across all households. On the contrary, the results look quite different for elderly units as compared to nonelderly ones. And within each age group, the results vary by income level. This, of course, casts serious doubts on the empirical findings of all studies on income and/or consumption that ignore the contributions of durables. The data adjustment proves to be especially important for those studies, such as the present one, that compare welfare levels of households at various stages of the life-cycle.

In the following sections, we will use the newly created income and consumption data to compare the consumption behavior of elderly and nonelderly units in order to shed more light on the LCHO. Note that the adjusted data are more favorable to the empirical confirmation of the LCHO than the unadjusted ones: the adjustments lower the ratio of consumption to income by the nonelderly from .80 to .69; for the elderly, this ratio falls from .77 to .72.

EVIDENCE ON THE AVERAGE PROPENSITY TO CONSUME

The income concept used in this paper is income after direct taxes. The use of any income-before-taxes measure, such as the Current Population Survey's money income concept, would bias our comparisons of rates of consumption by age because, as is well known, the aged pay less

in taxes than the nonaged at given levels of income. Our comparisons are based on the age of the head of the consumer unit; thus, some persons older than 65 live as dependents in nonelderly consumer units and some consumer units headed by an elderly person include nonelderly persons.

Table 2 displays our estimates of average propensities to consume, C/Y, by income quintile.[4] In the top panel, for all the consumer units in our sample, we report our results for six different age groups: under 35, 35-54, 55-61, 62-64, 65-71, and over 71. Because the quintiles in Table 2 are calculated on the basis of the size distribution of income for the whole population and not on the basis of the income distributions of the age groups separately, reading down any column shows the effect of age on the average propensity to consume, with income held roughly constant. The results show a consistent effect of age at all levels of income. For each quintile, consumer units aged 65 and over consume <u>less</u> of their income after tax than those who are younger. The most remarkable result shown in Table 2 is that this age effect on C/Y is consistent even <u>within</u> the population aged 65 and over. That is, for a given level of income, persons older than 71 have a lower average propensity to consume than those aged 65-71. If we read across any row, we find the expected result that, within age groups, the average propensity to consume decreases monotonically with the level of income. Therefore, a comparison of mean consumption to mean income by age group (next-to-last column in Table 2) obscures the direct effect of age because the elderly have lower than average incomes and because consumer units with low incomes have a higher average propensity to consume.

The bottom panel of the table gives a further breakdown of our estimates of C/Y by age and income level for just those consumer units that are couples, in order to control for both income and number of adults.

Table 2

Average Propensities to Consume (Consumption Divided by Income, C/Y) by Income Quintiles and by Age, 1973

Age of Head of Consumer Unit	Quintile of Income After Tax 1	2	3	4	5	All Income Classes	Mean Income After Tax
All Consumer Units							
< 35	1.52	1.01	.80	.68	.60	.78	$11,760
35-54	1.29	.88	.76	.67	.59	.66	16,581
55-61	1.10	.81	.70	.62	.53	.62	15,099
62-64	1.13	.75	.72	.62	.54	.65	12,344
65-71	1.09	.83	.71	.64	.52	.71	9,580
> 71	1.01	.79	.68	.59	.45	.73	7,082
All Units	1.22	.90	.76	.66	.57	.69	12,989
Couples							
< 62	2.02	.98	.75	.63	.55	.67	14,554
62-64	**	.81*	.70*	.60*	.54*	.65	13,192
65-71	1.24	.79	.72	.63*	.49*	.68	11,382
> 71	1.09	.82	.66	.59*	.38*	.69	9,172
All Couples	1.41	.88	.73	.62	.53	.67	13,023

Note: The upper limits to the income quintiles are $5,423, $9,077, $13,330, and above $18,720.

*Estimate based on fewer than 50 observations in cell.

**Fewer than 20 observations.

The quintile cut-offs are the same as those in the top panel, and the results reinforce those for all consumer units. The average propensity to consume is consistently lower for couples aged 65 and over than for nonelderly couples, holding constant the income quintile.

A DESCRIPTIVE REGRESSION MODEL

In order to control more precisely for differences in income and characteristics other than age that determine consumer behavior, we have estimated a number of descriptive regressions. The dependent variable in our regressions is either consumption (C) or its logarithm (lnC). The independent variables are income after taxes, consumer unit size (number of persons) and five dummy variables for the age of the head: under 35, 55-61, 62-64, 65-71, and over 71, with the age group 35-54 the omitted classification.

