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## The Composition and Drawdown of Wealth in Retirement

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As the “baby boomers” approach and enter their retirement years, the accumulation phase of their life-cycle is nearly over. Thus, the focus of many researchers, financial services firms, and public policymakers concerned with retirement saving is shifting from the accumulation of resources while working to the drawdown of resources during retirement.

Retired households are dependent on the annuitized income streams that they have built up during their working careers and on the wealth that they have accumulated in other forms. The two most common annuitized income streams are Social Security benefits and the payments from defined benefit pension plans. These payout streams provide income for life—and thus provide some protection against falling into poverty if one lives an especially long life. The three most common sources of accumulated wealth are equity in an owner-occupied home, financial assets such as bonds and stocks, and financial assets held in a personal retirement account such as an Individual Retirement Arrangement or a 401(k) plan.

Throughout our analysis, we will define “retirement-age households” as those headed by someone between the ages of 65 and 69. In 2008, just over 80 percent of these households had some equity in their home or another property, while 52 percent had assets in personal retirement accounts. A much higher fraction—87 percent—had some financial assets outside their retirement accounts, but for many households the amount of such assets was relatively modest. Only 45 percent had more than \$20,000 in non-retirement-account financial assets. The median financial asset holding for this group, including holdings in personal retirement accounts, is \$52,000. In short, many households have small enough amounts of accumulated wealth that they will depend heavily on the life-contingent payout streams offered by Social Security and, if they have one, a defined benefit pension.

This paper presents evidence on the resources available to households as they enter retirement. It draws heavily on data collected by the Health and Retirement Study, which we sometimes refer to as the “HRS.” We calculate the “potential additional annuity income” that households could purchase, given their holdings of non-annuitized financial assets at the start of retirement. Even if households used all of their financial assets inside and outside personal retirement accounts to purchase a life annuity, only 47 percent of households between the ages of 65 and 69 in 2008 could increase their life-contingent income by more than \$5,000 per year. At the upper end of the wealth distribution, however, a substantial number of households could make large annuity purchases. We also consider the role of

housing equity in the portfolios of retirement-age households and explore the extent to which households draw down housing equity and financial assets as they age. We find that many households appear to treat housing equity and non-annuitized financial assets as “precautionary savings,” tending to draw them down only when they experience a shock such as the death of a spouse or a period of substantial medical outlays. Because home equity is often conserved until very late in life, for many households it may provide some insurance against the risk of living longer than expected. A brief conclusion summarizes our findings and indicates how they bear on a number of policy issues, such as the role for annuity defaults in retirement saving plans.

## **Social Security, Housing Equity, and Household Balance Sheets at Retirement**

To set the stage for our analysis of financial support for retirement, we begin by describing the balance sheets of households headed by someone between the ages of 65 and 69 in 2008. Most of the 2008 interviews for the Health and Retirement Study took place between March and August of that year, before the sharp financial downturn that occurred in September and October 2008. Table 1 presents summary information on asset holdings. The table is divided into three panels: for all households, single-person households, and married households, respectively. Mean non-annuitized wealth (in 2008 dollars) for households in this age range is \$567,496. The median, which is not reported in the table, is much lower: \$221,700. The non-annuitized asset categories that are owned by the most households are financial assets (86.7 percent), home equity or other equity in a real property (81.3 percent), and personal retirement accounts (52.2 percent). Equity in real estate represents roughly half of non-annuitized wealth, while financial assets held outside personal retirement accounts represent 23 percent, and personal retirement accounts represent another 21 percent. Each of these wealth components represents a smaller share of total wealth, since non-annuitized wealth comprises just over half of total wealth. There are substantial differences between married and single households in the relative importance of various asset categories. For example, personal retirement accounts are roughly twice as large a share of non-annuitized wealth for married couples as for single individuals.

The figures for Social Security and defined benefit pension plans represent a capitalized value of the future stream of income. We calculate capitalized values by assuming that reported Social Security benefits represent an inflation-indexed annuity that provides full spousal benefits after the death of the primary beneficiary. We assume that defined benefit pensions also provide a life annuity for the current beneficiary and that spousal benefits will equal half the benefits for the primary beneficiary, an approximation based on the findings in Johnson, Uccello, and Goldwyn (2005). We further assume that the average annual increase in defined benefit pension payments will equal one-third of the increase in the Consumer Price Index inflation rate. Brown (2010) suggests that this assumption roughly describes the recent experience of beneficiaries from such plans. We aggregate payouts from private annuity contracts, which are reported by very few respondents in this survey, with payouts from defined benefit plans.

To compute the expected present discounted value of life-contingent payout streams, we use the survival probabilities that were projected in the Social Security Administration’s 2006 life table under the assumption that spousal mortality rates are independent. We also adopt the “intermediate” nominal interest rate and inflation assumptions in Board of Trustees (2008), which correspond to long-term interest rates of 4.4 percent in 2008, with a gradual rise to 5.8 percent in 2012 and then a drop to 5.7 percent in 2017 and in all future years. Actual interest rates in the period since 2008 have been lower than these assumptions.

The data in Table 1 show that the average capitalized value of Social Security for all retirement-age households is \$341,556. For those households who receive some Social Security income, the corresponding mean is \$387,200. There is less dispersion in the capitalized value of Social Security benefits than in many of the other components of wealth. The mean capitalized values of Social Security and defined benefit pension payouts, taken together, represent 46 percent of the mean value of household wealth. These findings are broadly consistent with Butrica and Mermin's (2006) analysis of earlier waves of the Health and Retirement Study, which found that married couples on average held 55 percent of their wealth in annuitized form, while unmarried individuals held 59 percent in this form.

Table 1 also highlights the importance of housing equity, mostly in owner-occupied homes but also including second homes and other real estate, as a component of household net worth for households of retirement age. Table 1 does not report the components of real estate equity, but on average, home equity in a primary residence accounts for 16.8 percent of net worth for 65–69 year-old households. Adding equity in second homes and in other real estate brings the total to 25.9 percent. These assets loom even larger as a share of non-annuitized household net worth: 31.0 percent for owner-occupied housing equity and 47.9 percent for all real estate. While many households in the cohort of the baby boomers' parents were able to avoid tapping their housing equity to cover other outlays until late in life, whether this pattern will apply to the baby boomers as well remains an open question.

