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THE COMPOSITION AND DRAW-DOWN OF WEALTH IN RETIREMENT

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ABSTRACT

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 and calculates 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. The paper also considers the role of housing equity in the portfolios of retirement-age households, and explores the extent to which households draw down housing equity and financial assets as they age. 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.

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As Baby Boomers approach and enter their retirement years, the focus of researchers, financial services firms, and public policy-makers concerned with retirement saving is shifting from the accumulation of resources while working to the draw-down of resources during retirement. For the oldest Baby Boomers, the accumulation phase is nearly over.

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 (DB) pension plans. These are life-contingent payout streams that provide income for as long as household members are alive and as such they 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 (PRA) such as an Individual Retirement Account or a 401(k) plan.

There is substantial heterogeneity in the importance of, and the distribution of, these wealth components on the balance sheets of retirement-age households. Throughout our analysis, we define "retirement age households" as those headed by someone between the ages of 65 and 69. While just over three quarters of these households in 2008 had some home equity, only 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 assets for this group, including holdings in PRAs, is \$52,000. The distributions of financial asset holdings and of home equity among retirees are highly skewed. For many households, the sum of assets held inside and outside PRAs is small relative to the present discounted value of the life-contingent payout streams offered by Social Security and defined benefit pensions.

This paper presents new evidence on the resources available to households as they enter retirement, drawing on data collected by the Health and Retirement Study (HRS) during the last two decades. Section one describes the balance sheets of households of retirement age, recognizing both the importance of life-contingent payout streams and the substantial heterogeneity of asset holdings.

Section two presents new evidence on the capacity of retirement-aged households to purchase additional private annuities, beyond those provided by Social Security and private DB pensions. The limited size of the private annuity market is often cited as a puzzle, a challenge to models of life-cycle consumption that suggest the purchase of longevity insurance as a key part of late-life financial planning. We calculate the "potential additional annuity income" that households could purchase, given their holdings of non-annuitized financial assets at the start of retirement. For a majority of retirement-age households, limited holdings of financial assets translate into only modest capacity to increase life-contingent income by purchasing an annuity. For example, even if they used all of their financial assets inside and outside PRAs 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 \$5000 per year. At the upper end of the wealth distribution, however, there are a substantial number of households with the wherewithal to make large annuity purchases. In 2008, 11 percent of retirement-age households could purchase at least \$50,000 per year in future life-contingent income. For these households, the decision of how much wealth to annuitize, or equivalently how much longevity insurance to purchase, is an important one.

The third section describes the role of housing equity in the portfolios of retirement-age households. It emphasizes the variation in housing wealth, both unconditionally and conditional on annuitizable financial assets. While not as skewed as the distribution of financial assets, the distribution of housing wealth also displays substantial variation.

Section four explores the extent to which households draw down housing equity and financial assets as they age. For most households, housing equity is not used to finance year-to-year non-housing consumption in the early decades of retirement. Housing equity does drop substantially for many households when they experience a shock such as the death of a spouse (for married couples), or a period of substantial medical outlays. This pattern of tapping into home equity in response to identifiable shocks suggests that many households use view housing equity as a form of "precautionary savings." We find a similar pattern for non-annuitized financial assets, particularly for households in early decades of retirement.

The fifth section examines the interplay between late-life health and the evolution of household wealth. The desire to preserve liquid wealth for medical emergencies, along with bequest motives, are the two most common explanations for the observed lack of private annuity

demand. We describe recent studies of the distribution of post-retirement medical expenditures and suggest that out-of-pocket medical costs may represent only a part of the health-related costs that households may face in late life. We also show that the onset of illness can be an important trigger for the draw-down of financial assets. For married couples in the HRS over the 1992-2008 period, we find that while both members of the couple were in good health, average financial assets typically increased, while for those in less good health, assets did not increase or declined. While this was a period of strong financial market returns, and we recognize that in another financial environment, the average trajectory of financial assets by age might differ, the differences across those in different health circumstances is probably more general.

Section six summarizes recent analyses of how households trade off life-contingent income streams and non-annuitized "lump sum" asset holdings in the context of pension payout choice. It also summarizes the results of household surveys in which participants were asked to describe their demand for greater life-contingent income. The results suggest that a substantial fraction of households display some reluctance to select annuitized income streams when the alternative of a lump-sum payout is available. In addition, the choices between annuity streams and other payouts appear to be sensitive to the terms on which the lump sum and income stream are offered. 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.

1. Household Balance Sheets at Retirement

To set the stage for our analysis of financial support for retirement, we use data from the 2008 wave of the Health and Retirement Study (wave 9) to describe the balance sheets of households headed by someone between the ages of 65 and 69. For married couples, we consider the husband as the household head. Our balance sheet includes financial assets, home equity, and other assets such as real estate and business assets, as well as the capitalized value of Social Security and defined benefit (DB) pension payouts.

Table 1 presents summary balance sheet information. The table is divided into three panels, for all households, single-person households, and married households, respectively. Mean non-annuitized wealth (in thousands of 2008 dollars) for households in this age range is \$567.5, but the median, which is not reported in the table, is much lower: \$221.7. The non-annuitized asset categories that are owned by the most households are financial assets (86.7

percent), home equity in a primary residence (79.8 percent), and personal retirement accounts (52.2 percent). Home equity represents roughly 30 percent of non-annuitized wealth. Financial assets held outside personal retirement accounts (PRAs) represent 23 percent, and PRAs represent another 21 percent. There are substantial differences between married and single households in the level of non-annuitized wealth, and also in the relative importance of various asset categories. PRAs account for roughly twice as large a share of non-annuitized wealth for married couples as for single individuals.

Table 1 presents value of assets held in various forms without making any adjustment for the tax treatment of their associated income flows. While withdrawing assets from a PRA will usually, but not always, lead to tax liability -- distributions from "Roth Individual Retirement Accounts (IRAs)" and similar 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. There are also differences in the tax treatment of the annuity stream provided by Social Security, which is partly tax-exempt and is subject to varying levels of taxation related to the household's total income level, and defined benefit pensions, which are generally taxable. Similarly, 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. We do not attempt to determine the individual tax circumstances that would affect the after-tax value of different asset categories, but recognize that these tax considerations may lead to some differences in the after-tax value of some assets relative to others.

One concern with the HRS is the potential under-reporting of assets held in 401(k) and other similar defined-contribution retirement plans. Most respondents age 65 to 69 have retired from their primary job, but may still maintain 401(k) accounts with their former employers. Venti (forthcoming) presents evidence suggesting that these balances are under-reported.

The last two entries in each panel show the capitalized value of income from Social Security and DB pension plans. These income streams are received by 88 and 42 percent of retirement-age households, respectively. 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 DB pensions provide a life annuity for the current beneficiary, that spousal benefits will equal half the benefits for the

primary beneficiary. We further assume that the average annual increase in DB benefits will equal one third of the coincident increase in the CPI inflation rate. Brown (2010) suggests that this assumption roughly describes the recent experience of beneficiaries from DB plans. We aggregate payouts from private annuity contracts, which are reported by very few HRS respondents, with payouts from DB plans.

To compute the expected present discounted value of life-contingent payout streams, we use the forecast survival probabilities from the Social Security Administration's 2006 life table under the assumption that spousal mortality rates are independent, as well as the "intermediate" nominal interest rate and inflation assumptions presented in Board of Trustees, Federal OASDHI and Federal DI Programs (2008). These forecasts call for 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.

Our calculation will understate the importance of both Social Security and DB pension wealth if some households in the 65-69 age range have deferred the receipt of these income streams. Those who are currently employed, for example, may not have started receiving their DB payouts, and some individuals may postpone starting their Social Security benefits until they are 70. Although such households would have substantial accumulated wealth in the form of annuity benefits, we would not detect them.

Table 1 shows that the average capitalized value of Social Security for those households who receive some Social Security income is \$387.2 thousand; the median, \$351.7, is very similar. There is less dispersion in the capitalized value of Social Security benefits than in many of the other components of wealth. For DB pension benefits, the capitalized value averages \$140.2 across all households, but a much larger value, \$332.8, for the 42 percent of households receiving such payouts. The mean capitalized values of Social Security and DB pension payouts, taken together, represent 46 percent of the mean value of household wealth. For single households, these two components are more important -- 49 percent -- largely because Social Security benefits are relatively more important for singles than for married couples. The capitalized value of Social Security benefits is 34.8 percent of the average net worth of single-person households, but only 31.7 percent of that for married couples. These findings are broadly consistent with Butrica and Mermin's (2006) analysis of earlier waves of the HRS, 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 in second homes and other real estate, as a component of household net worth for the elderly. 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. The magnitude of real estate holdings underscores the importance of analyzing how these assets are drawn down in retirement. Real estate is less liquid than financial assets or the securities typically held in PRAs, but it can provide a source of wealth that households can tap in emergencies. While many households in the Baby Boomers' parents' cohort 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.

Table 1 omits the capitalized value of insurance payments from Medicare and Medicaid. Everyone over the age of 65 is eligible for Medicare, and a substantial fraction of elderly households receive benefits at some point from Medicaid, which is means-tested. Average Medicare and Medicaid benefits by age can be used to obtain the expected present discounted value of these insurance programs, viewed from the perspective of the early retirement years. This calculation suggests that for the average 65-year-old, the present discounted value of the medical care that Medicare and Medicaid will cover is a little over \$180,000. When added to the net worth shown in Table 1, Medicare and Medicaid "wealth" account for about 22 percent of wealth for single person households and 21 percent of wealth for married couples.

The means and medians in Table 1 conceal substantial heterogeneity in the distribution of wealth holdings. Table 2 provides some information on wealth dispersion, reporting separately the decile break-points in the distribution of housing equity, financial assets, PRA assets, and the capitalized values of Social Security benefits and DB 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 PRA assets. Since just over half of households (52.2 percent) have positive PRA assets, the low median PRA value -- \$5000 -- is

not a surprise. At the seventieth percentile, the value of PRA assets is \$75,000. The top ten percent of households, ranked by PRA assets, have at least \$347,000 in these accounts. The mean value of PRA holdings -- \$121,137 in Table 1 -- is close to the 80th percentile value in Table 2. A similar pattern obtains for financial assets.

