MEASURING DISSAVING OUT OF RETIREMENT WEALTH*

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INTRODUCTION

In 2008 the leading edge of the baby-boom generation will reach age 62 and begin to claim Social Security benefits. Between 2006 and 2025, the share of the population aged 60 or older is expected to rise from 17 to 26 percent. What distinguishes this generation of retirees, in addition to sheer size, is the increased importance of liquid assets, rather than annuitized forms of wealth, to its typical household balance sheet---a pattern that is likely to strengthen over time. The growing trend away from defined-benefit pensions and toward account-based plans, combined with increasing uncertainty over the solvency of the Social Security system, points to an increased reliance on "self-managed" retirement finance. This raises the question of how households will manage their retirement accounts as they age---and in particular, whether they will draw down their assets too quickly, leaving themselves destitute in very old age.

We examine this issue by following a panel of older households in the Health and Retirement Study from 1998 to 2004. Our sample covers all ages over 50 in 1998, allowing us to explore differences in asset changes across cohorts. We use the wealth-adequacy measures developed in Love, Smith, and McNair (2007) to investigate how households dissave from their retirement wealth, whether households appear to run down their retirement accounts "too fast," and how the adequacy of total household wealth evolves over retirement.

We find that the median value of retirement-account balances fell for all sample age groups from 1998-2004, despite the net positive increase in equity markets over this period. This result is perhaps not surprising, given rules requiring minimum withdrawals from tax-preferred retirement accounts. However, we find evidence that these withdrawals were not necessarily immediately consumed.

Our first indication begins with comprehensive wealth, our measure of total wealth including the present value of expected future annuity income (from, e.g., Social Security, defined-benefit (DB) pensions, individual annuities and/or welfare payments). We find that comprehensive wealth remained remarkably flat over the time period for all age groups, even as the present values of future annuity income fall mechanically with age. This suggests no clear evidence of "excessive dissaving," on net, and may be related to strength in asset markets over this time period.

This suggestion is confirmed when we look at the annuity value of comprehensive wealth, a measure of adequacy that compares total wealth to household life expectancies. We find that the annuity value of wealth increased over the period for all age groups. Since a benchmark life-cycle model without precautionary behavior or bequest motives would imply a flat age profile of annuitized total wealth, our finding of a rising profile suggests that households are actually "under-consuming" relative to this benchmark model; or, alternatively, that households display evidence of precautionary behavior or bequest motives (or both).

These findings are strengthened when we turn to our second measure of wealth adequacy, which is the ratio of total wealth to the wealth that would be required to provide poverty-line income in expected value. These poverty ratios, like the annuity value of total wealth, are found to be increasing over the time period for all age groups.

These results hold even when focusing just on households with falling retirement-account balances over the period, suggesting that retirement-account withdrawals do not appear to be "too fast" relative to life expectancies over this time period. Finally, when we investigate the drivers of annuitized wealth in a panel regression framework, we find that annuitized wealth rises with age, education, lifetime earnings, health status, and the expectation of leaving a bequest.

We turn next to a brief discussion of the data and our measures of wealth adequacy, then we discuss our findings, and draw a few conclusions.

*The views expressed are those of the authors and do not necessarily represent those of the Federal Reserve Board of Governors.

DATA AND MEASURES OF WEALTH ADEQUACY

We use four waves of the Health and Retirement Study (HRS), representing the years 1998, 2000, 2002, and 2004. The HRS is a national panel data set consisting of an initial (1992) sample of 7,600 households aged 51-61, with follow-ups every second year thereafter. In 1998, the HRS was merged with a similar survey covering older households, and younger cohorts were also introduced. We begin with the 1998 wave, rather than the 1992 wave, because 1998 is the first wave to represent all ages over 50. The youngest cohort (the "Early Baby Boomers," born 1948-1953) was introduced in the 2004 wave. We restrict our analysis to households with a respondent or spouse aged 51 years or older in 1998. Our final sample size is 16,395 households.

Comprehensive Wealth

Love, Smith, and McNair (2007) developed a broad measure of household wealth, called comprehensive wealth, and two measures of wealth adequacy. Comprehensive wealth begins with non-retirement financial wealth, including stocks, bonds, checking accounts, CDs, Treasury securities, and other assets, net of associated debts. Next we add nonfinancial wealth, such as housing, investment real estate, vehicles, and businesses less any outstanding debt secured by these assets. To these measures we add retirement accounts such as IRA balances and balances from defined-contribution (DC) pension plans from current and previous jobs.

Finally, we add the actuarial present values of a large set of expected payments, including DB plans, Social Security, life insurance, annuities, welfare, and future wages and DC-plan matches. To calculate actuarial present values, we use conditional survival probabilities based on the 1-year age- and sex-specific conditional death probabilities in the Social Security Administration's 2002 Period Life Table (SSA, 2006a). For DB pensions, we use questions about current pension benefits (for retirees) and expected future pension benefits (for those still working).[1] In the case of working households, we use the expected pension at retirement; this serves to include the value of benefits not yet accrued. This is parallel to our inclusion of expected future compensation in our calculation of comprehensive wealth. Our pension calculation accounts for indexation of benefits and survivor benefits (if applicable). We assume a nominal interest rate of 4.5 percent and a real interest rate of 2.5 percent, implying 2 percent inflation.[2]

The present value of Social Security is computed in a similar way, but accounting for the rules governing survivors' benefits, whereby a retirement-age widow or widower typically receives 100 percent of the spouse's benefits if these exceed their own benefit amount.[3]

The present value of life insurance is computed as the expected payout (net of premiums) of each spouse's insurance policy at each age, where the expectation is taken over the probability that the respondent dies at that age while the spouse is still alive. Note that the actuarial present value of insurance would be zero if premiums were actuarially fair and perfectly observed in the data. However, since we do not observe in the HRS the length of term policies, or their premiums, we assume that term policies will remain in force throughout retirement, and that their premiums have been pre-paid (i.e., are zero in each year going forward).