Table 3 reports the coefficients and standard errors that confirm the results from our tabular analysis. Consumption is significantly lower for the elderly relative to the age 35-54 reference group when income and unit size are held constant. The consumption of the 65-71 age group is, for example, $1043 lower than that of the age 35-54 group; the negative differential is $1753 for the oldest group (over 71). The results are basically the same for the logarithmic functional form. Both regression estimates contradict the prediction of the textbook LCHO.

SOME EXTENSIONS

The simple regression model is not sufficient on several counts. Therefore, we estimated a number of variations in an attempt to test the robustness of our empirical rejection of the LCHO. These involve age-

Table 3

Regression Results: Total Consumption as a Function of Income, Unit Size, and Age of the Head of the Consumer Unit, 1973

Independent Variables	Dependent Variables	
	Consumption (C)	lnConsumption (lnC)
Age of Head		
< 35	261.62	.037
	(154.79)	(.010)
55-61	-759.63	-.052
	(206.20)	(.014)
62-64	-994.93	-.092
	(300.64)	(.020)
65-71	-1042.53	-.084
	(234.14)	(.016)
> 71	-1752.74	-.201
	(220.23)	(.015)
Income After Tax[a]	0.368	.581
	(0.006)	(.005)
Unit Size	258.82	.031
	(36.05)	(.002)
Constant	3838.55	3.507
Corrected R^2	.383	.657
Number of Observations	9480	9480

Note: Age 35-54 is the omitted reference group for all regressions. Standard errors appear below regression coefficients.

[a]Income after tax is replaced by ln (Income After Tax) in ln Consumption equation.

income interactions, and adjustments for retirement and work expenses, wealth, and the differing income levels of successive cohorts.

First, the functional form used in Table 3 constrains all age effects on consumption to be the same at all levels of income. We reestimated the consumption equation allowing for full interaction of age and income. The results from this functional form are reported in Table 4. The constant terms, as in the simple model, are considerably lower for the elderly than for the nonelderly. On the other hand, the marginal propensities to consume are higher for the elderly.[5] Predicted consumption levels estimated at the mean level of income for the whole sample are distinctly lower for the elderly. For example, given the mean income of $12,989, the mean consumption level for units headed by someone aged 35-54 was $9,267, while the corresponding level for units headed by someone aged 65-71 was only $8,197. Since the elderly in 1973 had much lower incomes on average than the nonelderly, even after correcting for "income" from owner-occupied housing and durables, this result understates the actual differences in consumption levels and in rates of consumption between a typical elderly and nonelderly unit.

A second issue relating to our simple model arises because the usual macroeconomic formulation of the LCHO tends to obscure the distinction between advanced age (whether the person is working or not) and retirement. This distinction is potentially important because some items reported as consumption are, in part, work expenses rather than consumption. Also, the dissaving implications of the textbook versions of the LCHO refer to those whose normal labor income has fallen sharply at retirement and not to aged persons who maintain their normal incomes by continuing to work. We cannot fully resolve these difficulties with the

Table 4

Consumption Levels and Marginal Propensities to Consume by Age of Head

Age of Head of Consumer Unit	Age-Specific Constant[a]	Marginal Propensity to Consume[b]	Predicted Consumption at $12,989[c]
< 35	$3,474	.422	$9,470
35-54	4,393	.335	9,267
55-61	3,605	.334	8,452
62-64	2,244	.416	8,165
65-71	2,529	.397	8,197
> 71	1,508	.512	7,876

[a]Defined as the regression constant for age group 35-54 and as the constant + β_i for each other group, where β_i is the corresponding regression coefficient for the age dummy variable.

[b]Defined as the coefficient γ on income after tax for age group 35-54 and $\gamma + \delta_i$ for each other group, where δ_i is the coefficient on the interaction of income and the age group's dummy variable.

[c]$12,989 is the sample mean for income after tax; a family size of two is used for each prediction.

cross-sectional data from the CEX but we have attempted to deal with each.[6]

Table 5 shows results from disaggregating our regression equation from Table 3 for five mutually exclusive and exhaustive categories of total consumption: food, clothing, housing, transportation, and a residual category of "other" consumption items. If differences in consumption were due largely to work expenses, we would expect to find this to be reflected in differences in commutation and hence transportation expenditures. However, the expectation is not fulfilled. All consumption categories follow the age pattern of the aggregate consumption results. When incomes are held constant, consumption levels in the aggregate and for all five consumption categories decline, generally monotonically, with the age of the head of the consumer unit.

