

Can Americans Afford to Retire? New Evidence on Retirement Saving Adequacy

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ABSTRACT

Traditional mechanisms that spread mortality and longevity risk across a population group are increasingly being replaced by saving vehicles that leave this obligation in the hands of individual households. We explore the question of whether households are adequately saving for their future retirement by reviewing recent literature that examines household behavior in preparing for retirement – both in the accumulation phase and the decumulation phase – and by exploring representative households on the verge of retirement. While the median married couple of approximately fifty-five years of age holds assets totaling nearly \$400,000, they still must engage in substantial saving to retire comfortably at age sixty-two.

INTRODUCTION

The United States experienced a substantial risk transfer from the individual to the group in the retirement arena over the last half century, with the development of massive government institutions such as social security and employer sponsored defined benefit pension plans, to protect consumption in old age. This pattern has now reversed, with new pension and saving vehicles transferring the responsibility for retirement planning and its associated risks back to individual households. Are Americans ready, and able, to assume this increased responsibility for their financial well being as they age?

In this paper we describe, and evaluate, patterns in retirement asset accumulation through review of prior literature, and our own analyses of a national sample of households on the verge of retirement. We offer an assessment of the claim that “Americans do a poor job of preparing for retirement” and some justification of why this may be the case. Our second goal is to evaluate patterns of retirement asset decumulation, in order to determine whether the available financial (and other) tools are available to achieve satisfactory consumption during

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retirement. Finally, we outline approaches to assist in improving the targeting and management of retirement accumulation and decumulation paths.

HOW MUCH RETIREMENT WEALTH DO PEOPLE HAVE?

Deciding whether people will have enough for retirement requires evidence on saving patterns of workers as they age, as well as on their retirement income needs. In this section we ask whether actual saving patterns are likely to be enough to protect retiree economic security. To this end we examine a nationally representative dataset of Americans on the verge of retirement, the Health and Retirement Study (HRS), covering over 7600 households in 1992, where at least one family member was between the ages of fifty-one and sixty-one.¹

A summary of the evidence on wealth accumulations by type appears in Table 1.² Mean values, the average for the median ten percent of households, and averages for those households reporting each wealth source appear, along with the percentages of total wealth each asset class represents. Wealth in the study is divided into three categories:³

(1) *Financial wealth*, which includes business assets, financial assets (such as stocks, bonds, and bank accounts less outstanding debt), dedicated retirement assets including IRA and Keogh Accounts, and miscellaneous other financial assets;

(2) *Net home equity* for homeowners equals the market value of owner-occupied housing less outstanding mortgage debt; and

(3) *Retirement wealth*, equal to the actuarial present value of future social security retirement and survivor benefits and retirement pension benefits.

The evidence shows that the *average* HRS household has just under half a million dollars in total wealth. Total wealth for the *median* ten percent of households (i.e., the group between the 45th and 55th percentile) is approximately \$325,000, slightly more than two-thirds of the mean for the entire sample. The fact that the median is below the mean emphasizes the skewness of the wealth distribution. The composition of total wealth also differs for the mean and median

¹The HRS is recognized as the best available source for data on current wealth for households on the verge of retirement (Gustman and Juster 1996). Unlike most other cross-sectional household surveys used in the past to study asset accumulation, consumption patterns, and saving behavior, the HRS follows these original households through time, re-interviewing them every two years. This panel is providing a fertile data set for studying how households accumulate assets preceding retirement, how they decumulate assets in retirement, and how they manage bequests. For more information on the HRS, see www.umich.edu/~hrswww.

²Estimates of pension and social security values are influenced by assumptions regarding expected future nominal interest rates, inflation rates, and rates of real wage growth. In this work we use the "intermediate" assumptions adopted by the Social Security Administration to forecast future paths of interest rates, inflation, wage growth, and social security benefits. Assumed mortality rates are derived from projections based on data supplied by the Office of the Actuary at the Social Security Administration. All data are weighted to be representative of the US population in this age bracket, and dollar figures are presented in 1992 dollars. For further detail on construction of these data see Moore and Mitchell (1997), Mitchell et al. (1996), Gustman et al. (1997).

³Throughout this study we exclude the value of Medicare in retirement wealth.

household. For the *average* HRS household, retirement wealth comprises slightly less than half of total wealth (forty-nine percent), financial wealth just over one-third of total wealth (thirty-seven percent), and the value of housing makes up the remaining fraction (fourteen percent). By contrast, for the *median* household, retirement wealth comprises three-fifths (sixty-one percent) of total assets, housing accounts for one-fifth (nineteen percent), and financial assets the remaining twenty percent of total wealth. Social security wealth alone makes up forty-one percent of total assets for households near the median, with a value of about \$134,000 in present value terms. For the household at the sample mean, social security wealth represents twenty-five percent of the total, or about \$120,000. It is interesting to note that while most asset types have higher dollar values for the mean than for the median household, the reverse holds for social security. This is in large part due to the redistributive nature of social security benefits.

The two final columns of Table 1 report the fraction of HRS households that holds wealth in each of the specified categories, along with average values for those households with nonzero holdings. Coverage by social security is near universal among HRS participants, with ninety-six percent of households expecting some benefit from that system. A significant majority of sampled households also holds some financial assets (eighty-one percent), and most (seventy-six percent) own their primary residence. Slightly under two-thirds of the sample expect an employer provided pension, similar to overall coverage levels for this age bracket in the United States. Business assets (plus nonresidential property) are held by only one third of the sample (thirty percent), but their average value, around \$250,000, is quite large for those households holding them. Only thirty-eight percent of HRS households – people on the verge of retirement, it will be recalled – have any dedicated personal retirement assets in the form of Individual Retirement Accounts (IRA's) or Keogh plans. The average value among those with positive holdings is \$47,000. People's failure to take advantage of the tax advantages inherent in targeted saving programs might be explained by household lack of understanding of the availability of these programs, or perhaps because they do not value retirement saving. Alternatively, households may choose to hold assets in non-tax-favored categories because of the increased flexibility and lack of potential penalties for early withdrawal. The efficacy of dedicated retirement saving programs is discussed in more detail below.

Table 1
Wealth Components by Source in the HRS around the Time of Retirement (\$1992)

Source of Wealth	Mean for Sample		Median 10% of Households		Among Households Holding Wealth Sources	
	Dollar Value	Percent of Total	Dollar Value	Percent of Total	Average Value Among Source Holders	Percent of Sample with Source
(1) Net Financial Wealth	175,974	37	66,530	20		
Business Assets	78,951	17	15,920	5	\$ 250,198	30 %
Financial Assets	45,370	9	21,785	7	54,059	81
Individual Retirement Holdings	19,613	4	11,313	3	46,716	38
Other	32,040	7	17,512	5		
(2) Net Home Value	65,940	14	59,746	18	84,624	76
(3) Retirement Wealth	236,399	49	198,881	61		
Social Security	119,793	25	133,606	41	124,785	96
Pension	116,606	24	65,275	20	184,104	62
(4) Total Wealth	\$ 478,313	100%	\$ 325,157	100%		

