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EXPECTED BEQUESTS AND THEIR DISTRIBUTION

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ABSTRACT

Based on a sample of actual bequests that is population-representative and on the subjective probability of bequests, we estimate the distribution of bequests that the older population will make. We find that the distribution is highly skewed, so that the typical baby-boom person will receive a very modest inheritance. This is partly due to the skewed distribution of wealth and partly due to the tendency of the wealthy to have fewer children. But it is also due to anticipated dissaving: we estimate that households in the age band 70-74 will bequeath just 39% of their wealth, consuming the rest before they die.

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INTRODUCTION

Despite the central theoretical role bequests have played in economic models of inter-generational exchange (Yaari, 1965), there remains considerable controversy about their current and future importance. Some argue that bequests are a primary motive for saving (Kotlikoff and Summers, 1981; Juster and Laitner; 1996), that they are an important mechanism for supplying incentives for appropriate care-giving behavior between the elderly and their adult children (Cox, 1987; Bernheim, Shleifer and Summers, 1985), and that they are a central part of the solution to financial problems associated with population aging. In this view the baby-boom generations will eventually receive significant estates from their parents who have benefitted from the stock market boom, alleviating the tax burden necessary to support the older generation. Others argue that bequests have had little direct role as a motivation for private savings, do not facilitate interactions across generations, and that they have had little impact on the well-being of future generations.

Regardless of the economic model that leads to bequeathing behavior, the elderly hold substantial amounts of wealth, and are likely to leave large bequests. For example, Gale and Scholz (1994) estimated that the annual flow of bequests in 1986 was $105 billion. Flows of this magnitude make the study of bequests worthwhile both from the point of view of their possible macroeconomic effects and from the point of view of how they will affect the behavior of the receiving households.

However, our understanding of bequest motives has been limited by problems inherent in measuring the bequests that individuals anticipate making and the bequests that they actually make. One approach has inferred bequest intentions from changes in wealth accumulation with age, especially among older households (Hurd, 1989). Because wealth is observed with error, however, the change in wealth can have very substantial error, making it difficult to base estimation on observed individual-level data. In addition to any contamination due to large measurement error in wealth, unanticipated capital gains at the macro level can cause observed wealth change to differ from anticipated wealth change. A second approach to understanding bequests has been to examine patterns of actual bequests, relying on estate records (David and Menchik, 1985) or on IRS data (Wilhelm, 1996). Even though estate records and IRS data can increase our understanding of the magnitude of bequest flows and of motivations for bequests, they represent bequeathing behavior of the very well-to-do, and are not representative of the general population. Furthermore, they contain limited information about recipients and donors, which impedes the estimation of models of bequests.

In this paper we study bequest behavior in the general population by developing new methods to measure both anticipated bequests and actual bequests. Anticipated bequests have several advantages over studies based on wealth change or on actual bequests. Anticipated bequests are likely to reflect the long-term environment in that they reflect long-term savings objectives. For example they are likely to incorporate long-run rates of return on assets whereas both actual wealth change and actual bequests reflect short-term ex post realizations. Since anticipated bequests are measured in panel surveys, we can also track how intentions to bequeath evolve over time, especially in reaction to the large wealth increases associated with the recent stock market boom.

Our study of actual bequests uses data on the estates of a large, representative sample of decedents. Because these decedents had previously been surveyed, their actual bequests can be compared to their previously stated bequest intentions as well as their prior levels of household wealth.

This paper is divided into four sections. The next section outlines the theoretical model that informs our thinking about bequests. Section 2 has information about the data and the variables constructed from those data. Our research is based on unique data from several waves of the Health and Retirement Study (HRS) that measure the bequests that households anticipate bequeathing, and the actual bequests that they leave. Section 3 describes our methods for estimating the expected bequests of individuals and households, and the distribution of those estates across potential heirs. The fourth section contains our principal empirical findings concerning the level and distribution of expected bequest across birth cohorts, the expected inheritances to be received by children of these birth cohorts, and the amount of dissaving anticipated by these birth cohorts.

Section 1. Theory

Much of the economic literature on bequests has focused on distinguishing among three prominent motives for bequests: altruistic, strategic and accidental. Altruistic bequests reflect the care individuals have about future generations, particularly their children and grandchildren (Becker, 1981; Mulligan, 1997). There are two main implications of inter-generational altruism for bequests. First, bequests will depend on the relative economic status of succeeding generations: when their economic status is approximately the same bequests will be small. When the older generation is considerably better off, bequests will be large. The second implication is that at the household level the largest bequests should go to the least well-off children.

The strategic motive specifies that bequests are the outcome of an implicit or explicit contract made between the generations. Transfers between the generations represent payments that will be made conditioned on the observed behavior of the other generation (Cox, 1987; Bernheim, Shleifer and Summers, 1985). For example, parents may use the prospect of future bequests to induce their children to provide assistance to them when they are old. Finally, the accidental motive views bequests to be the result of a necessary precaution against the inherent uncertainties associated with the end of life (Yaari, 1965). Individuals would like to have consumed all their assets by their death, but because the date of death is uncertain, they will die with assets and hence leave bequests.

Our goal here is not to posit tests that distinguish among these motives, but rather to develop new methods of measuring the magnitude of total bequests and their distribution. Whatever the motive for bequests, expected bequests of households represent a combination of their assessment of the wealth they may have at each future age, and the probability they will die at each age and bequeath that wealth. Thus, the starting point for expected future bequests involves the shape of the optimal path of household wealth at older ages.

A useful framework to derive the optimal path of household wealth is the life-cycle model of consumption as explicated in Yaari (1965) and Hurd (1989). A typical solution is an equation of motion in marginal utility of consumption

$$(1) \qquad \frac{du_t}{dt} = u_t(h_t + \rho - r) - h_t V_t \qquad for \qquad w_t > 0$$

$$c_t = A_t \qquad for \qquad w_t = 0$$

where u_t = marginal utility of consumption at time t

h_t = mortality risk (mortality hazard)

V_t = marginal utility of bequests at time t.

D the subjective time rate of discount and r the real interest rate (constant and known)

A_t = flow of annuities and w_t bequeathable wealth at time t.

Suppose for the moment that there is no bequest motive, ($V_t = 0$ in (1)). If D > r,

$$\frac{du_t}{dt} > 0 \text{ so that } \frac{dc_t}{dt} < 0 \text{ provided } u(\cdot) \text{ is concave,}$$

and consumption will always decline with age. If r > D and h_t is small as would be the case at young ages

$$\frac{du_t}{dt} < 0$$

and consumption will increase with age. At older ages, however, h_t is approximately exponential so that at some age J

h_τ [illegible] ρ [illegible] r [illegible] 0

and

$\frac{du_t}{dt}$ [illegible] 0

at t = J.

For t ≥ J $\frac{du_t}{dt} > 0$ and $\frac{dc_t}{dt} < 0$

The main implication is that when there is no bequest motive the consumption path will begin to decline at some age following retirement. That age depends on the utility function and mortality risk, but once the consumption path begins to decline it will continue to decline at all greater ages. Because there is no utility associated with bequests, wealth must also decline: if wealth were to increase it would continue to increase at all greater ages so that wealth would be bequeathed with probability 1.0. This cannot be optimal. Based on prior estimation, the path of consumption by single men should begin to decline when they are in their late 60s and of single women at about age 75 (Hurd, 1989). Therefore, we should observe declining wealth at these ages or earlier. Unless annuities are zero, bequeathable wealth will be completely consumed should a household survive to advanced old age, and consumption will equal annuity income after that age. However, because the probability of dying is positive at any age expected bequests will be positive even in the absence of a bequest motive. Bequests will be accidental (Yaari (1965)), but if individuals are sufficiently risk averse, bequests could still be a large fraction of bequeathable wealth.