The distribution of the capitalized value of DB pension payouts resembles that for PRA assets, with a median value of zero and a small group of households with substantial DB pension wealth. One household in five has DB pension wealth of at least \$238,500. The decline in private-sector DB coverage in the last two decades suggests that the prevalence of annuities from DB plans is likely to be greater for the cohort that we analyze than for future cohorts of retirees. The dispersion of the capitalized value of Social Security benefits is substantial but it is much smaller than that for PRA assets or DB pensions. The table shows that the household at the 30th percentile of the Social Security benefit distribution has a capitalized value of \$214,500, while a household at the 80th percentile has \$549,200.

Table 2 highlights differences in the distributions of wealth, and wealth components, 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 sub-categories and at most quantiles of the wealth distribution. For example, the median married couple has housing equity of \$170,000, while the median single person between the ages of 65 and 69 has housing equity of \$60,000. More than thirty percent of single households report no housing equity, while more than ninety percent of married households have some housing equity. A much higher fraction of single than married households report very low levels of financial assets and PRA assets. We suspect that there is substantial heterogeneity within single-person households at retirement age, and that singles who have never been married are better prepared for retirement than unmarried individuals who are the surviving member of a married couple, particularly when the survivor is a woman with a limited labor market career.

Much of the attention in discussions of retirement preparation focuses on households in the bottom half of the wealth distribution, who have very little non-housing wealth with which to supplement Social Security and the DB pension income that a small fraction of these households receive. There are also, however, a substantial number of households who have accumulated significant wealth as they enter retirement. The median net worth for those between the 80th and 90th percentiles of the net worth distribution is roughly \$1.5 million, including the capitalized

value of Social Security and DB pensions. The median level of non-annuitized financial assets for the top twenty percent of the distribution is \$510,000. Because households at the top of the wealth distribution account for a very substantial share of the financial assets held by the elderly, their age-wealth profiles can have an important influence on the evolution of aggregate demand for portfolio assets.

2. Potential Annuity Income

Economists have long been puzzled by the limited size of the private annuity market. Yaari (1965) recognized that in a basic lifecycle 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) extend this analysis to allow for actuarially unfair annuities and for missing markets, and find that even if full annuitization is no longer optimal, consumers will still find partial annuitization attractive. Peijnenburg, Nijman, and Werker (2010) present further results on the optimal level of annuitization.

In this section we investigate the amount of annuity income that households of retirement age could purchase, given their accumulated financial assets. For a household with very little financial wealth, the absence of privately-purchased annuity income in late life is not particularly puzzling. Given these households' saving behavior prior to retirement, purchasing a substantial annuity is not feasible. The data in Tables 1 and 2 suggest that many retirement-age households have limited capacity to purchase annuitized income streams beyond those provided by Social Security and DB pensions. To evaluate the capacity of retirement-age households to purchase supplemental private annuities, we compute "potential additional annuity income" for each HRS household by converting stocks of financial assets into annual income streams. Previously, we converted annuitized income streams from Social Security and DB pensions into wealth stocks; now, we annuitize liquid wealth holdings, and compare the resulting income flows with other sources of annuity income. 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.

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. We present the average value of 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 of 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 2006 population mortality table, for an individual with the mortality experience of the population at large. The assumptions here are the same as those used to calculate the present discounted value of Social Security and DB pension payouts above. For a 65-year-old man, for example we solve for P in the equation

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

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, Federal OASDI Program (2008). This calculation generates the actuarially-fair annuity payout, per year, that the insurance company would be able to provide if it sought to break even when the discount rate was that specified by the series $\{r_k\}$. These payouts are higher than those in the AnnuityShopper data, in part because the mortality rates for the SSA table are higher than those in the current annuitant population as a result of self-selection into the existing private annuity market.

The entries in Table 3 provide a guide to the rates at which individuals can transform accumulated assets into streams of lifetime income. For married individuals, the annuitization decision often involves the provision of some spousal protection in the event that the annuitant predeceases his or her spouse. The annual annuity payout in that case depends on the age of both members of the couple. If a husband is 65 and his wife is 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 choose a nominal payout stream. If he chooses an annuity stream with a three percent annual nominal increase, the initial payout will be 4.80 percent of the purchase price. These values are nearly two percentage points lower than the payout rates if the husband selected an annuity that paid benefits only while he was alive.

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. We define annuitizable wealth as the sum of PRA assets and other financial assets less non-housing debt. There is substantial heterogeneity in households' holdings of annuitizable assets and in the share of their existing wealth that is held in annuitized form. Figure 1 plots the distribution of annuitizable wealth by percentile interval from 0-5 to 90-95 for HRS households between the ages of 65 and 69 in 2008. We omit the 95-100 percentile group, because this group has much higher wealth than all the other groups. The figure shows that 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 between three and four thousand dollars of annual annuity income, depending on the annuity product chosen. The 25th percentile of the annuitizable wealth distribution is just \$600; at the 75th percentile, the annuitizable wealth value is \$262,000. Households that fall between the 80th and 90th percentiles of the annuitizable wealth distribution have \$375,000 in annuitizable wealth. The top five percent of households, ranked by annuitizable wealth, have over \$1 million in such wealth.

Figure 1 also shows the median value of housing equity, including both owner-occupied housing and other real estate, within each annuitizable assets group. There is a positive correlation between median housing equity within a group and the group's financial assets, but as we show in the next section, there is also substantial heterogeneity. We do not show business assets in the figure because the median is zero in all intervals.

Figure 1 aggregates all households, regardless of their current level of annuity income. Yet households differ widely in the amount of annuity income that they receive. There is also great heterogeneity across households in both annuitizable wealth and housing wealth, conditional on current annuity wealth. To illustrate this, Figure 2 shows selected percentiles of the distribution of annuitizable assets for households in each decile of the distribution of current annuity wealth. As in Table 1, annuity wealth is the expected present value of Social Security and DB benefits. We omit the lowest annuity wealth decile because this decile appears to include both households that had very low lifetime earnings with other, possibly much higher earning, households who were not covered by the Social Security system. Summary statistics for this group are consequently very difficult to interpret. The median value of annuitizable wealth is close to zero for households in each of the first deciles of the current annuity wealth distribution. The medians do not capture, of course, the considerable dispersion among households even with the same level of current annuity wealth. For example, the 90th percentile of annuitizable wealth assets is greater than \$200,000 in all of the current annuity wealth deciles, and it exceeds \$1,000,000 for those in the top decile of current annuity wealth.

We turn now to the current and potential additional annuity income from annuitizing financial wealth. Figure 3 shows median levels of current Social Security and pension income received within each five percent interval of the total annuity income distribution. The dispersion of Social Security income is much less pronounced than that of annuitizable assets. Indeed, Social Security income varies very little in the top third of the distribution. The figure also demonstrates that private pension income is only an important component of current annuity income in the top third of the distribution.

Figure 4 shows the distribution of potential additional annuity income, including both financial assets and PRA balances, for retirement-age households in four current annuity income intervals--less than \$10,000, between \$10,000 and \$20,000, between \$20,000 and \$30,000, and more than \$30,000. The households in each of the annuity income intervals represent approximately one quarter of the population.

There is substantial variation in households' potential additional annuity income. For a large fraction of households, this amount is quite modest. Roughly one third of the group with the lowest current annuity income has close to zero potential additional annuity income, and another third has less than \$10,000. However, for households in the top decile of potential

additional annuity income, the median value is nearly \$75,000. It is important to remember that the calculations underlying Figure 4 presume that households annuitize all of their financial assets and their full PRA balance. Since it is unlikely that households would choose to relinquish all of their control over liquid financial assets, the entries in the figure represent an upper bound on the amount of additional annuity income that households would receive if they decided to annuitize their non-annuitized wealth. .

Even among households with more than \$20,000 in current annual annuity income, a large fraction have only modest levels of potential additional annuity income. Less than half of those in the \$20-30,000 current annuity income interval have the potential to purchase an annuity that pays more than \$10,000 per year, and only forty percent of those with current annuity income of more than \$30,000 can increase their annuity income by more than \$10,000.

Our analysis suggests that only a modest fraction of households of retirement age have the financial wherewithal to purchase substantial annuity streams in addition to those that they receive from Social Security and defined benefit pensions. Among all households, even those with substantial current annuity income, only about one-third could purchase more than \$10,000 of additional annuity income in the private annuity market.

3. Housing Equity and Household Wealth

For 58 percent of retirement-age households, housing equity (including other real estate) is greater than the sum of financial assets and assets held in PRAs. This is particularly true among households with low levels of total net worth. Table 2 showed that the household at the thirtieth percentile of the housing equity distribution has \$42,000 of such equity, while the household at the eightieth percentile has \$349,200. For married couples, the analogous values are \$90,000 and \$428,000, respectively. Recall from Figure 1 that median housing equity exceeds median annuitizable wealth in each five-percentile interval of the distribution of annuitizable wealth up to the 70th percentile. It is only for households between the 70th and 75th percentile of that distribution, with median annuitizable assets of \$220,000 and median housing equity of \$200,000, that annuitizable assets begin to exceed housing equity for most households in our five-percentile cells. For all higher percentiles, annuitizable assets exceed housing wealth. For households in the top 10 percent of distribution of annuitizable wealth, annuitizable financial assets are typically much greater than housing equity. The ubiquity and

size of home equity holdings suggests that the disposition of housing equity in retirement may be a key determinant of late-life financial security.

To provide some insight on the role of housing wealth in household portfolios, Figure 5 groups households by current annuity wealth as in the last section, and then shows the distribution of housing wealth for each group. There is substantial dispersion within these annuity wealth deciles. For example, among households in the sixth current annuity wealth decile, median housing wealth is \$92,000, but the 95th percentile value is \$475,000. Similar degrees of dispersion are found in the other current annuity wealth deciles.