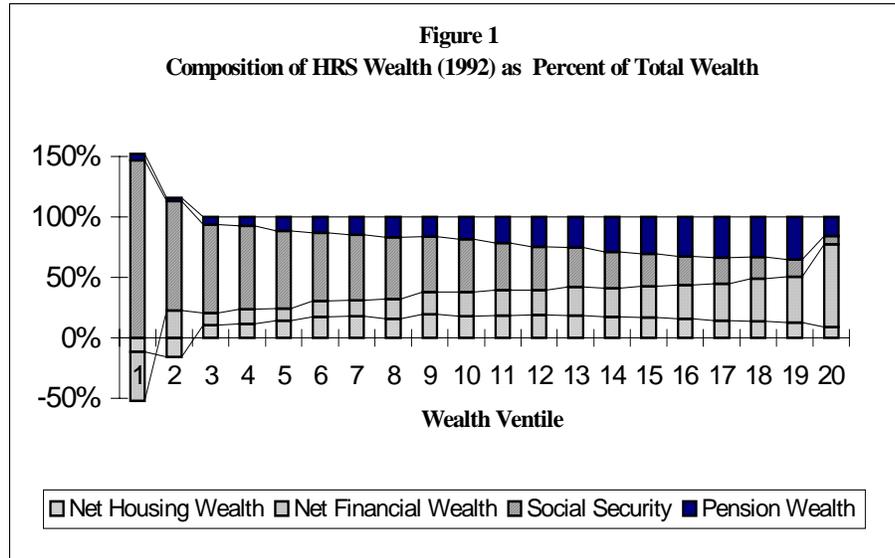
Source: Authors' computations using the 1992 Health and Retirement Study (HRS); N=7607

Note: Average for the median 10% is the average value for those households between the 45th and 55th percentiles.

More detail on the distribution of HRS assets appears in Figure 1. We divide the sample into twenty equal sized groups (ventiles) to show the breakdown of asset type across the wealth distribution. One observation is that households in the bottom ventile of the wealth distribution would have substantially negative net worth if not for future social security. Social security benefits are critical for the bulk of the population, constituting the largest component of household assets for three-quarters of the wealth distribution. Pensions play an increasing role as we move up the wealth spectrum except for the very wealthiest ventile. Surprisingly, except for the very poor, housing assets remain a relatively constant fraction of wealth across the board.⁴ Net financial wealth is the wealth category that is most

⁴A subject of considerable debate in the economics literature is whether the value of owner-occupied housing should be included when assessing the sufficiency of assets for retirement. Some analysts contend that housing wealth should not be taken into account, since retirees are reluctant to move from

highly skewed, a result apparent in both tails of the distribution. Those in the 95-100 percent ventile, with more than \$1.5M in net financial wealth, have nearly four times as much as those in the 90-95 percent ventile. At the other end of the distribution, those in the poorest ventile have negative net financial wealth and are in debt on the doorstep of retirement. Those in the next wealth ventile are similarly destitute, having an average of less than \$2,000 in net financial wealth – a scant three percent of total wealth.



BENCHMARKS: HOW MUCH IS ENOUGH?

In order to determine whether these wealth values are adequate, it is necessary to establish a benchmark against which household saving can be compared. The traditional economic approach to examining retirement wealth builds on the life cycle model originally proposed by Modigliani and Brumberg (1954) and Ando and Modigliani (1963). While the life cycle model is useful in theory, implementing it is complex in practice. Many in the financial advisory community suggest computing a number known as the “replacement rate,” or the ratio of household income needed to finance desired retirement consumption divided by annual pre-retirement income. The number is a spiritual descendent of life cycle theory, but implicitly assumes that post-retirement consumption should be equated

the houses they lived in while working (Venti and Wise 1991). On the other hand, housing wealth can be used as collateral to increase retirement consumption, as is clear from the rapid growth in second mortgages and the potential for growth in the reverse mortgage market (Cocheo, 1996; Nixon 1996; Rasmussen, Megbolugbe, and Morgan 1995).

to some fraction of the sum of pre-retirement consumption plus retirement saving. More sophisticated computations adjust retirement consumption to exclude work related and education expenses (e.g., clothing, travel, and related entertainment expenses), and to account for the differential taxation of workers and retirees (Palmer 1993; McGill et al. 1996).

Empirical efforts to compute retirees' target replacement rates yield a wide range of estimates depending on what is included in the computations and which dataset is used. Early studies recommended replacement rates declining in income: a household with \$10,000 in annual income would be encouraged to have a replacement rate (RR) of eighty percent (for an annual retirement income of \$8000), while the household earning \$50,000 before retirement was encouraged to have a replacement rate of about fifty-five percent (McGill et al. 1996). More recent work by Palmer (1988, 1991, and 1993) took into account changes in tax law, concluding that gross replacement rates declined with income in 1991, but rose in 1988 and 1993 for higher income households.⁵ A more sophisticated approach proposed by Bernheim (1992, 1993, and 1994) uses an explicit life cycle model in which a household maximizes the present value of its expected utility from future consumption given earnings, net government transfers (social security taxes and benefits), and accumulated wealth. Using dynamic programming (DP), Bernheim solves for the household's optimal saving rate path that is increasing in age up to retirement. Comparing these optimal patterns with actual saving behavior reported in a Merrill Lynch survey on household income and wealth, he finds that the survey respondents have saved only thirty-five percent of what they should have saved for retirement (with a range of sixteen to fifty-five percent allowing for more pessimistic and optimistic assumptions). This translates to a saving shortfall of nine to nineteen percent per annum for young households (age thirty-five to forty-five). Whether these figures are applicable to a more nationally representative cross section of the population is not known.

Both the replacement rate and the dynamic programming methods just described are powerfully influenced by assumptions regarding interest rates, as well as risk aversion and retirement ages. Bernheim's interest rate series is conservative since it is drawn from a historical series of 3-month Treasuries; returns on longer Treasuries have historically exceeded those for the short-term instruments.⁶ In addition, the DP results depend crucially on the researcher's choice of a risk aversion parameter. Bernheim again makes a conservative choice in this parameter, consistent with a finding of too little rather than too much saving.⁷ Offsetting this slightly is the assumption that workers retire at the age of

⁵The Palmer approach also does not take into account the logical feedback between increased saving and reductions in the replacement rate; for additional discussion on this point see Moore and Mitchell (1997).

⁶For example, the spread between the yields on 3-month and 30-year Treasuries was approximately 150 basis points in February 1997 (CNN Financial Network Feb. 21, 1997). This ignores the still higher returns available on stocks, but as holding stocks means bearing commensurately more risk, this may not be palatable to some risk-averse investors.

⁷Bernheim uses a CRRA utility function with a floor level of consumption (set at \$10,000 in 1993 dollars) and a risk aversion parameter of 4, a value at the high end of values commonly seen in simulation models. This parameter, which indicates the saver's sensitivity to consumption

sixty-five, so that less accumulation is needed in the model as compared to the modal United States retirement age of sixty-two. Whether alternative parameterizations of these key assumptions would yield substantially different results is not indicated in this study. It is also the case that his numbers also omit housing wealth; re-computations including housing values raise the estimated average adequacy level to eighty-four percent.

