Spending Trajectories After Age 65

Variation by Initial Wealth

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About This Report

There has been extensive research on the importance of saving for retirement and on tools to facilitate and support the accumulation of retirement wealth. Much less attention has been paid to the decumulation phase, that is, the spending down of wealth following retirement. Understanding the decumulation phase requires information about the spending patterns of older households and how those patterns evolve with age. The RAND Corporation has conducted extensive research on spending trajectories of older households. Building on this prior work, this report provides statistics on household spending and its composition based on the latest available data from the University of Michigan Health and Retirement Study. The report presents estimates of the trajectories of spending after age 65 among single and coupled households stratified by wealth holdings observed at or closely following age 65. The estimated trajectories can help with the prediction of households' spending needs at older ages.

The information about patterns of spending in retirement will be used by the scientific research community, by expert financial advisors, and by institutions and policymakers who are concerned with the structure of retirement benefit payouts.

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Social and Behavioral Policy Program, RAND Center for the Study of Aging

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statistics, and survey to ensure long-term well-being across the life span, aging in place, healthy aging, financial security, and resilience of older adults.

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Summary

This report is part of the broader issue of financial preparation for retirement, which involves balancing economic resources at retirement against spending needs after retirement. Frequently, recommendations are based on rules of thumb: For example, households need to replace a certain percentage of preretirement income, such as 70 or 90 percent, depending on the type of household. This recommendation fails to recognize that spending needs are not constant over the course of retirement. Furthermore, there is heterogeneity across households with respect to the evolution of spending with age. Many households may be able to anticipate the cost of their desired standard of living near retirement but may find it difficult to know how their spending is likely to evolve after that, often several decades into the future. This research clarifies how household-level spending has evolved after age 65 and, therefore, provides for households approaching retirement a guide to probable spending trajectories.

Approach

We analyzed longitudinal data on total household spending from the University of Michigan Health and Retirement Study.[1] The basic method was to estimate two-year rates of change of real household spending, that is, spending adjusted for inflation. Then, using the rates of change, we constructed life-cycle trajectories of spending from age 65 to advanced old age. We conducted separate analyses for single persons and for married persons, and for each we stratified by quartiles of wealth as observed when the individual was in the age range 65 to 69. This *initial wealth* stratification is important because lower-wealth households may have different spending trajectories resulting from their more restricted economic circumstances.

Key Findings

- Real spending—that is, spending adjusted for inflation—declined for both single and coupled households after age 65 at annual rates of about 1.7 percent and 2.4 percent, respectively.
- Real spending declined for all initial wealth quartiles, although with some modest variation.
- The fact that spending declines broadly, including among those in the highest wealth quartile, suggests that the decline may not be related to economic position. (See Figure S.1.)

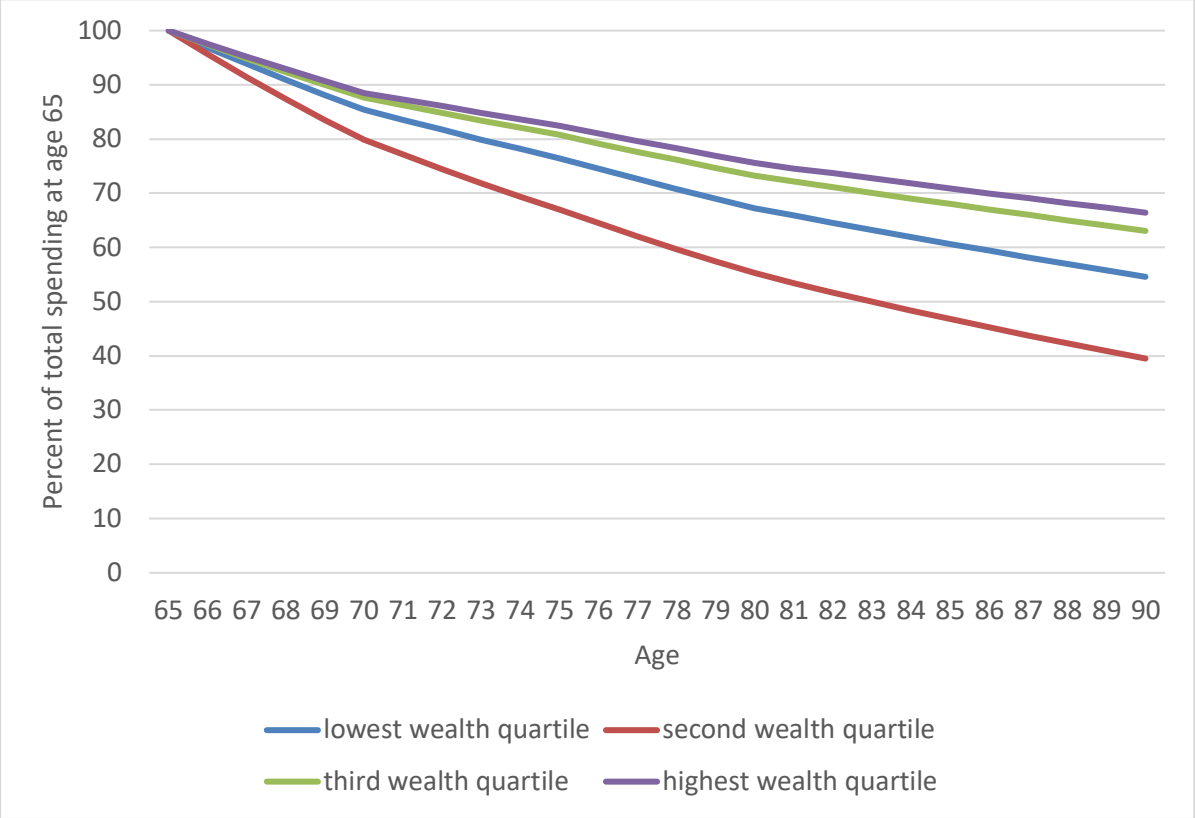
[1] The Health Retirement Study is funded by the National Institute on Aging (grant number NIA U01AG009740), with additional funding from the Social Security Administration; it is conducted by the University of Michigan.

- The view is supported by an analysis of budget shares, the fraction of total spending devoted to subcategories of spending.
- The budget share for gifts and donations increases with age, which suggests that economic position on average does not deteriorate with age, even as spending declines.

Recommendations

- Financial planning for retirement should begin with determining spending requirements over the course of the household's retirement years.
- In determining those spending needs, households, financial planners advising them, and policymakers should not rely on the common assumption that real spending will be constant or even increase, because this is not supported by estimates of spending trajectories based on household-level spending data.
- Instead, households, financial advisors, and policymakers should use the observed rates of spending change to help determine adequate saving rates during the working life and affordable spending levels during retirement.

Figure S.1. Estimated Spending Trajectories for Single Households



SOURCES: Authors' calculations using Consumption and Activities Mail Survey (CAMS) for 2005–2019 and Health and Retirement Study (HRS) core data.
NOTE: See Figure 3.1 and surrounding text of the full report for details on model specification and estimation methods.

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Chapter 1. Background

A great deal of research has been devoted to quantifying the optimal accumulation of wealth during the working life. The literature has developed and estimated a number of types of models, the most advanced being life-cycle dynamic programming models, which account for uncertainty in earnings, rates of return, spending shocks, and so forth. However, there has been relatively little study of the decumulation phase—that is, study of the optimal decumulation of wealth following retirement. Yet decisionmaking in the postretirement years is complex. New uncertainties arise and others become more relevant. Examples of such risks include longevity (both of self and spouse), health shocks (own and spouse); rates of return on assets, including inflation; long-term care; and loss of cognition, which limits problem-solving ability. During the working life, adjusting labor supply in response to a shock provides implicit insurance, but following retirement, returning to work is difficult at best and, for many, not possible. Thus, understanding the decumulation phase is important, and more research is needed. It is a critical input into the evaluation of economic preparation for retirement: A thorough understanding of the decumulation phase is necessary to successfully navigate the accumulation phase.

The most widely used economic theory to study the decumulation phase is the life-cycle model, which emphasizes uncertainty about survival (Yaari, 1965). In the model's simplest form, as applied to a single person, individuals do not derive utility from contemplating a bequest to survivors; that is, they have no bequest motive. Therefore, wealth not consumed is wasted. In the face of a stochastic age of death, that loss can be reduced by consuming more earlier in life. If someone has the "bad luck" of surviving, they will reduce spending to avoid much larger reductions in the future should they continue to survive. Because mortality risk is approximately exponential, individuals choose a spending path that declines at old age. This is true also in the presence of a bequest motive because of very heightened mortality risk at advanced old age. Spending by couples is more complex because of the necessity of providing for the surviving spouse. But also, in the context of this model, couples would choose a spending path that declines, at least eventually, even with a bequest to the surviving spouse: At advanced old age, the marginal utility of wealth to the surviving spouse declines because of their short life expectancy, causing the couple to consume more earlier. Furthermore, the spending path of the household will decline at widowing because of the reduction in household size. Thus, couples should anticipate a declining spending path over the lifetime of the household, including that of the surviving spouse.

The economic theory just outlined concerns the *spending* (or *consumption*) *path*: its level and shape. The theory is not about the *wealth path*; that path is determined from the spending path, wealth level, rates of return, Social Security, and defined benefit pensions. Thus, common rules of thumb, such as "decumulate wealth at 4 percent per year," are not consistent with optimization

in life-cycle models. Similarly, the income replacement rate, which is a common method of measuring economic preparation for retirement, is not consistent with life-cycle models. To move beyond such rules of thumb, we need to know what actual spending paths look like and establish whether they constitute a useful guide for others to use in their financial planning for retirement.

Prior research has established that real spending—that is, spending adjusted for inflation—declines as people age into their middle and late retirement years and that the rate of decline varies by marital status and education (Hurd and Rohwedder, 2012; Rohwedder, Hurd, and Hudomiet, 2022). The simple life-cycle model does not predict variation by education, but such variation is to be expected because of the correlation between education and mortality risk: On average, individuals with more education face lower mortality risk, and so their (optimal) spending path should decline more slowly than that of individuals with less education, who face higher mortality risk on average. However, recent work has suggested an alternative and additional reason for declining spending paths (Rohwedder, Hurd, and Hudomiet, 2022). Budget shares, which are the fraction of spending allocated to a particular category of spending, change systematically with age, and the pattern of change suggests that reductions in some categories are due to declining health. For example, the budget share for trips and vacations declines with age possibly because worsening health makes travel more difficult and hence less enjoyable. The marginal utility of travel would depend positively on health so that trips and vacations would be complementary to health. More generally, marginal utility could decline with age because of changed circumstances, such as widowing: Indeed, single persons have smaller budget shares for trips and vacations than married persons. Or perhaps, as more travel is accumulated, the marginal utility of travel declines. If individuals are aware that the marginal utility of spending on some categories will decline with age, they will bring spending forward, which would steepen any decline due to mortality risk.[1]

An alternative explanation for declining budget shares is a worsening of economic resources with age, which would lead to a disproportionate reduction in spending on luxury goods. However, as shown in Rohwedder, Hurd, and Hudomiet (2022), the budget share for gifts and donations increases with age, which would suggest that the decline in spending for such categories as trips and vacations is not because of increasingly restrictive budget constraints. Rather, people travel earlier when health is good, and worsening health leads to an age pattern of spending similar to that in a Yaari-type model (Yaari, 1965).

