RAND

Real Wealth Changes from 1982 to 1991 Among the Newly Retired

Michael Hurd and Elaine Reardon

DRU-3012

February 2003

Labor and Population Program

Working Paper Series 03–15

Real Wealth Changes from 1982 to 1991 Among the Newly Retired

Michael Hurd
Elaine Reardon

RAND

February, 2003

Financial support from the Social Security Administration under grant 10 P-98355-9 is gratefully acknowledged

Introduction

Although economic status is typically measured by income, assets can be used to augment consumption following retirement: if holdings of assets are substantial and if the retired elderly finance some of their consumption by decumulating assets, welfare as measured by consumption would be higher than welfare as measured by income. Whether the elderly do decumulate assets (dissave) is, of course, an empirical matter.

The typical elderly household has enough assets that their decumulation can increase consumption considerably, particularly if housing assets are included. For example, in AHEAD wave 1 mean income among singles age 70-74 was $17.0 thousands and mean wealth was $141.6 thousand (Hurd, McFadden and Merrill, 2001). Life expectancy of a 72 year-old female was about 13.9 years, so that if wealth were consumed at a steady rate over those 13.9 years consumption could increase by about 60 percent each year.[1]

The saving behavior of the elderly is important for a number of other reasons. Under the life-cycle model of consumption (LCM) wealth holdings will be at their maximum near retirement, which implies that the elderly as a group should hold a considerable fraction of the assets of the household sector. Therefore, the aggregate household saving rate will depend in an important way on the saving behavior of the elderly: if they dissave, the saving rate of the rest of the population will have to be high for the household saving rate to be even moderate. The economic status of the children of the elderly depends on the saving behavior of their parents: should they not dissave, the children can expect inheritances which may, in turn, affect their own saving behavior. Furthermore, should the elderly have a strong desire to leave bequests (a bequest motive for saving) their time horizon for economic-decision making will be substantial, and that will affect their response to financing of government expenditures by taxation or by borrowing. A bequest motive will affect their response to changes in the economic environment: for example, an increase in Social Security benefits through taxation of the working generation will at least be partly offset by increased bequests.

[1] Of course, this consumption plan would not be optimal. The optimal consumption path under the LCM will be discussed later.

The aim of this paper is to find whether during the 1980s the recently retired consumed at a greater rate than their incomes and hence decumulated assets. It aims to find the characteristics that are associated with different rates of dissaving, and if the variation is consistent with the theoretical predictions of the LCM. It will document outlays associated with the death of a spouse to find the causes of wealth loss at widowhood.

Background

The main organizing idea for the study of consumption and saving among the elderly has been the LCM (Modigliani and Brumberg, 1954). As originally formulated, the LCM specifies that utility derives only from consumption, and that the length of life is known. A condition of lifetime utility maximization is that wealth will decline to zero by the date of death. If the date of death is uncertain, but the maximum age to which anyone can live is fixed and known, wealth must decline to zero at that maximum age. In either case a prediction of the LCM is that at some age wealth will decline with increasing age. The age at which wealth should decline is not known, however, without further information about the form of the lifetime utility function. A typical specification as in Yaari (1965) implies that the age will depend on the real rate of interest, the subjective time rate of discount, ρ, and mortality risk. For example, if $r = 0.03$ and $\rho = 0$ wealth should be declining by the time males reach age 66 and females reach age 74. A reasonable guess would be that the wealth of retired single men would begin to fall by their 60s or possibly earlier, and of retired single women by their early 70s or earlier.

Table 1 shows rates of wealth decumulation from four panel data sets. These results show dissaving after retirement as required by the LCM. Nonetheless, because observed bequests are large, there has been considerable interest in a bequest motive for saving. A bequest motive will increase the saving rate causing the rate of dissaving to be reduced, and it could even cause wealth to increase. Thus, dissaving by the elderly is consistent with the LCM, but it is also consistent with the LCM augmented by a bequest motive, which does not rule out dissaving.

Because the rate of wealth decumulation does not by itself provide any evidence about the importance of a bequest motive for saving, additional information needs to be used to identify its importance. It is reasonable to suppose that parents have a stronger bequest motive than no parents and, therefore, that they will dissave at a lower rate. Then, differences in the rates of dissaving will be a measure of the bequest motive. In the Retirement History Survey (RHS), the rates of dissaving by parents and nonparents are practically the same whether measured in a way that is almost free of functional form restrictions or in a way that imposes a good deal of functional form (Hurd, 1987, 1989a).