Our calculations of wealth from annuities exactly parallels that of wealth from DB pensions, while our measure of expected welfare payments includes veteran's benefits, food stamps, Supplemental Security Income (SSI), and other welfare. In this calculation, we assume that individuals who are currently receiving these payments will continue to receive the same inflation-indexed welfare payments as long as they live, and that those not currently receiving these payments never will.

We account for expected future earnings by assuming that wage and salary income grows at a 1 percent real rate[4] until the age of 61. Thus, to the extent workers experience different wage growth or work more or fewer years, their actual resources in retirement will differ from our projections. Another form of compensation is employer matches to DC plans.[5] We calculate the current employer match in dollar terms and add it to current wages to calculate total compensation.[6] We then discount the stream of total compensation through age 61 using the real interest rate minus 1 percent (to account for the assumed real growth) and the relevant conditional survival probabilities.

Measures of Adequacy

Our first measure of the adequacy of comprehensive wealth is its annuitized value--a measure of how much consumption each household can expect to finance per person per year over their remaining lifetimes.

We define a household's annuitized value of wealth as its comprehensive wealth times an annuity factor, which is a function of an interest rate and the life expectancies of the household members. This measure implicitly ignores precautionary and bequest motives and assumes a willingness to fully consume all forms of wealth, including nonfinancial forms such as housing, businesses, and vehicles. It is a hypothetical annuity in that it ignore fees, loads, or expense charges. However, this abstraction is immaterial to the purpose of our measure, which is simply to rank households according to a uniform metric. In this paper, we do not account for any economies of scale in household consumption--our measure simply places an expected value on how many dollars are available for consumption per person, per year.[7]

Our second measure of wealth adequacy is the ratio of comprehensive wealth to what we call "poverty wealth," which is the actuarial present value of future poverty lines. Poverty wealth is interpreted as the amount of wealth that would be necessary to produce income equal to the expected poverty line in each year. Since poverty lines depend on the number of household members and their ages, the expectation is taken over the age-specific survival probabilities of the household members. Since poverty lines are indexed to inflation, we discount the stream of poverty lines at the real discount rate.

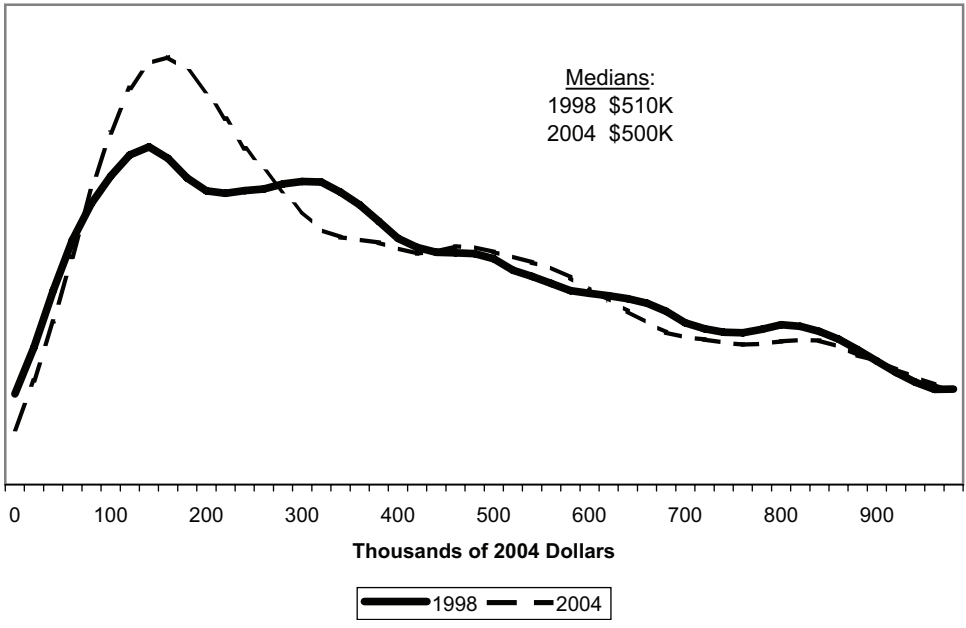
THE EVOLUTION OF WEALTH AND WEALTH ADEQUACY

Comprehensive Wealth and Adequacy

As an illustration of our measures of comprehensive wealth and its adequacy, this section provides the distributions of our principal measures for a sample of recent retirees aged 62 to 68 in 1998, and the corresponding distributions among the same households six years later in 2004. We will discuss the evolution of wealth adequacy for different age groups in more detail below.

Figure 1 shows the distribution of comprehensive wealth among households aged 62 to 68 in 1998, and among the same households six years

Figure 1: **Distributions of Comprehensive Wealth in 1998 and 2004: Age 62-68 in 1998**



later. The distribution shifted very slightly to the left, in real terms, as the households aged: the median in 1998 was $510,000, while in 2004 it was $500,000.

