Pension Design and Structure

New Lessons From Behavioral Finance

EDITED BY

OLIVIA S. MITCHELL

AND

STEPHEN P. UTKUS

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Chapter 14

Annuities and Retirement Well-Being

Constantijn W. A. Panis

The economic position of the elderly has improved dramatically over the past several decades. In 1960, 35 percent of individuals aged 65 and older lived below the poverty line; today, only 10 percent are poor (US Bureau of the Census, 2002). This impressive gain is the result of a combination of public policy and private initiatives. The generosity of Social Security and Medicare was increased steadily, and the 1974 Employee Retirement and Income Security Act (ERISA) promoted private retirement savings. Yet, the outlook for the next generation is more clouded. The leading edge of the baby boom generation is now around 57 years old, and more workers than ever will be retiring in the next decade. This generation will retire at a younger age, spend more years in retirement than their parents, and will live longer. The life expectancy of a 65-year-old today is 82.9 years old, more than 4 years higher than in 1960 (Centers of Disease Control, 2001). At the same time, older people are less likely to enjoy lifelong guaranteed pension benefits. In 1978, some 38 percent of American workers were covered by a pension that guaranteed a lifelong benefit, compared to only 21 percent in 1998 (USDOL 2001, 2002). Instead, workers more often participate in 401(k) and similar plans (up from 7 percent in 1978 to 27 percent in 1998). If the funds in such plans were invested wisely, they can be substantial but they still offer no insurance of income security over many years of life in retirement. If the rate of return disappoints, there may not be much principal remaining. Almost everyone has Social Security, but system benefits may need to become less generous to cope with projected deficits. The most widely discussed reform proposal, personal accounts, could involve a shift similar to what happened with employer-provided pensions.

Concerns about the financial security of future retirees have until recently been muted by extraordinary stock market gains and corresponding wealth

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accumulation among baby boomers. But the recent downturn of the stock market and corporate bankruptcies have focused attention on the vulnerability of future retirees to investment risks. Much less discussed—but potentially even more painful—are longevity risks, that is, the risks that ever-longer-living Americans outlive their 401(k) and other savings and end up poor.

This chapter studies two measures of retirement well-being: Self-reported satisfaction with retirement, and the number self-reported of depressive symptoms. We are particularly interested in the association between the degree of annuitization and subsequent retirement well-being. Do people prefer being relatively rich at retirement, with a large amount of their own money readily available to be spent as flexibly as they wish? Or would they rather have the comfort of knowing they have a steady income in perpetuity? Our answers afford a peek into the well-being of the next generation of retirees.

Analysis Sample

Our empirical analysis uses the Health and Retirement Study (HRS), a longitudinal nationally representative survey of older Americans' financial matters, health, expectations, demographics, and participation in the labor force. It began in 1992 with 7,700 households that included someone aged 51–61; spouses were also included, regardless of age, for a total of over 12,600 respondents. These persons have then been re-interviewed every other year, barring death or loss of contact. A survey of older persons began in 1993 with 6,050 households including someone at least 70 years old. Again, spouses of any age were included, for a total of over 8,200 respondents. Re-interviews were conducted in 1995, 1998, and 2000, and along the way, several birth cohorts were added to make the survey representative of the non-institutionalized US population aged 51 and older. In what follows, our analysis mainly uses information from all cohorts in the 2000 survey wave; in some cases, however, earlier waves or only a subset of the respondents (such as retirees only) are used.

In 2000 the most recent year for which we have data, 2000, the sample was 59 percent female and 41 percent male; respondents were 51 percent "completely retired" and 49 percent not. The sample as a whole was predominantly married people, though this is more true of men than of women (78 versus 55 percent). Women were much more likely to be widowed (30 percent, versus 9 percent for men). Income, not surprisingly, varied substantially between the retirees and others. The median for retirees (in 2000 dollars) was about $28,500, while before retirement it was about $54,700.[1] More than 22 percent of the non-retired group received over $100,000 in income, while only 6 percent of the retired did. Wealth, on the other hand, did not vary much between retirees and others.