PROJECTED SAVING SHORTFALLS

We next ask whether accumulated wealth is adequate for retirement using the nationally representative HRS study, and present the results by marital status in Table 2. The approach we take is to roll forward each median household's current total wealth from existing sources to both ages sixty-two and sixty-five for three household subgroups – married couples, single men, and single women.⁸ This represents a six-year projection to age sixty-two and a nine year projection to age sixty-five.

The median married couple can expect wealth of approximately \$460,000 at age sixty-two and half a million dollars if households postpone retirement until age sixty-five. This represents growth of twenty percent to age sixty-two and thirty percent to age sixty-five from the current level of \$385,700. Looking at the composition of wealth, we also see different growth patterns across asset classes. Net financial wealth changes modestly due to the depreciation of vehicle stock, which offsets more sizable growth in stocks, bonds, and other assets. Home value grows by one sixth by age sixty-two, as mortgages are paid down. The largest source of growth is in pension wealth, which increases by one-half (age sixty-two) to two-thirds (age sixty-five) and represents accruals due to additional service as well as increases in the present value of previously accrued benefits. Social security wealth does not rise as dramatically, seven to eighteen percent, as benefits are based on lifetime earnings and full entitlement to these benefits has already been earned.

fluctuations, is more typically assumed to lie between 0 and 2 in simulation models, where 0 corresponds to linear utility (risk-neutral) and 1 to logarithmic utility.

⁸A detailed description of how wealth is projected may be found in Moore and Mitchell (1997). In brief, we roll forward net financial wealth assuming assets are held in a portfolio of fifty percent bonds and fifty percent stocks, with these assets earning their average real historical returns over the period 1926-1995. Personal vehicles are assumed to depreciate over ten years. Net home value computations assume wealth is held in a single owner-occupied house and grows with the increased amortization of the mortgage principal. Pension wealth grows in line with increased accruals derived from additional tenure and pay and asset grown in employer plans; these data are derived from employer-supplied summary pension plan descriptions. Social security wealth increases are computed using respondent administrative records on earnings and social security benefit rules (see Mitchell, Olson, and Steinmeier 1996).

Table 2
Projection of HRS Households' Current Assets to 62 and 65 (\$1992)

	Married Couples		Single Males		Single Females	
	Age 62	Age 65	Age 62	Age 65	Age 62	Age 65
Net Financial Wealth*						
Current (1992)	\$ 73,400	\$ 73,400	\$ 24,200	\$ 24,200	\$ 13,700	\$ 13,700
Projected Growth	4,400	9,400	100	1,100	(2,000)	(2,500)
Projected at Retirement	77,800	82,800	24,300	25,300	11,700	11,200
Net Home Value						
Current (1992)	67,200	67,200	17,200	17,200	21,200	21,200
Projected Growth	11,200	15,000	4,800	6,500	8,500	9,900
Projected at Retirement	78,400	82,200	2,000	23,700	29,700	31,100
Pension Wealth						
Current (1992)	92,100	92,100	24,100	24,100	14,100	14,100
Projected Growth	45,100	66,100	14,500	20,300	12,400	19,200
Projected at Retirement	137,200	158,200	38,600	44,400	26,500	33,300
Social Security Wealth						
Current (1992)	153,000	153,000	73,000	73,000	56,000	56,000
Projected Growth	11,100	28,500	7,000	9,700	4,600	10,500
Projected at Retirement	164,100	181,500	80,000	82,700	60,600	66,500
Total Current Wealth	385,700	385,700	138,500	138,500	105,000	105,000
Projected Total Assets at Retirement Age	457,500	504,700	164,900	176,100	128,500	142,100

Source: See Table 1.

* Net Financial Wealth includes currently held physical assets such as vehicles that will depreciate over time.

Single men and women both have substantially fewer assets than married couples. Current and projected wealth for single men is about thirty-six percent of that for married couples (\$165,000 and \$176,000 at ages sixty-two and sixty-five, respectively), and projected wealth for single women (\$129,000 at age sixty-two and \$142,000 at age sixty-five) is less than thirty percent of that for married couples. Men have more than women do in all categories except net housing wealth, and hence portfolio growth for men exceeds that for women.

Given the projection of household wealth at age sixty-five, the next step is to determine household needs in retirement. We use a replacement rate concept as our baseline with households smoothing real consumption levels into retirement. Given a household's earnings, demographic information, and an initial replacement rate target, a target wealth level is calculated allowing for differential taxation, both prior to retirement and in retirement. The shortfall of projected assets relative to target assets enables us to calculate a percentage of income that needs to be saved

to reach the goal. This saving rate is then used to solve for a new replacement rate – if the saving rate is too large to be feasible, the replacement rate is lowered; if the saving rate is too small for consumption, taxes and saving to sum to 100 percent of income, the prescribed replacement rate is increased. We iterate this process until the prescribed saving and replacement rates converge. The three median households presented in Table 2 are used as representative cases to calculate saving and replacement rate prescriptions.

Results in Table 3 show the asset shortfall for each of these representative households and the annual saving required to equate consumption before and after retirement. Our married couple needs to save an additional \$65,000 to retire at sixty-two or about the same amount to retire at sixty-five. Delaying retirement to age sixty-five raises the couple's standard of living, both prior to retirement and during retirement. A three-year delay of retirement raises post-retirement income from sixty-one percent to seventy-one percent of pre-retirement income. Prescribed saving rates as a percentage of gross income fall decisively as well. To retire at sixty-two, the married couple must boost savings to one-fifth of annual income; to retire at sixty-five, a more modest saving rate of twelve percent is needed. This is still considerably more than the actual saving rate of four percent observed for households in this age bracket in the Consumer Expenditure Survey (Palmer 1993).

The picture for single individual households is bleaker. Both households need to accumulate additional wealth in excess of twice their annual earnings before retirement. Our calculations show that the representative single male and single female households should save thirty percent of income if they wish to comfortably retire at age sixty-two. If retirement is postponed to age sixty-five, saving needs drop to approximately eighteen percent per year, still a substantial fraction of annual income.

It is interesting to compare our results to the saving prescriptions offered by Bernheim (1994) using the DP methodology. Bernheim's approach advises an after-tax saving rate of nineteen percent for a fifty-five year-old married couple having a defined benefit pension and an annual household income of \$50,000. Expressed as a fraction of pre-tax income, this advised rate is between twelve percent and fifteen percent, a result that appears consistent with our estimates. Recall however that Bernheim's prescriptions ignore housing wealth, so including these assets would lower his prescribed rates. The discrepancy can be reconciled by noting that the "on-track" hypothetical couple in Bernheim's world holds approximately \$90,000 of retirement wealth. Using our own HRS sample, we find that actual older couples hold less financial wealth – only \$73,400 – so the median HRS household would need to undertake additional saving using both approaches.

Table 3

Projection of Savings Rates Needed to Smooth Consumption into Retirement (\$1992)

	Married Couples		Single Males		Single Females	
	Age 62	Age 65	Age 62	Age 65	Age 62	Age 65
Household Earnings	\$ 43,600		\$ 23,800		\$ 16,500	
Amount Needed to Sustain Consumption Level	522,300	567,000	214,500	176,100	165,200	177,900
Projected Wealth	457,500	504,700	164,900	222,700	128,500	142,100
Shortfall	64,800	62,300	49,600	46,600	36,700	35,800
Replacement Rate	61.0%	71.2%	56.6%	62.9%	53.9%	63.2%
Saving Rate Needed to Meet Goal	20.0%	12.2%	29.3%	17.6%	31.5%	18.8%
Dollar Amount in First Year	\$ 8,700	\$ 5,300	\$ 7,000	\$ 4,200	\$ 5,200	\$ 3,100

Source: Authors' calculations.