We also estimated the regression for total consumption with the addition of a dummy variable which took the value of one if the head of the unit was retired. The LCHO led us to expect that the coefficient for the retired worker variable would be significantly positive. Instead it was negative, but not significant, and had no effect on the signs or statistical significance, and little effect on the absolute magnitude of the other age dummy coefficients (data not shown). Thus, we can reject the hypothesis that consumption differentials between the elderly and the nonelderly can be explained away by work expenses that are misclassified as consumption.

Another problem arises because of data constraints. We are unable to test what is basically a "time-series" LCHO with "cross-section" data. Thus, an elderly unit with the same current income in 1973 as a nonelderly unit is at a very different position in its permanent income distribution. One method for dealing with this is to include a broad

Table 5

Regression Results: Consumption Expenditures by Major Categories

Independent Variables	Dependent Variables				
	Food	Clothing	Housing	Transportation	Other
Age of Head					
< 35	-471.3	13.5	684.1	60.5	-26.3
	(28.2)	(20.2)	(96.1)	(40.5)	(39.4)
55-61	-52.9	-142.6	-484.9	-26.9	-55.5
	(37.6)	(26.9)	(127.9)	(54.0)	(52.5)
62-64	-138.1	-138.1	-300.5	-218.7	-183.0
	(54.8)	(39.4)	(186.6)	(79.7)	(76.5)
65-71	-251.9	-216.0	-92.5	-316.1	-178.2
	(42.8)	(30.7)	(145.5)	(62.3)	(59.7)
> 71	-393.1	-286.9	-196.4	-540.6	-299.9
	(40.2)	(29.0)	(136.7)	(61.6)	(56.1)
Income After Tax	.038	.029	.175	.058	.063
	(.001)	(.001)	(.003)	(.001)	(.001)
Unit Size	256.4	40.6	-113.1	34.6	37.0
	(6.6)	(4.7)	(22.4)	(9.5)	(9.1)
Constant	849.5	236.4	1624.1	691.1	579.2
Corrected R^2	.381	.219	.231	.201	.217
Number of Observations	9,470	9,356	9,479	8,963	9,484

Note: Age 35-54 is omitted reference group for all regressions. Standard errors appear below regression coefficients. Number of observations differs in each regression because nonpositive values of the dependent variable were omitted.

wealth variable in our models. If sufficient data were available, it would include not just the amount of conventional fungible wealth, but also all substitutes for such wealth such as human capital, the present value of private and public pension rights, and, for low-income households, even the present value of expected cash and in-kind benefits provided by the government. The CEX is certainly inadequate for constructing such a comprehensive wealth measure. We have experimented with a number of wealth proxies: ownership of a house, with or without a mortgage; dummy variables for the sex and race of the head of the consumer units; and the level of property income, given total income. The detailed results of these experiments are not of sufficient interest to deserve a full discussion here--in no case does the inclusion of any wealth proxy significantly change the pattern of average propensities to consume by age reported above.

While our data are inconsistent with the textbook version of the LCHO, they are consistent with simple representations of two closely related consumption function theories--the relative and permanent income hypotheses. Consider another concept of income, Y*, which is a measure of the position of a household in the distribution of income of its cohort. More precisely, we assume the following linear relationship:

$$Y^*_{ij} = Y_{ij}/\bar{Y}_j$$

where: Y_{ij} = income after taxes of consumer unit i of cohort j;

j = < 35, 35-54, 55-61, 62-64, 65-71 and 72+,

$\bar{Y}_j$ = mean income of cohort j.

Y* is important in this context because current income and age are strongly negatively correlated (see the last column of Table 2). For example, the mean of the 35-54 year old cohort is more than twice that of

the oldest cohort. Consequently, when ranked by Y*, a 45-year-old with his cohort's mean income, $16,581, would be only about half as well off as a 75-year-old with the same $16,581. Duesenberry's relative income hypothesis (1979) suggests that elderly persons would have a lower average propensity to consume out of that $16,581 of current income than the younger person because the elderly person is much higher in the distribution of income of his peers. This expectation is examined in Table 6.