Empirical Results Regarding Well-Being in Retirement

We first consider workers' expectations prior to retirement. When asked what they expected would happen to their living standard when they retired, just over half of the HRS respondents said it would stay about the same.[2] Most of the remainder thought their standard of living would decline somewhat (36 percent) or a lot (6 percent), while only 7 percent thought it would improve. Women were somewhat more pessimistic than men, and women who used to be married (separated, divorced, or widowed) were particularly so (11 percent thought their living standard would decline a lot). The poorest 10 percent of the population (in terms of net worth), as might be expected, was more pessimistic than average. However, a remarkable percentage (19 percent) thought their lot would improve, perhaps because of eligibility for government programs such as Social Security, Supplemental Security Income (SSI), and Medicare. Surprisingly, workers with a pension were about as likely as those without one to expect a decline in their living standard.

Turning to the post-retirement experience, we next asked whether the reality lined up with expectations. The HRS did not directly query retirees to compare their standard of living with that of their pre-retirement years, but it did ask whether their retirement years have been better, about the same, or not as good as the years just before retirement. Almost half the retirees (48 percent) thought their retirement years were better; another third (34 percent) rated them about the same, and only 18 percent stated that their retirement years were not as good. It, thus, appears that most retirees were pleasantly surprised by their standards of living in retirement. Alternatively, it is possible that people's standard of living did not enter strongly into their judgments of whether their retirement years were "better."

Reality exceeded expectations not only with respect to retirement living standards, but also with respect to health. When 50–54-year-olds were asked about the chances that health would limit their work activity during the next 10 years, the average response was 36 percent. However, when persons (including retirees) 10 years older were asked whether they had an impairment or health problem that limited the kind or amount of paid work they could do, only 28 percent responded affirmatively.

We also explored several measures of well-being in retirement. The first is a direct question on satisfaction: "All in all, would you say that your retirement has turned out to be very satisfying, moderately satisfying, or not at all satisfying?" The second is a compound measure of mental health during the past week, similar to the Center for Epidemiologic Studies Depression (CES-D) scale (Radloff, 1977). The CES-D scale is based on 20 self-reported questions designed to assess symptoms of depression. The HRS administers an abbreviated version with just nine questions:

Now think about the past week and the feelings you have experienced. Please tell me if each of the following was true for you much of the time during the past week.

- [. . .] you felt depressed.
- You felt that everything you did was an effort.
- Your sleep was restless.
- You were happy.
- You felt lonely.
- You enjoyed life.
- You felt sad.
- You could not get going.
- You had a lot of energy.[3]

For each item, the answer could be "yes," "no," "don't know," or "refused." We explored each individual item as well as a composite score. The composite score increments by one for every "yes" on the six items expressing negative feelings, and for every "no" on the three positive items (happy, enjoyed life, lot of energy). The composite score ranges from zero (no sign of depression) to nine (strong signs of depression).

First, we assess how satisfied respondents are in retirement, without regard to any comparisons. In 2000, fully 59 percent said their retirement had turned out to be "very satisfying," and another third said it had been moderately satisfying. Only 8 percent stated that their retirement was "not at all" satisfying. Percentages did not vary much between men and women.

Though most people found retirement very satisfying, some were clearly more satisfied than others. What are the main factors responsible for differences in retirement satisfaction? Our analysis (Table 14-1, first three columns) shows that the most important factors were health and financial resources in retirement, as measured by household income or wealth. People who described their health as excellent or as very good were much more likely to find retirement very satisfying than those who described it as fair or poor. Satisfaction also varied substantially with income, as about two-thirds of retirees with household incomes in the $30,000–$50,000 bracket and 74 percent of those above $50,000, stated they found their retirement very satisfying, compared to only 40 percent of those with incomes below $15,000. The pattern for wealth is the same. "Wealth" refers to household net worth, or the value of all assets, including financial assets, housing, and vehicles, minus mortgages and other debts. Over three fourths of retirees with net worth above $400,000 found their retirement very satisfying, compared to only 38 percent of retirees with net worth under $50,000. Age and marital status were also of some importance. Older retirees were more