We should mention a few caveats about these estimates. First, our calculation of Social Security and defined benefit pension wealth is based on the level of benefits households received on the interview date in 2008. Some households in the 65–69 age range who were still working, or who were retired but deferred the receipt of these income streams, may have substantial accumulated wealth in the form of annuity benefits, but we would not detect it. Second, Venti (2011) offers some evidence that data from the Health and Retirement Study may underreport assets held in 401(k) and other similar defined contribution retirement plans. Third, our analysis does not consider the tax treatment of the income from, or the sale of, different kinds of assets held at retirement age.<sup>1</sup> Finally, Table 1 omits the value of payments from Medicare and Medicaid. Data on average Medicare and Medicaid benefits by age can be used to estimate the expected present discounted value of these insurance programs. For the average 65-year-old, the present discounted value of the medical care that Medicare and Medicaid will cover is approximately \$180,000. When added to the net worth shown in Table 1, Medicare and Medicaid "wealth" would account for about 22 percent of wealth for single-person households and 21 percent of wealth for married couples.

The means in Table 1 conceal substantial heterogeneity in the distribution of wealth holdings. Table 2 provides some information on wealth dispersion, reporting several percentiles in the distribution of housing equity, financial assets, assets in personal retirement accounts, and the capitalized values of Social Security benefits and defined benefit pension payments. The table shows that half of the households between the ages of 65 and 69 in 2008 have net financial assets of less than \$15,000; roughly one-third have almost no financial assets. Seventy percent have less than \$70,000 in net financial assets. The same pattern emerges for assets in personal retirement accounts. Since just over half of households (52.2 percent) have positive assets in personal retirement accounts, the low

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<sup>1</sup>Different assets are subject to different tax rules. For example, withdrawing assets from a 401(k) account will usually lead to tax liability, but distributions from "Roth" Individual Retirement Accounts are not taxed. Drawing down other financial assets is not a taxable event unless it is associated with the sale of an asset with accrued capital gains. Social Security may be partly tax-exempt, but its tax treatment depends on a household's total income level. Defined benefit pensions are generally taxable. The equity in an owner-occupied home is largely tax-exempt, although gains that exceed \$500,000 are subject to capital gains taxation, while all gains on the sales of second homes are subject to capital gains taxation. Sales of business assets would also typically be subject to capital gains tax.

median value in these accounts—\$5,000—is not a surprise. The top 10 percent of households have at least \$347,000 in their personal retirement accounts. The mean value of holdings of personal retirement accounts—\$121,137 in Table 1—is well above the 70<sup>th</sup> percentile value in Table 2. A similar pattern obtains for financial assets.

The distribution of the capitalized value of defined benefit pension payouts resembles that for assets in personal retirement accounts, with a median value of zero, but one household in five has defined benefit pension wealth of at least \$238,500. Defined benefit pension plans have been declining in the private sector in the last two decades, so annuities from this source will be less prevalent for future cohorts. The dispersion of the capitalized value of Social Security benefits is substantial but much smaller than that for the other balance sheet components. A household at the 30<sup>th</sup> percentile of the Social Security benefit distribution has Social Security wealth with a capitalized value of \$214,500, while a household at the 90<sup>th</sup> percentile has \$643,100.

The lower panels of Table 2 highlight differences in the distributions of wealth for single-person and married households as they enter retirement. The median net worth of married households is more than twice that of single-person households. A similar pattern is observed for most asset subcategories and across the wealth distribution. For example, the median married couple between the ages of 65 and 69 has housing equity of \$170,000, while the median single person has housing equity of \$60,000. More than 30 percent of single households report no housing equity, while more than 90 percent of married households have some housing equity. A much higher fraction of single than married households report very low levels of financial assets. We note also that there is considerable heterogeneity within single-person households. Those who have never been married are better prepared for retirement than the surviving members of married couples. Much of the attention in discussions of retirement preparation focuses on households in the bottom half of the wealth distribution. These households typically have very little nonhousing wealth and they are unlikely to have a defined benefit pension. Consequently, they rely heavily on Social Security. However, a substantial number of households have accumulated significant wealth as they enter retirement. The median net worth values at the 70<sup>th</sup> and 90<sup>th</sup> percentiles of the net worth distribution are roughly \$1.1 million and \$2.1 million, respectively, including the capitalized value of Social Security and defined benefit pensions. The median levels of non-annuitized assets at the 70<sup>th</sup> and 90<sup>th</sup> percentiles of the distribution are roughly \$500,000 and \$1.3 million.

## Potential Annuity Income

Economists have long been puzzled by the limited size of the private annuity market. Yaari (1965) recognized that in a basic life-cycle model with stochastic mortality but no uncertainty about consumption needs and no bequest motives, consumers should fully annuitize their wealth at retirement if an actuarially fair annuity market exists. In this case, length of life is the only uncertainty facing older households. Davidoff, Brown, and Diamond (2005) demonstrate that even in much more general economic environments, consumers should still find partial annuitization attractive.

To evaluate the capacity of retirement-age households to purchase supplemental private annuities, we compute “potential additional annuity income” for each household in our dataset by converting their stocks of financial assets into annual income streams. Some of the calculations underlying the entries in Tables 1 and 2 involve converting annuitized income streams from Social Security and defined benefit pensions into stocks of wealth. Now, we do the reverse by annuitizing financial wealth holdings.<sup>2</sup>

Table 3 provides information on annuity payout rates in the private market and in a synthetic, actuarially fair annuity market. The upper panel shows average annuity payouts for the sample of firms whose annuity products are included on the AnnuityShopper website. The table shows the average payout rate for the annuity policies for which this website presented data in its July 2008 information release; the data are based on annuity policies offered in late spring and early summer 2008. The data illustrate the importance of age, gender, and the presence of an inflation-adjusting cost-of-living provision in annuity pricing. For a 65 year-old man who purchases a \$100,000 immediate, level-payment annuity without inflation protection, the annual payout would be \$8,460—or 8.46 percent of the annuity's purchase price. If the same individual annuity buyer picked an annuity stream with a 3 percent per year escalator, the annual payout in the first year would be only \$6,470. The escalating annuity is the closest approximation to an inflation-indexed annuity; the market for true inflation-protected annuities is very limited.

The lower panel in Table 3 presents the actuarially fair annuity payout, calculated using the Social Security Administration's (SSA's) 2006 population mortality table for an individual with the mortality experience of the population at large.<sup>3</sup> These payouts are higher than those in the AnnuityShopper data, in part because the mortality rates from the Social Security Administration are higher than those in the current annuitant population as a result of self-selection of those who will on average live longer into the existing private annuity market, and in part because the SSA's projected interest rates are higher than prevailing market rates.

The entries in Table 3 provide a guide to the rates at which single individuals can transform accumulated assets into streams of lifetime income. For married individuals, annuitization often involves a decision about the extent of spousal protection in the event that the annuitant predeceases his or her spouse. The AnnuityShopper data also provide rates for joint and survivor annuities, although these are not shown in Table 3. For example, if a husband is age 65 and his wife is age 60, and he purchases a joint and survivor annuity that will pay his wife half of the amount that he received while alive if he predeceases her, he will receive an annual payout of 6.78 percent of the annuity premium if he chooses a nominal payout stream. If he chooses an annuity stream with a 3 percent annual nominal increase, the initial payout will be 4.80 percent of the purchase price. If he chooses no spousal protection, as noted above, the payout rates will be 8.46 and 6.47 percent, respectively.