There are a number of reasons for wanting to quantify observed spending trajectories of the older population. Under the assumption that past cohorts have achieved a good balance between spending early in retirement and spending late, the observed paths can be used to predict the spending paths following retirement of people approaching retirement. When combined with

[1] How the change over time in the composition of spending would affect overall spending depends on the substitutability and complementarity of the various goods.

data on income and wealth, economic preparation for retirement can be evaluated using simulation methods (Hurd and Rohwedder, 2012). Should economic resources be inadequate to support the anticipated spending path as measured by a nonnegligible probability of running out of wealth, the entire spending trajectory would be lowered; should the simulations show excess wealth, the spending trajectory would be raised.

With respect to saving for retirement, if a declining path is forced because of an increasingly stringent budget constraint, the path may point to under-saving. If the declining path is due to a change in the marginal utility of spending with age, the declining path would not be evidence of under-saving.

The objective of this report is to present spending trajectories based on longitudinal data on total spending of U.S. households and to examine how these vary by households' wealth position shortly after the most common retirement age in the United States, specifically age 65 through 69. The motivations for the classification by wealth near retirement or by *initial wealth* are, first, to address the question about whether the observed spending declines are due to an increasingly tight budget constraint as people age and, second, to provide evidence about the spending path that people of differing initial economic status might expect, which is an important input to effective financial planning for retirement.

A strength of our approach compared with past studies is that we use a long-running panel. Cross-section evidence about spending paths is not valid because of differential mortality and possible cohort differences. A long-running panel is necessary because of macro shocks that could dominate over short periods. Furthermore, we use data on the detailed composition of spending to study budget shares and what those might imply for the interpretation of the declining spending path.

Chapter 2. Data: The Health and Retirement Study and CAMS

Our analyses are based on data from the Health and Retirement Study (HRS) and its supplement, the Consumption and Activities Mail Survey (CAMS).[2] The HRS is a biennial panel. Its first wave was conducted in 1992. The target population was the cohorts born from 1931 through 1941 (Juster and Suzman, 1995). Additional cohorts were added in 1993 and 1998 so that, in 1998, the panel represented the population from the cohorts of 1947 or earlier. In 2004, more new cohorts were added, making the HRS representative of the population 51 or older. The HRS is very rich in content and—importantly for this study—stands out for its high-quality and detailed information on economic resources.

CAMS is a supplemental survey to the HRS; it is administered to a random subsample of HRS households. One of its main objectives is to elicit total household spending over the preceding 12 months, which can be linked to the rich information collected in the HRS core survey on the same individuals and households. The first wave of CAMS was collected in fall 2001, and longitudinal follow-up surveys have been conducted every two years since then. When the HRS inducts a refresher cohort into the survey, a random subsample of households that are part of the refresher group is also inducted into CAMS.

CAMS is administered as a mail-out survey. Initially, it queried about spending in 32 categories—then, in later waves—39 categories, to obtain a complete measure of annual spending.[3] Total spending in CAMS aggregates closely to total spending from the Consumer Expenditure Survey (Hurd and Rohwedder, 2015). For example, among those ages 65 through 74, and 75 or older, CAMS spending in 2007 was $40,700 and $29,400, respectively; in the Consumer Expenditure Survey, such spending was $39,700 and $29,400. These cross-section figures should not be interpreted as life-cycle variation in spending, but spending paths constructed from two-year panel changes in CAMS do decline with age, as we have shown in prior work (Hurd and Rohwedder, 2012; Rohwedder, Hurd, and Hudomiet, 2022) and will show in updated results below.

[2] The HRS is funded by the National Institute on Aging (grant number NIA U01AG009740), with additional funding from the Social Security Administration; it is conducted by the University of Michigan. In this report, we specify the dates of waves of data used for each observation.

[3] The number of spending categories varied somewhat across waves: A few categories were added in the early waves (2003 and 2005), and some categories were split to distinguish spending on goods versus spending on services. CAMS waves 2005 through 2019 queried spending in 39 categories.

Analytic Sample and Derivation of Initial Wealth Quartile

We derive our analytic sample in two stages: First, we determine eligible longitudinal observations on spending based on CAMS waves 2005 through 2019;[4] then we obtain information on each household's asset position when observed earlier in the HRS panel at or near ages 65 through 69. To measure the trajectories of household spending after age 65, we select observations from CAMS with

- sufficient self-reported information on household spending (with at least ten reported spending categories)
- longitudinal observation to measure spending change from one wave to the next
- CAMS respondents age 65 or older
- for married persons, reported information on the spouse's age and where spouse's age is within five years of the respondent's age
- no change in marital status from one wave to the next.

A total of 16,443 CAMS observations meet these selection criteria (see Table A.1), representing 4,599 individuals and their households.

For all retained observations, we look back in the long panel of the HRS to find the wave when the respondent (or spouse) was ages 65 through 69 and assign the wealth quartile that the household was in at that time relative to other households of similar age and same marital status. In constructing the wealth quartiles, we used total net worth, including the net value of housing, real estate, transportation, business, and financial wealth. For 85.5 percent of the spending sample, we assigned the initial wealth quartile in this manner. For 14.5 percent, the earliest HRS observation dates to when individuals in the sample were ages 70 through 74; we assigned them their initial wealth quartile from that wave. We verified that wealth position is substantially rank-order stable: drawing on all available HRS waves, 63 percent of HRS households observed in their late 60s held the same relative wealth position in their early 70s; this rate increases to 95 percent if it includes those whose wealth position changed by just one quartile (see Table C.1 for transition rates between quartiles). For simplicity, we will refer to initial wealth, even if observed at ages 70 through 74, as wealth at 65 through 69 or to the *initial wealth quartile*. The resulting sample sizes for subsequent analyses by age band and initial wealth quartiles are shown in Table D.1.

Financial Resources and Spending Patterns Near Retirement

Before analyzing spending trajectories, we describe the economic context of households near retirement.

[4] We do not use spending information from the first two waves of CAMS obtained in 2001 and 2003 due to differences in those early waves compared with subsequent waves.

Asset Position of Older Households Near Retirement

Households in our analytic sample come from multiple birth cohorts, spanning birth years 1917 to 1952 (median: 1936); therefore, the year when individuals in our sample were observed near retirement (ages 65 through 69) varies. To summarize households' asset position near retirement age, we show in Table 2.1 statistics of total wealth and of financial wealth of 65- to 69-year-olds by (total) wealth quartile for two HRS waves (1998 and 2018).[5] Amounts are adjusted by the Consumer Price Index (CPI) to 2019 dollars, and statistics are weighted.

For single households, as indicated by the median values, total wealth and financial assets declined between 1998 and 2018 in the bottom half of the wealth distribution. In the lowest quartile, the median was approximately zero in both years, and in the second quartile, it declined from $53,300 to $20,400. In the third quartile, there were meaningful increases in the median both in total wealth (21 percent) and in financial wealth (56 percent). The highest quartile saw a substantially larger increase in median financial wealth from $247,200 to $426,600. An implication is that about half the households who enter their retirement years as singles will largely have to finance consumption in retirement out of income unless they are homeowners who can monetize home equity.

Coupled households hold more wealth than single households. Real total wealth declined between 1998 and 2018 in the first wealth quartile and increased slightly in the second. Reflecting increasing wealth inequality, the top quartile experienced the largest increase: 75 percent at the median and 44 percent at the mean.

[5] Total wealth for the construction of wealth quartiles includes housing, transportation, real estate, business, and financial wealth, including individual retirement accounts (IRAs) (but not pension or Social Security wealth or defined contribution balances not rolled over into IRAs). Financial wealth is the sum of the net value of stocks, mutual funds, investment trusts, checking, savings or money market accounts, CDs, government savings bonds, treasury bills, net value of bonds and bond funds, IRAs, Keogh accounts, and the value of all other savings minus the value of nonhousing debt.

Table 2.1. Financial Assets by Total Wealth Quartile, Ages 65 Through 69, Single and Married Households

Initial Wealth Quartile	Total Wealth Quartile Cut Points		Total Wealth		Financial Assets	
	Minimum	Maximum	Mean	Median	Mean	Median
			Single Households			
1998						
Lowest	−193,314	12,548	−550	157	−2,143	0
2nd	12,704	104,302	55,331	53,327	11,715	1,937
3rd	104,537	280,752	169,873	159,982	46,374	35,290
Highest	283,889	9,230,316	952,558	617,184	502,484	247,187
2018						
Lowest	−83,791	4,582	−3,660	0	−4,916	0
2nd	5,000	101,812	34,818	20,362	3,188	0
3rd	104,887	411,600	214,420	193,443	68,314	54,978
Highest	418,244	6,545,000	1,301,632	712,745	722,853	426,592
			Married Households			
1998						
Lowest	−308,043	139,592	56,944	68,196	1,734	471
2nd	139,906	344,274	232,101	225,856	65,707	47,053
3rd	345,059	774,813	528,829	526,998	229,932	227,425
Highest	776,382	19,761,356	2,345,095	1,324,475	1,128,958	723,943
2018						
Lowest	−1,005,902	154,000	46,703	36,449	−4,339	0
2nd	157,669	473,426	280,508	267,256	70,606	40,216
3rd	474,444	1,119,932	747,911	687,333	302,723	254,530
Highest	1,138,258	19,982,386	3,370,432	2,320,295	2,166,999	1,170,838

SOURCES: Authors' calculations using HRS 1998 and HRS 2018. (As previously mentioned, for these tables we cite the specific waves of data used from this database.)
NOTE: Weighted statistics. Financial assets include net value of IRAs and Keogh accounts; net value of stocks and mutual funds; checking, savings, and money market accounts; CDs, government savings bonds, and treasury bills; corporate, municipal, government or foreign bonds, or any bond funds; and any other savings or assets, minus (nonhousing) debt. Amounts are CPI-adjusted to 2019 dollars. Total wealth includes financial assets; net value of housing; and real estate, transportation, and business wealth.

Spending of Older Households Near Retirement

Spending levels. Comparisons of total spending reveal large differences across initial wealth quartiles (see Table 2.2). Among singles, average annual household spending in the highest initial wealth quartile is more than twice that of those in the lowest wealth quartile ($48,000 compared with $23,000). Differentials in median spending are slightly smaller but still similar in overall magnitude. The variation across age groups within quartiles is modest, pointing to lower spending at older ages. However, the statistics in Table 2.2 reflect cross-sectional variation by age and should not be interpreted as life-cycle variation: Quantification of the age profile requires longitudinal data.

Among couples, as one would expect, total annual household spending is almost twice that of single households. The spending differentials between highest and lowest initial wealth quartile are about 2:1, similar in magnitude to those observed for singles. Average household spending in

the highest quartile is about $75,000, compared with $37,000 in the lowest quartile. Again, age patterns are suggestive of spending being lower at older ages, but we will quantify the age pattern in longitudinal analyses below.