TABLE 14-1 Retirement Satisfaction and Depression Symptoms by Demographic and Socioeconomic Characteristics

	Retirement Satisfaction (%)			*Number of Depression Symptoms (#)*		
	Not at All	*Moderate*	*Very*	0	1–3	4-*plus*
Total	8.3	32.9	58.9	27.9	51.8	20.3
By sex						
Female	7.8	33.7	58.5	25.5	50.7	23.8
Male	8.8	31.9	59.3	30.5	52.9	16.5
By health						
Excellent	2.7	14.3	82.9	51.8	42.4	5.8
Very good	1.5	22.2	76.3	41.3	50.5	8.2
Good	4.6	33.8	61.5	25.5	58.4	16.1
Fair	10.2	42.8	47.1	12.7	54.5	32.8
Poor	27.2	41.5	31.4	4.4	38.5	57.1
By household income						
0–14,999	14.3	45.5	40.1	16.3	50.1	33.6
15K–30K	7.7	34.7	57.6	24.2	53.7	22.1
30K–50K	5.8	27.0	67.2	32.5	52.0	15.5
⩾ 50K	4.0	22.3	73.7	36.8	50.6	12.6
By household wealth						
0–49,999	16.8	45.1	38.1	15.8	51.0	33.2
50K–150K	8.7	37.0	54.3	22.4	54.2	23.4
150K–400K	4.5	28.1	67.4	31.4	52.8	15.9
⩾ 400K	2.6	20.7	76.7	37.7	48.9	13.5
By age						
<60	19.8	36.2	44.1	26.1	47.1	26.9
60–64	11.6	32.1	56.3	30.8	51.2	18.0
65–74	7.5	32.0	60.5	31.1	51.0	17.9
75–84	5.7	33.8	60.6	24.6	53.8	21.5
85+	5.1	31.8	63.0	17.9	54.6	27.5
By marital status						
Never married	8.7	34.9	56.4	24.8	58.4	16.9
Married	7.5	30.2	62.3	31.7	51.9	16.5
Separated/divorced	17.6	39.8	42.6	23.0	51.1	26.0
Widowed	6.7	36.4	57.0	20.2	51.1	28.8

Note: First three columns sum to 100%; last three columns sum to 100%.

Source: 2000 Health and Retirement Study.

satisfied than younger ones. (Below we discuss whether this is an age or a cohort effect.) Married people and those who never married were more satisfied with retirement than those who were once married but now widowed, separated, or divorced.

Next we turn to the depression scores described above. Among retirees in the 2000 wave, 28 percent reported no sign of depression during the week before the interview, 25 percent reported one symptom, 27 percent two or three symptoms, and the remainder reported four or more symptoms. One in six retirees stated that he felt depressed for much of the prior week, one in three slept restlessly, and one in five felt sad much of the prior week. However, 89 percent were happy much of the time and 93 percent enjoyed life. Differences by sex are of interest as well. While women reported approximately the same levels of satisfaction with retirement as men, they showed more signs of depression than men. Women responded "yes" more often on all six negative items, and "no" more often on all three positive items. In particular, they more often felt depressed (19 versus 14 percent), lonely (22 versus 15 percent), and sad (25 versus 15 percent).

Returning to the composite depression score, the last three columns of Table 14-1 show the distribution of number of depression symptoms by sex, health status, household income, household net worth, age, and marital status. We collapsed the 0–9 scale into three items: No symptoms of depression, 1–3 symptoms, and 4 or more. We find the same patterns as for satisfaction with retirement. (The simple correlation between the 3-item retirement satisfaction response and the 10-item composite depression score was −0.40.) Mental health strongly correlated with general self-reported health: More than half of those who stated that their health was excellent reported no symptoms of depression, whereas more than half of those in poor health reported four or more depression symptoms. Individuals with higher incomes or higher net worth reported fewer signs of depression. Elderly retirees reported more symptoms of depression than younger retirees, except for very young retirees. Married individuals reported fewer signs of depression than, in particular, separated, divorced, and widowed retirees.