The amount of annuity income that a household can purchase is the product of the prevailing annuity payout rate and the household's holding of annuitizable assets. For our calculations, we define annuitizable wealth as the sum of assets in private retirement accounts and other

<sup>2</sup>Love, Palumbo, and Smith (2008) and Smith, Soto, and Penner (2009) use a related annuity income concept, applied to a broad measure of household net worth that includes annuitized wealth, to track the evolution of wealth at older ages. Neither of these studies estimates the incremental annuity income that households could purchase.

<sup>3</sup>The assumptions here are the same as those used to calculate the present discounted value of Social Security and defined benefit pension payouts above. For a 65 year-old man, for example, we solve for  $P$  in the equation

$$\$100,000 = P + \frac{P * S_{66}}{(1+r_{2009})} + \frac{P * S_{67}}{(1+r_{2009})(1+r_{2010})} + \dots + \frac{P * S_{119}}{(1+r_{2009}) \dots (1+r_{2054})}$$

We truncate the sum at age 119, since the probability of surviving beyond that age is very small. In this equation,  $S_{66}$  denotes the survival probability to age 66 conditional on having reached age 65, and  $r_{2010}$  denotes the nominal interest rate projection (in this case for 2010) from the Social Security Administration as reported in the Board of Trustees (2008). This calculation generates the actuarially fair annuity payout per year,  $P$ , that an insurance company could pay if it sought to break even in expected value when discounting using the interest rate series  $\{r_k\}$ . Table 3 reports  $P$  as a percentage of the \$100,000 annuity premium.



financial assets, minus nonhousing debt. Figure 1 plots the distribution of annuitizable wealth by five-percentile intervals of this wealth value for Health and Retirement Study households between the ages of 65 and 69 in 2008. The median retirement-age household has approximately \$50,000 in annuitizable wealth. Using the annuity payout rates above, a household with this wealth level could purchase \$3,000–\$4,000 of annual annuity income, depending on the annuity product chosen. The 25<sup>th</sup> percentile of the annuitizable wealth distribution is just \$600; at the 75<sup>th</sup> percentile, the annuitizable wealth value is \$262,000. The top 5 percent of households, ranked by annuitizable wealth, have over \$1 million in such wealth.

Figure 1 also shows the median value of equity in owner-occupied housing and other real estate for households in each of the subgroups that were created by stratifying on annuitizable assets. There is a positive correlation between median housing and real estate equity within a group and the group's median financial assets, but there is also substantial heterogeneity within each group.

Figure 1 suggests substantial variation in households' potential additional annuity income. For a large fraction of households, this amount is quite modest. Roughly one-third of households have zero, or very little, potential additional annuity income. Another one-third has less than \$10,000 of potential additional annuity income. However, for households in the top decile of potential additional annuity income, the median value is nearly \$75,000. Of course, these calculations presume that households annuitize *all* of their financial assets and personal retirement account balances.

It is important to remember that there is great heterogeneity across households in current annuity wealth, annuitizable wealth, and housing wealth. For example, if one stratifies households by their Social Security wealth, private pension income is only an important component of current annuity income for those in the top three or four deciles. If households are divided into deciles based on their level of current annuity wealth, including both Social Security and private pensions, the 90<sup>th</sup> percentile of the annuitizable wealth distribution is greater than \$200,000 *within every decile* of the current annuity wealth distribution, and it exceeds \$1,000,000 for those whose current annuity wealth falls in the top 10 percent.

Some of those with little annuitizable wealth already have substantial annuity wealth in the form of a defined benefit pension. However, even among households with more than \$20,000 in current annual annuity income, including both Social Security and a defined benefit private pension, a large fraction have only modest levels of annuitizable wealth. Less than half of those in the \$20,000–\$30,000 current annuity income interval have the potential to purchase an annuity that pays more than \$10,000 per year, and only 40 percent of those with current annuity income of more than \$30,000 can increase their annuity income by more than \$10,000.

For 58 percent of households between the ages of 65 and 69, housing equity (including other real estate) is greater than the sum of financial assets and assets held in personal retirement accounts. This pattern is even more pronounced among households with low levels of total net worth. Table 2 showed that the household at the 30<sup>th</sup> percentile of the housing equity distribution has \$42,000 of such equity, while the household at the 90<sup>th</sup> percentile has \$585,000. For married couples, the analogous values are \$90,000 and \$725,000, respectively. Recall from Figure 1 that median housing equity exceeds median annuitizable wealth in the distribution of annuitizable wealth up to the 70<sup>th</sup> percentile. As a result, the disposition of housing equity in retirement may be a key determinant of late-life financial security for many households.

A closer look at housing wealth shows great heterogeneity. When we stratify households by current annuity wealth—that is, by the value of the sum of their Social Security and defined benefit pensions—there is substantial dispersion of housing wealth within each decile. For example, among households in the sixth current annuity wealth decile, median housing wealth is \$92,000, but the 95<sup>th</sup> percentile value is \$475,000. Similar degrees of dispersion are found in the other current annuity wealth deciles. Even for households in the group with no annuitizable assets, there is large variation in housing wealth and many have substantial housing equity. These results suggest many households with little potentially annuitizable wealth may have the capacity to draw on housing equity in the event of late-life financial needs.

## Shocks to Family Structure and the Drawdown of Post-Retirement Wealth

We now examine the evolution of housing equity and financial assets for households in their retirement years. We are particularly interested in the extent to which households tap their housing equity and their financial assets at various ages to finance consumption needs and other late-life spending.

Several previous studies have examined the drawdown of housing assets at advanced ages. Venti and Wise (2004) study the evolution of housing equity in the Health and Retirement Study and find that housing equity tends to be conserved until a shock to family status such as the death of a spouse or entry to a nursing home. Their study looked at households in the original HRS cohort (household heads between the ages of 51 and 61 in 1992) between 1992 and 1998, and at Asset and Health Dynamics Among the Oldest Old (AHEAD) households (over the age of 70 in 1993) between 1993 and 1998. On average, among households that either moved or discontinued ownership, home equity increased by 0.28 percent annually among households in the relatively younger HRS cohort, while it declined 1.76 percent per year for the same category in the older AHEAD cohort. This is a weighted average of a 0.11 percent decline for two-person households that remain intact, a 1.15 percent decline for one-person households that remain intact, and a 7.84 percent decline for households that experience a shock to family status, either through the death of a spouse or divorce. The results thus suggest that households do not tap home equity until well into retirement and that substantial declines in housing wealth are often associated with shocks. Nakajima and Telyukova (2011) find similar results using HRS data through 2006.