Figure 6 presents a scatterplot showing the value of housing wealth and the value of potential annuitizable assets for all households that rank in the fifth and sixth deciles of the current annuity wealth distribution. The households that are included in this figure have current annuity wealth between \$325,000 and \$500,000. Even for households in this group with no annuitizable assets, there is large variation in housing wealth. Many have substantial housing equity. Similar variation in housing wealth is seen for all levels of annuitizable assets.

These results suggest that while there is a positive correlation between housing equity and annuitizable wealth, there are many households with little potentially annuitizable wealth that may have the capacity to draw on housing equity in the event of late-life financial needs. The open question is whether housing equity plays a role similar to financial assets in providing late-life financial security.

4. The Draw-Down of Housing Equity and Financial Assets in Retirement

The balance sheets of retirement-age households provide important insight on the degree to which these households can supplement the income that they receive from Social Security and defined benefit pension plans. A snapshot of wealth holdings when households are in their late sixties, however, does not provide any information on the subsequent evolution of wealth or its components. While a household owns a home, it earns returns in the form of imputed rent plus any capital gains or losses associated with changes in the home's value. The implicit rental value of the specific home that the household has lived in for many years may be especially high for the retired household, as it provides continuing contact with a familiar neighborhood and long-standing friends. But owner-occupied homes can, if necessary, be sold and converted to financial assets. Thus home equity may provide a pool of resources that can be used in the event

of unanticipated expenses, such as medical care needs, or in the event that the household outlives its other resources. In this section, we examine the evolution of housing equity 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 draw-down of housing assets at advanced ages. Venti and Wise (2004) study the evolution of housing equity in the Health and Retirement Survey (HRS) 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 HRS households (age 51 to 61 in 1992) between 1992 and 1998 and at Asset and Health Dynamics Among the Oldest Old (AHEAD) households (age 70+ in 1993) between 1993 and 1998. On average, home equity increased by 0.28 percent annually among households that either moved or discontinued ownership in the HRS cohort. For the AHEAD cohort, the average change in home equity was a decline of -1.76 percent per year among households that either moved or discontinued ownership. 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 HRS and AHEAD 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 (2010) find similar results using HRS data through 2006.

These results are supported by the longer time series of HRS and AHEAD data that are now available through 2008. Figures 7 and 8 present a graphical description of the wave-to-wave changes in home equity (in 2008 dollars) and home ownership respectively for the HRS cohort between 1992 and 2008. They are organized by family status—married in adjacent waves (continuing two-person households), single in adjacent waves (continuing one-person households), and widowed or divorced in adjacent waves. Figure 7 shows wave-to-wave changes in home equity for households between the ages of 51 to 61 in 1992. For one-person and two-person households that remain intact, the wave-to-wave change in home equity is positive with the exception of the change from 2006 to 2008, a period of nationwide house price decline. However, there is a sharp drop in home equity for households in which a spouse died or

the couple was divorced between the waves. Since the period we are studying was one of generally rising house prices, the findings on home equity growth are likely to reflect relatively little change in housing choices for continuing one- or two-person households, but changing values of real estate. This makes the decline in housing equity for dissolving households even more striking.

Figure 8 shows 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 and home ownership data for the AHEAD households are shown in Figures 9 and 10 respectively. 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. In the later years there is also a drop in the equity of continuing two-person household in the AHEAD data.

Further analysis of the data show that these declines 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. 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. For AHEAD households, Figure 10 suggests that there may be some decline in the home ownership of continuing two-person households by the 2000-2002 interval, when these households were over 80 years old,

Our findings suggest that there is relatively little withdrawal of housing equity to purchase other assets, to buy life annuities, or to support consumption in old age. This finding is broadly consistent with other analyses of homeownership among the elderly, such as Smeeding *et al.* (2006). It appears that most households do not use housing equity to maintain their pre-retirement non-housing 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, such as a discrete change in household structure. Households are preserving their housing consumption at close to pre-retirement levels. Greenhalgh-Stanley (2010) reports that 59.9 percent of AHEAD

respondents who died between 1993 and 2004 were homeowners at the time of death. It is possible, as Davidoff (2009) suggests, that the presence of substantial housing equity on many households' balance sheets helps to explain the limited demand for annuity products. Those who hold housing wealth until very late in life may be less concerned with the need to insure against longevity risk than those who do not have a housing equity buffer.

The findings on the slow draw-down of housing equity raise 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 HRS 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 to rely in their later years on the payouts from Social Security, DB pensions, and welfare. Love, Palumbo, and Smith (2008), who also analyze the HRS wealth data, create a measure of "annualized comprehensive wealth" which adds to financial and housing wealth a measure of the expected present discounted value of annuities from Social Security and DB pensions. Annuity wealth declines as the household ages, reflecting the declining number of expected remaining years of life. For the median household, annualized comprehensive wealth rises with age. An open research issue is whether these findings can be explained using standard lifecycle models augmented with late-life expense shocks.

The same techniques that we use to study the draw-down in housing equity can be used to examine the post-retirement evolution of financial assets. We apply methods similar to those that we used to study housing equity to annuitizable financial assets. Figures 11 and 12 show results for HRS and AHEAD households, respectively. We consider all financial assets held in taxable forms, plus IRA and Keogh balances, less non-housing debt, but exclude balances in 401(k) and similar accounts because the HRS data on these balances is incomplete.

The results in Figure 11 for financial assets resemble those for housing equity. The figure shows the wave-to-wave change in financial assets for households in three family status groups. For example, for persons who remained in two-person households between 1992 and

1994, median financial assets increased from about \$37,000 to \$51,000. For those who remained in two-person households between 1994 and 1996, median assets declined from about \$53,000 to \$52,000. In most intervals, assets increased for continuing two person households. Especially with financial assets, it is important to distinguish between wave-to-wave changes in assets shown by the line segments in the figure and the effect of differential mortality indicated by the "gaps" between segments. To illustrate this point, note that two-person households present in both the 1996 and 1998 waves had \$57,579 in financial assets in 1998, but that two-person households present in both the 1998 and 2000 waves had \$63,605 in 1998. This difference is circled in Figure 11. The difference between \$63,605 and \$57,579 is the mortality selection effect--two-person households that dissolved, either through either death or divorce, between 1998 and 2000 had lower financial assets at the start of this period than continuing two-person households.

To understand the evolution of assets as households age, as distinct from the selection effect, it is important to focus on the wave-to-wave changes (segment slopes). For two-person households between the ages of 51 and 61 in 1992, the wave-to-wave changes are positive in most years. The increase in assets for continuing two-person households can be seen by tracking the assets in the first year of each interval. An important component of this increase is due to the progressive selection of households with greater financial assets. 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. The death selection effects are not so apparent for single-person households, largely because a large fraction of one-person households had financial assets less than \$10,000 in 1992. The figure shows that the financial assets of two-person households that dissolve between waves declined substantially in all but the last interval. The decline in financial assets may be due in large part to divorce, with half of the financial assets going to each spouse for example. The assets of the two- to one-person households were also much lower at the beginning of an interval than the assets of continuing two-person households.

Figure 12 shows the evolution of financial assets for AHEAD households. The data for 1993 are omitted from the figure because, as Rohwedder, Haider, and Hurd (2006) explain, financial assets were under-reported in AHEAD in that year. For the AHEAD households, 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. The within-interval increase in financial assets for continuing two-person households was positive in some intervals and negative in others. The decline in the 2004-2006 interval is especially large. Additional data show that on balance, however, assets of two-person households increased, with those with the largest asset holdings in 1995 remaining in the sample longer. The assets of continuing one-person households declined in each period. Unlike the decline in the assets of two-person HRS households that dissolved (often due to divorce) between waves, the data suggest that wealth changes for AHEAD two-person households that dissolved (often due to the death of a spouse) were similar to the within-interval changes observed for continuing two-person households.

5. Late-Life Health Risks and Wealth Dynamics

The importance of changes in family status in the draw-down 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. Several studies, including Palumbo (1999), DeNardi, French and Jones (2010), and Ameriks, Caplin, Laufer, and Van Nieuwerburgh (forthcoming), have incorporated information on the stochastic process for out-of-pocket health care costs into lifecycle models. In these models, households face multiple risks after retirement. The optimal lifecycle saving and consumption plan generally include 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 that covers nursing home expenses after the household has spent down its own assets, can have an important effect on 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 are adequately prepared for retirement can drop significantly when households are confronted with the distribution of potential medical outlays, rather than the expected value.

When facing multiple risks, households need to balance the benefits of insuring against an unexpectedly long life, which comes from 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 models of post-retirement consumption behavior. A number of recent studies have tried to calibrate the distribution of out-of-pocket medical expenditures. Marshall, McGarry, and Skinner (2010) consider medical expenditures in the last year of life for HRS participants. For the period 1998-2006, they estimate median outlays of \$5,061, but they also find that outlays at the 90th (95th) percentile are \$29,335 (\$49,907). 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). For those in the top quintile, mean outlays are \$18,233 (\$14,269). Hurd and Rohwedder (2009) also examine the HRS-based distribution of health expenditures. They compare the HRS data with information from other surveys, and conclude that particularly in the early years, the HRS may over-state outlays. Their overall distribution of late-life medical expenses, however, is broadly similar to that in Marshall, McGarry, and Skinner (2010).

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 rises 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. Given the truncation of the distribution at zero, this points to the presence of a long right tail of high potential outlays. DiNardi, French, and Jones (2010) conclude that when the risk of uninsured late-life medical expenditures is combined with relatively standard models of lifecycle utility maximization, the optimal trajectory of wealth-holdings is relatively flat though much of the retirement period. This is broadly consistent with some of the empirical findings above.

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. DiNardi, French, and Jones (2010) decompose health care spending into a transitory and a permanent component; the permanent component has an AR(1) coefficient of 0.922. These estimates suggest that a forward-looking household would rationally prepare for a non-trivial probability of substantial and persistent medical care spending at advanced ages.