Annuitization and Retirement Satisfaction

Financial resources which play an important role in predicting post-retirement satisfaction may take two forms: annuities and bequeathable wealth. Social Security provides an annuity, private saving builds wealth, and private pensions may provide an annuity, wealth, or both. We now explore how well-being in retirement correlates with the degree of annuitization of retirement resources. Theoretically, according to a simple life-cycle model, people ought to value their annuitized pension more highly than non-annuitized wealth (Brown and Warshawsky, 2001).

Not every pension entitles its holder to an annuity. Only the so-called "defined benefit" (DB) plans provide lifelong benefits based on the number of years worked for the employer and the salary in the last few years before retirement. By contrast, widespread 401(k) plans and the other so-called "defined contribution" (DC) plans do not provide a lifelong benefit.

In those plans, workers and their employers generally contribute funds to accounts owned by the workers. Tax treatment apart, these DC plans are not much different from other savings, so while they do not result in lifelong guaranteed pension benefits, they are available to support retirement spending.

Defined contribution pension plans have become increasingly popular and are now the most common source of pension coverage. As mentioned above, the fraction of workers covered primarily by a DB pension plan went from 38 percent in 1978, to 21 percent in 1998. The fraction of workers with a DC plan as their primary pension went from 7 to 27 percent (USDOL 2001, 2002) over the same period. Workers with DB plans that switch jobs sometimes settle their pension entitlement with a lump sum payment and put the money in an Individual Retirement Account (IRA); IRAs have essentially the same features as DC plans.

Some DC plans allow the beneficiary to convert his or her balance into an annuity upon retirement. Surveys of medium and large firms show that only 27 percent of full-time 401(k) participants had this option in 1997, down from 34 percent in 1993 (Mitchell, 2000). The fraction may be higher in larger firms: on the 2000 National Compensation Survey, showed in a General Accounting Office analyses that 38 percent of DC plan participants in large firms had the option to convert their plan balance into an annuity (GAO, 2003). In practice, very few retired workers take the option to annuitize. Hurd and Panis (2003) found that only 7 percent of HRS respondents with a DC plan who retired from their jobs converted the balance into an annuity. For all practical purposes, DC plans thus do not, at present, provide a lifelong benefit.

We define two measures of the degree of annuitization. Both are ratios which use as the denominator expected total retirement resources, that is, bequeathable wealth plus the expected discounted value of income from Social Security and DB pensions. Bequeathable wealth is measured as net worth. Here, we define "Social Security reliance" as the ratio of the expected discounted value of income from Social Security to expected total retirement resources. It ranges from 0 (for individuals without Social Security entitlement) to 1 (for individuals without any savings or pension entitlement). Similarly, we define the "pension annuity ratio" as the ratio of the expected discounted value of income from DB pensions and privately purchased annuities, to expected total retirement resources. It, too, can vary between zero and one.

Our empirical analyses shows, for the HRS sample, that the more people relied on Social Security for financing their consumption in retirement, the less satisfied they were with retirement (Table 14-2, first three columns). This result arises mainly because heavy Social Security reliance implies little or no private pension and private saving. In other words, retirees who rely heavily on Social Security tend to be poor. This interpretation is confirmed

TABLE 14-2 Retirement Satisfaction and Depression Symptoms by Degree of Annuitization

	Retirement Satisfaction (%)			*Number of Depression Symptoms (#)*		
	Not at All	*Moderate*	*Very*	0	1–3	4-*plus*
By Social Security reliance						
0–25	5.7	26.4	67.9	31.7	51.1	17.3
26–50	5.6	32.2	62.2	28.1	52.7	19.1
51–100	13.1	43.0	43.9	18.3	52.0	29.7
By pension annuity ratio						
No pension	10.6	35.1	54.3	25.9	50.3	23.8
1–25	4.4	28.9	66.7	27.2	53.6	19.2
26–100	3.5	27.0	69.5	32.1	52.6	15.3

Note: First three columns sum to 100%; last three columns add to 100%.