At sufficiently advanced ages such that individuals plan to dissave, the population will dissave provided on average the anticipations of individuals are realized. In this situation the pure effect of age (or equivalently surviving to another year) on bequest probabilities is unambiguous in a stationary environment. As illustrated in Figure 1, for ages greater than 69 wealth will decline with increasing age and thus expected bequests must decline.[1] For example, should someone survive from 70 to 71 and die at an age equal to life expectancy, their age of death would increase from 85.4 to 85.8, and at the latter age wealth is lower.

In cross-section, greater wealth should be associated with higher anticipated bequests even without a bequest motive: the wealth path in Fig. 1 is shifted out. In panel data, there is no direct relationship between wealth change and anticipated bequests if the observed wealth change is due to anticipated dissaving. In Figure 1 panel wealth change will be positive at ages less than 69 yet the change in anticipated bequests would be negative because life expectancy is approximately 15 years. Both panel wealth changes and bequest changes will be negative at ages greater than 70, but, even at advanced ages, there will be no stable relationship between the change in wealth and the change in bequests in panel. An unanticipated wealth change should change anticipated bequests. For example, an increase in wealth through a stock market expansion should lead to an increase in anticipated bequests.

An explicit bequest motive means that individuals place value on holding wealth, which reduces consumption, causing wealth to decline less rapidly with age. An increase in the bequest

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[1]An increase in life expectancy via an unexpected decrease in mortality risk at all ages will reduce bequests were there no behavioral response to the change in mortality risk: individuals would consume more of their bequeathable wealth before they die. If there is a behavioral response, however, bequests could increase: a decline in mortality risk will flatten the consumption path and reduce initial consumption, causing more wealth to be held against the increased risk of outliving resources. The total effect is ambiguous.

motive, say through the birth of a first grandchild, would flatten the consumption path, and reduce initial consumption further, causing more wealth to be held and expected bequests to increase.

Section 2. Sources of Data

Our research uses a set of companion surveys representative of the cohorts born in 1947 or earlier. These surveys include the Health and Retirement Study (HRS), the Assets and Health Dynamics of the Oldest Old (AHEAD), the Children of the Depression Age (CODA), and the War-Babies Cohort. HRS is a national sample of about 7,600 households with at least one person in the birth cohorts of 1931 through 1941. HRS age-eligible persons were about 51-61 years old at the baseline interview in 1992. The first companion survey, AHEAD, includes 6,052 households with at least one person born in 1923 or earlier; the AHEAD subjects were aged 70 or over at the initial interview in 1993. Two-year follow-ups were conducted for both surveys, and by 1998 four waves of HRS and three waves of AHEAD were completed. In 1998, these surveys were augmented with baseline interviews from the cohorts of 1924-1930 (the CODA cohort with 2,320 households) and 1942-1947 (the War Babies with 2,528 households). We will refer to the collection of all the cohorts in 1998 as HRS98. We organize the research in this paper around the birth cohorts of individuals or of households. That is, a person born between 1924 and 1930 is assigned to that birth cohort no matter which of the HRS98 samples in which he originally appeared. In married households, birth cohort is assigned by randomly selecting the birth cohort of a spouse. All data are appropriately weighted.[2]

Three measures are central to our research: household wealth, anticipated bequests, and actual bequests. Regarding household wealth, HRS asks about house value and mortgage, and about non-housing assets in the following eleven categories; real estate; vehicles; business equity; IRA and Keogh; stocks and mutual funds; checking savings and money market funds; CD's, government savings bonds and treasury bills; other bonds; other assets; and other debt. HRS has adopted several innovative techniques to improve the quality of wealth data and is

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[2]The main weighting is for oversamples. See Juster and Suzman (1995) and Soldo, Hurd, Rodgers and Wallace (1997)

widely regarded as providing one of the better measures of wealth in those household surveys that lack a high-income over-sample (Juster and Smith, 1997).

We derive anticipated bequests from the reports about the subjective probability of leaving a bequest greater than or equal to several target amounts. The basic form of the subjective probability of bequest questions can be illustrated with the initial question asked about a $10,000 target. "Using a number between 0 and 100 what are the chances that you will leave an inheritance of at least $10,000?" Respondents had previously been instructed to interpret 0 as absolutely no chance and 100 as absolutely certain. If the answer was 31 or more, the question was repeated but with a target of $100,000. If the answer was 0, respondents were then asked the probability of leaving any positive bequest. In the case of a couple, each spouse was asked these questions independently. The subjective probabilities were ascertained for the cohorts in HRS98 and in the preceding waves for HRS and AHEAD, with the exception of the HRS baseline in 1992.

In prior work we have subjected the subjective bequest probabilities to a number of validity checks. They covary strongly with wealth; for example, AHEAD respondents in the top wealth decile report 0.78 to be the average probability of a bequest greater than or equal to $100,000, whereas those in the lowest wealth decile report an average probability of just 0.01 (Smith, 1999a). In panel the subjective bequest probabilities pass a test for stationarity which combines rational expectations with predictive validity for actual bequests (Hurd and Smith, 2001)

Our third central measure is actual bequests and how such bequests are divided among potential heirs. Bequests are inherently difficult to measure in the population and most applied research on inheritances has relied on estate records (David and Menchik, 1985). While valuable, estate data can provide only a limited picture as the great majority of inheritances are below the estate tax thresholds and so do not appear in official estate records. The strategy pursued here relies instead on 771 "exit" interviews. Exit interviews are interviews by proxy of those who died between the first and second wave of the AHEAD survey. The proxy respondent, usually the widow or widower or a child of the deceased, was asked about the value of the estate, to whom the estate was bequeathed and the specific amounts that were received by each heir. These data have the advantage of describing the complete distribution of inheritances in the population, not just those in wills or probate. By linking to the AHEAD wave 1 survey we have detailed information about the deceased during the years prior to their death.

Actual Bequests

Table 1 shows the distribution of the estates of 771 respondents who died between the first and second wave of AHEAD. As would be expected from the unequal distribution of wealth, the distribution of estates is dispersed and highly skewed. One in five of the deceased AHEAD respondents had an estate of no value. The mean estate was $104.5 thousand but the median was much lower, $62.2 thousand. Some respondents leave relatively large estates: 30% are $120,000 or more and 5% are in excess of $300,000. Only 3% of the estates were valued at $600,000 or more, which was the lower limit for estates to be subject to the estate tax. Consequently, estate tax records are extremely incomplete and they give a very distorted picture of bequests and the attributes of households who bequeath. For example, AHEAD deceased respondents left bequests worth more than 73 million dollars, but only one quarter of that value would appear in estate tax files.

One way of testing the quality of exit interview reports is to compare the value of estates with reports of wealth by the deceased in the prior wave of the survey. Absent any significant death related costs, the value of assets reported in the prior wave and the value of estates should be similar. The last three rows of Table 1 provide that comparison by listing both exit interview reports of estate values and household wealth as reported in wave 1 by the AHEAD respondents. When there is no surviving spouse, mean estates values are quite close to AHEAD wave 1 household wealth. However, in married households the estate is quite close to non-housing wealth, suggesting that when there is a surviving spouse the house, which is often jointly owned, is not included in the estate. On average across both types of households wave 1 wealth was $133.7 thousand, and the estates averaged $104.5 thousand.