Despite these findings there remain considerable gaps in our knowledge of the facts about saving by the elderly, and of the explanation of these facts. In particular, the results given in Table 1 come from particular decades, and all observed rates of dissaving in panel data will depend on macro events of a particular epoch which will affect consumption and ex post saving of all in the panel.

In the RHS, a considerable amount of wealth disappeared at the death of the husband (Hurd and Wise, 1989), often leaving the widow in considerably worse financial situation. We do not know what happened to the wealth, whether it was used for medical expenses, funeral costs, or was bequeathed to children. Its disappearance may provide a partial explanation for the high rates of poverty among widows.

The role of housing as an asset is not well understood, and even the basic facts are in dispute. According to Venti and Wise (1989) the elderly do not reduce ownership or equity as they age. These conclusions are based on the RHS in which the maximum age was 73, so it may be that the respondents in the RHS had not reached an age at which downsizing had begun. However, based on the Study of Asset and Health Dynamics (AHEAD), which includes all ages 70 or over, Venti and Wise (2001) concluded that the elderly do not reduce housing equity as they age. Hurd (forthcoming) estimated housing transition rates in the AHEAD, and based on them he estimated that from an ownership rate of 83 percent at age 70 the rate of home ownership would decline to about 53 percent at age 85. Thus, over 15 years the rate of home ownership in the population would

decline by about 30 percentage points or 2 percentage points per year. Hurd concludes that, as measured by the rate of ownership, housing is decumulated, and because the rates of decumulation are similar to the rates of decumulation of total wealth housing does not appear to be treated any differently from total wealth.

Financial support from children is not frequent when the elderly parents live independently (McGarry and Schoeni, 1995), but the children may provide insurance against asset depletion by offering the opportunity for joint living. Although we have no evidence of its quantitative importance, this opportunity could be the reason parents decumulate assets at about the same rate as nonparents, rather than more slowly as would be predicted by a bequest motive.

In summary, although the LCM has empirical support, there remains considerable doubt about its validity.[2] The importance of establishing its validity comes from the predictions it can make about the response of saving behavior to changes in Social Security, mortality, pensions, and the targets of a bequest such as children. This paper provides empirical evidence that is largely consistent with the LCM.

Theory

We use a life-cycle model of consumption augmented at times with a bequest motive for saving to guide our thinking about wealth change. The life-cycle model of consumption has these features and assumptions: life-time utility is based on time-separable utility from consumption and from bequests (Yaari, 1965); the only uncertainty is date of death; resources are initial bequeathable wealth and a stream of annuities; bequeathable wealth cannot become negative, and, therefore, borrowing against future annuities is not allowed. The model has no provision for the choice of labor, so it is only appropriate for retired persons.

[2]See for example Browning and Lisardi (1996).

These assumptions translate into the following behavioral model for a single person: maximize in the consumption path $\{ c_t \}$ expected lifetime utility

$$\int_0^N u(c_t) e^{-\rho t} a_t dt + \int_0^N V(w_t) e^{-\rho t} m_t dt$$

The first term is expected discounted utility from consumption.

$u(\cdot) =$ the utility flow from consumption;

$\rho =$ the subjective time rate of discount;

$a_t =$ the probability of being alive at t ;

$N =$ the maximum age to which anyone can live ($a_N = 0$)

The second term is the expected discounted utility of bequests:

$V(\cdot) =$ utility from bequests which will depend on potential inheritors such as children in an altruistic model or in a strategic bequest model;

$w_t =$ bequeathable wealth at t ;

$m_t =$ probability of dying at t .

Let $u' > 0,$ becoming arbitrarily large as $c \to 0$, and $u'' < 0.$ Assume that $V' > 0$ and that $V'' < 0$, but that $V'(0)$ is bounded. This is reasonable in that those outside the household have incomes of their own, so that if they receive no bequest they still can consume.