Source: Author's computation using the 2000 HRS.

in a multivariate analysis that controls for household wealth (see the Methodology Appendix).

By contrast, the more people felt that they could count on lifelong guaranteed pensions, the more satisfied they were with their retirement. About half of retirees had no DB pension: that is, their pension annuity ratio was zero. Of these retirees, 54 percent said they had a very satisfying retirement. One in four retirees had a pension annuity ratio of 1–25 percent; among them, 67 percent were very satisfied. Among the remaining one in four retirees, who could finance more than 25 percent of their consumption in retirement from DB pensions, 70 percent reported having a very satisfying retirement.

The last three columns of Table 14-2 report the same breakdown for depression symptoms. As before, the same pattern arises as for satisfaction with retirement: The more retirees relied on Social Security for their consumption, the more signs of depression they reported, and the greater the fraction of consumption that could be financed from pension annuities, the fewer signs of depression were reported. Furthermore, satisfaction among persons with lifelong guaranteed pensions lasted longer than among those without (Table 14-3, first three columns). Satisfaction among persons without any DB pension or privately purchased annuity tended to decline the longer they were retired (from 58 percent very satisfied shortly after retiring to 47 percent 10 years later). The same was not true of persons with DB pensions; their satisfaction remained approximately constant over the duration of their retirement. The explanation may be that persons without a DB pension were becoming increasingly anxious about outliving their savings.

The last three columns of Table 14-3 confirm this pattern for depressive symptoms: retirees with a DB pension were better able to maintain their

TABLE 14-3 Retirement Satisfaction and Depression Symptoms by DB Pension Receipt and Retirement Duration

Years Retired	*Retirement Satisfaction (%)*			*Number of Depression Symptoms (#)*		
	Not at All	*Moderate*	*Very*	0	1–3	4-*plus*
Without a DB pension						
0–1	10.9	31.4	57.7	33.3	47.0	19.7
2–4	13.5	32.3	54.2	28.6	49.9	21.5
5–10	11.7	36.3	52.0	28.4	47.2	24.4
10+	14.6	38.6	46.9	24.1	48.0	28.0
With a DB pension						
0–1	5.6	30.5	64.0	33.9	53.2	12.8
2–4	4.1	27.3	68.6	33.3	53.2	13.5
5–10	5.3	28.5	66.2	33.4	52.1	14.5
10+	5.4	27.3	67.3	30.3	52.7	17.0

Note: First three columns sum to 100%; last three columns sum to 100%.

Source: Author's computations, 1992–2000 HRS.

mental health. While both retirees with and without a DB pension experienced increasing numbers of depression symptoms over time, the rate of increase was markedly slower for DB pensioners.

These results also shed light on the relationship between age and retirement satisfaction shown in Table 14-1, where, satisfaction increased with age. In Table 14-3, satisfaction stays the same or declines with increased retirement duration, which is correlated with age. (Both Tables 14-1 and 14-3 are based on cross-sectional outcomes from the 2000 HRS.) A potential explanation is that the age relationship could reflect a cohort effect: the oldest-old, who lived through the Great Depression, appeared to be more content with less money than the younger generation. Another possibility is that the oldest-old have had time to adjust to income losses, whereas younger retirees might compare their retirement income to recent pre-retirement earnings and find the ratio not to their satisfaction.

One may suspect that the positive relationship between pension annuity ratios and retirement well-being is due to income rather than pension annuity ratios themselves. Indeed, retirees with higher household incomes were more likely to receive a pension, for them, pension annuity ratios may be proxy for income. Table 14-4 addresses this issue: looking down the first three columns, the relationship between income and satisfaction is clear. But the more interesting comparison is within rows: at any income level, retirees with a DB pension were more likely to be very satisfied than those without. Having a DB pension increased satisfaction by about as much as moving one income category up. For example, retirees with total

TABLE 14-4 Relationship Between Retirement Satisfaction and Pension Annuity Ratio, by Income Category