Households were ranked by their Y* and formed into quintiles. Thus in each column consumer units have roughly the same relative position in the distribution of income of their cohorts. In each row, the average propensity to consume out of current income falls as income rises for every cohort as in Table 2. Within the columns, however, the monotonically declining relationship between the average propensity to consume and age has been dissolved. Nonetheless, the young and the old dissave only when their incomes are very low relative to others in their cohort.

To further test the relative income hypothesis, we added the unit's relative income position (Y*) as an independent variable to the basic regression (Table 7). Relative income proves to be statistically significant and to have a large effect on total consumption. Predicted consumption continues to fall with age, as evidenced by the increasingly negative coefficients on the age dummies, and to increase with current income and unit size. However, age and the average propensity to consume are positively correlated when households of the same relative income are compared (thus confirming the results of Table 6).

To see this, consider the following example. Compare two consumer units. The head's age is 45 in one, 65 in the other. Each household consists of two persons and the current income of each stands at the mean

Table 6

Average Propensities to Consume (C/Y) by Quintiles of Y^* and by Age of Head of Consumer Unit

Age of Head of Consumer Unit	Quintile of Y^*					C/Y for All Income Classes	Mean Income After Taxes
	1	2	3	4	5		
< 35	1.53	1.02	.85	.72	.61	.78	$11,760
35-54	1.03	.80	.69	.65	.56	.66	16,581
55-61	1.00	.75	.67	.60	.52	.62	15,099
62-64	1.09	.75	.75	.63	.54	.65	12,344
65-71	1.13	.92	.77	.71	.57	.71	9,580
> 71	1.10	.96	.83	.76	.56	.73	7,082
All Units	1.17	.88	.74	.67	.56	.69	12,989

Note: Y^* represents position of household in the income distribution of its cohort. Quintile cutoffs for Y^* are below .46, .74, .101, and 1.37.

Table 7

Regression Results: Total Consumption as a Function of Current Income, Income Relative to Cohort Mean, Unit Size, and Age of the Head of the Consumer Unit, 1973

Independent Variables	Consumption
Age of Head	
< 35	-384.80 (181.81)
55-61	-964.99 (207.97)
62-64	-1568.93 (311.81)
65-71	-1974.35 (271.47)
> 71	-3018.24 (289.07)
Income After Tax	0.236 (0.021)
Relative Income (Y*)	1783.63 (264.76)
Unit Size	256.74 (35.96)
Constant	4269.28
Corrected R^2	.385
Number of Observations	9480

Note: Age 35-54 is the omitted reference group. Standard errors appear below regression coefficients.

of its cohort--$16,581 and $9,580 respectively, i.e., Y* = 1.0 for each. Given the coefficients of Table 7, these characteristics imply consumption levels of $10,479 and $6,853 for the two households. The predicted average propensity to consume of the elderly couple is .72 and exceeds that for the nonelderly couple (.63). This result follows not because we have included Y* in Table 7 and excluded it in Table 3. Rather, we have reversed the sign on the relationship between consumption and age because the relative income hypothesis suggests computing the average propensities to consume at different levels of current income (but at the same relative income).[7]

To sum up, the average propensity to consume falls as current income rises, and holding current income constant, it also declines with age. However, once units are ranked by their ratio of their current incomes to the mean income of their cohort, age and the average propensity to consume are no longer negatively correlated.

To make this fact consistent with the permanent income hypothesis merely requires that mean cohort income and the permanent income of individuals in a cohort be positively correlated, which is certainly plausible. Income relative to one's cohort clearly matters.

CONCLUSIONS

The weight of available evidence, including the results of this study, refutes a central prediction of the "textbook" version of the LCHO--that the elderly dissave out of accumulated wealth to finance the continuation of preretirement consumption levels after retirement. In fact, our results show that the elderly spend less than the nonelderly at the same level of income and that the very oldest of the elderly have the

lowest average propensities to consume. If these results and similar findings by others hold up after being subjected to further testing with new and better data, many of the important positions in mainstream, modern macrotheory will have to be abandoned. As just one example, our findings suggest that the expected sharp rise in the percentage of population aged 65 and over by early in the next century could lead to increased, not decreased, personal saving.

The main puzzle that comes out of this study is why the elderly continue to save after the great majority of them are retired and why their rate of saving is highest for the most elderly. We give below a short list of possible reasons.

First, in our cross-section, we may have a selectivity bias problem. The elderly households we observe saving in a given year may be the unrepresentative survivors of a much larger group. Households that failed to save before retirement may have found it financially impossible to maintain independent households and as a result live in nursing homes or as dependents in households headed by their nonelderly children or other relatives. The elderly households whose saving we observe may have much higher than average tastes for financial independence.