As shown in Table 2, most financial inheritances are bequeathed to the immediate family. A surviving spouse received at least three quarters of the estate while about one-fourth went to children. At the death of the surviving spouse more than 90% went to children. Consequently, all other beneficiaries were left relatively small amounts of money. Aggregating across all decedents, those outside of the immediate family received only 10% of the total bequests. Among these people, friends received 1% and contributions to charity were relatively modest, about $1,200 per estate.

Table 3 displays the distribution of inheritances received by the children of AHEAD decedents. Most children received nothing from their parents estates. Even when the death involved the last surviving parent, more than 40% of children received nothing. Many other children were left just a few thousand dollars. Still, a reasonable fraction of adult children were bequeathed a significant amount of money. One in every ten children collected $45,000 or more from an estate of their parent and one in every hundred got at least $250,000.

Table 3 understates the amount of inheritances received by children from their parents because one part of the inheritance is always missing. The column labeled "no surviving spouse" includes only the inheritances children received from the last surviving parent ignoring any inheritance they received when the first parent who died. The column labeled "surviving spouse" ignores future inheritances children will receive when their last parent dies. Our methods, which are based on expected bequests, will avoid this undercounting.

Bequest probabilities and wealth

Many of the qualitative conclusions of this paper are based on a comparison of subjective bequest probabilities and household wealth, both averaged over members of birth cohorts. Such comparisons are presented in Table 4. The table shows the percent of persons with wealth at least as large as the $10,000 and $100,000 bequest targets and the average of the subjective probabilities of leaving bequests at or above those two targets.[3] For example, about 88% of people born in 1923 or earlier had wealth at least as large as $10,000; yet, if the subjective bequest probabilities are accurate predictors of actual bequests, just 66% of them will die with bequests of $10,000 or more. Similarly, about 57% of the cohort had wealth of $100,000 or more, but only 38% of them will leave a bequest of $100,000 or more. While the precise numbers vary, at both targets all cohorts reported lower average bequest probabilities than wealth. The implication from these data is that bequests will be less than current wealth; that is,

[3]As explained in the table, for couples wealth is a weighted average of non-housing and of total wealth to amount for the fact that a bequest from one spouse to the other appears not to include housing wealth. Were we to use total wealth, the excess of wealth over bequest probabilities would be even greater.

individuals on average anticipate significant dissaving before they die.

Although the questions about the subjective bequest probabilities do not specify whether the bequest is in constant or current dollars, we believe that most people think in terms of constant purchasing-power dollars. Therefore, we will interpret our results about saving or dissaving to be in real terms. Were we to interpret the responses to be in nominal terms, the real rate of dissaving would be greater.

Table 4 indicates that bequests are likely to grow over time. For example, the proportion of those who anticipate leaving a bequest above $100,000 is 46% among those born between 1942-1947 compared to 38% among those born in 1923 or earlier. Secular increases in the size of estates are not surprising in light of the increases in the lifetime wealth of successive cohorts.

Section 3. Methods for Estimating Household Bequest

In this section, we outline our methods for estimating the expected future bequest of each individual and household and how those bequests are likely be distributed among potential heirs. The data used for these calculations are based on total household wealth and non-housing wealth, the individual responses about bequest probabilities, and the estate divisions as revealed in the AHEAD exit interviews.

From the sequence of bequest probability questions, we can calculate for each individual his or her probability of leaving a bequest of zero and the probability of a bequest in the following bequest intervals: $1-9,999, $10,000-99,999, $100,000 or more.[4]

Then the expected bequests for each individual *i* can be expressed as

$$E(B_i) = \sum E(B_i \mid B \in I_j)\, P_i(B \in I_j) \qquad (2)$$

where $E(B_i \mid B \in I_j)$ is the expected bequest given the bequest is in interval I_j and $P_i(B \in I_j)$ is the probability the bequest is in I_j. The $P_i(B \in I_j)$ are known from individual responses to subjective bequest questions so we need to know only the expected bequest in each bequest interval.

We estimate expected bequests in each bequest interval in two steps. The first step

[4] Some individuals gave partial answers to this sequence. For example, they answer the $10,000 or more question, but do not answer when asked the $100,000 target question. In this case, all we know is the probability of a bequest of $10,000 or more. In our computation of expected bequests, we allow for all possible bequest intervals.

involves deriving the likely distribution of expected bequests in the population without assigning a bequest value to any specific individual. The second step involves the assignment of a specific bequest value from this bequest distribution to individual respondents.

Consider the first step of obtaining the distribution of expected bequests in the population. From the answers to the subjective bequest questions we observe the population average of three probability points of the bequest distribution: $P(B > 0)$, $P(B \geq 10\text{k})$ and $P(B \geq 100\text{k})$. Our basic strategy is to shift to the left the actual wealth distribution of the population until it matches these three probability points of the bequest distribution, while preserving the shape of the wealth distribution. For example, let w_{100} be the point on the wealth distribution such that $P(W \geq w_{100}) = P(B \geq 100\text{k})$. Because the bequest distribution is shifted to the left of the actual wealth distribution, $w_{100} > 100\text{k}$, and the implication is that a person who holds w_{100} in wealth at baseline plans to dissave the fraction $(w_{100} - 100\text{k}) \div w_{100}$ of his wealth before he dies. We then apply the same fractional amount of dissaving to all persons with wealth greater than w_{100} and call the resulting distribution the distribution of anticipated bequests for those bequests $\geq$ 100k. To illustrate, assume that 30% of the population assert that they will leave a bequest greater than 100K while exactly 30% of the population have actual wealth greater than 150K. In this case, 150K-wealth households plan on average to dissave one-third of their wealth, a fraction we apply to all wealth values above 150K to obtain a bequest distribution above 100K. In a similar way, we find w_{10} which satisfies $P(W \geq w_{10}) = P(B \geq 10\text{k})$. Someone with initial wealth of w_{10} plans to dissave a fraction of their initial wealth $(w_{10} - 10\text{k}) \div w_{10}$ before dying.[5]

We now have two population-wide distributions: actual wealth and estimated bequests and we need to assign a specific bequest value to each individual. For each of the bequest intervals for which an individual has a positive probability of leaving a bequest, we assigned a bequest that depends on his bequest probabilities and on his actual wealth. The bequest value assigned in an interval will be at the same percentile in the bequest distribution for that interval as that person's actual wealth percentile where the actual wealth distribution is taken over those with a positive bequest probability in that interval. Among those with positive probabilities of

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[5]Because $(w_{100} - 100\text{k}) \div w_{100}$ is unlikely to be the same as $(w_{10} - 10\text{k}) \div w_{10}$, neither $(w_{100} - 100\text{k}) \div w_{100}$ nor $(w_{10} - 10\text{k}) \div w_{10}$ can be applied to all of the wealth observations between w_{10} and w_{100}. Rather we apply a linear interpolation to the amount of the shift that will be applied to the points between w_{10} and w_{100}.

bequests in any interval, the ranking of bequests will be exactly the same as the ranking of actual wealth.