Table 2.2. Annual Household Spending

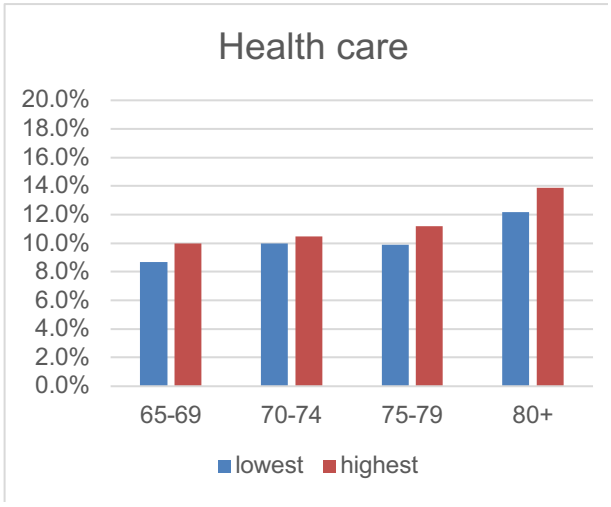
	Initial Wealth Quartile				
	Lowest	**2nd**	**3rd**	**Highest**	**All**
	Single Households				
Age Band	**Means**				
65–69	22,133	29,816	39,337	50,698	34,687
70–74	25,922	28,127	36,788	49,276	34,520
75–79	23,993	27,796	33,120	47,976	32,824
80+	21,915	27,718	32,494	46,293	32,956
All	23,401	28,239	34,902	47,912	33,578
	Medians				
65–69	16,755	26,760	33,288	40,731	28,505
70–74	20,003	24,240	31,605	39,226	27,446
75–79	20,609	24,794	28,320	38,998	26,963
80+	18,505	23,464	26,549	35,776	26,094
All	19,333	24,549	29,067	37,677	26,968
	Married Households				
Age Band[a]	**Means**				
65–69	42,843	53,444	68,873	91,051	64,055
70–74	39,451	49,830	57,881	81,775	59,196
75–79	33,550	46,348	54,269	71,214	54,171
80+	30,042	38,116	43,771	59,976	46,328
All	37,661	47,772	56,565	75,333	56,466
	Medians				
65–69	34,980	47,419	62,115	77,798	53,990
70–74	34,971	41,765	49,262	73,644	49,252
75–79	28,972	37,526	46,897	61,685	45,663
80+	22,773	34,088	38,836	49,946	38,885
All	31,335	40,022	48,235	63,776	46,649

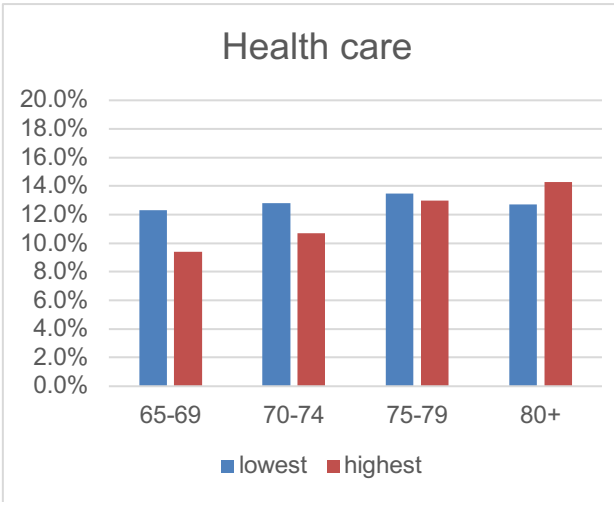
SOURCE: CAMS, 2005–2019, pooled. (As previously mentioned, for these tables we cite the specific waves of data used from this database.)
NOTE: n = 8,455 for single households; n = 7,988 for married individuals and their households. Amounts are CPI adjusted to 2019 dollars.
[a] Married households are stratified by the age of the male spouse. Statistics computed separately for single males and single females show similar patterns, but single females' spending levels are somewhat lower than those of single males (not shown).

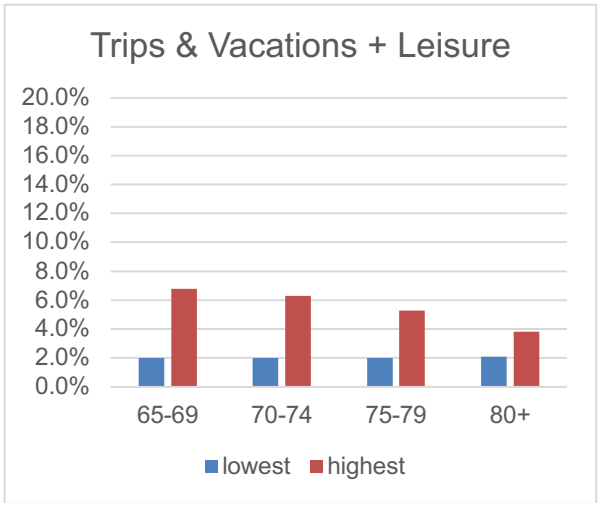
Budget shares. We aggregated the 39 CAMS spending categories into 12 broad categories (see Table B.1). Among 65- to 69-year-olds, the largest five categories combined make up about 80 percent of total spending for both singles and coupled households: These are housing, transportation, food, utilities, and health. The composition of spending varies notably by socioeconomic status (as measured by initial wealth quartile) and by age. Table E.1 and Table E.2 show detailed statistics, and Figure 2.1 displays some examples.

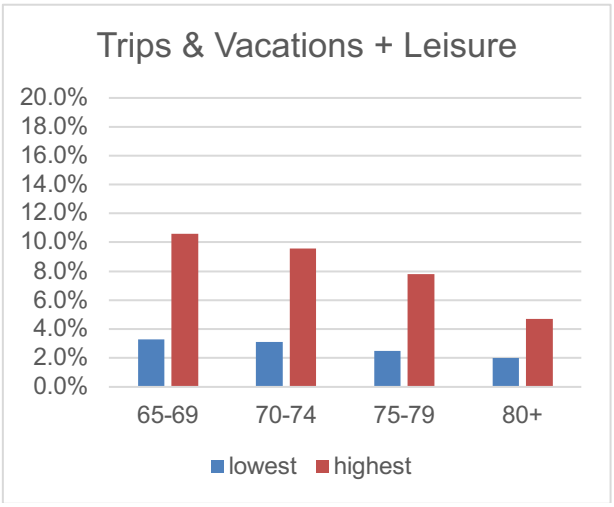
Figure 2.1. Budget Shares for Lowest and Highest Initial Wealth Quartiles by Age Band

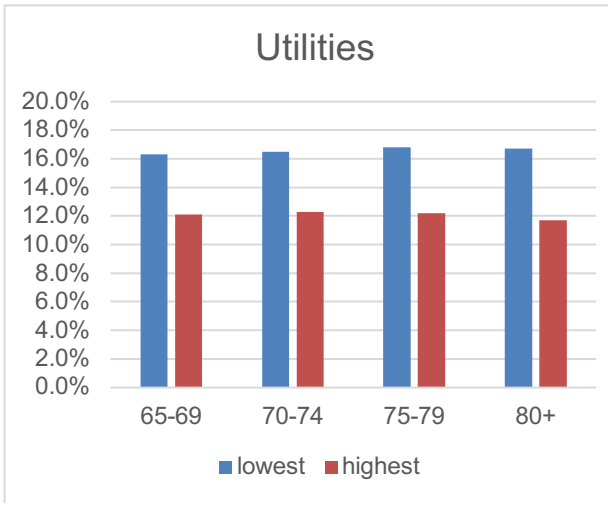
Single Households	Coupled Households

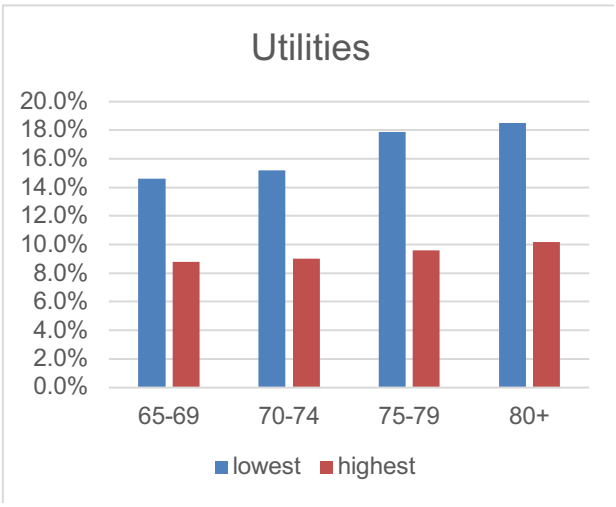


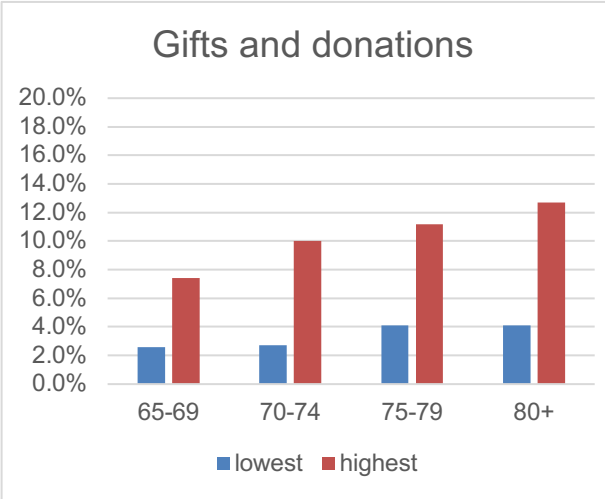
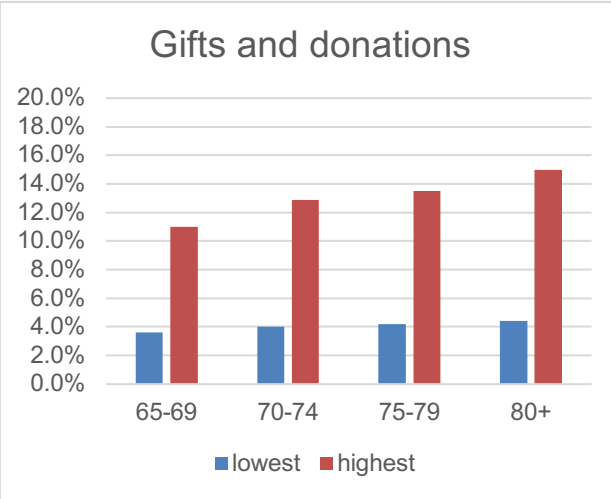










Single Households	Coupled Households
	

SOURCE: CAMS, 2005–2019, pooled.

The variation by initial wealth reflects the different nature of goods and services: Some meet basic necessary needs of the household, and others are optional and are usually purchased only if the budget permits (luxuries). Necessities, such as food or utilities, make up a smaller fraction of the total budget of higher-wealth households than the budget of less well-to-do households. For example, the households of married persons ages 65 through 69 spend on average 10.9 percent of their total budget on utilities. However, those in the lowest initial wealth quartile spend a larger fraction (14.6 percent) than those in the highest quartile (8.8 percent) on utilities. Budget shares of luxury goods and services, such as trips, vacations, and leisure, or gifts and donations, show a strongly positive wealth gradient. Households of married persons ages 65 through 69 in the lowest quartile spend just 3.3 percent on trips, vacations, and leisure; households in the highest quartile spend 10.6 percent.

There is also important variation in the budget shares by age, which suggests an interaction of spending with health and other factors correlated with age, such as widowing. For example, as one might expect, the share spent on health care is higher at older ages, with 9.4 percent among singles at ages 65 through 69 and 13.9 percent at age 80 or older. Among married households, the shares are 11.0 percent at ages 65 through 69 and 15.4 percent at age 80 or older. The opposite trend is found for budget shares of trips, vacations, and leisure, which decrease with age. These patterns suggest that there are three types of spending: those that are complements to health, those that are substitutes for health, and those that are neutral to health.

The relationship between spending allocation and health further interacts with the variation in spending by socioeconomic status, that is, necessities versus luxuries. Notice the variation in the budget shares of gifts and donations, a luxury good: Higher-wealth households' budget share for gifts and donations is more than twice that of lower-wealth households. Furthermore, it increases with age, although this type of spending is presumably neutral with respect to health. This

pattern suggests that households in the highest initial wealth quartile do not experience tightening budget constraints at older ages.

Chapter 3. Spending Trajectories

We first present raw data on spending change. Table 3.1 shows real two-year spending changes for couples and singles, by age band, over years 2005 to 2019, or seven changes. To reduce the influence of outliers, we show medians within age-band-wave cells of the rates of change. The changes are calculated over all observations that are observed in two adjacent waves, thus showing within-household rates of change.