INCENTIVES AND DISINCENTIVES FOR SAVING

If we take as given that households tend to save too little for retirement, the next question is why and what might be done to rectify the situation. One potential explanation for why households save too little is that some people simply might not be able to afford to save.⁹ This might be true, for instance, if income barely covers a subsistence level of consumption. However this view is not likely to hold for other than the poorest of the poor in the United States.

A second explanation for undersaving focuses on the inherent difficulty solving of the household's planning problem. As can be seen from the discussion of the DP model above, many issues must be considered and assumptions made about inherently uncertain future variables including future income streams, interest rates to be earned on various asset classes, tax rates and issues, future inflation rates, and mortality. One study that seeks to determine whether people forecast the future accurately finds households generally lacking in financial knowledge; and financial illiteracy is correlated with underpreparation for retirement (Bernheim 1996). Another analysis by Hurd and McGarry (1995) reveals that people can predict the likelihood of surviving to age seventy-five fairly accurately, but they tend to overestimate the probability of living to eighty-five. This suggests that people should tend to oversave rather than undersave, so the evidence is not supportive of the undersaving hypothesis.

A different rationale for too little saving may be lack of self-control (Thaler 1994; Sheffrin and Thaler 1988). This theory contends that people face a conflict between a desire for immediate gratification versus a forward-looking need to save for the future. The psychological perspective asserts that people develop so-called

⁹For an excellent recent review of the determinants of saving see Browning and Lusardi (1996).

“mental accounts,” and treat money differently depending on which account it is attached to. In this framework, some income surprises tend to be consumed immediately, while others tend to be saved for future consumption. Thaler argues that to increase saving, people need to have funds deposited automatically through payroll deductions or mandatory saving of tax refunds.

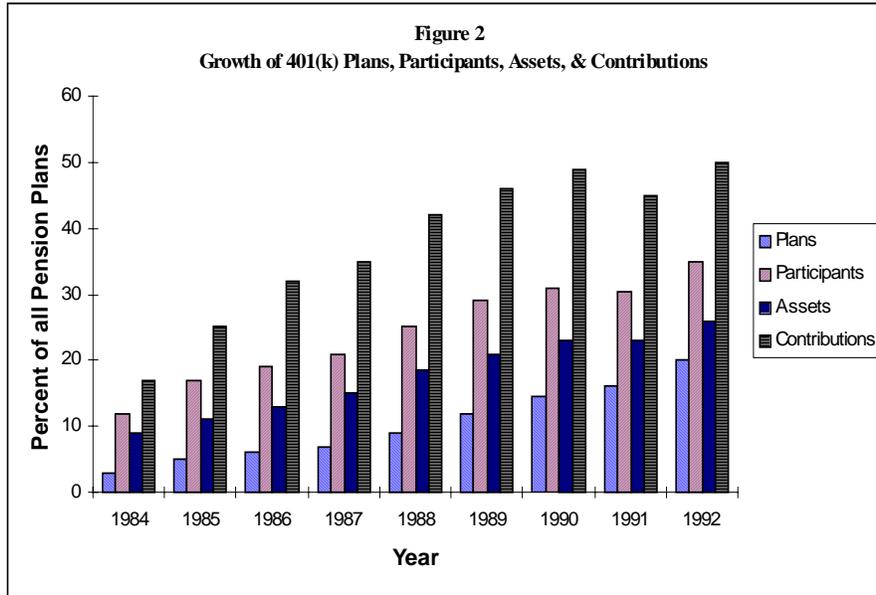
A final explanation for undersaving patterns relies more on incentives rather than psychological constructs. This approach emphasizes the role of government in providing an income safety net for the elderly (Gokhale, Kotlikoff, and Sabelhaus 1996; Hubbard, Skinner, and Zeldes 1994, 1995). No longer worried about living beyond their income (in the case of social security), or paying catastrophic medical costs (in the case of Medicare and Medicaid), the elderly rationally can view such government programs as curtailing the need for households to save. The logical extension of this behavior is that households expecting to use these services will increasingly tend not to save at all; those who are wealthy must save more since for them, the possibility of government assistance is remote. Better data are needed to investigate the relative explanatory power of these different undersaving hypotheses.

The fact that there is undersaving is all the more puzzling in light of the fact that most dedicated retirement saving programs benefit from a tax-advantaged status which effectively raises the after-tax rate of return on these assets. That is, earnings saved through these programs reduces taxable income that year; and capital gains, dividends, and interest payments are also not taxed as they accumulate. By the time they are withdrawn, the saver is generally in retirement and hence in a lower tax bracket. This observation raises two important questions for researchers concerned with saving behavior and public policy. The first is whether tax inducements raises saving rates, or whether saving is simply shifted from taxed to tax-deferred vehicles. The second question is whether the increase in saving generated by these tax incentives justifies the foregone tax revenue that it costs.

Answers to these questions are available in several recent studies exploring the saving effects of defined contribution pensions, in particular Individual Retirement Accounts (IRA's) and 401(k) plans.¹⁰ IRA's were first allowed in 1974 to provide a tax-preferred saving mechanism for those individuals with no company-sponsored pension plan; 401(k) plans are employer-sponsored in which employers can match employee contributions in a tax protected way (Poterba, Venti, and Wise 1996c). Figure 2 illustrates the relative growth of 401(k) plans versus all other employer-provided plans: contributions to 401(k)'s have soared from eighteen percent to fifty percent of all pension contributions, and assets attributable to 401(k)'s rose from under ten percent to more than twenty-six percent of overall pension assets. Over one-third of all covered employees now has a 401(k) pension plan. Though the research debate continues, the bulk of the evidence suggests that both tax-preferred saving vehicles generate new net saving; the IRA effect appears

¹⁰The literature on this subject began with work by Feldstein (1977), Diamond and Hausman (1980), and Munnell (1982). Recent studies include Hubbard and Skinner (1996).

to be about twenty-five cents on the dollar, while estimates of the measured 401(k) effect are less conclusive.¹¹



Whether an increase in saving of this magnitude justifies the cost in foregone taxes is a complex matter. To evaluate it, Hubbard and Skinner (1996) calculate the ratio of the change in private capital accumulation per dollar of IRA contributions to the change in net tax revenue per dollar of IRA contribution. This ratio indicates the amount of saving generated per dollar of tax subsidy. Under their baseline scenario, each dollar of tax subsidy generates \$2.21 in increased saving; that is, if IRA contribution limits were to be raised, it indicates that there would be a surge of new saving through IRA's. It will be interesting to explore how national saving will be influenced by the introduction of Roth IRA's and the recent expansion of eligibility for traditional IRA contributions.