These results are supported by the longer time series data that are now available through 2008. Figure 2 presents a graphical description of the wave-to-wave changes in home equity (in 2008 dollars) for the Health and Retirement Study cohort between 1992 and 2008. The data in the figure are organized by family status—married in adjacent waves of the survey (continuing two-person households), single in adjacent waves (continuing one-person households), and widowed or divorced in adjacent waves. Figure 2 shows wave-to-wave changes in home equity for households between the ages of 51 to 61 in 1992. For two-person households that remain intact, the wave-to-wave change in home equity is positive in seven of the eight intervals. For one-person households, the change is positive in five of the eight intervals. However, households in which a spouse died or the couple was divorced between the waves of the survey see a sharp drop in home equity. We have studied, but do not present, the wave-to-wave changes in home ownership for the same family-status groups. As with home equity, the effect of shocks to family status are revealed by the sharp drop in home ownership for the households who began an interval with two people and ended the interval as one-person households.

Home equity data for the Asset and Health Dynamics Among the Oldest Old (AHEAD) households are shown in Figure 3. The AHEAD data also show a large drop in the home



equity of households that transitioned from a two-person to a one-person household during an interval compared to the change for continuing two-person households. Further analysis shows that declines in home equity—even among households that remain intact within an interval—are disproportionately accounted for by households that dissolve in the next interval. In other words, at older ages, households reduce home equity in the interval preceding the transition from two to one person as well as in the interval when the transition occurs. To illustrate this point, consider continuing two-person households in the 2004–2006 interval in the AHEAD data. The heads of these households were at least 83 years old by the end of the interval. The housing equity of households that would dissolve in the 2006–2008 interval declined by 25.6 percent, but the housing equity of households that would not dissolve in the next interval declined by only 7.1 percent.

Our findings suggest that there is relatively little withdrawal of housing equity to purchase other assets, to buy annuities, or to support consumption in old age. This finding is broadly consistent with other analyses of homeownership among the elderly, such as Smeeding, Torrey, Fisher, Johnson, and Marchand (2006). Most households do not use housing equity to maintain their preretirement nonhousing standard of living after retirement, even though housing equity may serve as a buffer that can be drawn down in low-probability, high-cost circumstances. Greenhalgh-Stanley's (2010) study finds that 59.9 percent of respondents in the AHEAD survey who died between 1993 and 2004 were homeowners at the time of death. Davidoff (2009) suggests that the presence of substantial housing equity on many households' balance sheets may help to explain the limited demand for annuity products. Those who hold housing wealth until very late in life may be less concerned than others, without such wealth, about the need to insure against longevity risk.

The slow drawdown of housing equity raises the question of how other components of the balance sheet evolve after retirement. There has been voluminous research on this topic, but the longitudinal data collected in the Health and Retirement Study provides some of the strongest information to date. Previous research using the HRS data suggests relatively little decline in financial assets for many households, at least in the early decades of retirement. For example, Smith, Soto, and Penner (2009) combine housing equity with financial assets to construct a measure of net worth. They find that households in the top quintile of the wealth distribution report rising net worth until about age 85, and that those in the middle three quintiles report relatively stable net worth. They find some evidence that those in the lowest quintile draw down their non-annuitized wealth and rely in their later years on the payouts from Social Security, defined benefit pensions, and welfare. Love, Palumbo, and Smith (2008), who also analyze the Health and Retirement Study data, create a measure of "annualized comprehensive wealth" that combines financial and housing wealth as well as the expected present discounted value of annuities from Social Security and defined benefit pensions. Using this measure, for the median household, annualized comprehensive wealth rises with age, even though annuity wealth declines as a result of the declining number of expected remaining years of life. In Poterba, Venti, and Wise (2011), we examine withdrawals from personal retirement accounts and find a modest rate of withdrawal until account holders reach age 70½ and must begin required minimum distributions.

The same techniques that we use to study the drawdown in housing equity can be used to examine the post-retirement evolution of annuitizable financial assets. We consider all financial assets held in taxable forms, plus Individual Retirement Account (IRA) and Keogh balances, less nonhousing debt, but exclude balances in 401(k) and similar accounts because the Health and Retirement Study data on these balances are incomplete. The results, shown in Figure 4, resemble those for housing equity. For example, for persons who were in households headed by someone between the ages of 51 and 61 in 1992 and who remained in two-person households between 1992 and 1994, median financial assets increased from

about \$37,000 to \$51,000. For those in this group who remained in two-person households between 1994 and 1996, median assets declined from about \$53,000 to \$52,000. In most intervals, however, assets increased for continuing two-person households. For one-person households, assets increased in some wave-to-wave intervals and decreased in others, with declines most notable in the last two intervals.

When analyzing the evolution of household net worth, and especially financial assets, as a cohort of households ages, it is important to recognize the potential impact of wealth-related differential mortality. Age-specific mortality rates are negatively correlated with socioeconomic status, which means that as we track a given age cohort over time, the survivors will be disproportionately those who had higher wealth levels at earlier ages. We illustrate this point with an example. For two-person households present in both the 1996 and 1998 waves of the Health and Retirement Study, median financial assets in 1998 were \$57,579. Two-person households present in both the 1998 and 2000 waves, by comparison, had median financial assets of \$63,605 in 1998. This difference is circled in Figure 4. The difference between \$63,605 and \$57,579 is the mortality selection effect. Two-person households that dissolved, through either death or divorce, between 1998 and 2000 had lower financial assets at the start of this period than continuing two-person households. The death selection effects are not so apparent for single-person households, mostly because a large fraction of one-person households had financial assets of less than \$10,000 in 1992.

For the generally older group of households in the Asset and Health Dynamics Among the Oldest Old (AHEAD) data—households headed by someone over the age of 70 in 1993—the mortality selection effects are extremely important. Persons who continued in two-person households from one interval to the next typically held much greater balances in financial assets than those who did not. Figure 5 demonstrates this point. The within-interval change in financial assets for continuing two-person households in the AHEAD data was positive in some intervals and negative in others. On balance, however, the financial assets of two-person households increased, and those with larger asset holdings in 1995 remained in the sample longer than those with smaller balances. The financial assets of continuing one-person households were also positive in some intervals and negative in others, but on balance increased over time due to selection effects.

## Shocks to Health: An Important Determinant of Wealth Dynamics

The importance of changes in family status in the drawdown of both financial and housing wealth suggests that “trigger events,” such as death of a spouse or the onset of a medical condition, may play an important role in the evolution of household net worth. This section explores the role of late-life health status in affecting the path of wealth accumulation.