A related explanation is that the elderly may have planned before retirement to dissave but found that their accumulated wealth was insufficient to meet their future consumption standards (e.g., because inflation eroded the values of their private pensions or financial assets) and revised their saving plans after retirement. This explanation is unsatisfactory and incomplete, however, because it implies that at some advanced age the planned dissaving would occur, something we did not find in our data.[8]

Another explanation is that the elderly are more efficient consumers in the sense that they can substitute time for money in purchasing and using commodities and, because of their experience, can also avoid most trial and error experiments in consumption (see Stigler and Becker, 1977). A different explanation is that they do not have sufficient health and mobility required to complement the consumption of market goods and services. These explanations require zero marginal utility from market commodities, however, which we consider implausible for the elderly population as a whole.

A quite different sort of explanation is that the bequest motive dominates the consumption motive for dissaving. That is, the elderly may continue to save because the marginal utility to them of leaving a dollar to their children is greater than the marginal utility of that dollar used for their own consumption. Except in unusual circumstances, mainly among the minority of the aged with large wealth, we find this explanation to be unconvincing.

If the LCHO is to be saved, the most likely revision of the story will go something like the following: Elderly households at the same current income levels as nonelderly households in a cross-section are higher in the income distribution of their peers, and probably always have been. They are therefore larger savers for the reasons advanced by Duesenberry (1949). Also, the elderly at any given current income level have lower expected future incomes for the reasons advanced by Friedman (1957, pp. 90-93). Their human capital and private pension wealth is being depleted, especially at the most advanced ages. They face a complex problem of uncertainty about their health, life expectancy, and their ability to maintain independent households. In these circumstances, they respond by maintaining their wealth in the only way

available to them, reducing their consumption. The details of this story are much too complex to be accommodated well in a simple LCHO framework, with its assumptions of certainty and perfect capital markets. In any event, the expectation created by the LCHO about the relationship between savings and age which underlies much theorizing, many measures of economic well-being, and important policy judgments do not appear to accord with the facts. It seems rather late for this discovery.

NOTES

[1]See, for example, Branson (1979), pp. 190-195; Dornbusch and Fischer (1981), pp. 153-154; and Gordon (1981), pp. 402-407.

[2]We did not, however, adjust the weights used to expand the sample to represent the entire U.S. population.

[3]See U.S. Department of Labor, Bureau of Labor Statistics (1977) for a complete listing of the excluded items. Consumption data are from the Interview survey only. Expenditure items collected only in the Diary were excluded. As a result we slightly underestimate total consumer expenditures (see Diary and Interview Survey Data). Our measures of income and consumption do not include the value of leisure and thus understate the "full income" of the elderly relative to that of the nonelderly.

[4]Savings, in this study, is equal to after-tax personal income less total personal consumption. For 1973, that yields low average propensities to consume for all income and age groups. Inclusion in income of tax refunds, a 4 percent shortfall in consumption due to statistical discrepancy and the omission of consumption as reported in the Diaries, previously mentioned, all contribute to the low ratio of consumption to income. Savings as reported directly by the CEX includes capital gains along with the out-of-pocket accounting system previously discussed in the adjustment for durables, and is simply inappropriate for use in this study. Further, such simple requirements as that reported durable purchases show up somewhere in net worth is not met in the reported savings data.

[5]The higher intercept and lower marginal propensity to consume of the nonelderly probably reflect the greater transitory component, in the Friedman sense, in their income. That is, whatever the longer run horizon is within which consumption decisions are made, the difference between current and expected (or permanent) income within that horizon is likely to be larger for the nonelderly. Consequently, transitory income would raise the intercept and lower the slope of the nonelderly consumption-income relation (relative to the relationship of consumption to permanent income) while barely affecting the consumption function of the elderly.

[6]Hamermesh (1981) has used longitudinal data to examine the interactions between consumption behavior and the retirement decisions of the elderly.

[7]This pattern--rising average propensities to consume when relative income is held constant, and falling propensities to consume when current income is held constant--is true for all values of Y* in Table 7, and Y in Table 3.

[8]In some regressions, we subdivided units where the head was over 72 years of age into three groups--72-74, 75-79, and 80 and over. The age coefficients were negative and increased with age, reinforcing our conclusion on the lack of dissaving.

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