Workers covered by a company-sponsored pension plan also benefit from inducements to save via contribution matches by the sponsoring employer. While companies are not obligated to offer a match, they will often do so in order to ensure that the plan does not violate nondiscrimination rules. Exactly how responsive behavior is, is still in contention. One longitudinal analysis of a single company examined worker contributions to a 401(k) plan and found that employees demonstrated practically no sensitivity to variations in employer match

¹¹Recent surveys of this debate include Bernheim (1996) and Hubbard and Skinner (1996); proponents of the net new saving view include Poterba, Venti, and Wise (1993, 1996a, 1996b, 1996c), while skeptics include Gale and Scholz (1994) and Engen, Gale, and Scholz (1996).

rates (Kusko, Poterba, and Wilcox 1994). Three-fourths of those eligible to participate either did not contribute, contributed up to the point where the employer would no longer match contributions, or contributed to the maximum degree the plan would allow. That is, employees effectively went on “auto-pilot” once a contribution rate was set.

In contrast, a cross-sectional analysis of many large firms by Clark and Schieber (1996) found that participation rates were sensitive to both match rates and employer efforts to educate them about retirement saving needs and targets. Specifically, pension contribution rates for those with 100 percent matches are two percent of salary higher than for those receiving a 25 percent match. Workers that were offered tailored communication about a plan saved as much as those that were offered 100 percent employer match rates on their contributions. Other work shows that retirement education boosted participation by about eight percent across the board, and the effect was strongest among non-highly compensated employees (twelve percent [Bayer et al. 1996]). These results were significantly stronger for seminars than for written plan materials, and frequent seminars increased participation the most. Bernheim and Garrett (1996) find that where education was provided, median 401(k) balances in pension plans were greater than where it was not offered (\$8250 versus \$5000).

The differential outcome is even greater when employees are divided according to whether they actually attended the educational sessions (\$10,000 versus \$4000). In addition, this study found that availability of retirement education increased overall saving by 1.65 percent, greater than the approximate 1.0 percent increase in targeted retirement saving. This indicates that education provides wholesale changes in saving behavior and not just small changes at the margin.

ASSET MANAGEMENT PRIOR TO RETIREMENT

Having described the asset accumulation procedure, the next issue is how people invest their assets intended for retirement. In this section we explore a range of views on how investors are advised to think about managing their portfolios prior to retirement, and in the text section we examine relevant data on how people actually manage their retirement saving.

Investment Advice

A great deal of investment advice is proffered to investors by the large and growing industry of financial advice-givers. This group generally advises conservative investors to hold the majority of their assets in bonds, while aggressive investors are encouraged to hold stock. Four such recommendations appear in Table 4, ranging from Fidelity Investments (a large mutual fund company), Merrill Lynch (a large brokerage firm), Jane Bryant Quinn (a financial columnist), and the financial section of the New York Times (Canner et al. 1994).

Table 4
Financial Advisors' Recommended Investment Portfolio Mix

	Fraction of Portfolio			Ratio of Bonds to Stocks
	Stocks	Bonds	Cash/ Money Mkt.	
Conservative Investor				
Fidelity	.20	.30	.50	1.50
Merrill Lynch	.45	.35	.20	0.78
Jane Bryant Quinn	.20	.30	.50	1.50
New York Times	.40	.40	.20	1.00
Average	.31	.34	.35	1.10
Moderate Investor				
Fidelity	.40	.40	.20	1.00
Merrill Lynch	.55	.40	.05	0.73
Jane Bryant Quinn	.50	.40	.10	0.80
New York Times	.60	.30	.10	0.50
Average	.51	.38	.11	0.75
Aggressive Investor				
Fidelity	.65	30%	.05	0.46
Merrill Lynch	.75	20%	.05	0.27
Jane Bryant Quinn	1.0	0%	0.0	0.00
New York Times	.80	20%	0.0	0.25
Average	.80	18%	.02	0.23

Source: Canner, Mankiw, and Weil (1997)

Averaging the advice from these four representatives of the financial community reveals that investment advice offered varies with investor risk aversion. Should the investor believe himself to be risk averse or conservative, he is advised to hold about a third of his portfolio in bonds and another third in cash (or short term money market funds); this conservative investor would therefore have only about a third of his remaining funds to invest in stocks. If the willingness to take on risk is higher, the investor would be advised to hold more stock, so the moderately risk-averse individual would be expected to hold about forty percent in stock, and an "aggressive" individual would hold eighty percent or more in stocks. It is interesting that these asset allocation recommendations accord closely with Siegel's (1995) proposal that the optimal portfolio of a conservative investor should consist of twenty-five percent stock, a moderate investor's should include fifty percent stocks, and a risk-taking investor's holdings should be ninety-five percent stock. But Siegel argues that this recipe is "best" for investors with only a single year time horizon; since people saving for retirement have a far longer holding period than a single year, he argues that a better long term allocation would be much more concentrated in stock. Even a conservative investor planning on holding the assets for ten years is advised to hold forty percent in stock, and if more than thirty years, he advises seventy-two percent in

stock. The aggressive investor contemplating either a 10-year or a 30-year holding period is counseled to place more than 100 percent of investable funds in stock (borrowing against other assets to achieve this goal). Siegel's conclusion flows from his view that, in the long run, bonds and money market funds are likely to lose value due to inflation and be dominated by higher stock returns.

Notwithstanding the popularity of the advice that long-horizon investors should hold stock, some in the research community take issue with it. One concern is that people tend not to know whether they are conservative or aggressive investors, leading investment advisors offer questionnaires that seek to elicit risk preferences (and ability to bear risk; see Hallman and Rosenbloom 1993). A simple solution is to link some simple observable characteristic about the investor – such as age – to (unobserved) risk preferences. This is usually the thesis behind the prescription that young people should invest in stocks, presuming that they have a longer time horizon and thus should be more tolerant of risk. A proponent of this view is Malkiel (1996, 411), who favors “more common stocks for individuals early in the life cycle and more bonds for those nearer to retirement.” The view that stocks are a better investment for the young is also challenged by a distinguished group led by Samuelson (1994), who argues that the decision to hold stocks versus bonds depends on a complex set of assumptions about the capital market as well as other assets the investor holds. In a recent review of the arguments, Canner et al. (1994, 5) concluded that in a world with a simple CAPM model, the optimal rule is for “all investors [to] hold risky assets in the same proportions” (see also Jagannathan and Kocherlakota 1996). In particular, all investors would be predicted to hold bonds to stocks in a constant ratio of 0.3 throughout their lives, and adjust portfolios to suit risk tolerance by adjusting the relative holdings of this stock-bond portfolio with cash holdings. This is a very different prescription than the fractions proposed in Table 4.

Financial advisors tend to deviate from the CAPM golden lifetime ratio of stocks to bonds because they argue that risk averse investors are unwilling to face a 1929-type stock market crash. That is, even though in the long run investors might make more money holding a large fraction of stocks, this much stock exposes them to a potentially large loss of the type that would wipe them out. It simply might not be possible to borrow enough against the future in order to survive in the short run (Bodie 1995). Another reason to deviate from the simple CAPM model's prescription is because people hold a great deal of their wealth in human capital rather than physical capital, particularly when they are young. So, when deciding how to invest financial assets, what becomes critical is the anticipated future correlation between labor earnings and capital returns as well as the worker's remaining work life. If bonds were more closely correlated with salaries than stocks, for instance, then a young worker would hold more of his financial capital in stocks to offset earnings risk. Later in life when a worker's human capital was exhausted, he would reasonably switch to a portfolio heavier in bonds.¹² Additionally, the asset allocation needs of a dual-earner married couple are likely to

¹²Models producing this prediction include Bodie, Merton, and Samuelson (1992) and Gollier and Zeckhauser (1995).

differ from those of a single individual; as Kotlikoff and Spivak (1981) have shown, risk sharing within the family can be quite powerful. Similarly, risk sharing occurs across generations, where for example an anticipated bequest of a parental home could influence the adult child's desired asset allocation.