Figure 2 shows the distribution of annuitized comprehensive wealth among households aged 62 to 68 in 1998, and among the same households six years later in 2004. In contrast to the distribution of comprehensive wealth shown previously, the distribution of *annuitized* comprehensive wealth shifted notably to the right, in real terms, over the six years: the median in 1998 was $26,000 per person per year, while in 2004 it was $30,000. This pattern suggests that, while recently retired households did run down their assets somewhat over the 6-year period, they did not do so "fast enough" (relative to life expectancies) to keep their expected wealth per year from growing. As we discuss later, this could be due to precautionary savings motives (e.g., risk of significant medical expenses), bequest motives, or optimization error (e.g., a positive surprise in housing market appreciation).

Sources of Wealth

In this section we explore the evolution of various sources of wealth, by age in the base year of 1998. We begin with our question of particular interest, which is the evolution of DC and IRA balances.

As shown in Figure 3, in the base year of 1998, younger households had larger median DC and IRA balances than older households. This is not surprising, since older households have had fewer years to contribute (a cohort effect) and more years to withdraw (a life-cycle effect). Median balances fell over the six years for all age groups, with the steepest declines among the older households. The dip in the stock market between 2000 and 2002 is clearly part of this pattern, though it is interesting that the strong rebound in equities in 2004 is apparent in this figure as a leveling out, rather than an increase in DC balances (except perhaps for the youngest cohort)---suggesting that households are actively dissaving from these accounts. Given rules requiring withdrawals after age 70-1/2, this pattern is not surprising. A key question of interest is whether households are drawing down DC accounts too fast (e.g., in such a way as will lead to large decreases in annuitized wealth as they age). Note that among the cohort age 70-79 in the base year, median non-DC financial wealth is roughly constant even as DC balances are drawn down, sug-

Figure 2: **Distributions of Annuitized Wealth in 1998 and 2004: Age 62-68 in 1998**

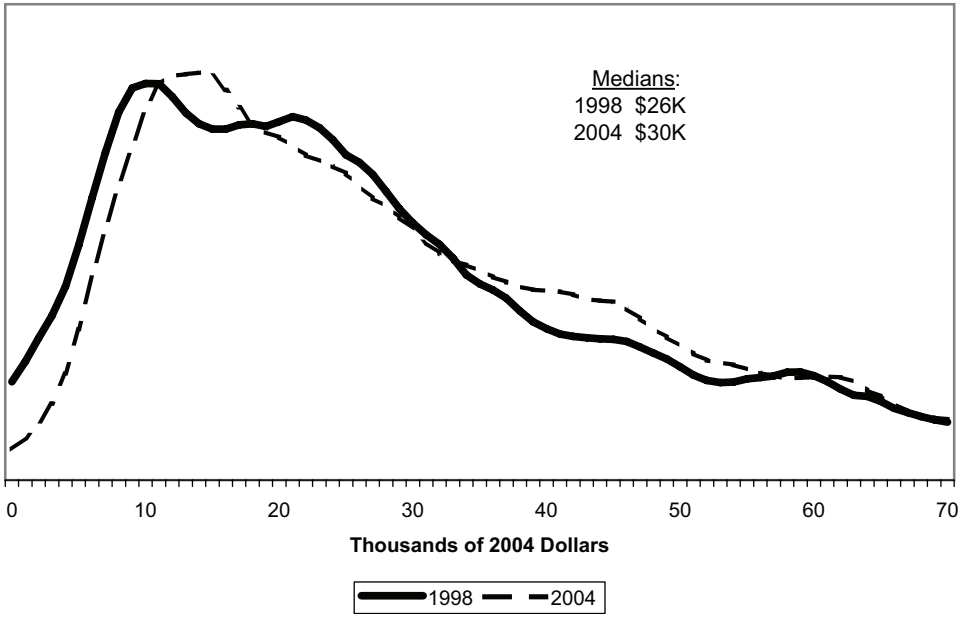
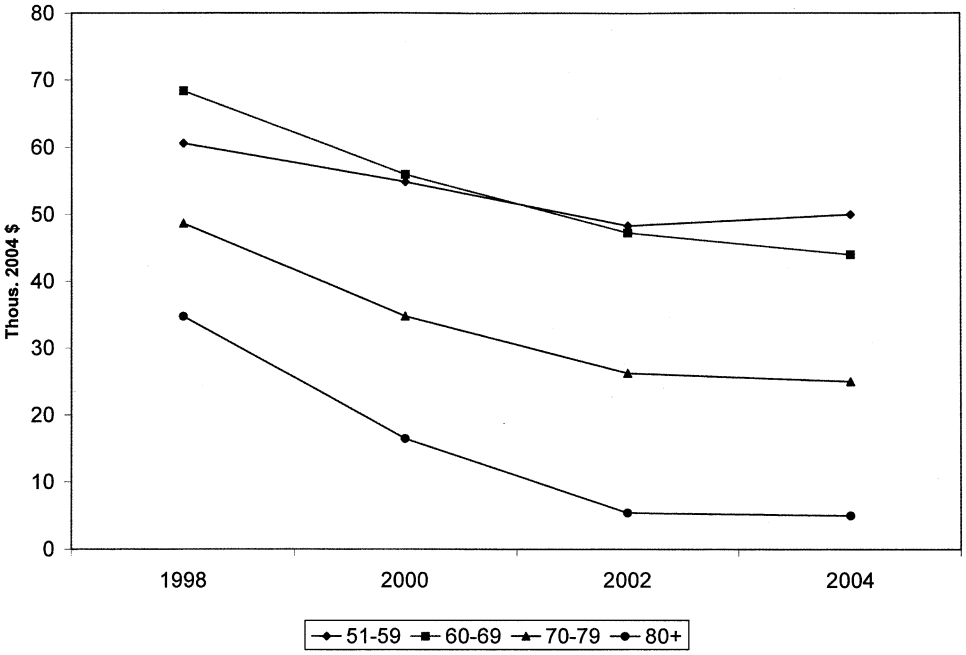


Figure 3: **Evolution of Median DC and IRA Wealth, by Age in 1998**



gesting that DC withdrawals are perhaps not fully consumed right away. We examine this question in more detail later.