The constraints on the maximization are: w_0 is initial bequeathable wealth which is given; $w_t \geq 0 \quad \forall t$ is the nonnegativity constraint;

(1) $$\frac{dw_t}{dt} = r w_t - c_t + A_t$$

in which $r =$ real interest rate (constant and known), and $A_t =$ flow of annuities at time t .

The nonnegativity constraint on bequeathable wealth can be justified by a legal ban on borrowing against Social Security benefits. In addition, in data very few are observed with negative wealth, and those few tend to have negative wealth as the result of negative business wealth. This is likely to be the result of unanticipated losses rather than

borrowing for consumption purposes. The importance of taking account of the corner solution ($w_t = 0$) is seen from the fraction of single elderly with approximately zero nonhousing wealth. In 1993, about 19% of those aged 70-79 and about 40% of those aged 90-100 had wealth less than $1,000 (AHEAD).

The model places considerable emphasis on annuity income, which is based on the empirical observation of its importance: in 1994, 94 percent of the elderly (65 or over) had some annuity or pension income; 79 percent had more than half of their income from annuities or pensions (Grad, 1996). We take annuities as given exogenously for the simple reason that in the U.S. almost no one has self-purchased annuities.[3]

The solution to the single's problem is:

$$(2) \qquad \frac{du_t}{dt} = u_t(h_t + \rho - r) - h_t V_t \qquad \text{for } w_t > 0$$

$$c_t = A_t \text{ for } w_t = 0$$

and w_t given[4]. Here

u_t = marginal utility of consumption at time t

$h_t = m_t / a_t$ = mortality risk (mortality hazard)

V_t = marginal utility of bequests at time t .

The first order conditions can be written in terms of consumption using $\frac{dc_t}{dt} = \frac{1}{u_{tt}} u_t$.

$$(3) \qquad \frac{d \ln c_t}{dt} = -\frac{1}{\gamma_t}(\rho - r) + \frac{h_t}{\gamma_t}\left(\frac{V_t}{u_t} - 1\right)$$

where $\gamma_t = -c_t u_{tt} / u_t$ is a measure of risk aversion evaluated at c_t .

In this model the strength of a bequest motive is given by the magnitude of V_t . If there is no bequest motive ($V_t = 0$),

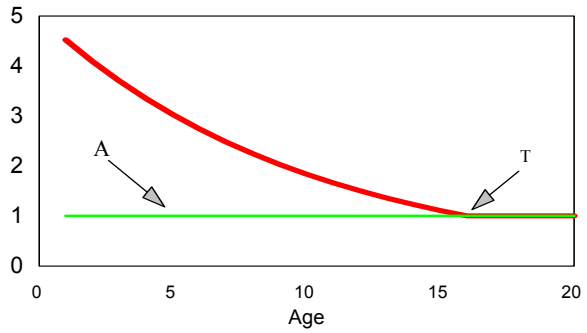
$$(4) \qquad \frac{d \ln c_t}{dt} = -\frac{1}{\gamma_t}(h_t + \rho - r),$$

[3] The high load factor on self-purchases annuities is thought to be substantially responsible (Friedman and Warshawsky, 1988; Hurd, 1990).

[4] See Hurd, 1989, for a derivation.

and this equation will generate the consumption path as long as bequeathable wealth is positive. Because h_t is approximately exponential, consumption will eventually decline even when $\rho < r$, and because of a transversality condition in the solution to the lifetime utility maximization problem, wealth must also decline. At some age bequeathable wealth will have been completely consumed and then $c_t = A_t$ as shown in Figure 1.[5]

Figure 1
Consumption



In principle, equation (3) can be solved along with the equation of motion of wealth (1) and the initial conditions for the consumption path. This path will be a function of initial wealth, the path of annuities, the survivorship curve, the characteristics of potential inheritors operating through V_t and the utility function parameters. From the consumption path the path of wealth is implicitly defined as a function of the same variables and parameters.

When there is a strong bequest motive the slope of the consumption path will be algebraically increased and initial consumption decreased. The rate of wealth decumulation will be reduced, and wealth could even increase with age. Because more wealth is held, bequests will be larger. These are the main implications of a bequest motive.