Do People Do What They Are Told?

Having explored some of the practical and theoretical advice offered to investors, the next question is, how do people actually invest their retirement assets? Do they appear to follow advice from the investor community, and if so, does it influence their investment allocations? Since all but the wealthiest households have few financial assets other than housing, we turn to an examination of company-sponsored pension accumulations to examine retirement asset allocation patterns. In this context, it is necessary to distinguish between *defined benefit* (DB) plans, where employers normally have the sole responsibility and control over asset allocation decisions, and *defined contribution* (DC) plans, where participants are normally able to influence the way their accounts are invested.

It has long been conventional wisdom that DB pension plans tend to hold more of their portfolio in equities than do DC plans, perhaps because of the expectation that individual participants are more risk averse than are group pension trustees. A glance at Table 5 indicates that this pattern was accurate in the past, but is no longer true. Assets held in large, single-employer defined contribution pension plans are now about sixty percent in equities, a fraction not very different from the holdings of defined benefit plans. One explanation for this trend is that "[a]s the stock market rises, participants don't necessarily rebalance their 401(k) asset allocations the way pension executives rebalance defined benefit plan allocations" (Williams 1997, 1). Another reason is that DC participants have moved away from guaranteed investment contracts (GICs) over time. Between 1990 and 1996, the GIC share in DC plans fell from twenty-nine percent to twenty-one percent of assets (Williams 1997). At least based on current data, then, excessive conservatism among defined contribution investors appears to not be a matter for substantial concern.

Table 5
Pension Plan Investment Portfolios by Plan Type

		Asset Allocation	
		Equities	Fixed Income*
Top 1000 DB Plans	1992	53%	na
	1995	56%	34%
	1996	57%	33%
Top 1000 DC Plans	1992	48%	na
	1995	52%	33%
	1996	60%	30%

Source: Williams (1997)

Notes: (*) includes bonds, GIC's and insured funds.

Nevertheless, equity holding patterns do differ across participant characteristics as is shown in Table 6. In a survey of twenty-four large corporate pensions, workers over age sixty held little of their 401(k) portfolio in equities – less than fifteen percent – while those younger than forty put half of their 401(k) money in stock or stock funds (Schieber and Goodfellow 1995). By contrast, fixed-income investments rose from about forty percent for people in their twenties, to more than double that for people over age sixty. Allocations also differed by pay level: those earning up to \$60,000 put at least half of their investments in balanced income funds, and only those earning more than that chose the pure equity funds. Though the low-paid group was less likely to choose any form of stock as compared to the higher-paid group, they still devoted over one-third of their portfolios to stock. Investment behavior also differs by sex: in the Federal Government Thrift Saving Plan, only twenty-eight percent of the women versus forty-five percent of the men opted for the equity index fund, and women held only nine percent of their assets in the equity fund (versus fifteen percent of men's assets). (The TSP plan is similar to the 401(k) offering available to private sector employees; Hinz and Turner forthcoming). Women's reluctance to invest more aggressively implies that men will end up with retirement portfolios worth four to sixteen percentage points more, simply as a result of having invested in higher risk/return holdings.

Table 6
401(k) Asset Allocation by Participant Characteristics

Age of Plan Participant (yrs)								
Asset Class	21 - 30	31 - 40	41 - 50	51 - 60	over 60	Total		
Stock Funds	39%	36%	30%	22%	10%	25%		
Company Stock	11%	9%	6%	6%	3%	6%		
International		3%	4%	3%	1%	3%		
Stocks	3%							
Balanced Funds	6%	8%	11%	8%	1%	8%		
Fixed Income	41%	43%	49%	62%	85%	58%		
Annual Earnings of Plan Participant (\$000)								
Asset Class	under 15	15 - 25	25 - 35	35 - 45	45 - 60	60 - 75	75 - 100	Total
Stock Funds	25%	22%	20%	19%	25%	42%	45%	52%
Company Stock	7%	8%	8%	7%	7%	11%	8%	2%
International	1%	1%	2%	2%	2%	4%	6%	10%
Stocks								
Balanced Funds	62%	63%	62%	67%	53%	32%	26%	27%
Fixed Income	6%	7%	9%	7%	12%	11%	15%	8%

Source: Goodfellow and Schieber (forthcoming)

One explanation for why people invest differently may be that they utilize different sources of financial advice. A nationally representative survey collected by the Federal Reserve Board asked people whom they consulted, and linked it to respondents' retirement assets and other wealth holdings. Specifically the question posed was "How do you (and your husband/wife) generally decide what kind of saving and investments to make – do you get help from an accountant, a banker, a broker, a tax advisor, a lawyer, a friend or relative, or what?" (Kennickell, et al. 1996). The findings, summarized in Table 7, show that only forty-five percent of the households questioned sought any financial advice, and of those, the largest group (fifty-seven percent) obtained it from relatives and friends. Only a quarter contacted any financial professional for advice including bankers (twenty-six percent), brokers and accountants (seventeen and fourteen percent, respectively), and tax advisers and lawyers (nine and eleven percent, respectively). People earning \$25,000 or less consulted friends and relatives, while higher-paid respondents were much more likely to go to brokers, bankers, and accountants.

bonds. The difference between the two cases was how the researchers presented data on each fund's returns. In the first scenario, one-year returns were arrayed from best to worst, and in the second scenario, 30-year holding periods were arrayed in the same fashion. Participants shown the first scenario allocated only forty percent to the stock fund, because they focused on the fact that Fund A had earned negative forty-percent returns at least once. Participants in the second scenario allocated ninety percent to stock, realizing that there was a small chance of a negative return across all 30-year holding periods. Hence the psychological research strongly suggests different data presentations on risk and return dramatically alters peoples' portfolio allocation results, and it may be that brokers have been adept at discerning this.¹⁴

THE PROCESS OF RETIREMENT ASSET DECUMULATION

We next assess available information on how people handle the retirement asset decumulation process. Simple life cycle theory suggests that a rational and far-seeing retiree would draw down his wealth steadily so as to maintain consumption, exhausting the asset stock at death. At that date, the only assets remaining are those intended to be passed on as bequests. Therefore a testable implication of this model is that older people would be expected to consume more than their income, with declines in wealth funding the difference. More complex life cycle models also recognize that retirees face an unknown date of death, uncertainty about human, financial, and physical capital, and substantial uncertainty about future paths of government and family support opportunities. They also confront tremendous risk in terms of future inflation and what this does to their retirement wealth.