To get a sense of the broader effects of retirement-account withdrawals on household finances, we turn to the evolution of other financial wealth (i.e., excluding DC plans and IRAs). Figure 4 shows that households aged 80 and above in 1998 held the most financial wealth in that year (with a median of about $52,000), and each cohort held less financial wealth than the one preceding it. Households aged 51-59 in 1998 held the lowest financial wealth, with a median of $25,000.

Following these households forward in time, we see that paths roughly converge: the median financial wealth of the oldest households falls through 2004 (clear evidence of dissaving among these households), while the median household wealth of the youngest households, who are still in their peak earnings and savings years, rises.

Figure 5 shows the evolution of net nonfinancial wealth (which is driven by housing, but also includes vehicles and businesses). In 1998, the 60-69-year-olds held the most housing wealth and the 51-59-year-olds held the least. As the housing market boomed, however, nonfinancial wealth evolved differentially by age. The younger cohorts (those under 70 in 1998) gained significant housing wealth over these years (particularly the 51-59-year-olds), while the older cohorts did not (and the oldest cohort lost significant nonfinancial wealth). We interpret this as evidence of dissaving out of housing assets, particularly in the oldest cohort.

Finally, Figure 6 puts together all the components of comprehensive wealth and shows its evolution over time. The path of comprehensive wealth is remarkably flat over time, despite the mechanical decreases in all the present value calculations (e.g., DB plans, Social Security, life insurance, veterans' benefits and welfare) with age. This suggests that, when including all sources of wealth, there appears to be little evidence of excessive dissaving at the median for any age group, at least over this time period. This is likely due in part to recent strength in the housing and equity markets, though the 2000-2002 dip in stock markets is generally visible only for the youngest