Among single persons, the overall two-year rate of change is −3.46 percent, or −1.73 percent per year. The years with the largest declines are 2007 through 2009 and 2009 through 2011, years associated with the Great Recession and its aftermath. All cells are negative except three. Among couples, the average overall change is −4.81 percent, or an annual rate of decline of about 2.40 percent. As with singles, the years with the greatest declines are 2007 through 2009 and 2009 through 2011. All cells but one show declines. Thus, the raw data strongly support declining spending with age.

Table 3.1. Median Two-Year Percentage Change in Real Spending, 2005 Through 2019

Age Band	2005–2007	2007–2009	2009–2011	2011–2013	2013–2015	2015–2017	2017–2019	All
				Single Households				
65–69	−4.64	−10.34	−3.33	−1.73	−0.66	3.1	−2.72	−2.37
70–74	−2.67	−5.66	−3.01	−0.27	−0.34	−8.2	5.28	−2.00
75–79	−9.16	−2.68	−8.84	−3.19	−1.45	−2.44	−2.74	−3.84
80+	−5.98	−7.03	−7.49	−5.13	0.07	−3.56	−0.93	−4.19
All	−5.16	−6.58	−6.54	−2.50	−0.66	−2.44	−0.93	−3.46
				Married Households[a]				
65–69	−10.14	−7.08	−0.98	−6.99	−6.52	−8.12	−0.92	−5.17
70–74	−4.09	−10.25	−8.04	−3.56	1.95	−1.34	−5.60	−4.12
75–79	−4.27	−6.53	−3.17	−1.17	−3.37	−10.48	−3.60	−4.40
80+	−11.78	−6.42	−3.08	−4.37	−5.48	−2.58	−5.94	−5.49
All	−7.83	−7.43	−4.53	−3.71	−3.22	−4.53	−1.68	−4.81

SOURCE: Authors' calculations using CAMS waves 2005–2019.
NOTE: Weighted statistics. *n* = 9,657 for single households; *n* = 12,455 for coupled households.
[a] Married households are stratified by the age of the male spouse.

A nonparametric representation of trajectories would entail integrating up the rates of change, as we have done in other work (Hurd and Rohwedder, 2012; Hurd and Rohwedder, forthcoming). In this report, we focus on the variation by economic status as measured by wealth at ages 65 through 69. If we stratify by marital status and interact age and initial wealth quartiles, sample sizes become inadequate. Therefore, we control for wealth and age via regression. We

report in our main text results for the change in the log of spending. Appendixes F and G have results for other specifications, such as median regression of spending ratios.

Table 3.2 and Table 3.3 show regression results from three specifications for single and for coupled households, respectively. The outcome of all regressions is the two-year change in the log of spending; the regressions use indicator variables for wealth quartile with the lowest quartile as reference. The three specifications differ in how age is modeled. In the columns labeled "Age Bands," age is entered as categorical variables with ages 65 through 69 as reference. In the "Age Continuous" columns, age is entered linearly, normalized to zero at age 65. In the "No Age Effects" columns, age is suppressed.

For single households, the constant term shows a two-year rate of decline of the reference group of −0.0603, or an annual rate of decline of 3.0 percent. None of the age effects is statistically significant. The second wealth quartile has a statistically significant (algebraically) smaller rate of change, and from quartiles two to four, the pattern is an increase in the rate of change. When age is entered linearly, the coefficients on the wealth quartiles change very little; age itself has a small positive effect. In the last columns, age is suppressed, which changed the estimated effect of wealth only modestly. For example, the difference in the rate of decline is 0.0256 between the first and second quartiles when age is entered categorically; it is 0.0253 when age is suppressed (0.0253 = 0.0706 − 0.0453).

For coupled households, the constant term shows a two-year rate of decline of the reference group of −0.0750. None of the age or wealth effects is statistically significant. The wealth effects are almost unchanged when age is entered linearly and unchanged relative to each other when age is suppressed.

Table 3.2. Estimates of Spending Path Parameters, Single Households

	Age Bands		Age Continuous		No Age Effects	
	Coefficient	**S.E.**	**Coefficient**	**S.E.**	**Coefficient**	**S.E.**
Wealth quartile						
Lowest	(Ref.)	(Ref.)	(Ref.)	(Ref.)	−0.0453***	0.0111
2nd	−0.0256*	0.0145	−0.0261*	0.0145	−0.0706***	0.0103
3rd	0.0106	0.0137	0.0102	0.0138	−0.0343***	0.0086
Highest	0.0150	0.0138	0.0142	0.0138	−0.0288***	0.0088
Age						
65–69	(Ref.)	(Ref.)				
70–74	0.0200	0.0162				
75–79	0.0139	0.0154				
80+	0.0240	0.0147				
Age—65			0.0013	0.0008		
Male	−0.0100	0.0069	−0.0111	0.0070	−0.0077	0.0067
Constant	−0.0603***	0.0146	−0.0582***	0.0145		

SOURCES: Authors' calculations using CAMS 2005–2019 and HRS core data.
NOTE: n = 8,455. p-values: * p < 0.10; ** p < 0.05; *** p < 0.01. Ref. = reference; S.E. = standard error of the estimated coefficient. Standard errors are corrected for multiple observations on the same household.
The left-hand variable is the change in log spending, $\ln(s_{t+1}) - \ln(s_t)$, where s_t is spending in wave t. Thus, the results refer approximately to two-year proportional changes in spending. The regressions differ in how age is entered. Regressions are estimated by ordinary least squares (OLS).

Table 3.3. Estimates of Spending Path Parameters, Coupled Households

	Age Bands		Age Continuous		No Age Effects	
	Coefficient	S.E.	Coefficient	S.E.	Coefficient	S.E.
Wealth quartile						
Lowest	(Ref.)	(Ref.)	(Ref.)	(Ref.)	−0.0699***	0.0183
2nd	0.0246	0.0185	0.0253	0.0185	−0.0453***	0.0104
3rd	0.0101	0.0176	0.0105	0.0176	−0.0606***	0.0088
Highest	0.0099	0.0183	0.0107	0.0184	−0.0612***	0.0097
Male spouse's age						
65–69	(Ref.)	(Ref.)				
70–74	0.0309*	0.0176				
75–79	−0.0142	0.0171				
80+	−0.0048	0.0181				
Male spouse's age—65			−0.0010	0.0010		
Female spouse's age is 2+ years less than male spouse's age	0.0091	0.0100	0.0103	0.0101	0.0088	0.0102
Constant	−0.0750***	0.0225	−0.0626***	0.0210		

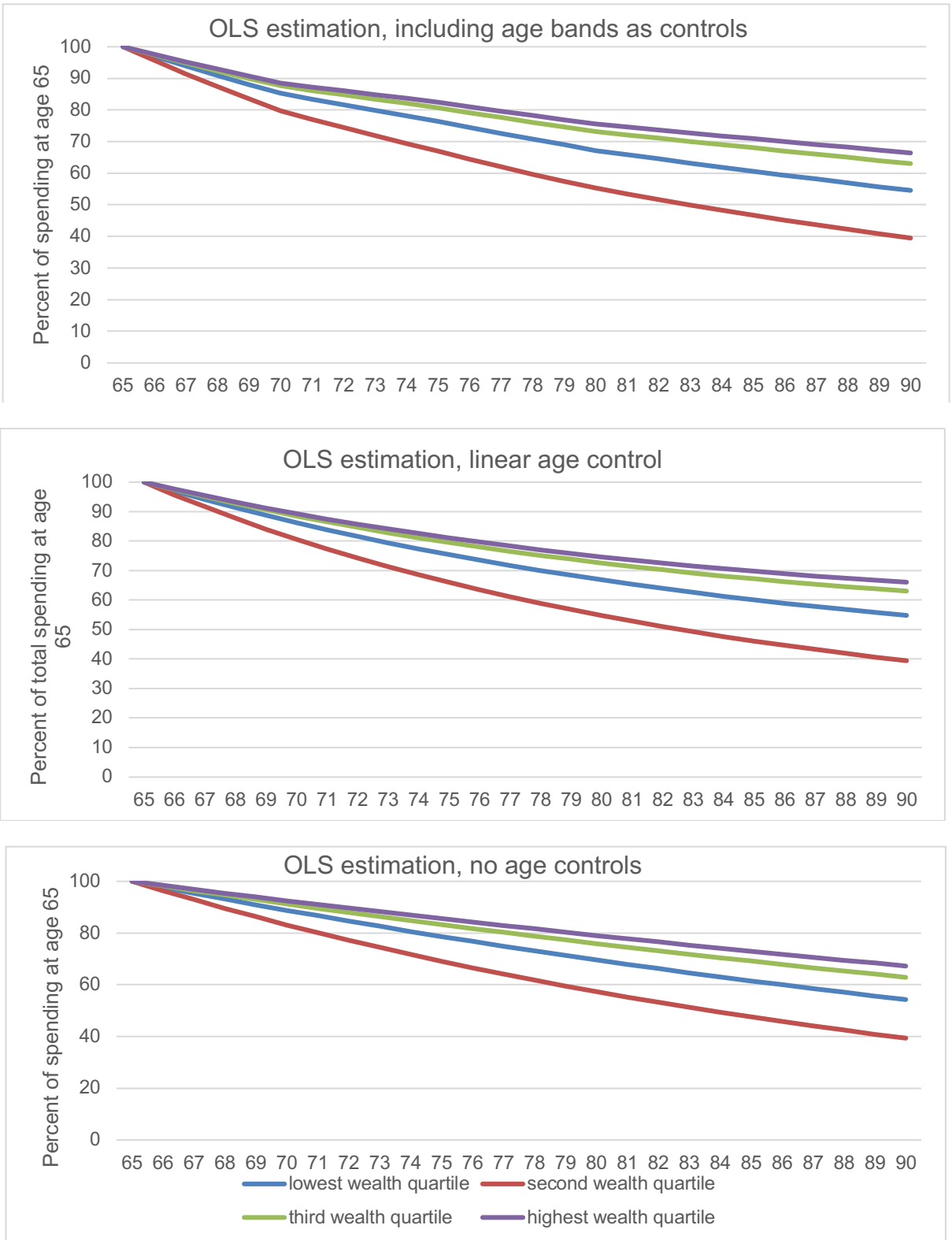
SOURCES: Authors' calculations using CAMS 2005–2019 and HRS core data.
NOTE: n = 7,988. p-values: * p < 0.10; ** p < 0.05, *** p < 0.01. Ref. = reference; S.E. = standard error of the estimated coefficient. Standard errors are corrected for multiple observations on the same household.
The left-hand variable is the change in log spending, $\ln(s_{t+1}) - \ln(s_t)$, where s_t is spending in wave t. Thus, the results refer approximately to two-year proportional changes in spending. The regressions differ in how age is entered. Regressions are estimated by ordinary least squares (OLS).

These results are summarized in graphs that show the predicted spending trajectories. Figure 3.1 shows that spending by single persons will decline by age 85 to the range of 61 percent to 71 percent of initial spending regardless of the specification for age, except for those initially in the second wealth quartile: In that case, spending will decline to about 47 percent. For couples (see Figure 3.2) there is little difference across age specifications and smaller differences by wealth quartile: The quartiles span a range of spending at age 85 of 50 percent to 65 percent of spending at age 65.

From the third specification, we generate spending trajectories with 95 percent error bands, as shown in Figures 3.3 and 3.4, for the first and fourth wealth quartiles. The top band comes from adding 1.96 standard errors to the mean rate of change, and the bottom band comes from subtracting 1.96 standard errors. The trajectories are bounded well away from 100 percent both for single persons and for couples, corroborating the finding of statistically significant declines of spending with age.