Theoretical life cycle models have produced few clear-cut testable implications about wealth decumulation patterns in old age (Browning and Lusardi 1996). One prediction is that dissaving would be faster among childless older people, and slower among older persons planning on leaving an inheritance to their children. Virtually no model implies that older peoples' assets would grow during retirement; whether they decline or remain roughly constant is not easily determined theoretically. To illustrate this ambiguity, we note that people facing the chance of having to pay for expensive nursing home care might save more when young but dissave when older. Saving decisions also interact with government support programs for the indigent. For example, eligibility criteria for Medicaid require people to consume all their assets in order to qualify for government-subsidized nursing home coverage. As a result this policy probably encourages more rapid dissaving among the younger half of the older cohort than would otherwise be the case.

¹⁴These simulations ignore rebalance and default risk. This is known as the "survival problem," examined by Brown, Goetzman, and Ross (1995), who show that looking back at return data on the winners imparts an upward bias to return statistics. The case for the dominance of stocks over bonds is therefore weaker *ex ante* than *ex post*.

Research on actual wealth decumulation by age is driven by two questions: (1) How does “bequeathable wealth” change with age, and (2) How do older people divide their assets between bequeathable and non-bequeathable wealth? Bequeathable wealth includes all non-annuitized wealth that could, in principle, be passed on to someone else (Kotlikoff and Spivak 1981). Focusing first on wealth patterns with age, we find that private saving declines with dependency rates in cross-country analysis, such that countries with many elderly have lower private saving rates. There is controversy over just how substantial the size of this relationship, with estimates ranging from nil to quite large.¹⁵ Household data also shows that people dissave with age, as described in Table 8. Average wealth spenddown rates run at one to five percent per year among the elderly, higher for the childless and lower for those with dependents. This decumulation pattern may not follow a smooth trajectory, however, since recent UK data show that financial wealth falls quickly at retirement, remains constant until a dozen or so years into the retirement period, and plummets after that point (Disney 1996).

Table 8
Changes in Bequeathable Wealth Among Older U.S. Households

Study	Annual Rate of Change in Wealth	Dataset Used in Study
Mirer (1980)	-1.2%	1963-4 Federal Reserve Data
Diamond & Hausman (1984)	-5.0%	NLS Mature Men
Hurd (1987)	-4.5%	Single Persons, RHS 1969-79
	-1.6%	Couples, RHS 1969-79
Hurd (1991)	-3.9%	Single Persons, SIPP 1969-79
	-1.8%	Couples, SIPP 1969-79

Sources: Hurd (1993, Table 6) and Disney (1996)

Assessing whether actual wealth spenddown patterns are “too large or too small” depends on how long the retiree anticipates living, what discount rate he uses, what government and other benefits he anticipates, and what assumptions he makes about financial market returns.¹⁶ To illustrate this point, we compute the “programmed withdrawal” that could be generated by financial wealth accrued by the representative HRS households described in Table 2.¹⁷ Converting the married couple’s net financial wealth into annual income flows (see Table 9) generates a real annual flow of \$4200, assuming retirement at age sixty-two and no additional

¹⁵Even less clear is what the effect of an aging population is on national saving as a whole, since this effect depends on government expenditures on the aged – particularly social security – and these programs are generally unfunded, pay-as-you-go systems that are perceived as reducing national saving (Disney 1996).

¹⁶It also depends on how much annuity income and government benefits the retiree anticipates receiving, as well as taxes.

¹⁷This approach computes a real annuity using mortality and interest rate assumptions as described in Moore and Mitchell (1997).

saving.¹⁸ Single men would fare much worse with only \$1,600 in annual income, and single women have less than half again, \$700. It should be noted that the programmed withdrawal approach does not avoid the possibility that the retiree outlives his assets; it is not a life annuity. If these households were to annuitize their housing wealth, their annual income would rise substantially – the contribution of income from housing wealth would nearly equal that from net financial wealth for the couple and the single male, and be more than twice as great for the single woman.¹⁹ Income from employer provided pensions is on par with that from savings and annuitized housing wealth for the couple and single male, but affords less income for the single female. If these households followed the saving prescriptions generated in Table 3, annual retirement income at age sixty-two could be \$3600 greater for the married couple, \$3300 greater for the single male, and \$2100 greater for the single female.

Table 9

Anticipated Annual Retirement Income for Representative Households under Programmed Withdrawal (\$1992)

	Married Couples		Single Males		Single Females	
	Age 62	Age 65	Age 62	Age 65	Age 62	Age 65
No Additional Saving						
Net Financial Wealth Only	\$ 4,200	\$ 5,000	\$ 1,600	\$ 1,900	\$ 700	\$ 700
Net Financial Wealth Plus Housing	8,500	9,900	3,100	3,600	2,400	2,700
Pension Income	7,500	9,500	2,600	3,300	1,500	2,100
All assets other than Social Security	16,000	19,400	5,700	6,900	3,900	4,900
With Additional Prescribed Saving						
Net Financial Wealth Only	7,800	8,700	4,900	5,300	2,800	3,000
Net Financial Wealth Plus Housing	12,000	13,700	6,400	7,100	4,500	5,000
Pension Income	7,500	9,500	2,600	3,300	1,500	2,100
All assets other than Social Security	19,500	23,200	9,000	10,400	6,000	7,200

Source: Authors' calculations

Note: Assumes households have access and control of distribution of Pension Wealth.

Annuity factors calculated using a 2.3% real interest rate and Social Security mortality tables.

A reason that these income flows look small is that older people have alternative assets that could be used in the event of need, including sale of their house. Do people actually decumulate housing assets to help finance old-age consumption? The answer seems to be that in the United States at least, past retirees have not released home equity by moving to smaller, less expensive homes;

¹⁸This abstracts from insurance loads charged by annuity vendors; see Mitchell, Poterba and Warshawsky (1997).

¹⁹Wealth and consequent income levels would be slightly higher if the respondent worked to age sixty-five instead of retiring at age sixty-two.

nor have they availed themselves of reverse annuity mortgages or second mortgages – financial products enabling older homeowners to unlock home equity to increase consumption without moving out of their homes. Consequently, some experts have argued that older people hold “excess” housing, and advocate extending mechanisms to help release this excess (Disney 1996). On the other hand there are technical problems with doing so, including the possibility of adverse selection (mainly the long-lived will seek to purchase the reverse annuity), and the fact that home depreciation and loss of value is a problem faced by older people’s housing stock. In any event, the size of the annuity that would thus be generated tends to be quite small, at least until the age of seventy-five (Skinner 1993).

Another issue is that many households have annuity income benefits from pensions and social security. Social Security entitlements cannot be borrowed against, nor taken as a lump sum.²⁰ Currently, most HRS respondents with pensions are covered by DB plans in which the benefit is paid out as an annuity.²¹ Future retirees will, however, have substantial funds in their DC accounts, where lump sum cash outs are the norm. This raises the question: How will pension-covered workers respond to the availability of their retirement accruals in the form of a lump sum? Research on how this excise tax affects early lump sum withdrawals shows that most low income recipients are undeterred from cashing out their lump sums; among higher income workers, a one percent increase in the excise penalty produces almost a half percent fewer rollovers (Chang 1995). In addition, the likelihood of rollover into a tax-qualified account is increasing in the size of the lump sum (McGill et al. 1996). Virtually nothing is known about lump sum distributions from pension plans invested during the retirement phase. Anecdotal evidence suggests that most workers, given the option to take cash from their pension accounts, take the cash rather than purchase life annuities through group retirement plans. This is surprising in that a life annuity provided through one’s employer is generally priced at group rates below those offered to individually purchased annuities (for adverse selection reasons as well as because of scale economies). The size of the group discount varies with group characteristics. In addition, individually priced annuities devote ten to fifteen percent of assets to administration and overhead costs, compounding their disadvantage versus group annuities (Mitchell et al. 1997).