Potentially expensive health shocks in late life are often cited as a key risk that households may insure against by holding assets in non-annuitized form. Palumbo (1999), DeNardi, French, and Jones (2010), Ameriks, Caplin, Laufer, and Van Nieuwerburgh (2011), and others have incorporated information on the stochastic process for out-of-pocket healthcare costs into life-cycle models. In these models, households face multiple risks after retirement. The optimal life-cycle saving and consumption plan that emerges in this setting generally includes both a stock of financial assets, held for precautionary reasons, and a stream of annuity payments. Institutional details, such as those associated with the means-tested Medicaid program, which covers nursing home expenses after the household has spent down its own assets, can affect the optimal level of precautionary wealth holdings and may be particularly important for those in lower tranches of the wealth distribution. Hurd and Rohwedder (2010) point out that at lower levels of the wealth distribution, the fraction of households that appear to be adequately prepared for retirement can drop significantly when

the full distribution of potential medical outlays, rather than the expected value, is included in the analysis.

When facing multiple risks, households need to balance the benefits of insuring against an unexpectedly long life by purchasing an annuity with the benefits of holding a stock of non-annuitized wealth that can be used to cover the cost of unexpected health or other expenses. A substantial and growing literature, including work by Sinclair and Smetters (2004), Turra and Mitchell (2004), Ameriks, Caplin, Laufer, and Van Nieuwerburgh (2008), Davidoff (2009), and Peijnenburg, Nijman, and Werker (2010), provides insights on late-life financial and consumption choices in this setting.

The level and variance of unpredictable but potentially “necessary” late-life expenditures for health or other needs, and the availability of insurance against such expenditures, is a key input to these models of post-retirement consumption behavior. Marshall, McGarry, and Skinner (2010) consider one of the most important late-life expenditures, out-of-pocket medical costs. They use data for the period 1998–2006 and estimate that median medical expenditures for Health and Retirement Study respondents in their last year of life were \$5,061. They also consider the distribution of outlays, and find that such spending was \$29,335 at the 90<sup>th</sup> percentile and \$49,907 at the 95<sup>th</sup> percentile. They also find that out-of-pocket expenditures are strongly positively correlated with both wealth and income. The mean outlay for those in the bottom wealth (income) quintile is \$7,173 (\$9,046), compared with \$18,233 (\$14,269) for those in the top wealth (income) quintile.<sup>4</sup>

DiNardi, French, and Jones (2010) consider medical expenditures at different ages, using AHEAD data, and find that both the mean and the variation in medical expenses rise sharply at very old ages. For individuals between the ages of 95 and 100, for example, they find mean out-of-pocket medical spending of \$9,227, with a standard deviation of \$19,988—which points to a long right tail of high potential outlays. They conclude that when the risk of uninsured late-life medical expenditures is combined with relatively standard models of life-cycle utility maximization, the optimal trajectory of wealth-holdings is relatively flat through much of the retirement period—households hold a stock of precautionary wealth and do not draw it down to any substantial extent.

Late-life medical costs tend to persist, so the appropriate measure of household risk needs to look beyond potential outlays in a single year. Hubbard, Skinner, and Zeldes (1995) estimate a first-order autoregressive model for health outlays using data from the late 1970s, and they find an autoregressive coefficient of 0.901. This implies that on average, a cost shock this year will raise costs next year by about 90 percent of the current increase, and raise costs in two years by more than 80 percent of the current increase. DiNardi, French, and Jones (2010) also decompose healthcare spending into a transitory and a permanent component; the permanent component has a first-order autoregressive coefficient of 0.922. Thus, a forward-looking household would rationally prepare for a nontrivial probability of substantial and persistent medical care spending at advanced ages.

A key component of late-life medical spending is long-term care, which is discussed in detail by Brown and Finkelstein in this symposium. They report that long-term care accounts for roughly 9 percent of total health expenditures in the United States, and that almost one-third of the cost of this care is paid for by the care recipients. They cite data suggesting that between 35 and 50 percent of those who reach age 65 will experience a

<sup>4</sup>Hurd and Rohwedder (2009) compare the Health and Retirement Study data with information from other surveys and conclude that particularly in the early years, the HRS may overstate outlays. Their overall distribution of late-life medical expenses, however, is broadly similar to that in Marshall, McGarry, and Skinner (2010).

nursing home stay at some point before they die, with a chance of between 10 and 20 percent of spending more than five years in a nursing home. Although the cost of a nursing home stay averages \$6,000 per month, for several reasons, including the interaction between private long-term care policies and the Medicaid program, the market for private long-term insurance policies is small.

If households are saving in part to prepare for the costs associated with adverse health shocks, then one would expect to find important wealth changes coincident with health shocks. A large literature on the correlation between health and wealth is broadly supportive of this proposition. Smith (1999) documents a cross-sectional wealth–health gradient in all age groups using data from the Panel Study of Income Dynamics. Smith (2004) studies households that experience major health shocks—the onset of cancer or a cardio-pulmonary disorder—as well as those who face minor health shocks. He finds a substantial cumulative effect of these shocks on income; such income effects are likely in turn to affect wealth. The effect is larger for major than for minor health shocks. Adams, Hurd, McFadden, Merrill, and Ribeiro (2003) and Michaud and van Soest (2008) explore possible causation from wealth to health, and from health to wealth, and find that especially for older households the causation from health to wealth appears to be the dominant pathway. Wu (2003) documents substantial declines in wealth following health shocks, and shows that in married couples, the adverse effect beyond the effect of lost earnings is much larger when women become sick than when men experience a health shock. Coile and Milligan (2009) find that health shocks are correlated with changes in portfolio structure for retired households, although the impact on total household wealth is difficult to evaluate.

In Poterba, Venti, and Wise (2010), we explore health and wealth linkages further. We use data on a number of self-reported health attributes in the Health and Retirement Study to construct a “latent health index” for each individual respondent. This index is highly correlated with various health-related outcomes, such as mortality. We then study the evolution of household net worth—the sum of financial wealth, assets in personal retirement accounts, and housing equity—for households in various quintiles of the latent health distribution.

As the voluminous prior literature would suggest, we find a strong correlation between health status and net worth in the cross-section of households. In 1992, when the respondents in the Health and Retirement Study are between the ages of 51 and 61, the net worth of those in the highest health quintile is more than double that of the lowest health quintile. The wealth dispersion across health quintiles increases as the cohort ages. In 2000, for example, “predicted mean assets,” computed as the fitted value from a regression, are roughly \$200,000 for those in the lowest health quintile, but more than \$500,000 for those in the second-highest quintile, and over \$600,000 for those in the healthiest quintile.

Changes in health status seem to be associated with changes in household net worth. For example, in a regression of the level of assets in one wave of the Health and Retirement Study, in this case the 2000 wave, on assets in the previous wave, the household’s health status percentile in the previous wave, and the *change* in health status percentile between the two waves, the estimates imply that for each one percentile drop in health status, household wealth drops by \$18,744. While further study is needed, this result suggests that wealth is affected not just by the level of health, but also by its changes.