One of the key late-life risks is long-term care. Brown and Finkelstein (2011) report that such care accounts for roughly nine percent of total health expenditures in the U.S., 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 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. There is a large literature on the correlation between health and wealth that is broadly supportive of this proposition. Smith (1999) documents both a cross-sectional wealth-health gradient in all age groups using data from the Panel Survey of Income Dynamics. Smith (2004) studies HRS households that experience both major health shocks -- the onset of cancer or a cardio-pulmonary disorder -- and 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 health shocks than for minor shocks. Adams, *et al.* (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 our own recent work, Poterba, Venti, and Wise (2010), we explore health and wealth linkages. We use data on a number of self-reported health attributes in the HRS 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, PRA assets, and housing equity, for households in various quintiles of the latent health distribution.

Figure 13 shows the evolution of net worth for continuing two-person households in each pair of years in the HRS. It suggests, as the voluminous prior literature would lead one to expect, there is a strong correlation between health status and net worth in the cross-section of households. In 1992, when the respondents 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 quintile. As the HRS cohort ages, the wealth dispersion across health quintiles increases. 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.

While it is not evident from any of the figures we present, changes in health status are associated with changes in household net worth. For example, in a regression of the level of assets in one wave of the HRS, 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 a household's health status, its reported 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.

Figure 13 suggests another important conclusion. While net worth rises with age for households in the healthiest three quintiles over most of the sixteen years for which we can track them, net worth changes very little for those in the lowest health quintile and rises for several years, but then stabilizes, for those in the second quintile. The wealth change between 2006 and 2008 is negative for all groups, in contrast to the wealth changes between previous survey waves. This reflects economy-wide shocks, notably the drop in housing values and stock prices between 2006 and 2008.

The summary measures of wealth change in Figure 13 do not explain why wealth rises more rapidly for healthier households than for those in poor health. There are many potential explanations, and the relative importance of each may vary with age. Note that we focus on pathways that explain how health may affect wealth; much of the existing literature has focused

on how past and current income, education, and wealth may affect current health. For households in their 50s and 60s, for example, poor health may reduce labor force activity, not just for the unhealthy spouse but also for the other 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 DB pension plans in retirement. Out-of-pocket medical expenditures are also likely to be higher for those in poorer health -- that is the linkage between health and wealth that has been the primary focus on many previous studies. It is also possible that poor health may induce a demand for non-medical outlays, such as home remodeling to accommodate activity limitations. We conclude from the patterns of wealth evolution in Figure 13 that if anything, past studies of the cost of poor health in late life under-estimate of the risks that households face from adverse health shocks. This could be important when trying to calibrate models in which households face competing risks and must decide how much wealth to allocate to insure against each.

6. Preferences for Annuitized Income Streams and Lump-Sum Payout Payouts

We have observed that many households do not have the financial capacity to purchase substantial annuitized income streams, but what of those who do? Relatively few households purchase private annuities, and the limited size of that market has been variously attributed to a failure to understand longevity risk, adverse selection, the presence of bequest motives, and precautionary saving considerations. Some information on household preferences can be gleaned from choices that participants in defined benefit pension plans make when they are confronted with a choice between a lump sum payout and an annuitized stream of benefits. In the early part of the last decade, the Bureau of Labor Statistics (2005) reported that 53 percent of retirees from private firms had the option to elect a partial lump-sum payout of their defined benefit pension; 43 percent could elect a full lump-sum payout. Studying choices in plans with such options can provide some insight on the way households balance insuring against longevity risk and other considerations in late-life financial planning. In this section, we briefly summarize several of the leading contributions in this area.

Warner and Pleeter (2001) examine the choices that military households make when they may select a lump-sum payout or an annuity stream in the context of an early-retirement incentive program. In 1992, a substantial group of military personnel was offered access to two

benefit programs designed to encourage retirement. Those who were eligible for these programs could choose between a lump-sum and an annuity; the authors estimate that the nominal rate of return that equated the present discounted value of the two was between 17.5 and 19.8 percent. In spite of these high internal rates of return on the annuity option, nearly ninety percent of the enlisted personnel and half of the officers in the study selected the lump-sum payout.

The authors estimate that the implicit real discount rates for officers were approximately 16 percent, and that those for enlisted men were between 18 and 22 percent. Older individuals, those with more education, and those who were eligible for larger payouts exhibited lower discount rates and were more likely to select the annuity payout. Those who were eligible for larger payouts were more likely to choose the deferred stream of payouts. This may suggest that when larger wealth amounts are at stake, households apply lower discount rates.

Mottola and Utkus (2007) examine choices between lump-sum and annuity payouts in two large private-sector defined benefit pension plans. After excluding participants with accrued pension values of less than \$5000, whose accounts were automatically cashed out in both plans, they find that only 27 percent of the participants in one plan, and 17 percent of those in the other, chose annuity distributions rather than a lump-sum payout. The probability of choosing the annuity varied substantially with participant characteristics. Men, married individuals, and those with more accumulated net worth were more likely to select the lump-sum payout. Age also helped to predict payout choices: roughly half of the participants who were at least 70 years old chose an annuity rather than a lump sum, but less than 20 percent of those in their late 50s did. This suggests that proximity to retirement age may increase the salience of longevity risk, and the likelihood of choosing an annuity payout. One notable finding in this study is that many married couples actively "de-annuitize," rather than following the default to select an annuity stream. In order to obtain a lump-sum payout, these participants needed to visit a notary public and jointly sign a document indicating their decision to select a lump-sum payout.

Fitzpatrick (2011) studies another interesting DB plan setting in which households trade off current lump sums and future payout streams. In 1998, teachers in the state of Illinois were offered the opportunity to purchase additional pension benefits at prices that varied with their current salary. This creates a source of price variation that makes it possible to estimate the willingness-to-pay for pension benefits. The findings suggest that for most teachers, receiving \$1.80 in current pay would be preferred to \$10.00 in the present value of future pension benefits.

This finding, while striking, is consistent with the high implicit discount rates that have been estimated from household choices in other contexts. Frederick, Loewenstein and O'Donoghue (2002) provide an overview of this literature.

Experience with Social Security in the United States also offers some insight on the relative demand for annuity streams and lump sum payments. Coile, Diamond, Gruber, and Jousten (2002) point out that by delaying the date of claiming Social Security benefits, a potential beneficiary can effectively purchase additional future annuity benefits because the flow of future benefits is adjusted in an actuarially fair manner. Relatively few households, however, take advantage of the opportunity to defer the start date of their benefits. Brown (2008) summarizes the results from a question on the HRS which asked respondents if they would like to reduce their prospective Social Security benefits by 25 percent in return for a current, actuarially fair, lump-sum payment. About sixty percent of respondents would prefer to receive the lump-sum when it is actuarially fair, and many would continue to choose the lump sum even when it the lump-sum has a lower present discounted value than the benefit annuity.

Defined contribution (DC) plan participants also appear reluctant to choose annuity payout options. Johnson, Burman, and Kobes (2004) report that in early waves of the HRS, only four percent of DC participants who left their jobs after age 55 chose an annuity payout stream. The fraction was somewhat higher, ten percent, for those who left jobs after age 65. An open question, however, is whether some of these retirees might not choose to annuitize at the time of retirement, but convert their account balance to an annuity at a later date. Given the growing importance of defined contribution plan balances and PRA holdings on the balance sheets of retirement-age households, the choices these households make with regard to annuitization of these accounts will play an increasingly important role in determining the level of annuity income for future retirees.

7. Conclusion

Our analysis of the composition of wealth at retirement, and the draw-down 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. For these households, discussions of

whether to purchase an annuity or draw down wealth in another fashion are largely moot; the amount of retirement support that their saving will provide is very limited. The opportunity to annuitize part of their wealth holdings may be limited for many of these households. Many providers of single premium immediate annuities require minimum investments that would effectively require devoting most of the household's resources to the annuity purchase. Forty-three percent of the households aged 65 to 69 would not be able to make a \$25,000 minimum investment if they liquidated all of their financial assets (including PRAs).

Second, for the minority of households that reach retirement with substantial financial assets, the late-life financial planning problem is multi-faceted. Twenty percent of retirement-age households have financial assets greater than \$375,000. For these households, the three most important risks in their retirement years are likely to be longevity risk, the risk of uninsured late-life medical expenses, and the risk of unfavorable returns on their portfolio assets or their housing investments. Most of the households in this wealth strata have sufficient financial resources, or financial plus housing resources, to cover the expected cost of late-life medical expenses. But how they perceive the risk of, and the consequences of, low-probability scenarios with very high out-of-pocket costs may be critical to understanding their financial behavior. 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. This suggests that these households have little day-to-day need for additional income beyond that provided by their current annuity income streams and their capital income returns.

Third, home equity may substitute for other forms of insurance against living longer than expected or facing unanticipated medical costs. For the majority of households, housing equity exceeds financial assets. This suggests that studying the way retired households draw upon their housing wealth is important for understanding retirement finance. The existing evidence suggests that most households are reluctant to sell their homes. They 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 health care need. The presence of this reserve stock of housing equity may also help to explain the limited demand for private annuities.

One important issue that has not been adequately addressed is how households with enough wealth to confront meaningful financial decisions in retirement perceive the array of risks that they face in retirement. The small literature on decision-making by households

confronting annuitization choices suggests both some elements of rational choice and some role for other factors.

Several studies show that households have at least a rudimentary understanding of the role of annuities in providing longevity insurance. 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. Brown, Casey, and Mitchell (2008) find that variation in health status and in the relative present discounted value of the annuity and lump-sum payout options affects the choice between the two.