Consider, for example, the bequest interval, \$10,000-\$99,999. We selected a sample of people with positive probabilities of bequests lying in that interval and then ordered them by their actual wealth. We have a distribution of bequests that lie between \$10,000 and \$99,999 that are also ordered from lowest to highest value. We make the bequest assignment so that the top wealth percentile persons are assigned the highest bequest values, the next highest wealth percentile persons the next highest bequest values and so on until all assignments are completed. The same procedure is done for the other bequest intervals. Then the expected bequest for each person can be calculated from equation (2) as the sum of B_i P_i where B_i is the within-interval bequest assigned to the individual and P_i is the probability the bequest lies in that interval.

There are two additional issues that arise in married families: how to treat the house when there is a surviving spouse and what to do with the two spousal responses to the subjective bequest questions. The evidence from the data is that housing equity is not counted as part of the bequest when the first spouse dies: as shown in Table 1 the average actual bequest was the same as average non-housing wealth when there was a surviving spouse, while the average actual bequest was approximately equal to total household wealth when the last surviving spouse died. Consequently, for married individuals, the procedure for assigning a bequest value in each interval was followed twice, once using total household wealth and once using total non-housing wealth. The bequest values obtained from the non-housing wealth distribution were used when the individual left a surviving spouse while the bequest values from the total wealth distribution were used when the individual was the last spouse to die.

In married families, both spouses were asked about their bequest expectations and they typically gave quite different answers. We interpret the answer to the expected bequest of each spouse to be the expected value of the estate at the time of that spouse's death. Assume for the moment that the probability that the husband dies before the wife is approximately 1.0. Then his answer to the subjective bequest questions reflects his expected bequest of total non-housing assets at the time of his death while his wife's answer reflects her expected bequests of total household wealth upon her subsequent death. This interpretation takes into account any dissaving between the time the husband dies and the time the wife dies: reporting by the wife has information about that dissaving.

In the more usual case, the husband will die before the wife with a probability that we can calculate from standard life-tables. The details of those calculates are shown in the Appendix.

The expected bequest of each spouse can be expressed as an average of the death-weighted probabilities of leaving a bequest if that spouse dies first and if that spouse dies last. For example, the husband's expected bequest is $P_a(h) \times E(B_h \mid \text{husband dies first}) + (1 - P_a(h)) \times E(B_h \mid \text{husband dies second})$.[6]

We also distinguish between bequests made by an individual to which the preceding discussion pertains, and bequests made by the household making sure not to double-count bequests made by one spouse to the other. Household bequests are those made to persons or institutions outside of the household, and exclude bequests made from one spouse to the other. Let $f(s_h)$ be the fraction of the estate bequeathed to the wife by the husband and $f(s_w)$ the share of the estate bequeathed to the husband by the wife. Then, the expected bequest by a married household to persons or institutions outside of the household is

$$(1- f(s_h))\, P_a(h) \times \mathrm{E}(B_h \mid \text{husband dies first}) + (1 - P_a(h)) \times \mathrm{E}(B_h \mid \text{husband dies second})$$
$$+ (1-f(s_w))\,(1 - P_a(h)) \times \mathrm{E}(B_w \mid \text{wife dies first}) + P_a(h) \times \mathrm{E}(B_w \mid \text{wife dies second}).$$

To allocate an expected bequest by a household among its heirs we need to estimate how estates are divided. To obtain these rules, we used the exit interviews available from the 771 AHEAD decedents who died between the first and second wave of the survey. We computed shares of estates given to the following categories of heirs: surviving spouses, children and grandchildren, siblings, other relatives, friends, and charity. These shares were computed

[6] To distinguish between the first and second bequest among couples with no housing requires an assumption about the differential rate of wealth depletion before and after the death of the first spouse. We assume that annual rate of wealth depletion of the surviving spouse is the same as that observed for currently non-married households. Therefore, $\mathrm{E}(B_h \mid \text{dies second}) = s_w\, \mathrm{E}(B_h \mid \text{husband dies first})\,(1- \$ \times \mathrm{E}\,(\text{YrsLife}))$ where s_w is the share of the husband's estate left to his wife when he dies first, E (YrsLife) is the expected remaining years of life of the wife at the time of her husband's death, and $\$$ is the annual rate at which wealth is depleted after the husband's death until the final bequest of the wife. $\$$ is actually a vector of coefficients that vary by age and are estimated by comparing current wealth and expected bequests among the sample of currently single households. Using the sample of non-married households, $\$$ is computed as $(W(t)-E(B))/(W(t) \times E(YrsLife))$ where $W(t)$ is current household wealth and $E(B)$ expected bequests. A separate estimate is obtained for age brackets 50-50, 60-69, 70-75, 76-79, 80-85, and 85+. Using this relationship, we distinguish between the first and second bequest.

separately by whether there was a surviving spouse, whether there were surviving children, and by sex of the decedent.

For example, let $f(c)$ be the fraction of estate that is bequeathed to children. We allow this fraction to vary by the sex of the donor and by whether there is a surviving spouse and by whether there are any surviving children. Then in married families, the expected value of estates that goes to children can be expressed as

$$f(c_1)\, P_a(h) \times E(B_h \mid \text{husband dies first}) + f(c_2)\,(1 - P_a(h)) \times E(B_h \mid \text{husband dies second}) + f(c_3)\,(1 - P_a(h)) \times E(B_w \mid \text{wife dies first}) + f(c_4)\, P_a(h) \times E(B_w \mid \text{wife dies second}).$$

The index c_1 through c_4 indicates the fraction of total estate going to children when (1) by the husband when he died first, (2) by the husband when he died second, (3) by the wife when she died first (3), and by the wife when she died last.

In this formulation, children receive bequests from their parents in two stages. The first stage involves the bequest received upon the death of the first parent and the second the additional bequests received when the last parent dies. Our computation of expected bequests includes both stages and allows bequests to vary by whether the mother or father dies first.

Section 4- Expected Bequests and Their Distribution

In this section, we summarize our principal findings organized around the following topics: cohort levels of expected bequests, the division of expected estates among heirs, the extent of dissaving that will take place at older ages, and the response of bequest intentions to unanticipated wealth increases.

4.1 Expected Bequests by Cohort

With the assumptions outlined in section 3, we can calculate expected bequests of individuals in the HRS98 cohorts. Table 5 shows our estimates of the means and medians of expected bequests along with the means and medians of household wealth.[7] The medians of expected bequests are considerably lower than their means. Such inequality is not surprising given the dispersion and skew in household wealth, but bequest inequality is greater than wealth

[7] By our interpretation of the bequest probabilities, the values are all in 1998 dollars.

inequality particularly in the older cohorts. For example the ratio of the median to the mean among the cohort born in 1923 or earlier is 0.45 in wealth, but just 0.26 in bequests.

Median expected bequests increase steadily across birth cohorts until the median bequest among those born between 1942-1947 is about $100,000, more than twice the median bequest of those born in 1923 or earlier. While the median expected bequest increases across birth cohort, median household wealth reaches its cross-sectional peak among those born between 1931-1941. Even though the cohort of 1942-1947 has less current wealth than the older cohort, they believe they will leave larger bequests. The implication is that younger cohorts anticipate that their wealth will continue to grow, so that by the time they are the same age as the 1931-1941 cohort they will have higher wealth. Anticipated growth in wealth is reasonable in that the youngest cohort was 51-56 in the 1998 HRS interview, and has a number of years of future earnings. This indicates that in answering questions about expected bequests individuals are quite forward looking in that they do not base their responses on current wealth levels alone.