Our study does not explain why wealth rises more rapidly for healthier households than for those in poor health. Out-of-pocket medical expenditures are also likely to be higher for those in poorer health—which is the linkage between health and wealth that has been the primary focus in many previous studies. But in addition, for households in their 50s and 60s,

poor health may reduce labor force activity, not just for the unhealthy spouse but for the healthy spouse as well if there are care-giving responsibilities. Reduced labor market activity may result in lower income during traditional working years as well as lower levels of annuity benefits from Social Security and defined benefit pension plans in retirement. It is also possible that poor health may induce a demand for nonmedical outlays, such as home remodeling to accommodate activity limitations. We conclude that past studies of the cost of poor health in late life may have underestimated the risks that households face from adverse health shocks. This insight may be important when trying to calibrate models in which households face competing risks and must decide how to insure against each.

## Conclusion

Our analysis of the composition of wealth at retirement and the drawdown of wealth in the early years of retirement suggests several conclusions.

First, many households reach retirement with relatively little financial wealth to support their retirement needs. Half of all households headed by someone between the ages of 65 and 69 in 2008 had total financial assets, including assets in IRAs and 401(k)s, of less than \$52,000. Many providers of single-premium immediate annuities require minimum investments. Forty-three percent of the households aged 65 to 69 would not be able to make a \$25,000 minimum investment even if they liquidated all of their financial assets, including personal retirement accounts.

Second, for the minority of households that reach retirement with substantial financial assets, the late-life financial planning problem is multifaceted. Thirty percent of retirement-age households have non-annuitized wealth of more than \$518,000. For these households, the three most important risks in their retirement years are likely to be longevity risk, uninsured late-life medical expenses, and unfavorable returns on their portfolio assets or their housing investments. There is relatively little evidence that households in the upper half of the wealth distribution spend down financial assets in the early decades of retirement.

Third, most households appear to treat their houses as a source of reserve wealth that can be tapped in the event of a substantial expense—for example, a healthcare need—rather than a source of annual income. The potential to sell one's home and to redeploy the proceeds, which offers a precautionary wealth stock, may also contribute to the limited demand for private annuities.

Looking ahead, one important issue that has not been adequately addressed is how households with enough wealth to confront meaningful financial decisions in retirement perceive the risks that they face. Are they making choices based on a reasonable degree of information and rationality? Or are they making decisions based on other factors?

These questions are particularly relevant in evaluating decisions about whether to purchase annuities. The available evidence is divided on the extent to which households have a reasonable understanding of annuity decisions. On one side, several studies suggest that households have at least a rudimentary understanding of the role of annuities in providing longevity insurance. Brown (2001) finds that some households recognize the trade-offs associated with life-contingent payouts. Bütler and Staubli (2010) find that in Switzerland, a nation with a high annuitization rate for pension payouts, variation in the “money's worth” of pension annuities and in the extent to which a pension annuity would reduce the value of means-tested transfer payments is correlated with choices between an annuity and a lump-sum payout.



Other studies, however, suggest that annuity decisions are excessively sensitive to nonfinancial considerations. Chalmers and Reuter (2009) study decisions by public sector workers in Oregon and find that households appear to understand how some factors, such as poor health, affect the attractiveness of annuities but have difficulty valuing life annuities and comparing them with lump-sum payouts. Brown, Kling, Mullainathan, and Wrobel (2008) show that many households view annuities as investment products and consequently see them as risky since they offer low returns in the event of a premature death. When these products are described instead as a form of insurance against outliving one's resources, interest in them increases. Agnew, Anderson, Gerlach, and Szykman (2008) and Brown, Kapteyn, and Mitchell (2011) find that choices between annuitized payouts and lump-sum distributions are influenced by the nature of the information that households are provided. Thus, one important policy question is how best to provide information that will enable households to make well-informed choices about their retirement income options.

Survey evidence provides some information on the way households perceive the risks that they face in retirement. The Society of Actuaries (2010) collected information on concerns about post-retirement financial circumstances with a telephone survey of 804 households. Only 11 percent of retired respondents indicated that they were planning to use home equity to finance their retirement. Thirty-six percent of retirees indicated that they did not have a "set plan" for drawing down their savings, but use them "as needed." Twenty-four percent indicated that they viewed their savings as funds to be used to pay for emergencies only. Only 4 percent planned to never draw down savings because they wanted to pass assets to their heirs. When asked about risks, 58 percent of retirees indicated that they were worried that they would not be able to preserve the inflation-adjusted value of their savings, 48 percent indicated that they might not have enough money to pay for adequate health care, 46 percent indicated that they might not be able to pay for a stay in a nursing home, and 46 percent indicated that they might deplete all of their savings. Forty-four percent expressed concern that they might not have enough money to maintain a reasonable standard of living for the rest of their life. Twenty-four percent of retirees indicated that they had chosen the lifetime income option from an employee retirement plan or that they planned to do so. These survey findings support our general observation that most households are trying to deal with multiple sources of risk during their retirement years.

Because the financial choices confronting households during both their wealth accumulation period and their retirement years are complex, many areas of retirement planning have focused on "default options" of various kinds. Such defaults typically assign households a particular choice, while allowing them to "opt out" if they so choose. Given the apparent difficulty of formulating an optimal retirement saving plan, as well as the challenge of deciding whether to annuitize wealth at retirement, it seems likely that default options would affect the choices of many households. A number of recent proposals have called for annuity defaults or for mandatory annuitization of some share of balances in 401(k) and other defined contribution plans. Our findings suggest caution in applying a "one-size-fits-all" approach to all retirees. A household's preferences regarding different payout streams may depend on its wealth, its planned future expenditures, and the range of uncertain potential outlays that it faces. It may be possible to design default options with sufficient flexibility to address such issues. If not, defaults may improve the situation for some households while reducing welfare for others.

In the decades ahead, financial pressures on entitlement programs such as Social Security and Medicare may shift an increasing share of late-life risks from governments to households, at least for those in the upper strata of the income and wealth distribution. An increase in the degree of means-testing in these programs would raise the importance of private insurance of all types. If the cost of medical care continues to increase, the risk of



late-life healthcare costs will weigh more heavily, too. These considerations highlight one of the most difficult challenges facing retirement-age households who are formulating their financial plans: the need to forecast government policies, as well as key future expenses, for three or four decades into the future.