Other studies, however, suggest that annuities are poorly understood and that annuity decisions are excessively sensitive to non-financial 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 households' perceptions of the benefits of annuity products are affected by how the features of an annuity are presented. 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 ones resources, interest in them increases. Agnew, Anderson, Gerlach, and Szykman (2008) also find that choices between annuitized payouts and lump sum distributions are influenced by the nature of the information that households receive as they approach times when they must make decisions about annuitization or other forms of pension payouts. A lack of understanding of how annuities work and a reluctance or inability to undertake retirement planning may prevent some potentially beneficial annuitization decisions from being made. One important policy question concerns how best to provide education 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 various risks that they face in retirement. The Society of Actuaries (2010) collects information on concerns about post-retirement financial circumstances with a biennial telephone survey. The most recent survey contacted 804 households. A number of the survey responses regarding plans

for retirement are consistent with what we observe. Only 11 percent of retired respondents, for example, 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 four percent planned to never draw down savings because they wanted to pass assets to their heirs. When asked about risks that they were concerned about, 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 indicated 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 results provide some suggestion for the range of risks that retirement-age households are trying to insure against. The results also suggest that most households are trying to simultaneously deal with multiple sources of risk, and that they may be pursuing several different late-life financial planning strategies to confront these various risks. Choices under such circumstances may depend on the range of public and private insurance options available to address these risks.

The complexity of financial options in retirement, as well as during the asset accumulation period, is one reason that default options have gained such traction in many areas of retirement planning. Default contribution rates and asset allocations in 401(k) plans have important effects on participant behavior. A number of recent proposals have called for annuity defaults or for mandatory annuitization of balances in 401(k) and other defined contribution plans. Our findings underscore the heterogeneity in household circumstances at retirement and suggest the difficulties of 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. For some households, the welfare cost of foregoing the capacity to draw on asset stocks in an emergency may exceed the welfare gain from reduced exposure to longevity risk, while for others, insuring against the risk of outliving their resources will take precedence. One approach to recognizing the heterogeneity

of household circumstances would be to condition annuitization proposals or guidelines on household attributes, which might include other financial assets and housing equity. A key research question concerns the welfare effect of changes in the fraction of the household's wealth that is held in annuitized form.

While our analysis suggests a number of unresolved questions concerning late-life financial planning, there are many reasons to expect the importance of household financial choices at retirement to increase in the years ahead. Financial pressures on entitlement programs such as Social Security and Medicare may place a greater share of late-life risks on households, rather than the government, in the coming decades. An increase in the degree of means-testing in these programs would imply a coarser "safety net" for some households, and correspondingly increase the importance of private insurance of all types. If the cost of medical care continues to increase, the relative balance between longevity risk and late-life health care cost risk may shift toward medical outlays. 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.

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Table 1. Balance sheets for households aged 65-69 in 2008					
Asset Category	Percent of Households with Asset	Mean Holding	Share of Total Wealth	Values Conditional on Positive Holding	
				Mean	Median
All Households					
Financial Assets	86.7	132,484	12.6	152,805	25,000
Non-Mortgage Debt	36.2	-3,679	-0.4	10,225	5,000
Home Equity (primary home)	79.8	176,188	16.8	222,546	145,000
Home Equity (second home)	15.8	26,280	2.5	166,423	50,000
Other Real Estate	14.8	69,137	6.6	466,416	125,000
Business Assets	9.7	45,966	4.4	473,289	200,000
Personal Retirement Accounts	52.2	121,137	11.5	231,910	100,000
- IRAs & Keoghs	41.5	75,299	7.2	181,577	80,000
- 401(k)s and Similar Plans	26.1	45,839	4.4	175,670	50,000
Social Security	88.2	341,556	32.6	387,195	351,709
Defined Benefit Pension	42.1	140,176	13.4	332,834	232,492
Non-Annuity Net Worth	90.8	567,496	54.1	626,768	269,800
Net Worth	99.4	1,049,228	100.0	1,056,245	732,866
Single-Person Households					
Financial Assets	82.3	83,082	12.8	100,941	12,000
Non-Mortgage Debt	34.8	-3,042	-0.5	8,734	4,000
Home Equity (primary home)	65.9	107,483	16.6	165,712	110,000
Home Equity (second home)	9.4	7,969	1.2	86,894	20,000
Other Real Estate	8.7	73,361	11.3	845,335	150,000
Business Assets	6.1	18,069	2.8	297,513	100,000
Personal Retirement Accounts	36.4	47,074	7.3	129,148	64,000
- IRAs & Keoghs	27.9	32,206	5.0	115,385	52,000
- 401(k)s and Similar Plans	15.6	14,869	2.3	95,604	30,000
Social Security	86.6	225,842	34.8	260,890	256,051
Defined Benefit Pension	38.0	89,323	13.8	235,059	190,032
Non-Annuity Net Worth	84.4	333,996	51.5	398,690	150,000
Net Worth	99.1	649,161	100.0	655,857	420,494
Married Couples					
Financial Assets	90.3	172,830	12.6	191,419	39,000
Non-Mortgage Debt	37.2	-4,232	-0.3	11,364	5,000
Home Equity (primary home)	91.1	232,300	16.9	256,111	160,000
Home Equity (second home)	21.1	41,235	3.0	195,369	70,000
Other Real Estate	19.8	65,688	4.8	331,062	120,000
Business Assets	12.7	68,750	5.0	542,028	250,000
Personal Retirement Accounts	65.1	181,625	13.2	278,881	122,000
- IRAs & Keoghs	52.5	110,493	8.0	210,295	100,000
- 401(k)s and Similar Plans	34.7	71,132	5.2	204,975	59,600
Social Security	89.6	436,059	31.7	486,901	494,485
Defined Benefit Pension	45.5	181,708	13.2	399,557	272,490
Non-Annuity Net Worth	96.0	758,196	55.1	790,385	385,000
Net Worth	99.6	1,375,963	100.0	1,381,422	1,016,076
Source: Authors' tabulations using Health and Retirement Survey, Wave 9 (2008).					

Table 2: Distribution of Wealth Components for Households Aged 65-69 in 2008 (in 000's)							
Percentile	Financial Assets	PRA Assets	Financial + PRA	Housing Equity	DB Pension	Social Security	Net Worth
All Households							
10	0.0	0.0	0.0	0.0	0.0	0.0	197.0
20	0.3	0.0	0.8	5.0	0.0	154.3	297.3
30	2.0	0.0	5.5	42.0	0.0	214.5	413.6
40	6.0	0.0	20.0	80.0	0.0	267.9	564.0
50	15.0	5.0	52.0	120.0	0.0	315.3	731.1
60	32.0	28.8	104.0	162.0	25.3	379.0	898.4
70	70.0	75.0	195.0	229.5	116.8	463.3	1,146.4
80	145.0	142.0	375.0	349.2	238.5	542.9	1,483.4
90	358.0	347.0	711.0	585.0	468.9	643.1	2,103.0
Single Person Households							
10	0.0	0.0	0.0	0.0	0.0	0.0	157.9
20	0.0	0.0	0.1	0.0	0.0	128.4	210.9
30	0.4	0.0	0.8	0.0	0.0	166.2	266.3
40	1.8	0.0	3.4	25.0	0.0	196.9	337.7
50	5.0	0.0	12.5	60.0	0.0	230.1	414.4
60	13.5	0.0	39.0	100.0	0.0	265.9	534.2
70	34.0	10.1	90.0	150.0	73.4	299.2	695.6
80	79.0	50.0	150.0	204.0	177.1	326.8	906.9
90	240.0	124.0	380.0	392.0	292.2	387.6	1,291.3
Married Households							
10	0.0	0.0	0.3	12.0	0.0	0.0	346.9
20	2.0	0.0	6.0	50.0	0.0	232.1	512.0
30	6.0	0.0	24.0	90.0	0.0	326.0	685.9
40	13.0	10.0	55.5	125.0	0.0	405.6	853.3
50	27.8	35.0	111.6	170.0	0.0	473.9	1,015.3
60	58.0	80.0	190.0	230.0	51.2	521.0	1,242.2
70	107.0	137.0	332.4	300.0	163.7	571.6	1,489.5
80	220.0	260.0	518.0	428.0	324.8	622.0	1,913.7
90	459.2	464.0	878.0	725.0	622.0	711.4	2,582.3
Source: Authors' tabulations using 2008 (Wave 9) Health and Retirement Survey; see Table 1 and text for further description.							

Table 3: Annuity Payout Per \$100.000 Annuity Purchase, Single Life Annuities, 2008

Age of Annuitant	Men		Women	
	Nominal Payout	3% Escalating	Nominal Payout	3% Escalating
AnnuityShopper Prices				
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
Actuarially Fair (Using SSA Data)				
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 data were collected from AnnuityShopper.com website and represent averages of the payout as a fraction of annuity premium for all of the companies offering policies of a particular type. Prices are reported in July 2008 and correspond to price quotes in the few weeks prior to that date.