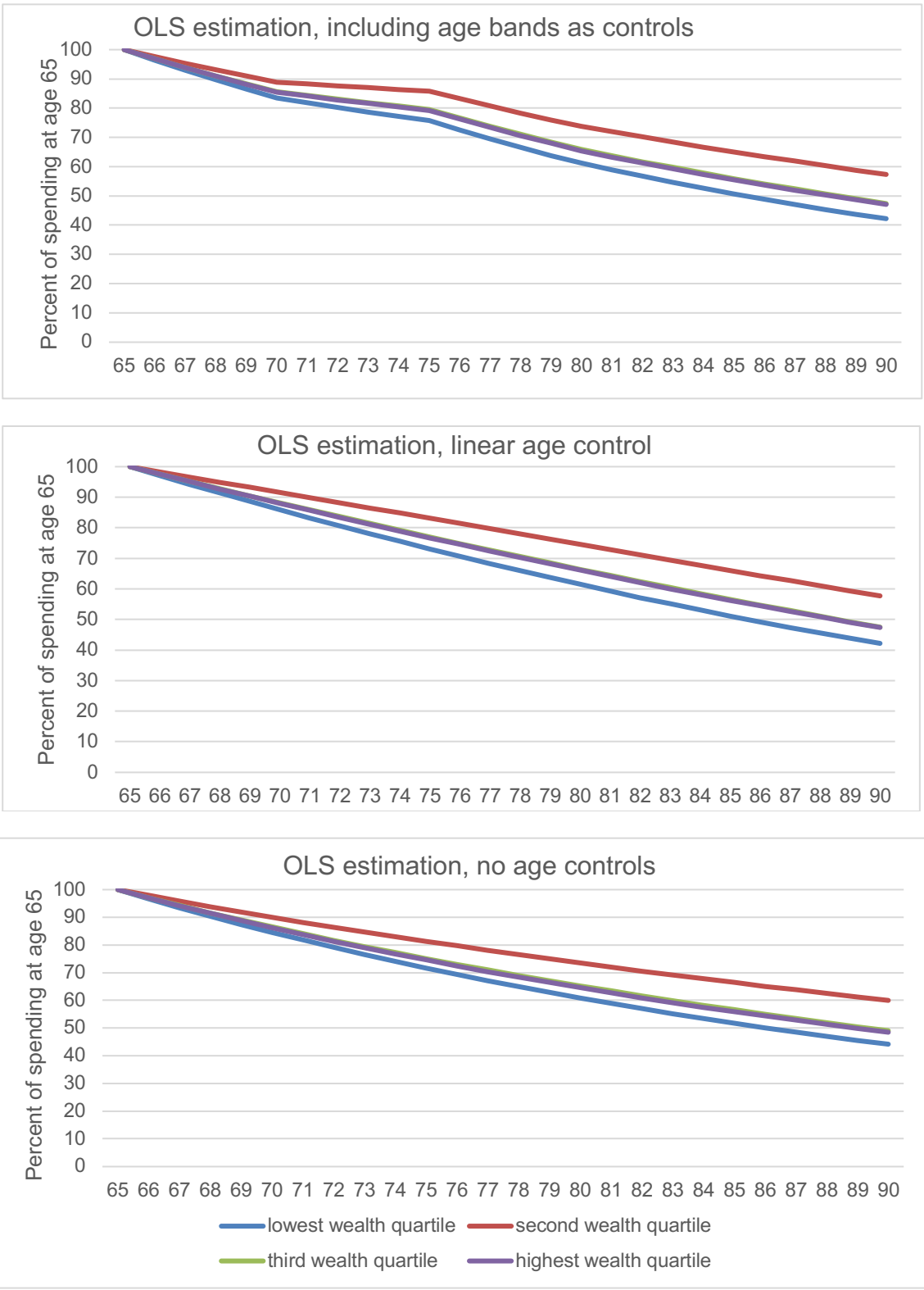
We conducted a large number of robustness checks. We explored alternative specifications of the outcome, such as the fractional spending change $(s_{t+1} - s_t)/s_t$, where s_t is spending in wave t. That specification can produce substantial outliers because of observation error on s_t. A robust estimator in that case is median regression. Results of that estimation are in Tables F.1 and F.2 and in Figure G.1. They are similar to the results in Table 3.2 and Table 3.3. Other results not shown include the population ratios of mean spending or of median spending by age band, again with similar implications about declining spending paths.

Figure 3.1. Estimated Spending Trajectories of Single Households from Age 65



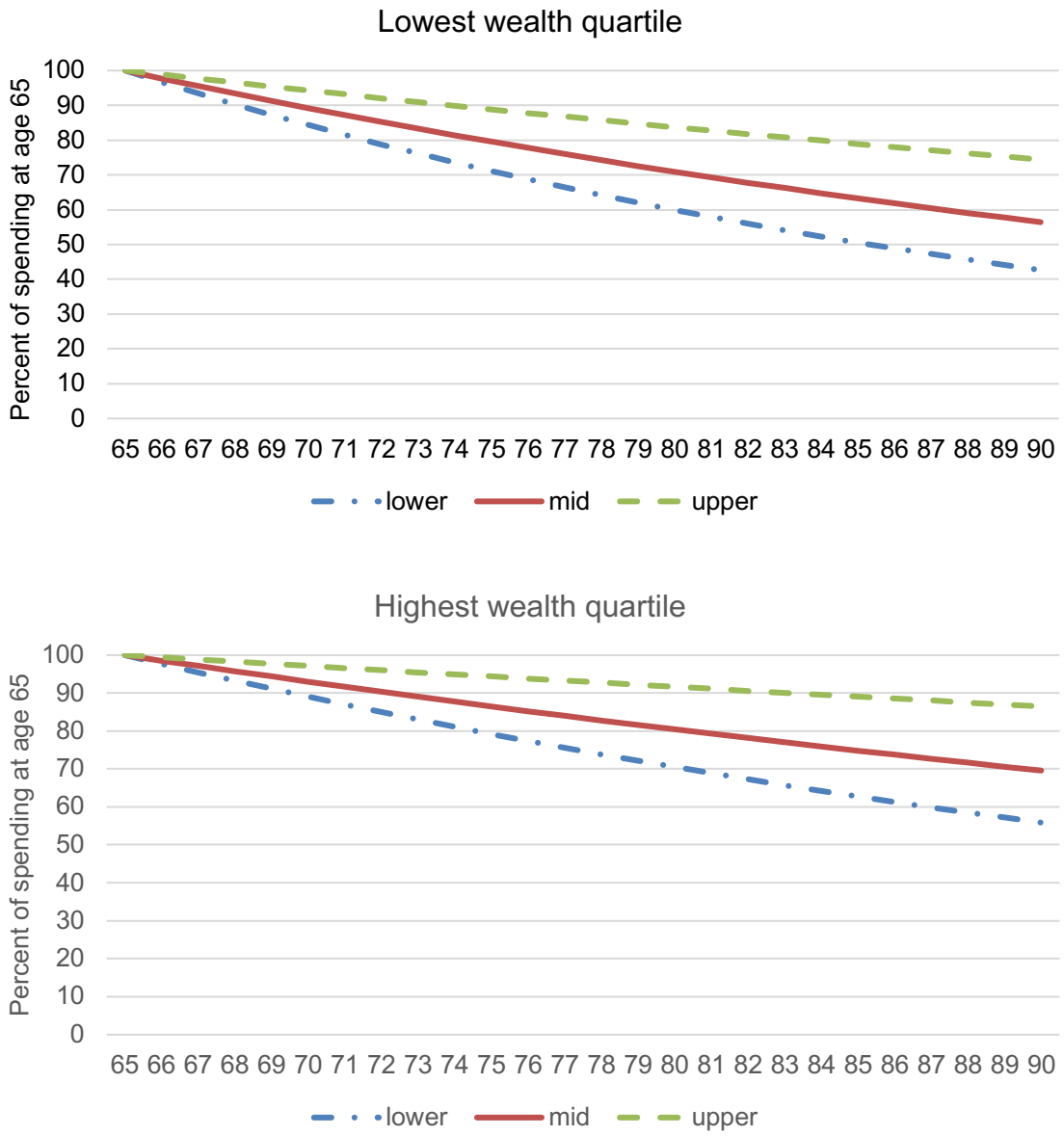
SOURCES: Authors' calculations using CAMS 2005–2019 and HRS core data.
NOTE: Based on estimates shown in Table 3.2.

Figure 3.2. Estimated Spending Trajectories of Coupled Households from Age 65



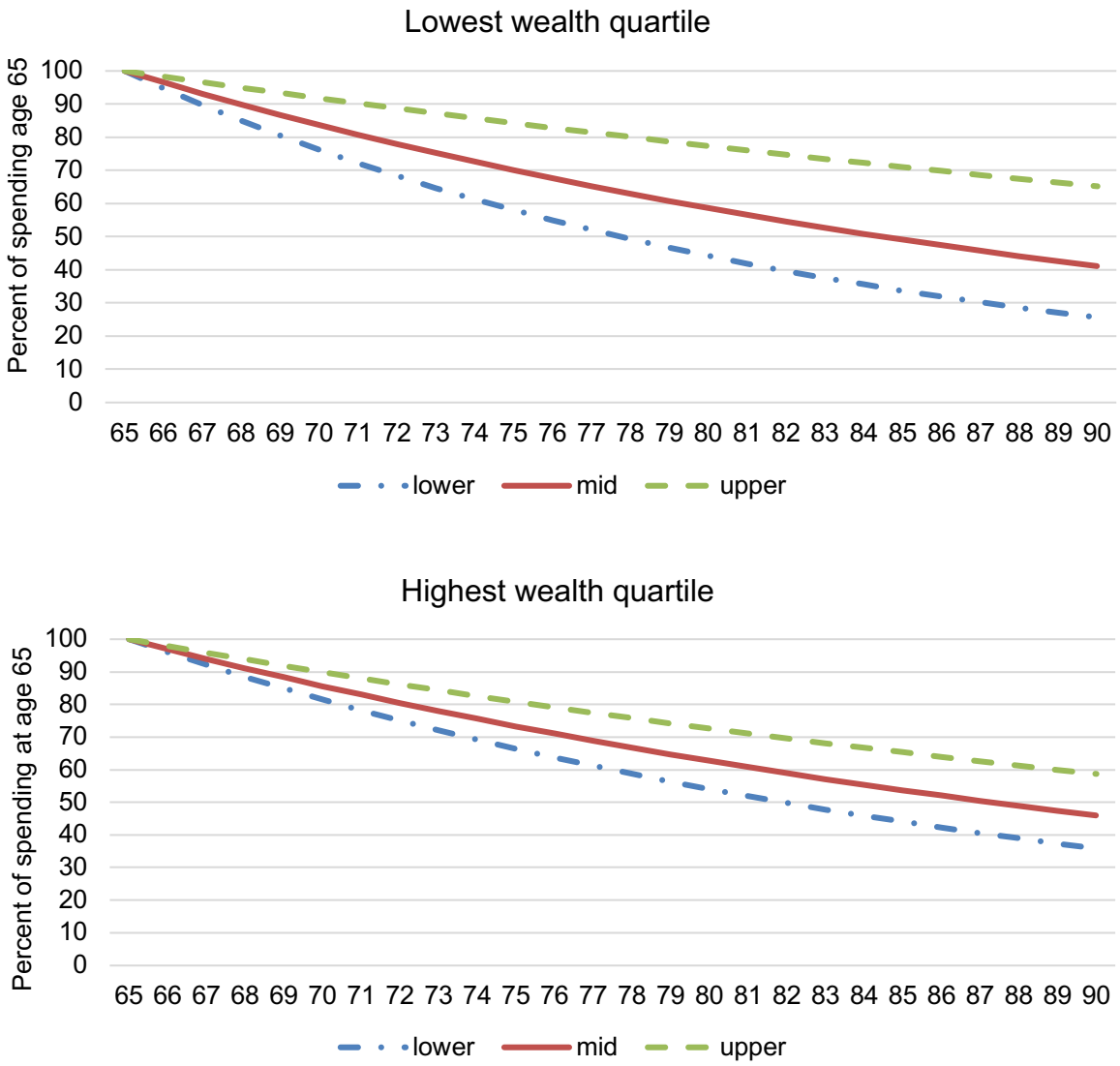
SOURCES: Authors' calculations using CAMS 2005–2019 and HRS core data.
NOTE: Based on estimates shown in Table 3.3.