Household Income	*Percent Very Satisfied*			*Percent with Zero Depression Symptoms*		
	Zero Pension Annuity Ratio	*Medium Pension Annuity Ratio (1–25)*	*High Pension Annuity Ratio (26–100)*	*Zero Pension Annuity Ratio*	*Medium Pension Annuity Ratio (1–25)*	*High Pension Annuity Ratio (26–100)*
Under $15,000	39.2	50.8	50.4	16.4	14.5	18.8
$15,000–30,000	54.5	62.0	62.4	24.8	23.4	23.8
$30,000–50,000	61.2	70.4	72.1	30.7	32.3	34.5
$50,000 or more	70.2	78.4	75.6	36.7	34.2	38.4

Source: Author's evaluation of 2000 HRS.

household income between $15,000 and $30,000 and with a DB pension were about as likely to be very satisfied (62 percent), as were retirees with an income above $50,000 but without the security of a lifelong guaranteed pension income (61 percent).

The last three columns of Table 14-4 illustrate the depression counterpart of retirement satisfaction. They report the fraction of respondents without any reported depression symptoms by pension annuity ratio and household income. The same pattern emerges as with retirement satisfaction, though it is not as sharp. The appendix contains a multivariate (ordered probit) analysis with controls for income and several other factors. In that model, pension annuity ratio has the expected negative sign and is significant.

Risk Aversion and Retirement Satisfaction

One further factor of potential interest is respondent risk aversion. The HRS asked respondents to imagine they were faced with a choice between two jobs: One that would guarantee their current family income for life, while the other would have a 50 percent chance of doubling income for life and a 50 percent chance of cutting it by a third. The expected value of the second alternative was 33 percent higher than the first, yet three out of four respondents took the safe choice, and were thus relatively risk-averse. More of them (61 percent) were very satisfied with their actual retirement than were the more risk-tolerant who took the second choice (51 percent).

This choice is similar in some respects to the choices available to everyone before retirement: They can put money into an arrangement that will pay an annuity, or they can invest it in ways that might make them wealthier during retirement but have the risk of leaving them worse off. This choice involves two sources of uncertainty: Rate of return on accumulated saving, and remaining length of life. Even if the saving builds to greater wealth than with an annuity, the saver can come out worse off. He or she may live so long that the saving is exhausted before death.

Long-Term Planning and Retirement Satisfaction

Our evidence conclusively shows that satisfaction with retirement was higher among retirees who had engaged in some sort of financial planning activity. In the 2000 data, 10 percent of respondents, generally those age 50+, had long-term care insurance coverage, and of those 71 percent reported being very satisfied in retirement, compared to only 58 percent among those without. This may well have been fueled by anxiety about large medical expenses: In 1993 and 1995, respondents age 70 or older with long-term care insurance were somewhat less likely to predict exhaustion of savings during the next 5 years due to medical expenses than those without (28 versus 32 percent). More broadly, approximately one in every four respondents to the 1992 and 2000 surveys reported having attended a meeting on retirement or retirement planning. Among those who had attended a meeting, 71 percent reported having a very satisfying retirement in 2000, compared to 55 percent among those not having attended a meeting. In 1993 and 1995, about one of every seven respondents age 70 or older had a financial adviser. Here again, those with an adviser were more satisfied in 2000 than those without (71 versus 60 percent very satisfied).

People with higher incomes were more likely to engage in long-term planning. As with pension annuity ratio, one may thus suspect that our planning measures (long-term care insurance, retirement planning, and financial adviser) reflect income differences and that their correlation with retirement satisfaction is purely due to income. This is not the case. Similar to what Table 14-4 showed for pension annuity ratio, we tabulated retirees' level of satisfaction by household income and long-term planning activities. For any income level, there was a 11–13 percent increase in the likelihood of high satisfaction with retirement if a person had attended a planning or other type of retirement meeting. The results for having purchased long-term care insurance and having a financial adviser held up similarly within income category.