Figure 4: **Evolution of Median Non-DC Financial Wealth, by Age in 1998**

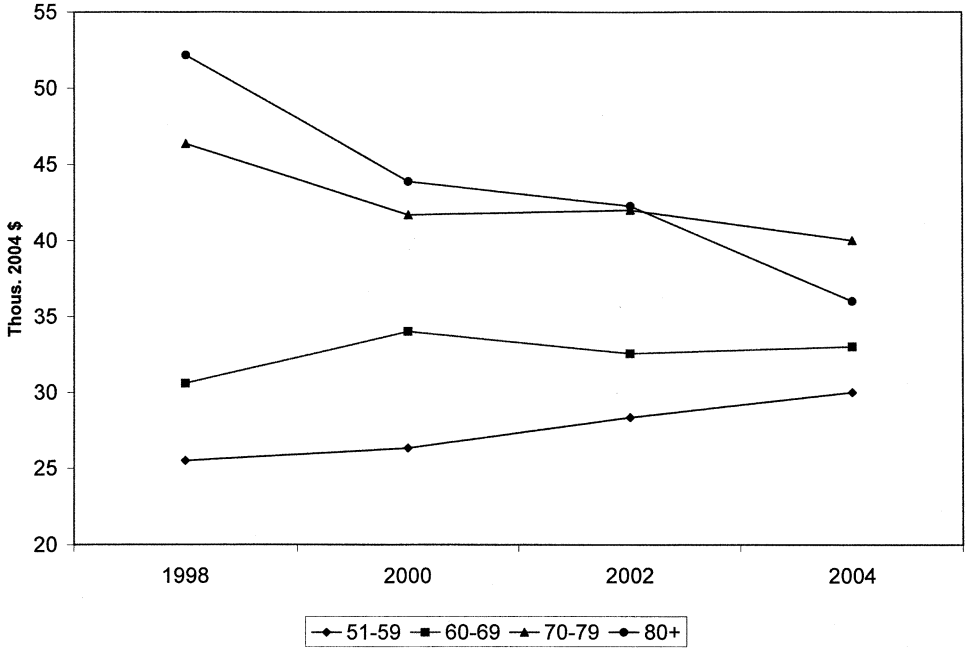


Figure 5: **Evolution of Median Non-Financial Wealth, by Age in 1998**

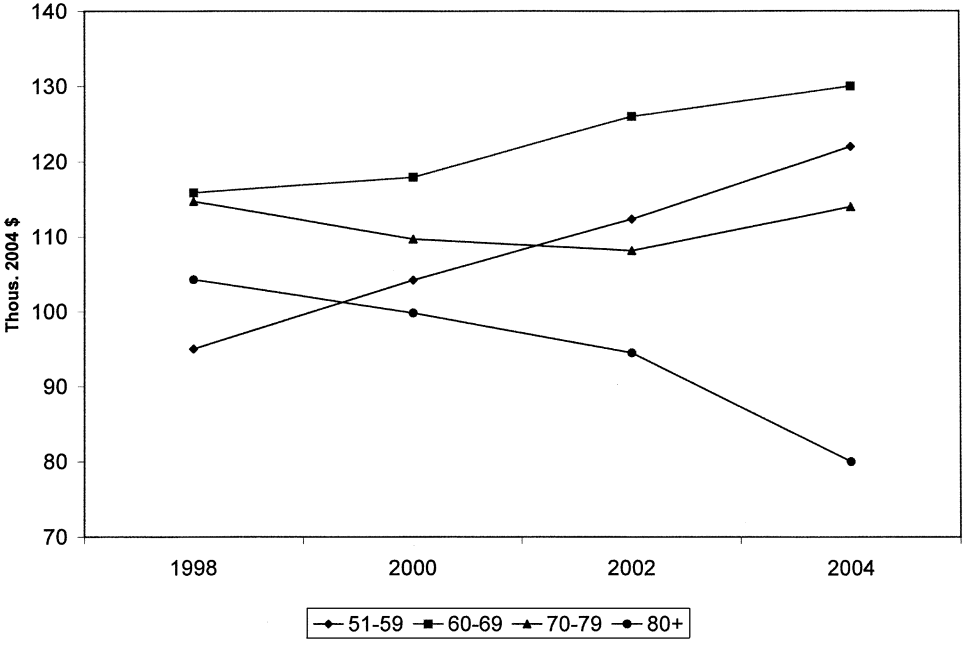
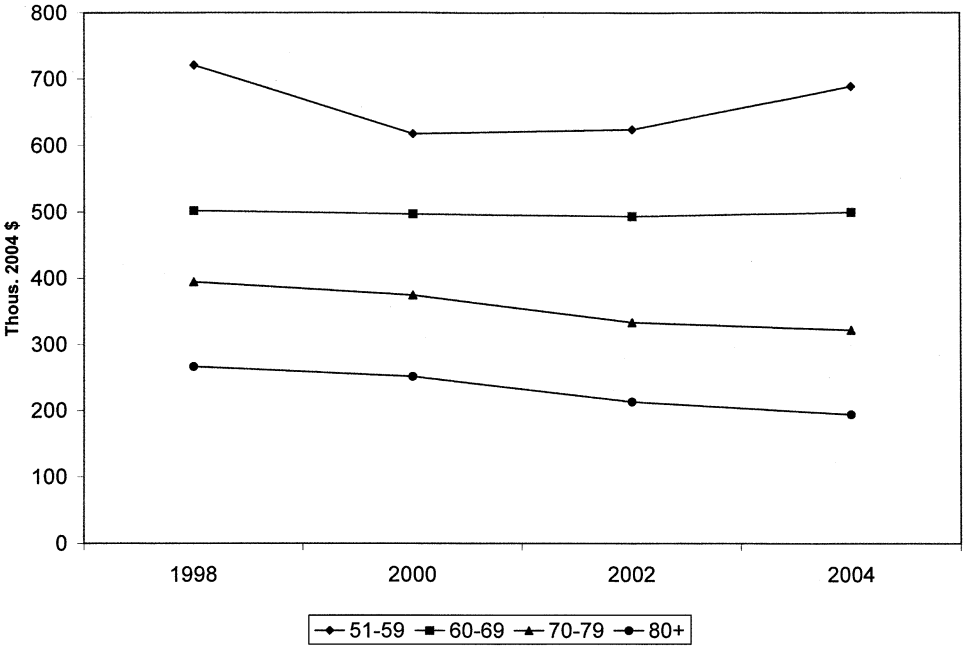


Figure 6: **Evolution of Median Comprehensive Wealth, by Age in 1998**



cohort (which holds the largest allocation of stock as a percent of comprehensive wealth).

Adequacy of Wealth

Next we investigate how our measures of wealth adequacy evolve over time. With relatively flat comprehensive wealth even as households age and life expectancies decrease, it is inevitable that the annuitized value of wealth will rise over time. Figure 7 shows that the increase is generally modest through 2002 in all but the oldest cohort (whose life expectancies are falling the quickest). The uptick in 2004 for the youngest three cohorts is likely due to the combined strength of the housing and equity markets.

This result is of particular interest because of its implications in the context of the life-cycle model. The standard model without precautionary or bequest motives would imply a flat age profile of annuitized wealth (i.e., households spread consumption evenly over their remaining expected lifetimes). In this model, a falling annuitized wealth profile would indicate overconsumption relative to their life expectancies, while a rising profile would indicate under-consumption. As mentioned earlier, "under-consumption" relative to the simple model could be due to precautionary savings motives or bequest motives, as well as optimization error.

Our second measure, the ratio of comprehensive wealth to poverty wealth, is shown in Figure 8. Here we see an even stronger rise over time, which we interpret as further evidence that, at least at the median and over the time period under study, we do not observe excessive dissaving out of comprehensive wealth. We reach a similar conclusion when we look at the evolution in the share of households with poverty ratios under one: among all but the oldest cohort, this share falls by a third to a half over time (e.g., from 18 percent to 12 percent in the youngest cohort, and 12 percent to 8 percent in the 70-79 cohort). In the oldest cohort, the share in poverty remains roughly constant at about 12 percent.