Figure 3.3. Estimated Spending Trajectories from Age 65 with 95 Percent Confidence Bands, Single Females



SOURCES: Authors' calculations using CAMS 2005–2019 and HRS core data.
NOTE: Based on estimates shown in Table 3.2, specification without age controls.

Figure 3.4. Estimated Spending Trajectories from Age 65 with 95 Percent Confidence Bands, Coupled Households



SOURCES: Authors' calculations using CAMS 2005–2019 and HRS core data.
NOTE: Based on estimates shown in Table 3.3, specification without age controls, predicted spending path for households in which female spouse's age is less than two years younger than the male.

Chapter 4. Discussion

The objective of this study was to document household spending trajectories after age 65 and how they vary by initial wealth. We found that, on average, individuals and households reduced spending by about 2 percent per year regardless of age but with some variation by wealth quartile as measured at ages 65 through 69. The closest counterpart study is by Chen and Munnell (2021): They reported a smaller estimated rate of spending decline of less than 1 percent, using the same spending data from CAMS. This discrepancy is due to their using a more restrictive analytic sample (retired only), using years since retirement rather than age, excluding spending on durables, and using an estimation method that imposes strong functional form assumptions.[6]

Using the Estimated Trajectories in Financial Planning for Retirement

An important question is how the estimated spending trajectories should be used in financial planning for retirement. A complete answer to that question is beyond the scope of this report, but we offer a number of comments to help with interpretation and to point to issues not considered.

Reasons for spending declines. If the reductions in spending were accompanied by expressions of financial distress, then the estimated spending trajectories would not be a good guide for financial planning for retirement. However, if the spending declines are chosen by households—as part of intertemporal allocation of lifetime resources regarding how much to spend earlier versus later in life—the estimated trajectories would provide useful information. We offer evidence that the reductions in spending were not due to tightening budget constraints but were rather chosen. First, spending declined for all initial wealth groups, including the most well-to-do, who are unlikely to be financially constrained. Furthermore, we documented that budget shares for gifts and donations increased with age, whereas if budget constraints were tightening with age, one would expect the opposite pattern. Additional supporting evidence comes from findings of a recent study that investigated reasons for spending declines at older ages (Rohwedder, Hurd, and Hudomiet, 2022). That study asked respondents directly about reasons for changes in spending, including multiple questions about changes in enjoyment of different types of spending. The majority of individuals at advanced ages reported less enjoyment from spending on travel; dining out; leisure activities; and new appliances, clothes, or a car. Poor health was a strong predictor of reduced enjoyment. At the same time, indicators of

[6] Chen and Munnell (2021) used a fixed effects estimator and modeled spending as a quadratic in age. However, the fitted shape of the spending path in a quadric specification will be dominated by the large sample sizes at younger ages, thus obscuring the spending declines at older ages. Our Table 3.1 and our nonparametric specification in Table 3.2 and Table 3.3 show substantial spending declines at all ages.

financial distress or of being financially constrained were much less frequently reported at advanced ages. Collectively, these findings reinforce the interpretation that reductions in spending are not primarily due to tightening budget constraints.

The role of inflation. The real annual change in spending over the period 2005 to 2019 was about 2 percent, which is just modestly less than the rate of inflation over that period. Although not consistent with economic theory, it could be that the observed rate of decline in spending is the result of people maintaining nominal spending. We investigated this hypothesis (results not shown but summarized here). Our method was to estimate which of real or nominal spending changes depended on price change: If people aim to maintain real spending, an increase in prices will lead to an increase in nominal spending but not in real spending. If people aim to maintain nominal spending, real spending will decline if prices increase, but nominal spending will not. We disaggregated by wealth quartile, surmising that both the level and mix of economic resources (as between those that are inflation protected and those that are not) would matter.

We found that among singles—except at the top wealth quartile—there was some support for the hypothesis that people aimed to maintain nominal spending. The results were consistent for both real and nominal spending. We note that this pattern would not be explained by single persons spending what they get from Social Security—that would lead to maintaining real spending. Among couples, we found opposite patterns from those of single persons. Our conclusion is that there are no consistent patterns over both marital types. However, we note data limitations. We observed only seven price changes that were the same for everyone: We would need eras of large price changes for better separation of hypotheses. We entertained no consideration of categories of spending or duration of contracts, such as automobile payments. The importance of this is that, with fixed prices over a contract period, the consumer will maintain both real and nominal spending for the duration of the contract, but an uninformed outsider will wrongly use fluctuating prices and think that real spending varies. The overall effect on the variation in total spending will depend on the mix of contracted spending and spot market spending, such as for food and gasoline.

Modeling approach. Our results, including the simulated spending trajectories, are based on historical rates of change. Although our choice of functional forms and explanatory variables are informed by economic reasoning, our data are not fit to a structural model based on utility maximization with explicit modeling of the determinants of spending. A correctly specified and estimated structural model can analyze situations not seen in historical data, whereas our results describe what has happened and what, under continuing similar conditions, would be expected to happen in the future. Some support for thinking that a decline in spending at older ages is generalizable is that the percentage change in real spending declines for almost all age groups: For single persons, 25 of the 28 age-wave cells are negative; for couples, 27 of the 28 are negative (see Table 3.1). Nonetheless, should there be an important change in a determinant of the rate of change in spending, our forecast of spending trajectories would be inaccurate, whereas a structural model that modeled and estimated the effect of that determinant might be accurate.

Additional Considerations Not Addressed in This Study

Widowing. Most households enter retirement as a couple; their spending would approximately follow the spending trajectory estimated for couples. Because of returns to scale in consumption, at widowing, the entire spending trajectory should shift down, then follow the estimated trajectory for single households. A quantitative example of returns to scale in spending comes from the Social Security system, which embeds an implicit returns-to-scale assumption. In the era in which married women had quite low lifetime earnings, the wife's benefit was half the husband's benefit, so that the couple's benefit was 150 percent of the husband's benefit. Following widowing, the surviving spouse would receive the husband's benefit, which would be consistent with the assumption that a couple needs just 50 percent more than a single person to achieve the same utility level.

The actual reduction in spending following widowing would depend on returns to scale but also changes in economic resources, such as the actual reduction in Social Security benefits or in a defined pension benefit. According to 511 panel observations in CAMS that involve widowing between adjacent waves, spending drops by about 16 percent (median change) when the household transitions from a married to a single household. Thus, the spending path observed over the lifetime of the couple, including the widowed phase, will have an average slope that includes the one-time downward shift. Our results do not include that one-time reduction.

Differential mortality. In prior work, we documented large survival differences by socioeconomic status, with important implications for how long retirement resources need to last (Hurd and Rohwedder, 2012; Hurd and Rohwedder, forthcoming). Drawing on the long panel of the HRS, we estimated survival differentials by age, sex, marital status, and education. According to our estimates, a single female lacking a high school education has a 50 percent chance of surviving to about age 80; a married female with a college education has a 50 percent chance of surviving to about age 96. In terms of life expectancy rather than in survival chances, married females with a college education will live 14 more years than single females lacking a high school education, and so will have to finance 14 additional years of consumption. For males, the results show the same qualitative patterns, although the differentials are slightly smaller. The implication is that when studying the spending trajectories for couples, only a fraction of the sample will reach advanced age as a couple. For most, the chances are high that they will experience widowing before reaching advanced old age.

At the methodological level, a further implication is that the sample on which spending transitions are estimated has a different composition across the age span, even while holding the sample of each estimated two-year transition the same. The same is true for the estimations of the spending trajectories of singles. A study of the role of differential mortality, in which these compositional changes are examined in more detail to verify the robustness of our approach, would be worthwhile, but it is beyond the scope of this report.

Heterogeneity in the rate of change in spending. Our models permitted differences in the rate of change in spending as a function of marital status, sex, age, and initial wealth quartile, thus revealing persistent differences in long-run rates of change and life-cycle trajectories of spending. Our main results are based on the central tendency of the rates of change—in most cases, the regression-adjusted mean of the change in the log of household spending. The uncertainty in the spending path as displayed in Figures 3.3 and 3.4 comes from uncertainty about the expected value of spending change conditional on a set of characteristics. Under this model, the average trajectory of spending should, with high probability, lie between those bands.

We did not consider unobserved heterogeneity conditional on observed characteristics. Under that model, each person has a different permanent rate of change of spending and possibly a different adjustment with age. The average of these rates of change would be the average observed in our data (about −0.04) so that, at the population level, the models we estimated and the model of individual heterogeneity are indistinguishable. But the implications at the individual level are quite different. Individuals with the (algebraically) largest rates of change could have flat or even rising trajectories, whereas those with the smallest could have sharply declining trajectories. The individual trajectories would average out to the population average of −0.04. Separating the models requires linking together individual-level rates of change over more periods and the direct modeling of individual heterogeneity. This in turn requires a more thorough understanding and modeling of differential mortality, both of which are left for future research.

End-of-life medical out-of-pocket spending. Prior research based on the HRS core data has documented a concentration of out-of-pocket (OOP) medical expenditures toward the end of life, which in turn is concentrated among a small percentage of individuals with particularly high OOP expenses: The top 10 percent of persons account for 42 percent of all OOP spending (Fahle, McGarry, and Skinner, 2016). In the case of widowing, that spending should be reported in CAMS by the surviving spouse, but in the case of the death of a single person, CAMS is not administered to any survivor, so that spending is not recorded. The HRS core elicits OOP medical spending with great care to capture end-of-life costs through proxy interviews or so-called *exit interviews*. Fahle, McGarry, and Skinner (2016) estimated median individual OOP spending in the last year of life of $6,300, which corresponds to about $6,800 in 2019 dollars. At least at the median, accounting for OOP would not materially affect our findings about declining spending with age. To be inclusive, however, future research might attempt to integrate the HRS core information with that collected in CAMS.

Chapter 5. Conclusions

By studying within-household spending change over a 14-year period, we established that real spending declines as individuals and households age. It is important to quantify the decline because of its implication for the optimal level of retirement resources, which, in turn, has implications for the optimal amount of saving during the working life. The rate of decline is an important input into the determination of spending level at retirement, conditional on retirement resources: It suggests that individuals and couples could spend more early in retirement than they would if the spending path were flat. The rate of decline also has implications for the optimal retirement income trajectory. For example, it suggests that the sum of Social Security and pension benefits, investment income, and planned asset withdrawals should slowly decline in real terms to match the desired spending trajectory.

We had anticipated that any decline in spending would be related to economic position: Those with more resources would maintain real spending, but those with fewer would reduce spending. We found little support for that hypothesis. The rates of decline were substantially independent of initial wealth position (at ages 65 through 69). This independence led to the interpretation that the declining path is unlikely to be due to tightening budget constraints because even those in the top quartile, who are the least constrained, exhibit a declining path. We used the variation in budget shares to support an alternative hypothesis: Worsening health associated with aging causes declining marginal utility from some activities so that people reduce spending in those categories. Spending on health care increases with age but not by enough to offset the decline.