Conclusions

Our analysis documents how Americans experience retirement. Using several measures of expectations, we have shown that retirement tended to be a more positive experience than expected for many Americans. Yet, satisfaction in retirement varies widely across individuals and is positively influenced by good health and financial resources. We also find that older retirees tended to enjoy greater satisfaction, partly due to a cohort effect: Perhaps as a result of having lived through the Great Depression, the oldest-old are more content with fewer resources.

The main thrust of our study concerns the importance of annuitization, that is, the extent to which retirees can finance their consumption with lifelong guaranteed income streams, as opposed to liquid saving. We find that those with greater annuitization were more satisfied in retirement, and they maintained their satisfaction throughout retirement. By contrast, retirees without lifelong annuities have become somewhat less satisfied over the years. The guaranteed income benefits may reduce anxiety about the risks of outliving one's savings and ending up in poverty. These findings are reiterated using measures of well-being in retirement, namely self-reported symptoms of depression. Our findings, thus, have direct implications for retirees of tomorrow, in view of the long-term trend away from DB pensions that pay a guaranteed benefit for life, and toward DC pensions, which tend not to pay lifelong benefit streams. If future retirees are less likely to be annuitized, this could drag down future retiree well-being.

Of course, this problem could be offset by providing DC plan participants with access to a lifelong guaranteed monthly payment (i.e. an annuity). Currently, only one in four 401(k) participants already has such an option, and for many, the security that a conversion brings will enhance their satisfaction and mental health for many years to come. But the evidence suggests that few retirees with a DC plan, only about 7 percent, chose to annuitize (Hurd and Panis, 2003). Why do so few DC plan beneficiaries annuitize their balance? First, annuity products may be perceived as expensive. This is not because of insurance company profits but because of adverse selection: People that annuitize tend to live longer than the average person in the population (Brown et al., 2001; Mitchell and McCarthy, 2002). Second, retirees may worry about unexpected large expenses, such as for medical care. This concern may be mitigated by new annuity products that incorporate long-term care insurance (Warshawsky, Spillman, and Murtaugh, 2002). Third, retirees may desire to maintain liquid assets to bequeath to their children. It is not clear how important such bequest motives are for household asset allocation and consumption decisions (Brown and Warshawsky, 2001). Fourth, would-be annuitants may worry about the lack of protection against inflation in current US annuity products. But Brown, Mitchell, and Poterba (1999) found that, for plausible levels of risk aversion, people attach only modest value to inflation protection. Fifth, retirees may be concerned that they will outlive the insurance company. Indeed, the long-term financial instruments that would be needed to match long-term obligations from annuities are currently not available in financial markets (Mitchell and McCarthy, 2002). Sixth, consumers appear to have only limited understanding of the longevity insurance that annuities offer. Many tend to focus more on the risk of dying early than of living long (American Council of Life Insurers, 1999). Consistent with this perspective, GAO would like pension plan sponsors to educate participants about the various risks that they face at and after retirement (GAO, 2003).

Another novel result we report is greater satisfaction among individuals who had engaged in long-term planning, from attending a retirement planning meeting or by purchasing an insurance policy for long-term care. These results are robust to controls for income and many other factors, though it is possible that people who engage in long-term planning activities are also prudent types that prepared themselves for retirement in more ways than we looked at. Nevertheless, these results coupled with those from other studies suggest that successful risk management enhances retirement well-being (Ameriks, Chapter 13, this volume; Drinkwater and Sondergeld, Chapter 15, this volume; Lusardi, Chapter 9, this volume; Weber, Chapter 3, this volume).