## Acknowledgments

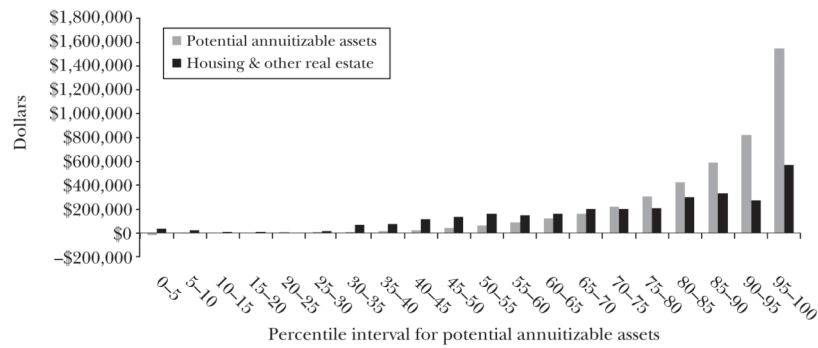
We are grateful to Isaiah Andrews for excellent research assistance, to Jonathan Skinner for providing us with estimates of the annuity value of Medicare and Medicaid, and to Jeffrey Brown and the editorial staff of the *Journal of Economic Perspectives* for extremely helpful comments and suggestions. Poterba is a trustee of the College Retirement Equity Fund and of the TIAA-CREF mutual funds; TIAA-CREF is a provider of retirement services and annuity products. We are grateful to the National Institute of Aging, grant P01 AG005842, and to the Social Security Administration, grant 5-RRC080984-00-03-00 (formerly 10-M-98363-1-02), and to the National Science Foundation (Poterba) for research support. Any opinions are those of the authors and not of any of the institutions with which they are affiliated.

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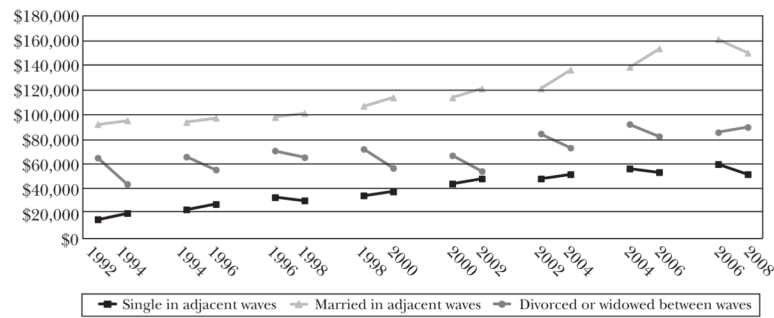
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**Figure 1. Median Potential Annuitable Assets and Housing Equity, by Potential Annuitable Asset Percentile, Household Heads 65–69 in 2008**

*Source:* Authors' calculations.

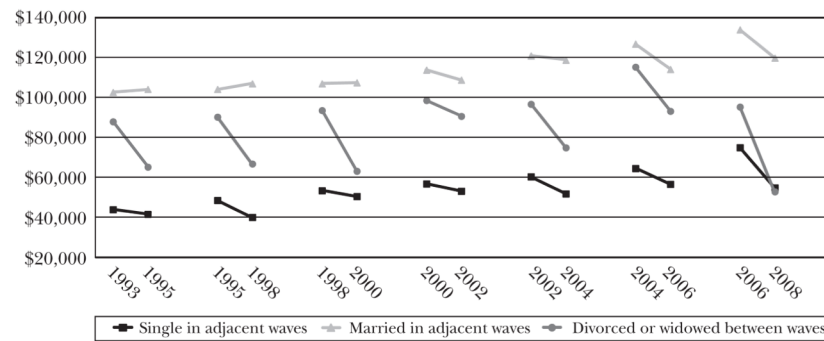
*Note:* Figure 1 plots the distribution of annuitizable wealth, and of housing equity (both owner-occupied and other real estate), by five-percentile intervals of the distribution of annuitizable wealth for Health and Retirement Study households between the ages of 65 and 69 in 2008.



**Figure 2. Wave-to-Wave Changes in Median Home Equity by Family Status, Original HRS Cohort (Age 51–61 in 1992)**

*Source:* Authors' calculations using Health and Retirement Study (HRS) data.

*Notes:* Figure 2 presents wave-to-wave changes in home equity (in 2008 dollars) for the original Health and Retirement Study cohort between 1992 and 2008, organized by family status—married in adjacent waves of the survey (continuing two-person households), single in adjacent waves (continuing one-person households), and widowed or divorced in adjacent waves. The original HRS cohort was age 51–61 in 1992.

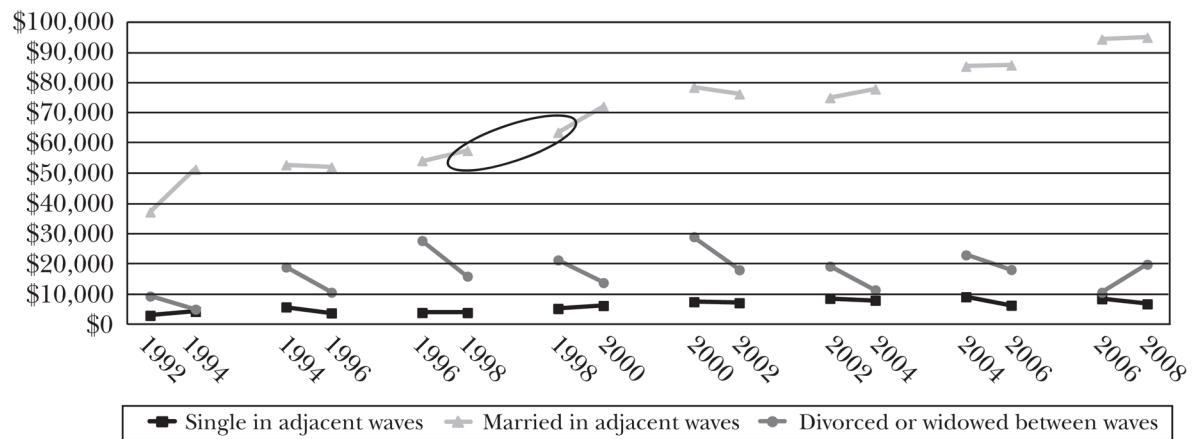


**Figure 3. Wave-to-Wave Changes in Median Home Equity by Family Status, Original AHEAD Cohort (age 70+ in 1993)**

*Source:* Authors' calculations using Asset and Health Dynamics Among the Oldest Old (AHEAD) data.

*Notes:* Figure 3 presents wave-to-wave changes (in 2008 dollars) in home equity for the original AHEAD cohort between 1993 and 2008, organized by family status—married in adjacent waves of the survey (continuing two-person households), single in adjacent waves (continuing one-person households), and widowed or divorced in adjacent waves. The original AHEAD cohort was age 70+ in 1992.