Our estimated mean expected bequest by the AHEAD cohort (about $181,000) is more than twice as large as that obtained in the AHEAD exit interview for decedents as shown in Table 1 ($94.5). There are several reasons for this difference. First, even at the baseline interview, survivors had higher household wealth than the AHEAD exit-interview decedents and for this reason alone they should bequeath larger amounts. Second and more important, due to the sharp run up in the stock market, AHEAD survivors experienced a very large wealth increment between the first and third wave of the survey.   Apparently, a sizable fraction of this new wealth will be bequeathed to their heirs, a subject to which we turn below.

4.2 Division of Estates

We applied the division patterns shown in Table 2 to the individual expected bequests discussed in the previous section to estimate bequests by the household. Table 6 shows mean and median values of three concepts; household wealth, expected household bequests to all those outside of the household including children, and expected total bequests to all children.[8]

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[8]The wealth and expected bequests in Table 6 differ from those in Table 5 in two ways. First, the unit of observation is the household rather than the individual so that household weights are used. Second, the expected bequests in Table 6 excludes bequests from one spouse to another whereas Table 5 includes bequests to a surviving

The cohort patterns of wealth and expected bequests are similar to the individual level analysis in Table 5.[9] Household wealth reaches a maximum with the cohort of 1931-1941, but then drops by about 25% for the cohort of 1942-1947. Yet total mean expected bequests are about the same for both cohorts and the median expected household bequest rises uniformly across cohorts. Our explanation is that the younger cohort which was 51-56 in the HRS98 interview anticipates additional saving and wealth accumulation before they begin to dissave.

Expected bequests to children are composed of bequests at the death of one spouse and bequests at the eventual death of the surviving spouse. Even though just 22% of the bequest at the death of the first spouse was given to children (Table 2), about 80% of all estates are eventually bequeathed to children. Following the pattern of bequests, there is a strong secular rise in the value of estates left to children, especially for median values. The median value of bequests to children of the oldest cohort is about 22 thousand dollars and increases to 61 thousand dollars to children of the youngest cohort. The inequality in total bequests to children is greater than in total bequests which in turn exceeds the dispersion in household wealth.

The inheritance by a child depends on the estate bequeathed to the children of the decedent, on how an estate is divided among the children in the family, and on the number of children. Consistent with other findings, the dominant pattern in the AHEAD exit interviews is that parents give equal financial inheritances to their children: in multiple child families each child was bequeathed the same amount in 81% of cases (not shown). Therefore in our estimates of future inheritances by each child, we assume equal distribution of the total estimated amount that was bequeathed to children.

Children with more siblings will receive a smaller bequest for two reasons. First, wealthier families have fewer children; second, the smaller estates of larger families are divided among more children. For example, in the AHEAD wave 2 exit interview, families with two children had average estates of $121,000. Of this amount $60,000 went to the children, so that each of the two children received $30,000. In families with five children, the total estate was

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spouse as part of the expected bequests by an individual.

[9]Wealth levels are lower since individuals who comprise married couples are wealthier than single individuals. These married individuals receive less weight at the household level than at the individual level.

only worth about $65,000 of which $27,500 went to children, so that each of the five children received only $6,700. This pattern of lower bequests per child in large families implies that distribution of bequests among children will be more unequally distributed than bequests are themselves.

Table 7 shows the distribution of expected inheritances per child. About one in five children will receive no inheritance and most will receive rather modest amounts. For example, while the mean inheritance per child is almost fifty thousand dollars, we estimate that the typical child of a member of the AHEAD cohort will ultimately receive only about eight thousand dollars. However, one in every ten children will eventually receive more than $111,000, while one in twenty will get at least $191,000.

Children of more recent cohorts will tend to receive larger bequests for two reasons: estate values will increase in size and the average number of children will decline. As shown in Table 6 median expected bequests to children increase monotonically with recency of cohort. Furthermore, family size reached a maximum in the 1931-1941 cohort. Taken together these factors lead to a median inheritance by the children of the youngest cohort of $19.2 thousand, more than double the median of the children of the oldest cohorts.

Nineteen thousands dollars is still a modest sum, the flow from which can only finance small additional consumption flows over a lifetime. In spite of the large secular increases in estate values and in the amount of resources transferred at death, most adult children of parents of the generations 1947 and earlier can not expect to receive much help from their parents in the form of inheritances. As far as the distribution of inheritances is concerned, we estimate that inheritances by children will become more unequal in the future than they were in the past. The top five percent of children of those born between 1942-1947 will get over $380,000, double the amounts received by the children of the pre 1924 cohorts.

4.3 Do Households Dissave during Old Age?

Whether the elderly will dissave during later life is one of the most controversial issues regarding household savings behavior. In part, this controversy is about establishing which economic theory is most consistent with the data because the prediction that they do in fact dissave is a central implication of the pure life cycle model. But there are other important reasons for wanting to know whether the elderly dissave. If they do dissave, their ownership of economic resources will decline with age and, should they survive to advanced old age, they may be poor. Because the elderly own substantial amounts of assets, dissaving by them could reduce the national household saving rate, a particular concern given their growing numbers.

There are several reasons why the dispute continues over what should be a simple empirical fact. The limited evidence available from repeated cross-sectional surveys are often contaminated by the presence of strong cohort effects which cause a negative age-wealth profile at older ages. Mortality selection bias will further distort the life-cycle, age-wealth relationship. Until recently, our available panel samples of older households were also limited and measures of wealth change contained substantial measurement error. Finally, both cross-sectional and panel data on changes in wealth with age can be dominated by strong year effects such as that due to a stock market increase or decline. Because our measure of dissaving is based on what households intend to do over their remaining lives, it is in principle free of many of these problems.

We use the subjective bequest probabilities to estimate future saving intentions. Our index of saving intentions is

$$S(t) = E(B_0) \div W(t)$$

where $W(t)$ is current household wealth and $E(B_0)$ is the expected present value of bequests to those outside the household. That is, $S(t)$ is the fraction of current wealth that the household anticipates not consuming. For single households, the expected bequest to those outside the household is the same as the expected bequest, while for married households it is a weighted average of the bequests by each spouse to those outside of the household as discussed earlier.

If we compare expected discounted bequests to actual wealth holdings of a cohort, we have an indicator of whether the cohort intends to build up its wealth in the future or to draw down its wealth.[10] If $S(t)$ is greater than one, cohorts anticipate saving before they die and if $S(t)$ equals zero, cohorts will eventually dissave (consume) all their current wealth. The life-cycle model implies that households should dissave if they live to a sufficiently old age.

As shown in Table 8, part A, in the youngest age groups the fraction of wealth that will be

[10]Because of measurement error in expected bequests and in wealth, we take the ratio of average bequests to average wealth where the averages are calculated by cohort.

saved (not consumed and therefore bequeathed) is about 37%. This proportion tends to increase with age. Were the anticipated wealth path flat, this result would be expected: at younger ages bequests take place farther in the future and so are smaller in present value. However, according to the life-cycle model, the wealth path should not be flat, so it is not obvious that the fraction saved should increase in age. Simulation of a life-cycle model for single persons as we discuss below does show the same age pattern.

A meaningful comparison across cohorts is further complicated by differences in life expectancy. In Table 8, part B, we have standardized for life expectancy by reporting the average annual rate of dissaving over the remaining expected lifetime of the cohort. HRS respondents anticipate that they will dissave, so all the average annual rates are rates of dissaving. The rates are uniformly greater among singles than among couples, and they also increase sharply in age. It should be noted that the table does not show the rate of dissaving by a cohort when it is any particular age: the rates in Table 8 part B are averages over the rest of lifetime. For example, the 70-74 year-old cohort will dissave at an annual rate of about 4.5% over a period of about 13 years, which is its expected remaining years of life, but we do not know the specific rate of dissaving at, say, 70-74.