The model for consumption by couples follows in a straightforward way from the model for singles (Hurd, 1995). Consumption depends on the mortality risk of each spouse,

[5]The figure shows constant annuities, which is the case for most people. In 1994, 77 percent of elderly singles had no private pension or annuity income, while just 10 percent had no Social Security income. Private pensions are typically not indexed formally, but only 12% of elderly singles had 20 percent or more of their income from private pensions (Grad, 1996), and even then some private pensions are partially indexed, if only on an ad hoc basis. For the discussion we will assume that annuities are constant in real terms (but not in the empirical implementation). Even if annuities decline, the theoretical results we will discuss will hold as long as the rate of decline is not too great.

bequeathable wealth, annuities, the interest rate, a bequest motive, and utility function parameters.

Data

The New Beneficiary Survey (NBS) is a survey of individuals who first received Social Security benefits in the period June 1980 to May 1981.[6] These individuals were interviewed in October – December, 1982. In this research we will use data on retired workers and on wives, widows, or divorced wives whose benefit is solely based on their husband's or former husband's earnings record. We use these categories because comparison with population-representative samples such as the Survey of Income and Program Participation (SIPP) and the Asset and Health Dynamics Study (AHEAD) showed that we could approximate important characteristics in the population with the selection. Had we just used the retired-workers sample, our sample would have substantially under-represented women. The categories of beneficiaries were sampled at quite different rates, so we will use weights when we calculate averages over all new beneficiaries. Because the sample is of new beneficiaries it will differ from the population to the extent that the probability of claiming Social Security benefits varies by important characteristics. For example, the NBS has a large number of individuals who reached age 62 in June 1980 to May 1981 because of the high retirement and Social Security claiming rates at that age. More importantly, if wealth encourages early retirement, the sample at age 62 will have above-average wealth compared with the population of all 62 year-olds. The sample selection makes the NBS difficult to use if the objective is to estimate population averages in cross-section.[7] Nonetheless the NBS is a useful data set for studying the newly retired because of its large sample size (18,136) over a narrow age range.

The New Beneficiary Followup (NBF) re-interviewed surviving NBS sample members and surviving spouses of deceased NBS sample members. It was conducted in 1991 and

[6] In addition the NBS has a sample of individuals who were entitled to Medicare in July, 1982 and who had not yet received Social Security benefits.
[7] See Hurd (1990) for a discussion of this and similar points.

achieved a 87.5% response rate among NBS surviving sample members. The NBS and NBF combined is called the New Beneficiary Data System (NBDS). Although it is not precisely representative of the population it is valuable for studying issues such as life cycle saving behavior because the population that it does represent is similar to the entire population and the extent to which the NBDS members follow the life-cycle model will be a good indication of the extent to which the entire population follows that model. Additional features and limitations of the NBDS are discussed in the appendix.

Wealth measurement in NBDS

Wealth is measured in a number of categories which are shown in Appendix Tables 5 and 6. As in all surveys there is considerable item nonresponse in the measurement of wealth. At the first level some respondents do not report whether they own the asset. This is item nonresponse with respect to ownership. Typically such nonresponse is small: for example, in the NBS it was 4.5% for ownership of money market accounts and 0.4% for home ownership. Among owners item nonresponse to the query about value is much greater than about ownership: in the NBS it was about 35% for the value of money market accounts and 11% for the value of the home.

The calculation of net wealth requires summing asset values across a number of asset categories, and so it is necessary to impute ownership and value, given ownership. We devoted considerable effort to the investigation of the quality of the imputations that were on the public use NBS and NBF data files. We became dissatisfied with those imputations both because of the imputation methods that were used and because of the implausibility of some of the imputations. Furthermore, we wanted to base imputations on the same methods that we have used successfully in other data sets. For these reasons we performed our own imputations of the asset items in both the NBS and NBF. Our imputations are longitudinal and the method is predictive mean matching.[8] The method and findings about the imputations are discussed extensively in the Appendix. All of our results reported in this paper are based on these imputations.

[8] Little (1998). This method is also known as "nearest neighbor" (Hoynes, Hurd and Chand, 1998).

Sample selection

We used three sample selection criteria. The first, based on our comparisons with SIPP and AHEAD, was to limit the sample to respondents born between 1914 and 1920 so as to achieve an approximation to the age distribution in the population. The second was to include only observations for which neither the respondent nor the spouse worked after the NBS interview: the LCM does not make firm predictions about asset change for workers. The selection was made on questions in the NBF on work experience since the NBS. The third, necessitated by comparing data in the NBS to the NBF, is to include only observations where either the respondent or spouse survived to the NBF interview. Our final sample size was 5090.