Figure 1. Median potential annuitizable assets and housing equity, by potential annuitizable asset percentile interval, households age 65 to 69 in 2008

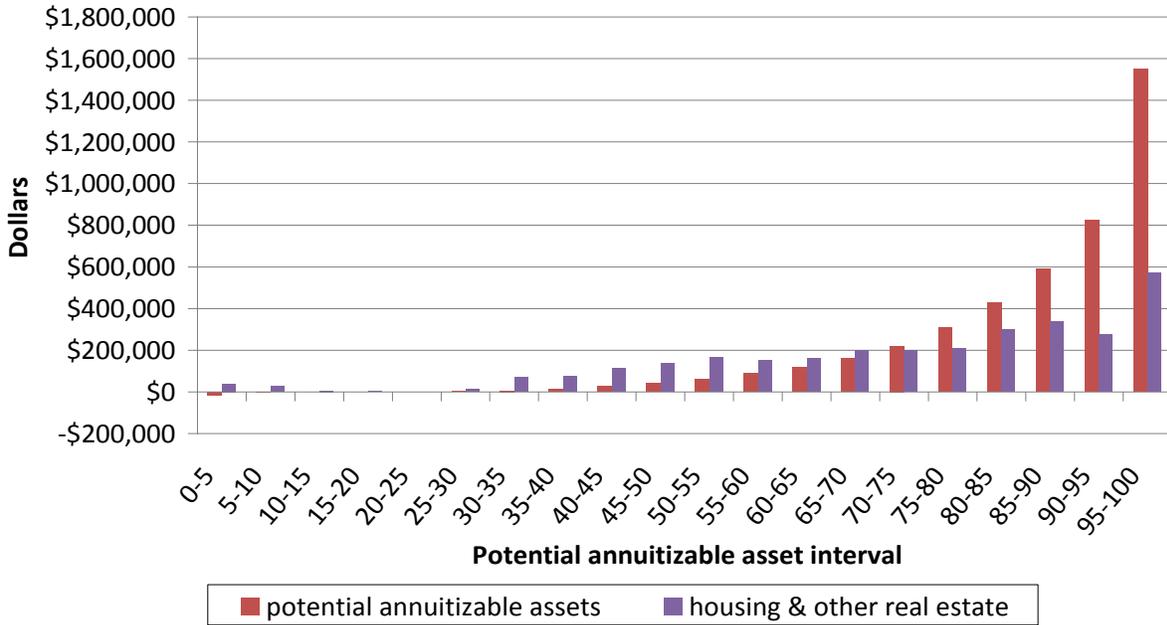


Figure 2. Percentiles of potential annuitizable assets by current annuity wealth decile, households age 65 to 69 in 2008

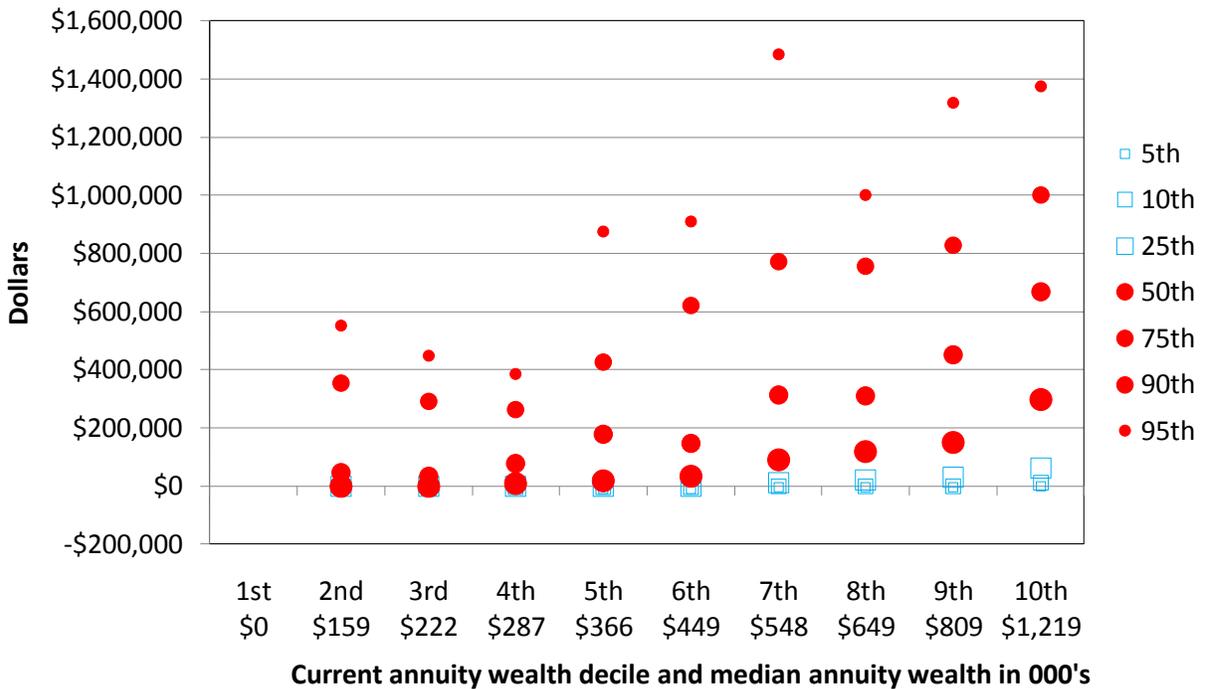


Figure. 3. Median Social Security and DB pension income, by total annuity income percentile, households age 65 to 69 in 2008

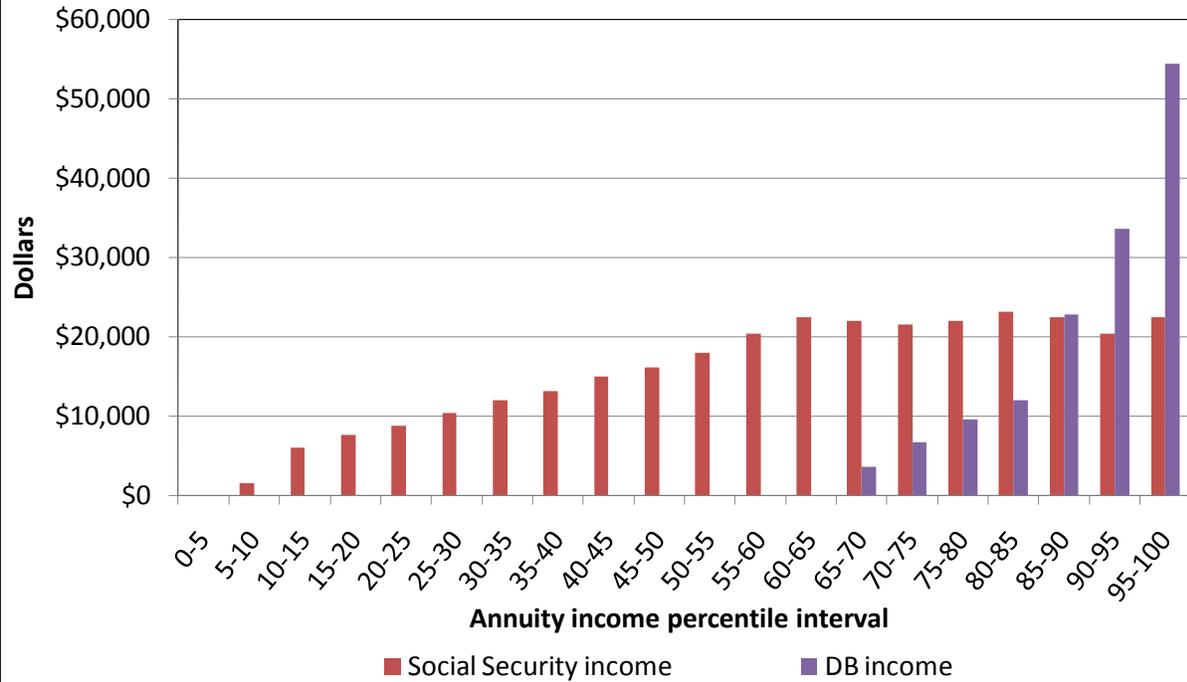


Figure 4. Potential income from annuitizing assets, by decile of potential income, for four current annuity income intervals