Several other factors influence the demand for annuities, including people’s expectations about their own anticipated longevity, the probability of poor health, the cost of nursing home care, and future macroeconomic conditions. In addition, people’s risk aversion and discount rates influence how the form in which they hold retirement assets, and how quickly they would draw down their assets in old age. The HRS recently asked older people about anticipated life expectancy, inflation rates, and (for a subset of people) risk aversion and discount rates. Early results suggest that respondents have an accurate estimate of their own life expectancy to age seventy-five and eighty-five, comparing self-reported longevity probabilities

²⁰It should be noted that some recent Social Security reform proposals would allow retirees access to at least part of their social security accounts (see TIRS [1995]).

²¹In the last decade, DB plans have also moved to allow eligible retirees to receive increasing portions of their benefits in lump-sums at retirement (McGill et al. 1996).

with actuarial life tables (Hurd and McGarry 1995). Those who expect to live longer than average also hold higher-than-average assets, indicating a link between anticipated retirement periods and saving. When thinking about annuity issues there is another issue that needs to be more fully recognized: that people are increasingly likely to buy guaranteed period certain options rather than simple life annuities (Hammond, forthcoming). This study also found that people tend to hold their defined contribution accruals as a variable annuity into retirement rather than taking a fixed benefit, notwithstanding the additional capital market risk imposed on the retiree by this strategy.

Taxes and government benefit programs also play a powerful role in asset decumulation patterns in old age, yet thus far relatively little is known about how sensitive people are to these programs. It is known, for instance, that people greatly understate the probability of needing, and the cost of, nursing home care; perhaps because they mistakenly believe that Medicare will pay for it. Instead, nursing home care in the United States is available only through Medicaid, which is a means-tested program requiring older people to exhaust their assets before becoming eligible for government-paid nursing home care. Irrespective of which program older people have in mind, many near the Medicaid asset threshold spend down their assets more rapidly than they would otherwise so as to receive the coverage (Davis 1996). To the extent that eligibility for other benefits is also conditioned on assets and/or income (e.g., housing subsidies, food stamps, disability benefits), these other programs could have similar effects on asset decumulation behavior. More remains to be learned about these potentially complex interactions between government programs and private behavior.

Putting these trends together, it appears increasingly likely for pensioners to lay claim on part or all of their pension assets without annuitizing them, in contrast to years past. If this trend continues, it suggests that ever larger segments of retiree wealth will move into the nonannuitized, and potentially bequeathable category; this will place increasing responsibility on retirees to manage the decumulation phase more carefully than ever before.

LESSONS AND IMPLICATIONS

The goal of this study was to review what is known about retirement asset accumulation and decumulation to assess whether Americans are doing a reasonable job of preparing for retirement, and spending down while in the retirement phase. On the basis of the best available data, we conclude:

(1) The median American on the verge of retirement has accumulated too little wealth to support a comfortable retirement. The median older married household currently has only about \$73,000 in net financial assets excluding company pension plan accruals, not enough to support 20+ years of consumption comparable to pre-retirement patterns.

(2) Most Americans have little other retirement wealth under their control besides company pension plans. Participants in defined contribution plans select a portfolio in line with financial advisors' suggestions: younger workers hold fifty to

sixty percent of their assets in equities, and even low-wage workers hold a third of the pension portfolio in stocks.

(3) To achieve widely agreed-on retirement accumulation targets, the typical United States older household would have to set aside an additional twenty percent of income between now and age sixty-two to achieve a replacement rate consistent with what retirement planners have recommended.

(3) Households derive relatively little financial advice from financial experts, relying instead on friends and relatives. However those who do use brokers for financial advice report higher saving rates and have more assets in stocks and mutual funds.

(4) People are moving into retirement with ever-smaller components of their wealth in bequeathable, non-annuitized, form.

We believe that four developments will have a powerful effect on future retirement accumulation and decumulation patterns. First, the switch from defined benefit to defined contribution plans will likely continue. Sponsoring employers believe that the DC option affords them a predictable benefit offering that meets workers' needs, without the additional complexity and risk-bearing associated with DB pensions. Employees, too, have become accustomed to the greater portability associated with DC pensions along with the ability to invest accruing assets as they see fit. As this movement carries over to the public sector, workers everywhere will have to become more alert to the need to save more in order to meet retirement accumulation targets.

A second factor that will affect retirement wealth patterns is government policy regarding tax-qualified contributions to, and withdrawal patterns from, retirement accounts. Tax changes allowing increased access to IRA's will likely spur additional saving, though it remains to be seen whether those most needing to save for retirement will take advantage of this opportunity.

A third factor that will influence future saving and asset allocation patterns is the recent introduction of inflation-indexed bonds or Treasury Inflation Protection Securities (TIPS). While new to the United States, they have proven rather successful in Britain, amounting to some twenty percent of outstanding government debt since their introduction more than a decade ago. Economists who see them both as an instrument that allows investors to hedge inflation risk and as a tool to accurately gauge market expectations of future inflation have long advocated instruments of this sort. Questions remain regarding the true inflation-hedging ability of these instruments, given current tax treatment, but they may prove appealing in tax-favored savings vehicles such as IRA's and 401(k)'s, or in indexed annuities.

The fourth area of concern, looking forward, has to do with the central role played by social security in retiree incomes, and how the promise of this benefit profoundly influences workers' saving patterns for retirement. What is difficult to foretell is how taxes and benefits will be adapted to bring what is currently an insolvent system into balance again. If taxes are raised in accord with the proposal to maintain benefits, private saving will not increase and may even decline – which could exacerbate the saving shortfall identified above. By contrast, if the system were downsized so that only a minimum guarantee were provided by the

government plan, and all extra taxes saved in individual accounts, this might raise private saving – though the overall effect would depend on whether the individual accounts would be fully offset by reductions in other saving. In any event, a massive change in the nation's major source of retirement income would be expected to have substantial spillover effects on private asset accumulation and decumulation patterns.

A broader sea change is also in the offing. Institutional change beginning during the Great Depression resulted in risk transfer from the individual to the group, with the development of government institutions such as Social Security and Medicare, and company-sponsored defined benefit plans, to protect consumption in old age. The last decade has reversed this pattern, with new pension and saving vehicles transferring risk back to individuals and households. Many positive results flow from increased personal responsibility, but the transition also raises concerns regarding the almost complete elimination of some traditional risk pooling mechanisms. For instance, retirees are much more exposed to longevity risk without annuities, and to some degree they are more exposed to investment risk when they hold lump sums with no predetermined draw-down path. This disintermediation places a much heavier burden on workers to become more educated and hold more reserves to substitute for these displaced institutions and mechanisms.

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