Although the age pattern of budget shares stimulated us to consider an explanation for declining spending based on health, other explanations for the decline seem reasonable. Individuals experience a decline in the marginal utility from some activities simply because of the accumulation over a lifetime in consumption of those activities: This explanation is similar to declining marginal utility within a period but where the accumulation period is the lifetime. Perhaps alternative uses of time that do not require much spending, such as attention to family and friends, become more important. More generally, with increasing age, time becomes the more important and valuable resource, so individuals allocate spending in a different manner, one in which more attention is given to time requirements. These explanations are, of course, speculative and ought to be the subject of future research. They, nonetheless, provide valuable perspectives for the interpretation of our findings, because they increase the plausibility that the decline in spending is chosen, not forced by an increasingly tight budget constraint.

Appendix A. Derivation of the Analytic Sample

We used data from eight waves of CAMS, spanning the period 2005 through 2019. In the case of coupled households, the information on household-level spending was attached to both spouses; when stratifying analyses by individual characteristics, such as by age, each spouse contributes to their respective age group. Pooling observations across waves and restricting the sample to those with at least ten reported spending categories yields 50,144 person-wave observations. We apply several additional sample restrictions, as shown in Table A.1, consistent with the analytical goals of this study: longitudinal analysis of spending trajectories of the population age 65 or older by initial wealth quartile.

Table A.1. Sample Derivation

Sample Criteria	Number of Observations
CAMS 2005–2019 respondent observations with at least 10 reported spending categories	50,144
CAMS wave *t* to *t* + 1 transition observed	36,357
CAMS respondent age over 65	23,087
Spouse age observed (in cases of coupled households)	22,362
Spouse age within 5 years (in cases of coupled households)[a]	18,942
Initial wealth observation available (near age 65)	17,557
CAMS marital status remains same from wave *t* to *t* + 1	16,443

[a] In 108 cases, husbands were excluded from the study because they were under age 65; for this group, sample sizes across age bands are insufficient for robust statistical analyses.

Appendix B. CAMS Spending Categories

The CAMS elicits household spending in 39 categories, which we aggregated into broader categories (see Table B.1).

Table B.1. Aggregation of CAMS Spending Categories for Budget Share Analyses

Spending Aggregate	Component Categories Elicited in CAMS
Housing	Household furnishings, mortgage interest, home/rent insurance, property tax, rent, home repairs supplies and services, home repair supplies, home repair services
Transportation	Purchase/lease auto, auto finance charges, car payments, auto insurance, gasoline, vehicle services
Food	Food/drink, dining out
Utilities	Electricity, water, heat, phone/cable/internet
Health	Health insurance, drugs, health services, medical supplies
Household supplies and services	House/yard supplies, housekeeping supplies, yard supplies, housekeeping services, gardening/yard services
Gifts and donations	Contributions, gifts
Clothing	Clothing
Trips and vacations	Trips and vacations
Personal care	Personal care
Leisure	Tickets, hobbies, sports equipment
Durables	Refrigerator, washer/dryer, dishwasher, television, computer

SOURCE: CAMS 2005–2019 data and questionnaires.

Appendix C. Determination of Initial Wealth Quartile

The overarching goal of this study was to estimate spending trajectories from age 65 onward by wealth quartile observed at or near age 65. In CAMS, we observe two-year household spending changes at various ages. By merging the CAMS data with the HRS core data and following the same individuals backward in the HRS panel to when each respondent or spouse was about 65 years old, we use the household's asset information from back then compared with the asset position of all other households in that age group at that time to determine what we call the *initial wealth quartile*. To operationalize this, we proceeded as follows:

- For each HRS wave, construct the wealth quartiles for the entire ages 65 through 69 population (and for the 70 through 74 population), separately for single and married persons, using weights.
- Merge data of initial wealth quartile at ages 65 through 69 to all HRS respondents with a CAMS observation. This resulted in initial wealth quartile observed for about 75 percent of the analytic sample.

Because a subsample of the HRS was recruited at age 70 or older, a sizable fraction of the information on the initial wealth quartile was missing. By allowing the initial wealth quartile to be assessed at ages 70 through 74 for those where it was missing, we increased the nonmissing rate to 92.7 percent of the analytic sample. Examination of the persistence of wealth quartile observed from ages 65 through 69 and 70 through 74 (see Table C.1) showed it to be high (63.3 percent on diagonal; 95.2 percent on or near diagonal), suggesting that our approach is a reasonable approximation.

Table C.1. Persistence of Wealth Quartile Between Ages 65 Through 69 and 70 Through 74

Wealth Quartile, Ages 65 Through 69	Wealth Quartile, Ages 70 Through 74				
	Lowest	2nd	3rd	Highest	All
Lowest	20.8	5.1	1.2	0.2	27.4
2nd	6.3	13.8	5.1	1.1	26.3
3rd	1.1	5.8	12.1	4.5	23.4
Highest	0.2	1.0	5.1	16.6	22.9
All	28.5	25.7	23.4	22.4	100.0

SOURCE: Authors' calculations using HRS 1992–2018.
NOTE: All respondents observed both from ages 65 through 69 and from ages 70 through 74 (*N* = 160,972).

Appendix D. Analytic Sample Size for Main Subpopulations

Table D.1 shows the sample sizes for analyses by age band and initial wealth quartiles.

Table D.1. Number of Observations by Age Band and Initial Wealth Quartile

Respondent Age Category	Lowest Quartile	2nd Quartile	3rd Quartile	Highest Quartile	All
	Single females				
65–69	309	323	339	217	1,188
70–74	310	325	338	294	1,267
75–79	297	308	347	299	1,251
80+	339	442	491	490	1,762
All	1,255	1,398	1,515	1,300	5,468
	Single males				
65–69	84	101	109	90	384
70–74	159	129	130	104	522
75–79	219	180	146	154	699
80+	327	327	336	392	1,382
All	789	737	721	740	2,987
	Couples, stratified by male spouse's age, female spouses < 2 years younger				
65–69	228	318	324	297	1,167
70–74	171	260	311	357	1,099
75–79	117	213	288	316	934
80+	63	155	215	267	700
All	579	946	1,138	1,237	3,900
	Couples, stratified by male spouse's age, female spouses ≥ 2 years younger				
65–69	186	225	218	145	774
70–74	219	365	371	283	1,238
75–79	204	304	356	306	1,170
80+	137	221	261	287	906
All	746	1,115	1,206	1,021	4,088

SOURCES: Authors' calculations using CAMS 2005–2019 and HRS core data.

Appendix E. Budget Shares by Initial Wealth Quartile and Age

Table E.1 and Table E.2 show detailed statistics of budget shares of single and coupled households, respectively.

Table E.1. Budget Shares of Single Households

	Quartile					Quartile				
	Lowest	**2nd**	**3rd**	**Highest**	**All**	**Lowest**	**2nd**	**3rd**	**Highest**	**All**
Spending Category	**Age Band 65–69**					**Age Band 70–74**				
Leisure	0.8	0.8	1.0	2.0	1.1	0.7	0.8	1.1	1.7	1.0
Durables	0.7	0.9	1.1	1.0	0.9	0.8	0.8	1.0	0.9	0.9
Housing	30.1	24.2	21.6	24.6	25.0	28.2	21.2	21.0	22.7	23.3
Transportation	12.1	18.8	19.8	16.1	16.9	14.4	17.6	16.1	14.5	15.7
Household supplies and services	4.0	3.7	3.5	3.7	3.7	3.8	4.3	3.8	4.0	4.0
Utilities	16.3	16.9	14.5	12.1	15.1	16.5	17.7	14.8	12.3	15.5
Health	8.7	9.1	10.0	10.0	9.4	10.0	11.3	11.4	10.5	10.8
Gifts and donations	2.6	4.4	6.8	7.4	5.2	2.7	4.0	7.5	10.0	5.9
Food	19.0	16.1	15.4	14.7	16.4	17.5	17.0	16.3	15.1	16.5
Clothing	2.7	2.1	1.8	2.1	2.1	2.4	1.8	1.7	2.0	2.0
Trips and vacation	1.2	1.5	2.7	4.8	2.4	1.3	1.7	3.7	4.6	2.8
Personal care	1.9	1.5	1.5	1.5	1.6	2.0	1.7	1.5	1.6	1.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
n	393	424	448	307	1,572	469	454	468	398	1,789
Spending Category	**Age Band 75–79**					**Age Band 80+**				
Leisure	0.7	0.9	0.9	1.4	1.0	0.7	0.7	1.0	1.2	0.9
Durables	0.7	0.7	0.7	0.8	0.7	1.0	0.8	0.8	0.7	0.8
Housing	26.2	22.1	21.1	23.5	23.3	26.3	24.4	23.6	25.0	24.8
Transportation	13.8	16.4	13.7	13.6	14.4	10.3	11.6	11.7	10.2	10.9
Household supplies and services	4.6	3.8	4.8	4.1	4.3	4.5	3.8	5.2	4.7	4.6
Utilities	16.8	16.7	14.9	12.2	15.3	16.7	15.8	14.4	11.7	14.5
Health	9.9	12.4	13.1	11.2	11.6	12.2	15.5	13.9	13.9	13.9
Gifts and donations	4.1	4.4	7.6	11.2	6.7	4.1	6.2	8.8	12.7	8.3
Food	17.3	17.0	16.9	14.5	16.5	18.4	15.7	15.3	14.0	15.7
Clothing	2.3	1.8	1.7	1.8	1.9	2.3	1.6	1.5	1.5	1.7

	Quartile					Quartile				
	Lowest	2nd	3rd	Highest	All	Lowest	2nd	3rd	Highest	All
Trips and vacation	1.3	1.9	2.9	3.9	2.5	1.4	2.0	1.8	2.7	2.0
personal care	2.3	1.8	1.7	1.8	1.9	2.2	1.9	2.1	1.7	1.9
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
n	516	488	493	453	1,950	666	769	827	882	3,144

SOURCE: Authors' calculations using CAMS 2005–2019 data, pooled.
NOTE: Weighted statistics. Because of rounding, budget shares do not always add to 100.0.