Methodology Appendix

This appendix offers additional results reported in the text. Table 14A-1 shows estimation results of two ordered probit models. Retirement satisfaction is the outcome of the first specification; the second pertains to the number of depressive symptoms. We present specifications that control for both household income and household net worth; the results are robust to a variety of alternative specifications. Most importantly, the relationships between pension annuity ratio and retirement well-being hold up after controlling for financial resources, health, sex, and marital status. The higher the fraction of sustainable consumption financed from lifelong guaranteed pension benefits, the greater is retirement satisfaction and the fewer depression symptoms reported. Holding constant the values of all other covariates, a 10 percentage point increase in pension annuity ratio decreases the chances of being not at all satisfied in retirement from 7.1 to 6.5 percent, and increases the probability of being very satisfied from 61.0 to 62.7 percent. (The multivariate analysis sample is slightly smaller than that in Table 14A-1 because of missing covariate values.) Similarly, a 10 percentage point increase in pension annuity ratio boosts the probability of reporting zero depression symptoms from 27.8 to 28.4 percent and decreases the chances of four or more symptoms from 20.1 to 19.7 percent.

The relationships between Social Security reliance and our two measures of retirement well-being are not significant after controlling for other covariates. In other words, the relatively low satisfaction and high depression found among retirees with high Social Security reliance is at least in part due to their low wealth or low income from other sources, rather than to Social Security reliance itself. However, Social Security benefits are in some respects preferable over private pensions, for example, because of the protection against inflation that Social Security offers. It is therefore somewhat puzzling to not find significant effects in the same directions as with respect to pension annuity ratio.

TABLE 14A-1 Ordered Probit Model Estimates of Retirement Satisfaction and Depression Symptoms

	Retirement Satisfaction (0 = Not at all, 2 = Very)	*Number of Depression Symptoms (0–9)*
Pension annuity ratio	0.53**	−0.21**
	(0.07)	(0.06)
Social Security reliance	−0.09	−0.07
	(0.07)	(0.07)
Ln(household income)	0.11**	−0.03
	(0.02)	(0.02)
Ln(household wealth)	0.10**	−0.05**
	(0.01)	(0.01)
Health (1 = excellent, 5 = poor)	−0.33**	0.43**
	(0.01)	(0.01)
Male	−0.03	−0.16**
	(0.03)	(0.03)
Separated or divorced	−0.17**	0.15**
	(0.05)	(0.05)
Widowed	−0.05	0.24**
	(0.04)	(0.03)
Never married	0.18	0.02
	(0.10)	(0.08)
Age	0.02**	0.00
	(0.00)	(0.00)
Pseudo-R^2	0.11	0.07

Notes: Standard errors in parentheses. Significance: * = 5%, ** = 1%. Satisfaction and depression specifications include two and nine ordered probit thresholds, respectively.

Source: Author's calculations, 2000 HRS.

The other covariates in Table 14A-1 are consistent with their corresponding univariate pattern. Household income and wealth are both positively correlated with satisfaction and negatively with depression symptoms, while the opposite holds for poor health. There was no net difference in satisfaction between men and women, but women tend to report more symptoms of depression. Individuals whose marriage was disrupted by separation, divorce, or widowhood report lower levels of satisfaction and more symptoms of depression than lifelong bachelors and married people. Satisfaction increases with age, even controlling for other factors, but has no net effect on depression symptoms.

Not shown is that the multivariate analysis also verifies the earlier finding that risk-averse individuals are more satisfied with their retirement than the risk-tolerant. Surprisingly, however, some other expected relationships involving risk aversion do not show up. First, while one might expect the risk-averse to choose jobs that promise lifelong pensions, their pension security (pension annuity ratio) is no greater than that of the risk-tolerant. Second, while both risk aversion and pension security correlated positively with greater satisfaction in retirement, their interaction is insignificant. In other words, the risk-averse do not derive more satisfaction in retirement from income guarantees than the risk-tolerant. One might also expect that individuals with longer-than-average expect that life spans would appreciate lifelong guaranteed pensions more than others, so that the interaction between survival chances and pension annuity ratio should be significant. Respondents were asked to assess their own chances of living to age 85. Those reporting higher survival chances (controlling for age) also report greater satisfaction, but there is no disproportionate difference for retirees with high levels of lifelong pension security.

Notes

[1] All monetary figures given in this chapter are in real 2000 dollars.

[2] For detailed results see Panis (2003).

[3] This item is not among the standard 20 CES-D items, but the HRS administers it in the same manner as the other eight items.

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