PATTERNS OF WITHDRAWALS FROM DC PLANS AND IRAS

There is clear evidence that households in the HRS are withdrawing from their DCs and IRAs as they age. For example, as shown in Table 1,

Figure 7: **Evolution of Median Annuitized Wealth, by Age in 1998**

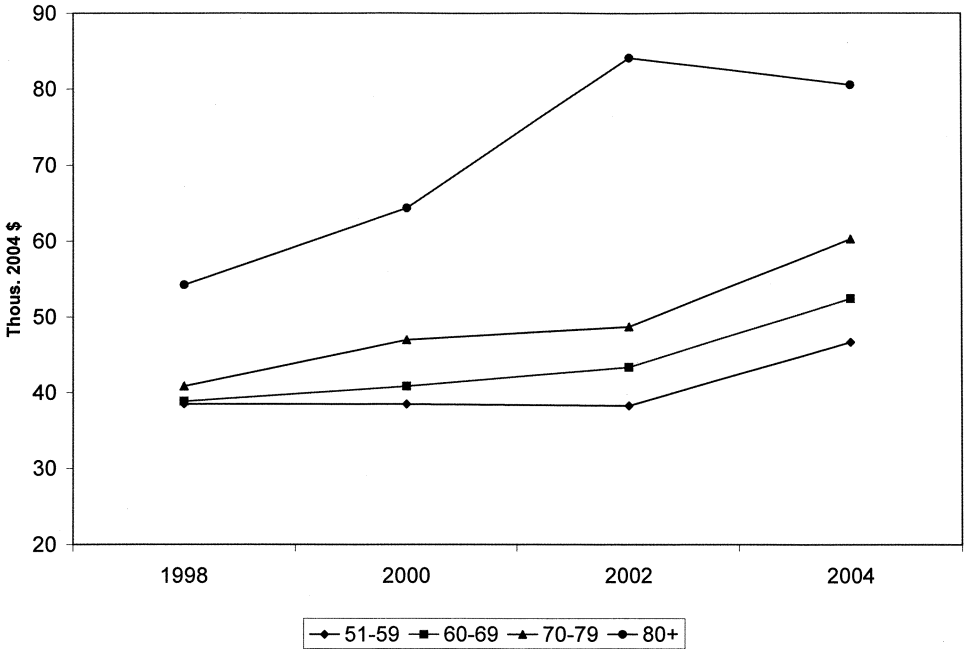


Figure 8: **Evolution of Median Poverty Ratio, by Age in 1998**

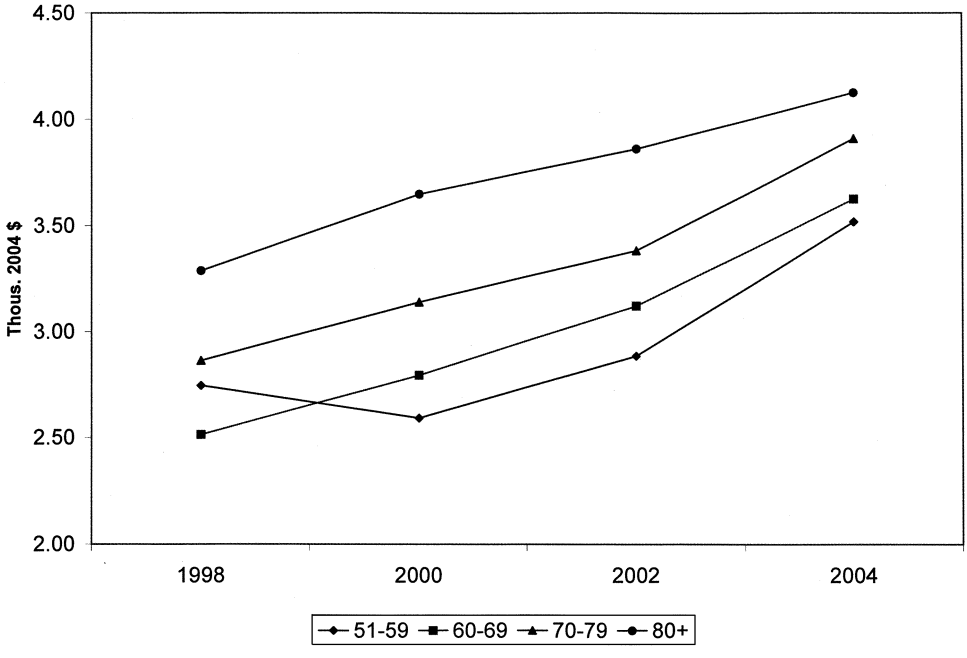


Table 1
Percent of Households whose DCs Rose or Fell, 1998-2004

Age in 1998	*Fell*	*Rose*
51-59	48	52
60-69	57	43
70-79	69	31
80+	75	25
Total	55	45

about 70 percent of households aged 70+ in 1998 had lower DC and IRA balances in 2004 than they did in 1998. The pace of withdrawal appears to be a function of age. Approximately three-fifths of the 60-70-year-olds (in 1998) had lower balances at the end of the sample, while about half of the 50-60-year-olds did. This pattern is consistent with a substantial effect of minimum required distributions (MRDs) beginning at age 70-1/2.

Table 2 presents the evolution of median DC and IRA balances by age, splitting the sample between those whose balances fell over the sample period and those whose balances rose. Overall, for those with declining DCs and IRAs, the median balance drops from $70,000 to $14,000 (about an 80 percent drop), while for those with rising balances, the median increases from $23,000 to $90,000 (about quadruples).

There is no evidence, however, that this pace of withdrawals is "too fast" at the median. For example, even among those households with declining DC and IRA balances, financial wealth generally increased from 1998 to 2004. Ignoring the impact of capital gains, this suggests that many households are placing a portion of their retirement account withdrawals in other assets. We now turn to further detail on the evolution of wealth adequacy among DC-tappers.

Table 3 displays the evolution of median annuitized wealth by age, splitting the sample between those whose DC and IRA balances decreased over the sample period and those whose balances increased. The motivation behind this exercise is to see whether there is a visible connection between lower DC balances and lower overall savings. As shown in the table, annuitized wealth is generally flat for those with declining DC and IRA balances (except for a dip in 2000 and 2002 in the youngest cohort, who has heavy exposure to stocks), while it increases markedly for those with rising balances. This suggests that, at the median, even households who are drawing down their DC and IRA balances are not drawing them down faster than is appropriate given their life expectancies. In other words, the median DC-tapper does not appear to be running down their balances too fast.