The estimated rates of dissaving in Table 8 have implications about future financial markets. Several researchers have speculated about the role of demographics on capital markets (Abel, 2000, Poterba, 1998): as the large baby-boom generations begin to retire and sell their assets, asset prices may begin to decline. A key component of this argument concerns whether retirees will actually desire to decumulate their assets. The subjective probability of bequests indicate that they do anticipate decumulating assets, but that decumulation will not begin in any substantial way until the cohort is in its 70s. At least for the foreseeable future, the fears of large asset price declines base on rapid asset decumulation appear to be exaggerated.

Comparison with the life-cycle model

We ask whether the patterns of wealth decumulation are consistent with the main features of the life-cycle model of consumption. To answer this question, we will simulate the wealth path of a single person aged 70 and compare it with wealth paths generated from a standard life-cycle model. Because the life-cycle model predicts that the rate of wealth decumulation will vary with mortality risk, we need to know the rates of wealth decumulation by age that are implied by the subjective bequest probabilities. From the average annual rates of dissaving by singles, we estimate dissaving rates by age as follows. Among those age 85 or over, we have estimated that the rate of dissaving will be 10.4 percent per year. Among those 80-84 the average rate until the date of death will be 7.4% per year, which is composed of the weighted average of the rate while 80-84 and the average rate while 85 or over. Since we know the latter rate and the average time that 80-84 year-olds will be 80-84 and 85 or over, we can solve for the rate of dissaving among 80-84 year-olds. In a similar way we can find the age-specific dissaving rates among 75-79 year olds and among 70-74 year-olds. These calculations produce annual rates of dissaving of 4.6%, 6.0%, 3.2%, and 10.4% in the age bands 70-74, 75-79, 80-84 and 85 or over.

The life-cycle model we will use for the comparisons is outlined in Section 1, and its features are explicated in Hurd (1989). The utility function is the constant relative risk utility function

$$U(c) = \frac{c^{1-\gamma}}{1-\gamma}$$

The consumption and wealth paths depend on mortality rates, annuities and wealth, and parameters. We take mortality risk from a 1997 life table. The flow of annuities is composed of $8,490 in real annuities (Social Security) and $7,560 in nominal annuities, which are averages among 70-74 year-old singles in the 1998 AHEAD. The nominal annuity produces a real annuity stream that declines by 1.9% per year, the average rate of inflation from 1997 to 1999. We take initial bequeathable wealth to be $191,000, the average among singles in the 70-74 age band. The path of consumption depends on γ which we assume to be 1.12, and on $r - \rho$, the difference between the real rate of interest and the subjective time rate of discount, which we assume to be 0.041. These specific parameters, which were estimated over wealth change data, are taken from Hurd (1989). We assume r to be 0.03, but conduct sensitivity tests below. The marginal utility of bequests, V_t, is a constant α, which we will vary to produce simulations of different intensities of bequest motives.

Figure 2 shows wealth paths produced by the life-cycle model for differing values of α, and the wealth path produced by the rates of wealth decumulation estimated from the subjective bequest probabilities. That curve is labeled “subjective bequests.” The expected present value of bequests is about 39 percent of bequeathable wealth. The curve labeled “no bequest motive” is simulated from the life-cycle model with $\alpha = 0$. Wealth reaches zero at age 93 after which consumption will be financed entirely from annuities.[11] The expected present value of bequests is about 31% of bequeathable wealth. In the framework of the life-cycle model all of these bequests are accidental, so taking the model to be a true representation of desired consumption behavior we would estimate the fraction of wealth that singles desire to bequeath to be ten percent.

The remaining curves in Figure 2 show the wealth paths associated with different values of α, which indexes the intensity of the bequest motive. As shown in equation (1), a bequest motive affects the path of marginal utility via its interaction with mortality risk: large values of α will reduce the effect of mortality risk. Said differently, someone with a bequest motive acts as if mortality risk is smaller than it actually is. Therefore a metric for a bequest motive is the equivalent reduction in mortality risk, which can be translated into a reduction in age through the life table. For example, the curve labeled “alpha = 2.2*10-6" incorporates a bequest motive with a bequest parameter $\alpha = 2.2\times10^{-6}$. For the parameters and interest rate we have assumed, a bequest parameter of this magnitude will initially reduce the effect of mortality risk by about 22%, which is like reducing age by about three years. That is, the bequest parameter makes mortality risk appear to be that of a 67 year-old rather than that of a 70 year-old. Because mortality risk flattens and lowers the consumption path, more wealth will be held and bequeathed. The fraction of wealth expected to be bequeathed is 35%.

Based on data from the Retirement History Survey, Hurd estimated α to be 6×10^{-7} which indicates a weak bequest motive: the effect of mortality risk is reduced by six percent, equivalent to a reduction in age of about one year, and the fraction of wealth bequeathed is just one percentage point greater than when there is no bequest motive. If $\alpha = 4.25\times10^{-6}$ the effect of mortality risk is reduced by 41 percent, which is equivalent to a reduction in age from 70 to 64. The fraction of wealth bequeathed is 40%, slightly larger than the fraction estimated from the wealth curve based on the subjective bequest probabilities. In the context of the life-cycle model

[11] The probability of a 70 year-old surviving to age 92 is about 0.167

desired bequests would be about 10% of bequeathable wealth.

We have done analyses of the sensitivity of these results to the assumption about the rate of interest. Table 9 shows the expected present value of bequests as a percentage of bequeathable wealth. Because the wealth curve estimated from the subjective bequest probabilities does not depend on the interest rate, increases in the interest rate reduce the expected present value of bequests due to higher discounting. In the life-cycle model, the effects resulting from higher discounting are attenuated because of behavioral responses to the higher rates of interest, so that the variation in the fraction of wealth that will be bequeathed is smaller. The results is that higher interest rates narrow the gap between bequests predicted from the subjective bequest probabilities and bequests predicted from the life-cycle model. At an interest rate of 5%, the subjective bequest probabilities predict that about 31% of bequeathable wealth will be bequeathed, and the life-cycle model with no bequest motive predicts about 29%. Thus, desired bequests would be about two percent of bequeathable wealth. At an interest rate of 7%, the bequests percentages are both about 26 percent, so that desired bequests are approximately zero.

4.4 The Elasticity of Expected Bequests to Unanticipated Wealth Increases

The sharp run-up in stock prices during the 1990s has led to considerable interest in estimating the effect on an exogenous increase in wealth on household consumption (the wealth effect on consumption). Most estimates of wealth effects have examined short-run consumption responses to wealth changes (Hurd and Reti, 2001). For reasons such as habit formation, risk aversion, and fixed costs of durable purchases, households may only slowly adjust their consumption to wealth shocks. Thus, short-run estimates will be small compared with long-run estimates (Juster, Lupton, Smith, and Stafford, 2001).

We believe that our data on anticipated bequests provide a good opportunity to estimate the long-run wealth effect. We will use panel changes in wealth and in expected bequests to study the elasticity of bequests with respect to wealth change over a period when stock prices increased at rates considerably greater than they had in the past. Under the assumption that the bulk of the wealth changes were unanticipated, the interpretation of the elasticity will be a wealth effect on bequests, and because the time horizon for bequests is substantial it is natural to interpret the response to be the long-run response. We note that according to the theory in

Section 1, which was supported by our cross-sectional empirical findings, in an equilibrium situation both wealth and bequests will decline in panel. However, unanticipated wealth increases should lead to increases in expected bequests.