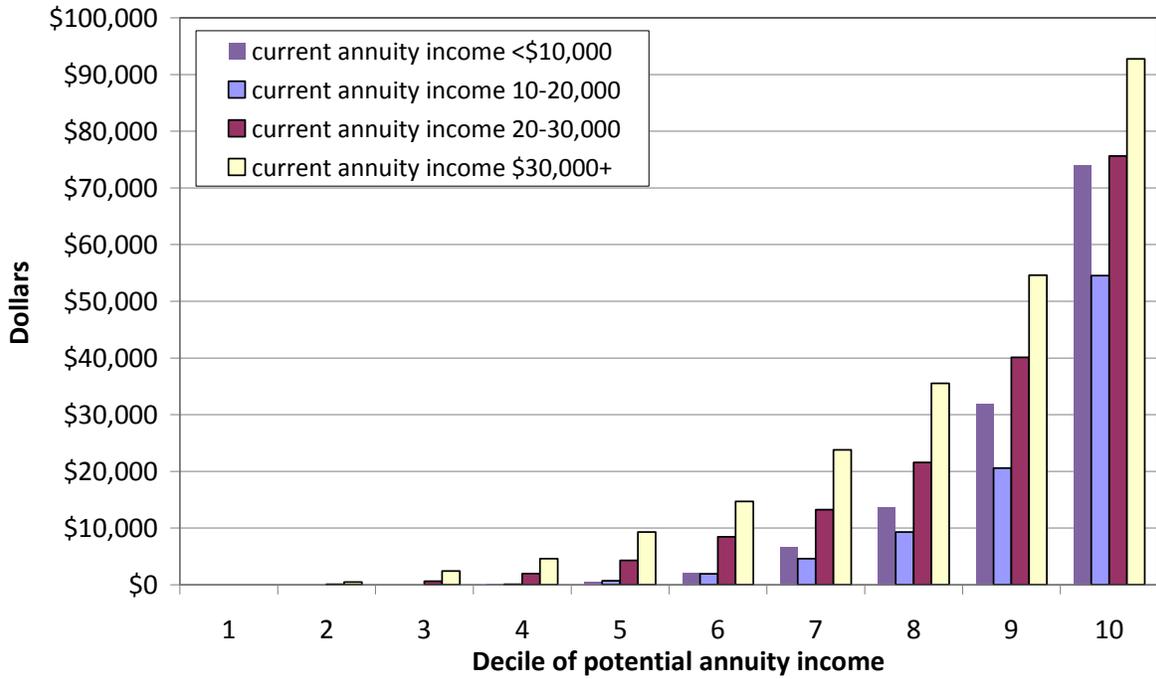


Figure 5. Percentiles of housing equity by current annuity wealth decile

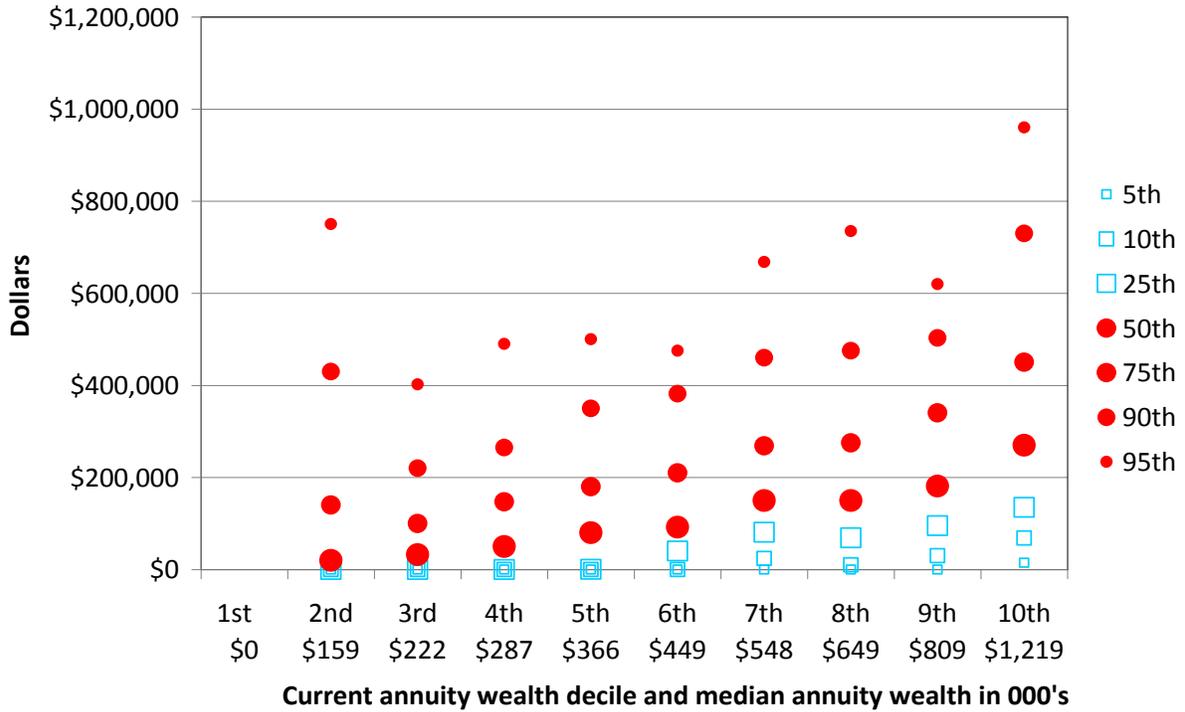


Figure 6. Distribution of potential annuitizable assets and housing equity for households in the 5th and 6th deciles of annuity wealth

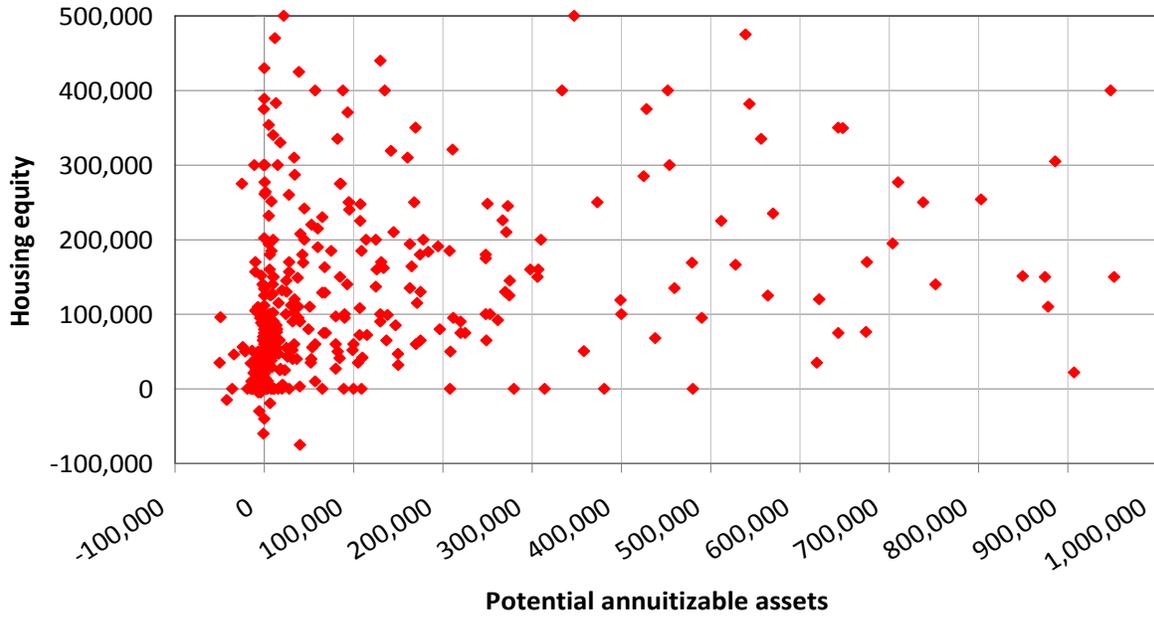


Figure 7. Wave-to-wave changes in median home equity by family status, original HRS cohort (age 51-61 in 1992)

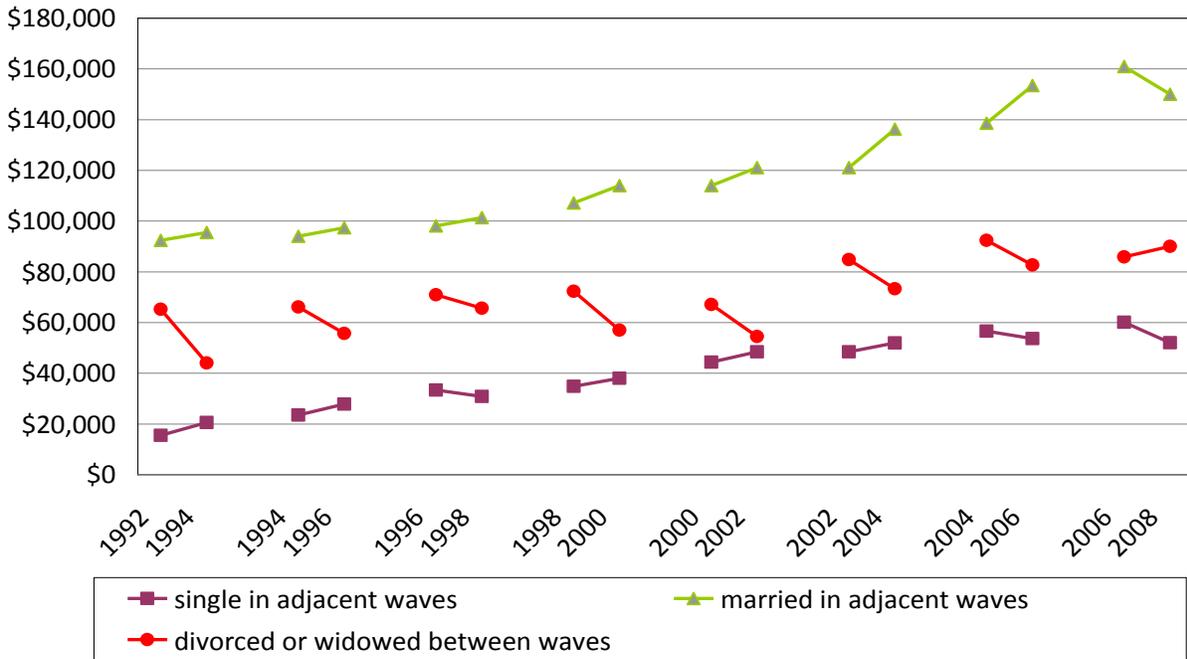


Figure 8. Wave-to-wave changes in home ownership by family status, original HRS cohort (age 51-61 in 1992)

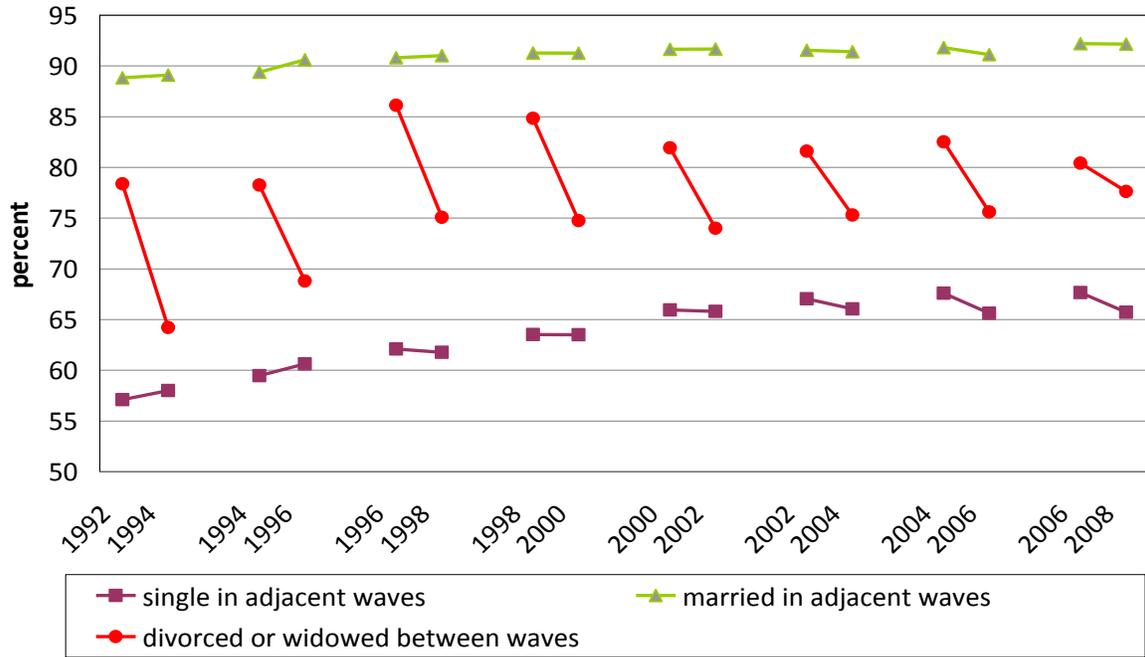


Figure 9. Wave-to-wave changes in median home equity by family status, original AHEAD cohort (age 70+ in 1993)