This interpretation is only strengthened by repeating the exercise for our second measure of adequacy, the poverty ratio. As shown in Table 4, the ratio of wealth to poverty-line wealth appears robust and generally increasing even among households who are tapping their retirement accounts (again, with a slight dip during the stock bust for the youngest cohort).

LIFE-CYCLE EFFECTS AND WEALTH ADEQUACY

In our previous work, we document the importance of life-cycle variables, such as expectations

Table 2
Median DC and IRA Assets of Households (in thousands)

Age in 1998	*1998*	*2000*	*2002*	*2004*
		Households with Falling DC Balances		
51-59	76.5	42.8	28.4	12.1
60-69	81.4	45.5	31.5	20.0
70-79	54.5	32.9	24.2	13.0
80-89	37.1	13.2	5.3	3.8
Total	69.5	38.4	26.3	14.0
		Households with Rising DC Balances		
51-59	23.2	51.6	53.2	99.0
60-69	29.0	54.8	50.7	87.0
70-79	19.7	32.9	29.4	75.0
80-89	0.0	0.0	2.2	32.0
Total	23.2	49.4	48.3	90.0

Table 3
Median Annuitized Wealth of Households (in thousands)

Age in 1998	*1998*	*2000*	*2002*	*2004*
		Households with Falling DC Balances		
51-59	37.0	31.0	31.7	34.5
60-69	35.3	36.5	38.0	39.4
70-79	44.0	44.6	46.9	50.2
80-89	62.3	57.1	65.3	62.3
Total	38.7	35.8	37.1	39.8
		Households with Rising DC Balances		
51-59	34.6	33.2	35.9	42.6
60-69	32.2	36.9	41.7	47.7
70-79	36.8	41.9	45.2	55.4
80-89	41.5	61.9	73.4	88.4
Total	34.6	35.4	38.4	45.4

Table 4
Median Poverty Ratio of Households

Age in 1998	*1998*	*2000*	*2002*	*2004*
		Households with Falling DC Balances		
51-59	3.51	3.18	3.34	4.05
60-69	3.72	3.98	4.40	4.76
70-79	4.50	4.79	5.28	5.72
80-89	6.86	6.27	7.29	6.82
Total	3.88	3.79	4.16	4.65
		Households with Rising DC Balances		
51-59	3.26	3.36	3.85	4.99
60-69	3.44	4.08	4.63	5.76
70-79	3.91	4.61	5.34	6.39
80-89	4.88	6.54	7.53	9.53
Total	3.36	3.78	4.28	5.40

about mortality, health status, and bequests, for explaining differences in wealth accumulation at the cross-sectional level. Much of the analysis in that work was constrained by data limitations inherent in cross-sectional studies; in particular, we could not separate age from cohort effects. With the 1998-2004 panel, however, we are able to track changes in wealth adequacy for different households across time.

Table 5 presents the results of a random effects regression of annuitized wealth on household characteristics such as age, education, race, health status, and expectations about the probabilities of giving or receiving bequests. The coefficients on the age brackets are positive and monotonically increasing, indicating that annuitized wealth grows with age over this period. This confirms the pattern visible in the figure mentioned earlier, in which annuitized wealth is shown to rise with age. The result is stronger in the regression framework than was visible in the figure, a finding that one might expect because the regression model is an expected value (i.e., a mean regression, rather than the medians shown in the figure) and the upward slope on the annuity age profile is larger for higher-wealth households. The finding suggests that, on average, households appear to be consuming assets more slowly than their life expectancy is shortening, which could be due to precautionary motives, bequest motives, or optimization error (e.g., from stochastic returns).

The other life-cycle variables in Table 5 are also generally consistent with theoretical models of consumption. As expected, education and lifetime earnings (proxied by Social Security income) are strongly and positively related to the amount of

Table 5
Random Effects Regression of Annuitized Wealth on Married Household Characteristics

Variable	*Coeff*	*Std Error*
Age 55-59	1.595	(1.793)
Age 60-64	2.360	(1.889)
Age 65-69	6.071	(1.992)***
Age 70-74	8.820	(2.144)***
Age 75-79	14.241	(2.364)***
Age 80-84	18.806	(2.821)***
Age 85+	27.985	(3.918)***
High school graduate	-2.706	(1.663)
Some college	0.511	(1.508)
College	21.758	(1.620)***
Nonwhite	-5.153	(1.782)***
Male, resp.	3.281	(1.305)**
Hispanic	-7.608	(2.195)***
Fair or Poor Health	-4.281	(1.131)***
Lifetime earn: med	2.894	(1.278)**
Lifetime earn: high	13.302	(1.426)***
Prob. 100K Bequest	38.701	(1.617)***
Prob. Inheritance	-3.578	(2.132)*
Year=2000	-2.312	(1.183)*
Year=2002	-3.822	(1.263)***
Year=2004	1.376	(1.246)
Constant	11.520	(2.401)***

* significant at the 10 percent level, ** significant at the 5 percent level, ***significant at the 1 percent level

Table 6
Random Effects Regression of Annuitized Wealth on Single Household Characteristics