Table 10 shows the levels of household wealth, expected discounted bequests, and expected discounted inheritances by children in AHEAD waves 1 and 3. Between the first and third waves household wealth rose by $103 thousand while expected discounted bequests increased by about $53 thousand. Thus about 52% of the wealth increase is expected to be bequeathed, and most of these additional bequests will go to the children of the AHEAD cohort. The elasticity of total bequests evaluated at the averages of wave 1 and wave 3 wealth and bequests is 1.30, which is close to what we find in simulations based on a life-cycle model.[12] Bequests are a superior good in line with the observed relationship between bequests and wealth as well as with the theoretical model (Hurd, 1995). Our estimates in Table 10 imply that older households foresee that eventually they will consume 48% of the between-wave wealth increases, which is considerably greater than the short-run response estimated by Hurd and Reti (2002) and more than twice the intermediate five year response estimated by Juster, Lupton, Smith, and Stafford (2001) .

Conclusions

We have developed and implemented a new method for estimating anticipated bequests. Our estimates are based on actual bequests as ascertained in exit interviews, on the subjective probabilities of bequests, and on current levels of wealth.

We found from the exit interview sample that the great majority of estates are bequeathed to spouses and children, and that on the death of the surviving spouse almost all of the remainder of the estate is given to children. When bequests are made to children, in eighty percent of cases bequests are made equally; that is, all children receive the same inheritance.

We found that younger cohorts will make larger total bequests to their children than older cohorts. For example, the median bequest by those born in 1923 or earlier will be 42 thousand dollars, but the median bequest of the 1942-1947 cohort will be $100,000. Wealth is, of course,

[12] In simulations of a life-cycle model discussed above, we estimate an elasticity of bequests to be 1.21.

unequally distributed, but expected bequests are even more unequally distributed. The increase in inequality can be explained by the life-cycle model augmented with a small bequest motive: those with high wealth will have a small marginal utility of consumption and, accordingly, may continue to accumulate wealth even at advanced ages. Those with moderate or small wealth will have a high marginal utility of consumption and will decumulate wealth with age. The result is increasing wealth dispersion with age and, therefore, increasing bequest dispersion.

Bequests will increase over time because younger cohorts are more wealthy than older cohorts. In spite of the secular increase, however, inheritances received by the typical adult child will be quite modest: less than $20,000 will be bequeathed to the median child of any birth cohort. Inequality in inheritances will expand from the already high levels. For example, we estimate that the 95th percentile point in the distribution of inheritances will be about $190 thousand among th children of the AHEAD cohorts, but it will be about $380 thousand among the children of the War Baby cohort.

By comparing our estimates of future bequests to current levels of household wealth, we are able to provide evidence on a long-standing issue: the amount of dissaving that will take place at older ages. We find unambiguous evidence that households intend to dissave at older ages. We estimate that households in the age band 70-74 will consume about 61% of their current assets, bequeathing the remainder. Intentions to bequeath apparently respond to unanticipated increases in wealth: households expect to bequeath about 53% of a wealth change that can plausibly be characterized as exogenous.

We compared the wealth path implied by the subjective bequest probabilities with a wealth path predicted from a life-cycle model that had been estimated over actual data on wealth change. The pattern of wealth change as a function of age was quite similar as was the fraction of wealth expected to be bequeathed. Because the wealth path based on the bequest probabilities incorporates any bequest motive the respondents may have, we can compare it with a wealth path generated from a life-cycle model of consumption behavior to estimate the magnitude of a bequest motive. As measured in this way a bequest motive causes an additional amount of wealth to be bequeathed that varies from 10% to none whatsoever, depending on the interest rate. Of course a major caveat to these findings is that the life-cycle model has to be correctly specified and estimated. While the model we use has empirical validity in that it was estimated over data on wealth, changes in the parameters would give different quantitative estimates of the effect of a bequest motive.

A straightforward interpretation of our results suggests that mortality risk is a substantial determinant of observed wealth holdings. Subject to rather minor variation associated with the interest rate, the level and pattern of wealth decumulation during the post-retirement period can mainly be explained by a model that only incorporates mortality risk. However, to make expected bequests as predicted by the life-cycle model match exactly expected bequests predicted by the subjective bequest probabilities requires that the life-cycle model be augmented with a bequest motive parameter. For our central case ($r = 0.03$) the bequest motive parameter alters the path of wealth moderately, causing the fraction of wealth bequeathed to increase by ten percentage points. Higher interest rates reduce the fraction of wealth bequeathed, but, of course, we do not know that interest rate a respondent had in mind when answering the questions about the bequest probabilities.

More substantial evidence for a bequest motive comes from the fact that at the death of the first spouse about 22% of the estate of the deceased goes to children. It is not obvious how this behavior can be reconciled with the lack of any bequest motive. Future work will investigate the circumstances of such bequests.

Our exploration of the strength of a bequest motive illustrates the usefulness of the subjective bequest probabilities. We were able to able to estimate a wealth path that was based on data, not on a model. While models are certainly valuable forecasting tools, it is vital to have methods that are independent of them. Other purely data-based methods of forecasting wealth have drawbacks that limit their application. For example, cross-section wealth paths cannot control for cohort effects, and panel wealth paths cannot account for macro shocks. Our methods incorporate cohort differences, and, as we illustrated with the data from AHEAD waves one and three, they can be used to take advantage of macro shocks.

Appendix

Probability one spouse dies while the other is still alive

Let $P_a(h)$ be the probability that the husband dies while the wife is still alive, and consider the calculation for a husband of age J and a wife of age 2. Let t index years beginning from the present date, $t = 0$. The event that the husband dies before the wife can happen by the husband dying in the coming year and the wife surviving that year, or the husband dying in the following year and the wife surviving that year and so forth to the greatest age possible. A life table for men shows the number of males, M_t, that are expected to survive from birth to any given age t, and similarly for the number of females F_t. Then among men who have reached age J, the probability of dying while age J + t is

$$\frac{(M_{\tau+t} - M_{\tau+t+1})}{M_{\tau}}$$

For the husband to die at age J + t while the wife is still alive, the wife must survive to age 2 + t + 1, and the probability of that is

$$\frac{F_{\theta+t+1}}{F_{\theta}},$$

Under the assumption that the deaths of the husband and wife are independent, the probability of the joint event is the product of the probabilities. Then,

$$P_a(h) = \sum_{t=0}^{\infty} \frac{(M_{\tau+t} - M_{\tau+t+1})}{M_{\tau}} \frac{F_{\theta+t+1}}{F_{\theta}},$$

which is the sum of the joint probabilities over all possible ages at which the husband could die. There is a similar calculation for $P_a(w)$, the probability that the wife dies while the husband is still alive.[13] Except for approximations intrinsic in life-table analysis, $P_a(w) = 1 - P_a(h)$.

[13] When men and women were equally likely to die in the same year, we allocated these 'ties' in proportion to expected mortality. That is, if the odds that a male dies first within a year was two-to-one, two-thirds of the ties in a year were assigned to the male dying first.