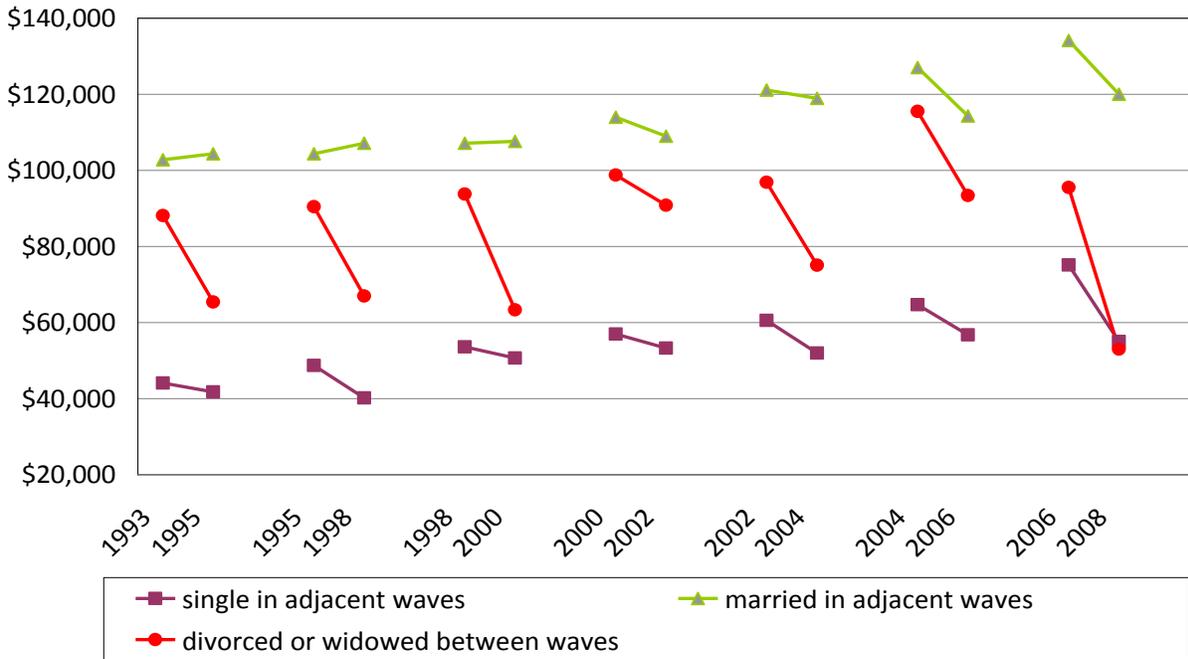


Figure 10. Wave-to-wave changes in home ownership by family status, original AHEAD cohort (age 70+ in 1993)

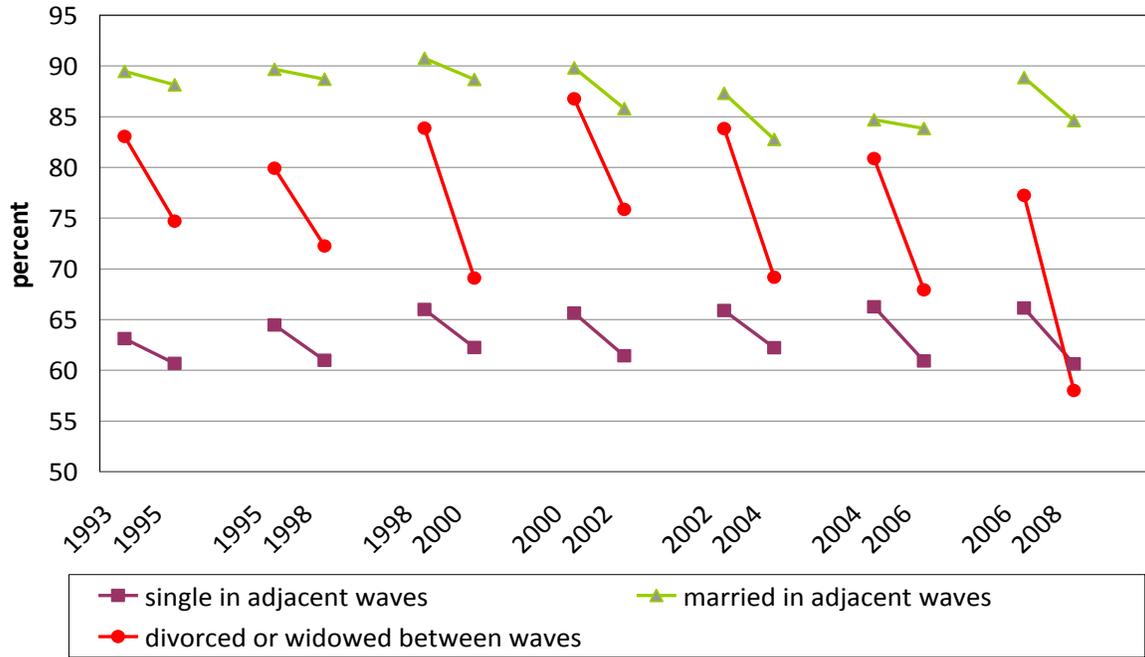


Figure 11. Wave-to-wave changes in median net financial assets by family status, original HRS cohort (age 51-61 in 1992)

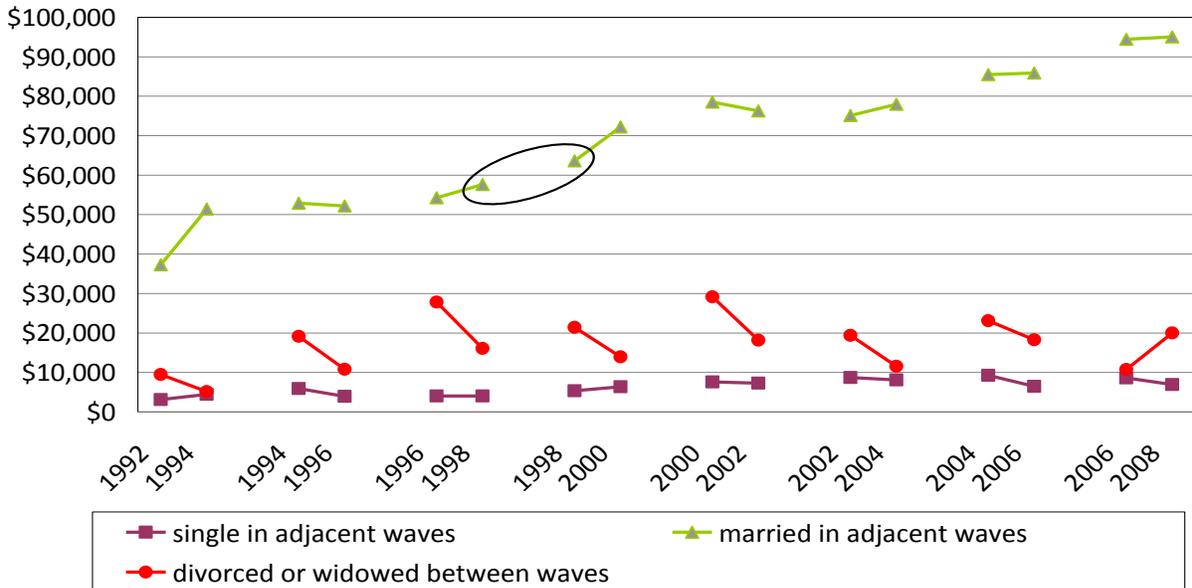


Figure 12. Wave-to-wave changes in median net financial assets by family status, original AHEAD cohort (age 70+ in 1993)

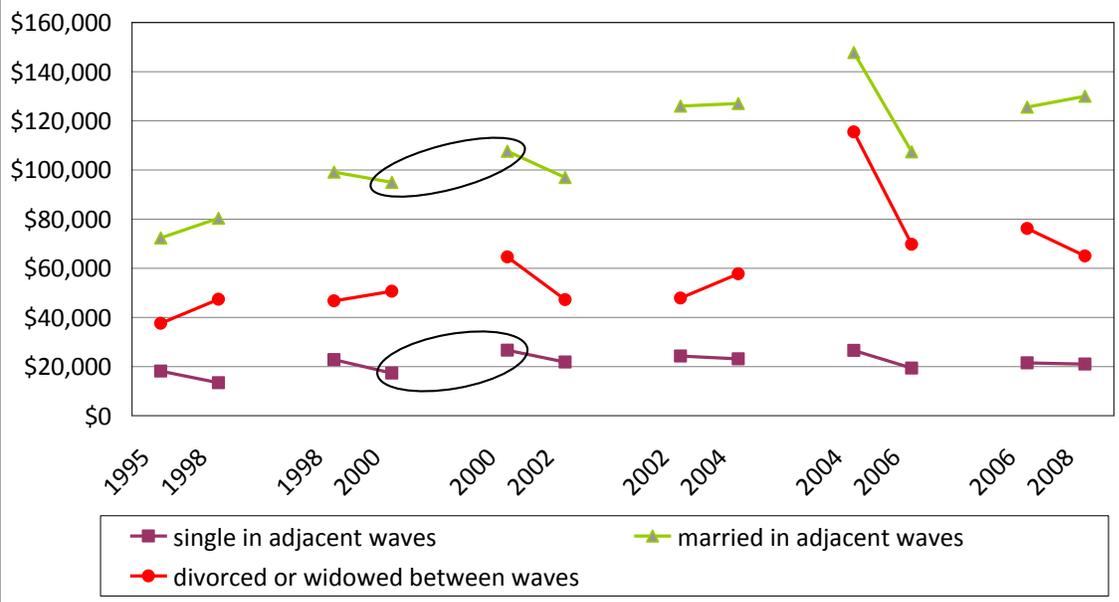


Figure 13. Predicted assets by year, all persons in continuing two-person households, by evolving health quintile for persons age 51-61 in 1992