Variable	*Coeff*	*Std Error*
Age 55-59	0.635	(3.945)
Age 60-64	4.684	(4.138)
Age 65-69	7.481	(4.298)*
Age 70-74	16.446	(4.475)***
Age 75-79	20.965	(4.540)***
Age 80-84	27.053	(4.636)***
Age 85+	47.705	(4.971)***
High school graduate	5.532	(3.113)*
Some college	12.297	(3.221)***
College	40.973	(3.723)***
Nonwhite	-10.481	(3.021)***
Male	18.972	(2.771)***
Hispanic	-7.963	(4.639)*
Fair or Poor Health	-3.172	(2.030)
Lifetime earn: med	5.051	(2.103)**
Lifetime earn: high	27.410	(3.161)***
Prob. 100K bequest	42.288	(2.626)***
Prob. inherit money	-9.183	(4.189)**
Year=2000	-1.636	(1.942)
Year=2002	-4.304	(2.049)**
Year=2004	-0.838	(2.061)
Constant	1.458	(4.728)

* significant at the 10 percent level, ** significant at the 5 percent level, ***significant at the 1 percent level

annuitized wealth. Education and lifetime earnings capture two important components of life-cycle saving. Households with higher education tend to have very hump-shaped earnings profiles, which induces a greater accumulation of assets for a given level of lifetime income. And households with higher lifetime earnings naturally save more than households with lower earnings.

Higher probabilities of leaving a bequest larger that $100,000 are associated with substantially larger amounts of annuitized wealth. As the life-cycle model would predict, expectations of *receiving* bequests work in the opposite direction. Fair or poor (self-reported) health status is negatively related to the amount of annuitized wealth. We should note that it is not obvious how health status should affect savings. Health affects saving through at least three channels: longevity, precautionary saving, and medical expenses. To the extent that poor health shortens an individual's life expectancy, it should lead to a reduction in saving, as the same amount of wealth now has to finance a shorter interval of consumption. The precautionary effect would arise if a bad health draw signaled higher future out-of-pocket medical expenses such as nursing home costs. Finally, *realized* medical expense shocks push up current consumption and drive down saving. So one interpretation of our health results is that a combination of reduced life expectancy and higher medical expenses leads to a net reduction in wealth accumulation. Table 6 displays the regression for single-headed households, showing generally similar results.

As an important extension, we would like to extend the empirical analysis to separate the effects of capital gains from those of actual flows (i.e., withdrawals), with a particular focus on DC wealth. Our idea is to look at the changes in wealth categories, stripped of any capital gains effects and see whether changes in DC wealth are due to asset substitution or higher consumption. The main difficulty with this type of exercise is properly accounting for capital gains when we do not have much information on the portfolio allocation within DCs and IRAs.

CONCLUSIONS

This study was our first look at how the balance sheets of older households evolve over retirement, using eight years of recent data from the HRS. We found that median DC and IRA balances fell for all

age groups over 51 from 1998 to 2004---particularly for the older households, which is not surprising given rules requiring minimum distributions from these accounts after age 70-1/2. However, we also found evidence that the withdrawals were not necessarily consumed when they were made, since other financial assets either rose or fell by smaller amounts, depending on the age of the household. Indeed, even among households with falling retirement accounts, many saw rising financial wealth, providing further evidence that withdrawals were not entirely consumed.

Using a comprehensive measure of total household wealth, we found that median wealth was remarkably constant over the period, for all ages, despite a mechanical decrease in the present value of annuities as households aged. Thus, we conclude that there was no obvious excessive dissaving over this time period (a period which included large variations in equity markets and considerable strength in housing markets).

Using a measure of annuitized comprehensive wealth that compares total wealth to the remaining life expectancy of the household, we found that median annuitized wealth rose over the period---a result that indicates households are not drawing down their assets too quickly given their life expectancies, but are actually drawing them down too slowly, at least relative to the simple life-cycle model in which households plan to die with zero assets. This finding suggests either optimization error, for example due to unpredictable asset-market returns, or other motives, such as bequest motives or precautionary saving in response to risks such as medical expenses. The finding is confirmed in a random effects regression framework.

We also utilize a measure of the adequacy of household wealth that compares total wealth to the wealth that would be needed to provide poverty-line income over the household's expected lifetime. This measure shows an even steeper increase over the time period, providing further evidence that older households do not seem to be excessively dissaving.

Looking more closely at households whose retirement balances declined over the period (about half of the households with retirement accounts), we find that even these households did not show falling annuity wealth at the median, indicating again that we could find no evidence that households were running down their retirement accounts too quickly over this period.

In future work, we intend to expand upon these findings by exploring differences across the wealth and earnings distributions, and by controlling for the effects of variation in asset markets to isolate the part of wealth changes that is due to "active dissaving."

Notes

[1] Thus, we are using self-reported pension data to calculate pension wealth. The HRS also includes supplementary employer-provided pension data that in some cases may provide a more accurate measure of pension benefits (see Gustman, 1998). The main differences between the self-reported measures that we use and the supplemental data involve workers' expectations of future pensions. Because most of our sample consists of retirees who are currently receiving pensions, we expect our results to be robust to our reliance on the self-reported data for workers.

[2] Love, Smith, and McNair (2007) report sensitivity results for alternative discount-rate assumptions.

[3] Widows older than 60 but under the full retirement age generally receive 71-99 percent of the workers' benefit amount.

[4] This is the same assumption as that used in the Social Security Administration's intermediate projection (SSA, 2006b).

[5] Future *employee* contributions to DC plans will be made out of labor income, so we do not need to include them. Future DB accruals have already been included as described above in the defined-benefit pension section.

[6] By including employer matches with wages, we implicitly assume matches will grow at the same 1 percent rate as wages.

[7] See Love, Smith, and McNair (2007) for results accounting for household economies of scale.

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