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Table 1
Distribution of estates (thousands), AHEAD decedents

Percentile	Single	Married	All
10	0.0	0.0	0.0
30	2.0	35.0	20.0
50	40.0	62.5	62.2
70	80.0	168.2	120.0
90	187.6	200.0	200.0
95	250.0	500.0	300.0
98	600.0	600.0	600.0
Mean estate	*82.0*	*117.0*	*104.5*
Wave 1 wealth	*81.6*	*193.7*	*133.7*
Wave 1 non- housing wealth	*42.7*	*108.8*	*73.4*

Table 2
Division of bequests (percent), AHEAD wave 2 exit interview

	characteristics of decedent				
	spouse		no spouse		
bequest targets	children	no children	children	no children	all
spouse	76.1	80.3	0.0	0.0	44.2
children	22.6	0.0	91.7	0.0	45.2
charity	0.2	17.6	0.6	5.5	1.1
siblings	0.2	0.7	0.6	39.1	2.9
other relatives	0.8	1.2	5.4	44.5	5.7
friends	0.0	0.1	1.7	9.6	1.4
other	0.1	0.0	0.1	1.2	0.2
total	100.0	100.0	100.0	100.0	100.0
number of observations	*302*	*17*	*284*	*58*	*661*
wave 1 wealth (1000')	*209.9*	*188.3*	*82.8*	*110.6*	*144.4*

Note: Excludes estates that had no value.

Table 3
Distribution of inheritances (thousands) to the children of the AHEAD wave 2 decedents

Percentile	All	No surviving spouse	Surviving spouse
60.0	0.5	7.8	0.0
80.0	15.6	30.0	5.8
90.0	45.0	65.0	25.0
95.0	90.0	100.0	50.2
99.0	260.0	300.0	250.0
Mean inheritance	*18.6*	*27.7*	*10.4*

Table 4
Percent of respondents with wealth at or above targets and average bequest probabilities

	target			
	$10,000		$100,000	
cohort	adjusted wealth	bequest probability	adjusted wealth	bequest probability
1923 or earlier	88.4	66.2	57.4	38.3
1924-1930	88.2	68.0	57.4	41.0
1931-1941	87.4	70.7	56.2	43.5
1942-1947	85.0	74.6	51.2	46.4

Note: For couples, adjusted wealth is a weighted average of nonhousing wealth and total wealth where the weights are the probability the respondent dies before his or her spouse, and the probability the spouse dies before the respondent. For singles adjusted wealth is total wealth.

Table 5
Wealth and individual expected bequests (thousands, weighted)

Cohort	mean wealth	median wealth	mean bequest	median bequest
1923 or earlier	335.3	150.2	181.0	46.7
1924-1930	342.7	162.5	183.4	58.9
1931-1941	420.3	160.0	291.8	79.6
1942-1947	304.3	134.6	266.7	99.5

Note- Weighted by individual weights

Table 6
Wealth and expected bequests outside of household (thousands, weighted)

	wealth		total expected bequests		expected bequests to children	
Cohort	mean	median	mean	median	mean	median
1923 or earlier	303.6	127.1	165.1	41.5	129.6	21.8
1924-1930	305.8	132.2	182.0	52.3	142.4	29.6
1931-1941	363.9	133.8	256.7	75.9	229.9	48.8
1942-1947	275.6	114.7	252.9	100.0	225.0	61.0

Note: Weighted by household weights

Table 7
Distribution of expected inheritances (thousands per child, weighted)

	Cohort of parents			
Percentile	1923 or earlier	1924-1930	1931-1941	1942-1947
5.0	0.0	0.0	0.0	0.0
10.0	0.0	0.0	0.0	0.0
25.0	0.7	0.5	1.5	2.9
50.0	7.7	7.8	12.1	19.2
75.0	37.1	41.6	52.2	65.1
90.0	111.0	110.9	134.2	186.7
95.0	191.3	195.3	237.0	381.9
Mean inheritance	*47.1*	*44.8*	*69.8*	*86.5*
# of children in family	*2.75*	*3.18*	*3.30*	*2.60*

Table 8
Percent of bequeathable wealth saved and annual rates of dissaving

Age	Singles	Couples	All
A. Percent saved			
50-59	37.2	36.4	36.6
60-69	42.1	41.3	41.8
70-74	40.2	38.1	38.8
75-79	44.5	41.8	43.7
80-84	42.8	46.4	43.7
85+	46.9	52.6	48.5
B. Annual rate of dissaving (percent)			
50-59	2.44	2.28	2.35
60-69	3.16	2.97	3.07
70-74	4.49	4.39	4.47
75-79	5.42	5.33	5.41
80-84	7.37	6.41	7.14
85+	10.39	8.14	9.93

Note: Fraction of wealth saved calculated from the present value of bequests. Based on an interest rate of 3%.

Table 9
Expected present value of bequests: percentage of initial bequeathable wealth

	Interest rate		
Prediction method	3%	5%	7%
Subjective bequest probabilities	38.9	31.4	26.3
Life-cycle model			
No bequest motive	30.6	28.7	26.8
" = 6×10^{-7}	31.6	29.7	27.7
" = 2.2×10^{-6}	35.1	33.0	30.9
" = 4.25×10^{-6}	40.5	38.5	36.3

Table 10
Average household wealth and expected bequests (thousands, weighted)

	wealth	expected discounted bequests	expected discounted bequests to children
AHEAD wave 1	188.1	69.5	50.3
AHEAD wave 3	289.8	122.7	93.3

Bequests discounted at 3% interest rate

Figure 1

Wealth

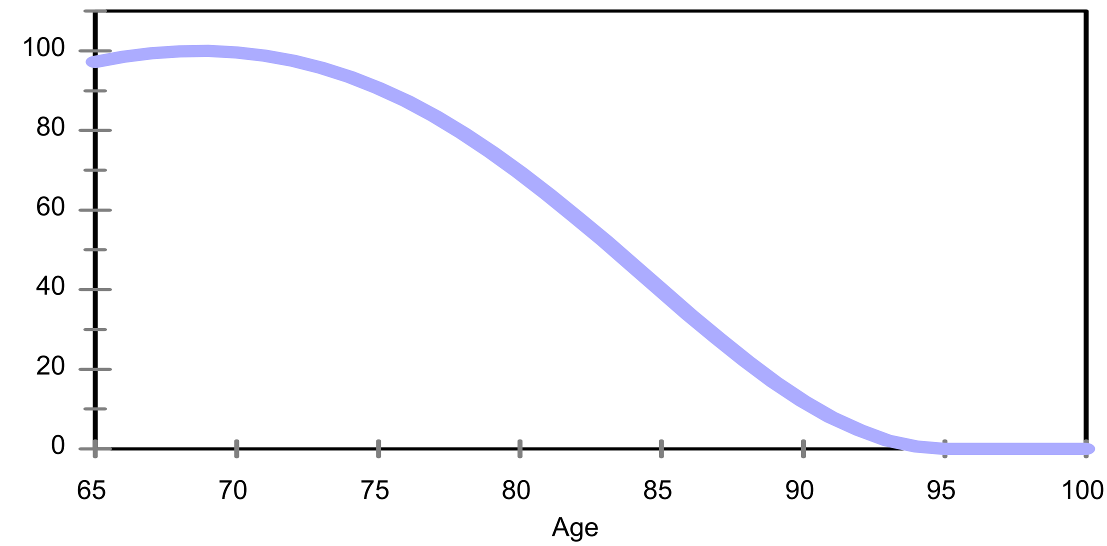

Figure 2

Simulated wealth paths