Table E.2. Budget Shares of Coupled Households

	Quartile					Quartile				
	Lowest	2nd	3rd	Highest	All	Lowest	2nd	3rd	Highest	All
Spending Category	**Age Band 65–69**					**Age Band 70–74**				
Leisure	1.0	1.4	1.7	2.2	1.6	0.8	1.1	1.4	2.1	1.4
Durables	1.0	1.2	0.9	1.1	1.1	0.9	0.9	1.0	1.2	1.0
Housing	18.9	18.0	19.4	20.8	19.2	19.9	17.2	18.6	18.1	18.3
Transportation	22.5	22.4	21.5	18.6	21.3	18.9	20.3	19.1	16.8	18.8
Household supplies and services	3.8	3.0	2.6	3.3	3.1	3.5	3.0	3.0	3.4	3.2
Utilities	14.6	11.9	10.1	8.8	11.2	15.2	12.5	11.2	9.0	11.6
Health	12.3	11.3	11.0	9.4	11.0	12.8	12.8	11.6	10.7	11.9
Gifts and donations	3.6	6.3	8.2	11.0	7.4	4.0	7.4	9.0	12.9	8.8
Food	16.5	17.0	15.5	13.8	15.7	17.6	18.0	16.3	15.3	16.7
Clothing	1.9	2.0	1.6	1.6	1.8	2.3	1.6	1.7	1.8	1.8
Trips and vacation	2.3	3.9	6.3	8.4	5.3	2.4	3.8	5.9	7.5	5.2
personal care	1.7	1.4	1.1	1.0	1.3	1.5	1.4	1.2	1.3	1.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
n	465	654	645	538	2,302	418	604	712	643	2,377
Spending Category	**Age Band 75–79**					**Age Band 80+**				
Leisure	0.8	1.1	1.2	1.9	1.3	0.8	0.9	1.0	1.3	1.0
Durables	0.8	0.8	0.9	0.9	0.9	1.0	0.9	0.8	0.6	0.8
Housing	18.4	17.1	17.4	16.9	17.3	19.9	15.0	17.2	17.6	17.1
Transportation	18.3	17.8	18.1	16.3	17.5	15.8	15.5	14.1	14.4	14.8
Household supplies and services	4.0	3.2	2.9	3.8	3.4	4.6	4.4	3.0	4.1	3.9
Utilities	17.9	13.5	11.8	9.6	12.4	18.5	14.9	12.3	10.2	12.9
Health	13.5	13.9	14.1	13.0	13.6	12.7	16.3	17.2	14.3	15.4
Gifts and donations	4.2	7.8	10.1	13.5	9.7	4.4	8.3	9.9	15.0	10.7

	Quartile					Quartile				
	Lowest	**2nd**	**3rd**	**Highest**	**All**	**Lowest**	**2nd**	**3rd**	**Highest**	**All**
Food	17.0	18.3	16.3	15.3	16.6	17.7	18.0	18.3	16.4	17.5
Clothing	1.8	1.5	1.4	1.7	1.6	1.5	1.8	1.5	1.3	1.5
Trips and vacation	1.7	3.5	4.7	5.9	4.3	1.2	2.7	3.3	3.5	3.0
Personal care	1.6	1.4	1.3	1.2	1.3	2.0	1.4	1.4	1.4	1.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
n	281	483	586	586	1,936	161	320	401	491	1,373

SOURCE: Authors' calculations using CAMS 2005–2019, pooled.
NOTE: Weighted statistics. Because of rounding, budget shares do not always add to 100.0.

Appendix F. Spending Path Parameters, Median Regressions

The left-hand variable is $(s_{t+1} - s_t)/s_t$, where s_t is spending in wave t. Thus, the results refer to two-year changes in spending. The regressions differ in how age is entered. Table F.1 and Table F.2 show median regressions of two-year spending change for singles and couples, respectively.

Table F.1. Median Regressions of Two-Year Spending Change, Single Households

	Age Bands		Age Continuous		No Age Effects	
	Coefficient	**S.E.**	**Coefficient**	**S.E.**	**Coefficient**	**S.E.**
Wealth quartile						
Lowest	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)
2nd	−0.0067	0.0128	−0.0060	0.0128	−0.0061	0.0127
3rd	0.0190	0.0129	0.0188	0.0128	0.0201	0.0129
Highest	0.0169	0.0152	0.0172	0.0150	0.0172	0.0148
Age						
65–69	(Ref.)	(Ref.)				
70–74	0.0022	0.0157				
75–79	−0.0056	0.0162				
80+	−0.0063	0.0142				
Age—65			−0.0003	0.0007		
Male	−0.0048	0.0098	−0.0053	0.0099	−0.0050	0.0098
Constant	−0.0472	0.0150	−0.0469	0.0128	−0.0509	0.0105

SOURCES: Authors' calculations using CAMS 2005–2019 and HRS core data.
NOTE: n = 8,455.

Table F.2. Median Regressions of Two-Year Spending Change, Coupled Households

	Age Bands		Age Continuous		No Age Effects	
	Coefficient	**S.E.**	**Coefficient**	**S.E.**	**Coefficient**	**S.E.**
Wealth quartile						
Lowest	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)
2nd	0.0054	0.0139	0.0067	0.0130	0.0060	0.0122
3rd	0.0028	0.0145	0.0046	0.0134	0.0057	0.0134
Highest	0.0055	0.0147	0.0085	0.0129	0.0068	0.0129
Male spouse's age						
65–69	(Ref.)	(Ref.)				
70–74	0.0119	0.0125				
75–79	0.0066	0.0148				
80+	0.0072	0.0146				
Male spouse's age—65			0.0011	0.0009		
Female spouse's age is 2+ years less than male spouse's age	0.0002	0.0098	−0.0021	0.0092	−0.0015	0.0092
Constant	−0.0678	0.0143	−0.0700	0.0118	−0.0608	0.0103

SOURCES: Authors' calculations using CAMS 2005–2019 and HRS core data.
NOTE: *n* = 7,988.

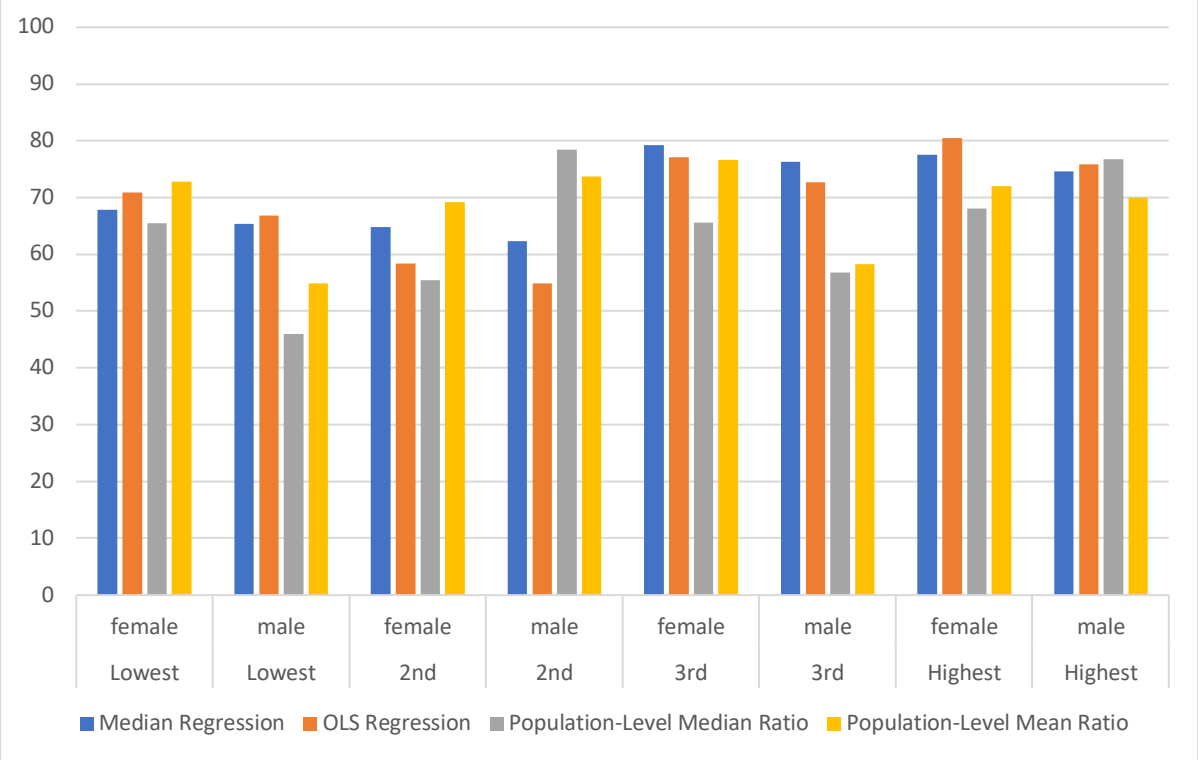
Appendix G. Sensitivity of Results to Estimation Method

Spending changes by age band, wealth quartile, and marital status (and by the spouses' age difference in the case of married persons) were estimated in four ways:

- median regression of spending ratio at the individual or household level: $i \ \frac{S_{i,t+2}}{S_{i,t}}$
- OLS regression of the log of that spending ratio
- the mean spending ratio at the population level: $\frac{\bar{S}_{t+2}}{\bar{S}_t}$, where $\bar{S}_t$ is the mean of population spending at t in each age band
- median spending ratio at the population level: $\frac{S_{t+2}^{med}}{S_t^{med}}$, where S_t^{med} is the population median spending at t in each age band.

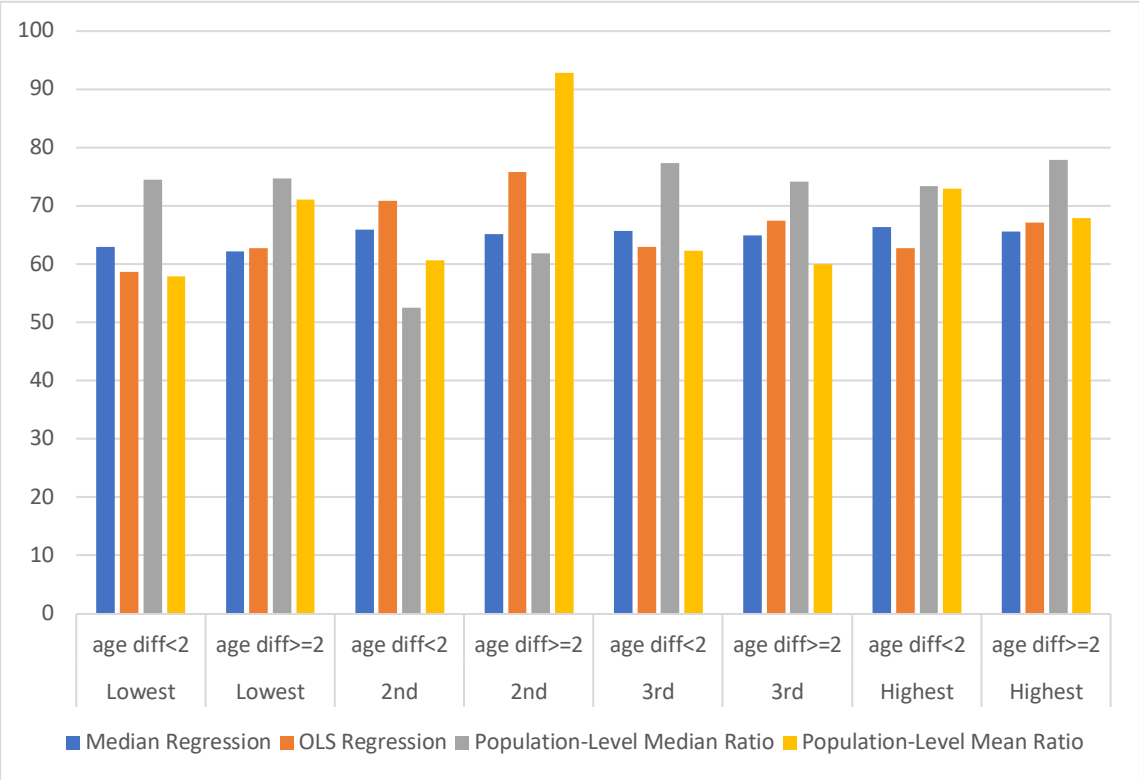
The spending ratios were used to predict spending at age 80. Those predictions are shown in Figure G.1 for households of single persons and in Figure G.2 for households of married persons.

Figure G.1. Predicted Real Spending at Age 80 as a Percentage of Spending at Age 65, Single Households



SOURCE: Authors' calculations using CAMS 2005–2019 and HRS core data.

Figure G.2. Predicted Real Spending at Age 80 as a Percentage of Spending at Age 65, Married Households



SOURCE: Authors' calculations using CAMS 2005–2019 and HRS core data.

Abbreviations

CAMS	Consumption and Activities Mail Survey
CPI	Consumer Price Index
HRS	Health and Retirement Study
IRA	individual retirement account
OLS	ordinary least squares
OOP	out-of-pocket (medical expenditures)
S.E.	standard error

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