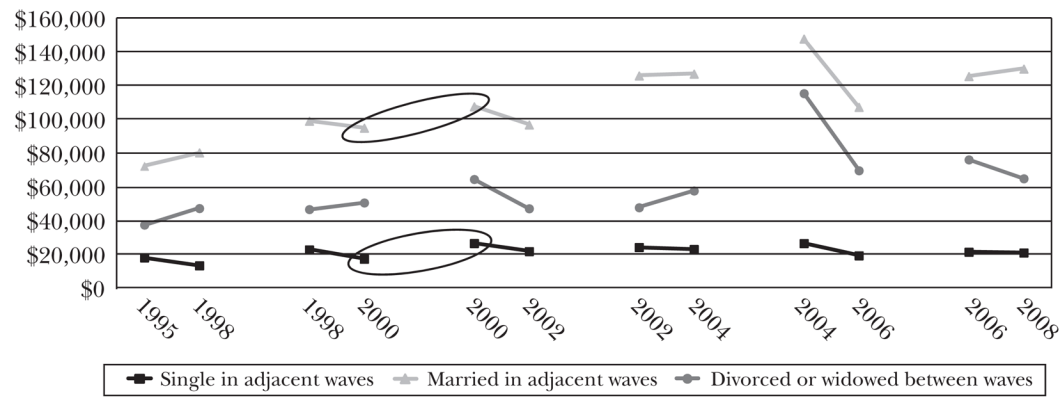




**Figure 4. Wave-to-Wave Changes in Median Net Financial Assets by Family Status, Original HRS Cohort (age 51–61 in 1992)**

*Source:* Authors' calculations using Health and Retirement Study (HRS) data.

*Notes:* Figure 4 presents wave-to-wave changes (in 2008 dollars) in median net financial assets for the original Health and Retirement Study cohort between 1992 and 2008, organized by family status—married in adjacent waves of the survey (continuing two-person households), single in adjacent waves (continuing one-person households), and widowed or divorced in adjacent waves. The original HRS cohort was age 51–61 in 1992.



**Figure 5. Wave-to-Wave Changes in Median Net Financial Assets by Family Status, Original AHEAD Cohort (age 70+ in 1993)**

*Source:* Authors' calculations using Asset and Health Dynamics Among the Oldest Old (AHEAD) data.

*Notes:* Figure 5 presents wave-to-wave changes (in 2008 dollars) in median net financial assets for the original AHEAD cohort between 1995 and 2008, organized by family status—married in adjacent waves of the survey (continuing two-person households), single in adjacent waves (continuing one-person households), and widowed or divorced in adjacent waves. The original AHEAD cohort was age 70+ in 1993.

**Table 1****Balance Sheets for Households Aged 65–69 in 2008**

<b>Asset category</b>	<b>Percent of households with positive balance</b>	<b>Mean holding (dollars)</b>	<b>Share of total wealth (percent)</b>
<b>All households</b>			
Net worth	99.4	1,049,228	100.0
Social Security	88.2	341,556	32.6
Defined benefit pension	42.1	140,176	13.4
Non-annuitized wealth	90.8	567,496	54.1
Financial assets	86.7	132,484	12.6
Personal retirement accounts	52.2	121,137	11.5
Housing and other real estate	81.3	271,605	25.9
<b>Single-person households</b>			
Net worth	99.1	649,161	100.0
Social Security	86.6	225,842	34.8
Defined benefit pension	38.0	89,323	13.8
Non-annuitized wealth	84.4	333,996	51.5
Financial assets	82.3	83,082	12.8
Personal retirement accounts	36.4	47,074	7.3
Housing and other real estate	67.8	188,813	29.1
<b>Married couples</b>			
Net worth	99.6	1,375,963	100.0
Social Security	89.6	436,059	31.7
Defined benefit pension	45.5	181,708	13.2
Non-annuitized wealth	96.0	758,196	55.1
Financial assets	90.3	172,830	12.6
Personal retirement accounts	65.1	181,625	13.2
Housing and other real estate	92.3	339,222	24.7

*Source:* Authors' tabulations using Health and Retirement Study, Wave 9, 2008. Two components of net worth, business assets (mean value \$45,966 for all households) and debt (–\$3,697) are included in net worth and non-annuitized wealth, but are not in any of the subcategories (financial assets, personal retirement accounts, or housing and other real estate). The sum of these three sub-categories therefore does not equal non-annuitized wealth.

**Table 2**  
Distribution of Wealth Components for Households Aged 65–69 in 2008 (*in 1,000s*)

Percentile	Net worth	Social Security	Defined benefit pension	Non-annuitized wealth	Financial assets	Personal retirement account assets	Housing & other real estate
<b>All households</b>							
10	197.0	0.0	0.0	0.1	0.0	0.0	0.0
30	413.6	214.5	0.0	71.8	2.0	0.0	42.0
50	731.1	315.3	0.0	221.7	15.0	5.0	120.0
70	1,146.4	463.3	116.8	518.0	70.0	75.0	229.5
90	2,103.0	643.1	468.9	1,274.0	358.0	347.0	585.0
<b>Single-person households</b>							
10	157.9	0.0	0.0	0.0	0.0	0.0	0.0
30	266.3	166.2	0.0	14.0	0.4	0.0	0.0
50	414.4	230.1	0.0	100.0	5.0	0.0	60.0
70	695.6	299.2	73.4	272.0	34.0	10.1	150.0
90	1,291.3	387.6	292.2	892.0	240.0	124.0	392.0
<b>Married households</b>							
10	346.9	0.0	0.0	24.7	0.0	0.0	12.0
30	685.9	326.0	0.0	158.0	6.0	0.0	90.0
50	1,015.3	473.9	0.0	357.0	27.8	35.0	170.0
70	1,489.5	571.6	163.7	755.7	107.0	137.0	300.0
90	2,582.3	711.4	622.0	1,677.8	459.2	464.0	725.0

*Source:* Authors' tabulations using 2008 (Wave 9) Health and Retirement Study; see Table 1 and text for further description.

**Table 3**

Annual Annuity Payout as a Percentage of Premium for a \$100,000 Single Life Annuity Purchase, 2008

Age of annuitant	Men		Women	
	Nominal payout	3% escalating payout	Nominal payout	3% escalating payout
<b>AnnuityShopper prices</b>				
65	8.46%	6.47%	7.86%	5.90%
70	9.53%	7.57%	8.73%	6.83%
75	11.05%	9.09%	10.07%	8.16%
<b>Actuarially fair</b>				
65	9.95%	7.94%	8.92%	6.91%
70	11.56%	9.57%	10.19%	8.21%
75	13.85%	11.88%	12.03%	10.08%

*Source:* “AnnuityShopper Prices” data were collected from AnnuityShopper.com website. The table shows the average payout rate for the annuity policies for which this website presented data in its July 2008 information release; the data are based on annuity policies offered in late spring and early summer 2008. “Actuarially fair” calculations use the Social Security Administration’s 2006 mortality table.

*Note:* Table 3 provides information on the annual payout as a percentage of the annuity premium for a \$100,000 annuity purchase in the private market and in a synthetic actuarially fair annuity market for two cases: a nominal payout and a 3 percent escalating payout.