Table 2 has some descriptive statistics about our sample. Our sample was 62-69 in 1982 and 71-78 in 1991. The mean age of our sample is 64 which is due to the high rate of retiring at 62 and to the delay between the selection of the sample and the interview date: on average the delay was two years so that those who retired at 62 would be 64 at the interview. The sample is, however, somewhat young for studying dissaving: according to the estimates in Hurd (1989) consumption would not begin to decline for single women until about age 75. The age at which wealth would begin to decline is uncertain, but it would be earlier.

Wealth change

We will mainly base our analyses of wealth and wealth change on population averages, medians and distributions rather than on individual level changes. The motivation for this strategy is that wealth is observed with considerable error. If the measurement error has a mean of zero then summing over the population in each time period such as $\Sigma w_2 / \Sigma w_1$ will give a good estimate of wealth change from time period 1 to time period 2, whereas averaging over individual rates of change as in $\frac{1}{n}\Sigma(w_2 / w_1)$ will not give a

good estimate.[9] For similar reasons we will compare the median of the wealth distribution in wave 2 to the median of the wealth distribution in wave 1 rather than the median of the individual ratios.

The top line of Table 3 shows mean and median wealth levels and the average annual change from wave 1 to wave 2 for the total sample.[10] These are cross-section wealth levels but calculated over the same households regardless of any change in marital status. We found that using means, households did not dissave over the 1980s, that in fact their wealth grew by 0.75% annually. This is not inconsistent with the life cycle hypothesis, which posits only that at some point households begin to dissave. Under reasonable parameter estimates, this age could be in the 70s. The pattern is different when we use medians as our summary measure. The median declined at a rate of 0.83% per year.

This highlights a result that recurs throughout our analysis: wealth inequality grew over the 1980s. Less wealthy households (whether measured by wealth, education, or other correlates of wealth) dissaved on average while wealthier households accumulated more wealth over the period. While mean wealth was rising, median wealth was falling.

We found the same trends in the means and medians of the wealth components. Non-housing wealth, which at wave 1 was more unequally distributed than housing wealth, increased faster than housing wealth, and the ratio of mean to median increased. Median housing wealth declined by 11.5%. Average wealth in stocks and bonds grew substantially over the period, while business ownership (which makes up the bulk of wealth on other non-housing real property) fell as business owners divested themselves of their businesses.

Trends in ownership are in Table 4. The rate of home ownership fell even as the average net equity among owners increased. This suggests that those with less equity sold their

[9] For some observations w_1 will be very small so that the ratio is very large, dominating the average of the ratios.

[10] In this and other tables we show the annual rate of change calculated as $\ln(w_2/w_1)/8.63$ where w_2 is wave 2 wealth and w_1 is wave 1 wealth. On average there were 8.63 years between the two interviews.

houses causing the average equity among remaining owners to increase. Also, owners may have paid off mortgages increasing home equity or housing prices may have increased relative to the CPI. The overall effect is that the fraction of wealth held in housing by the cohort decreased from 47.3% to 45.8% over the nine years.

The prevalence of ownership of real property, and businesses, farms and professional practices decreased substantially accompanied by a reallocation of assets into stocks. Stock and bond ownership increased by 3.8 percentage points, which represents a relative increase of 14.7%. The value among owners grew by about 4% (real) per year. In that the S&P500 increased by 8.9% (real) per year over this time period, the much smaller increase in the value of stock and bond accounts suggests that either money was taken out of existing accounts or the new accounts were much smaller than the wave 1 accounts.

The rate of ownership of IRAs and KEOGHs declined, most likely because most respondents had reached age 70 ½ when withdrawals must be made from such accounts.

Table 5 shows panel wealth change classified by demographic characteristics. In almost all cases means increased and medians decreased indicating that within demographic groups inequality increased. In wave 1 average wealth varied considerably by education level. For example, those with a college education had 3.42 times as much wealth as those who did not finish high school. Even this gap widened between the waves, however, so that the wealth ratio reached 4.06 in wave 2. Between the waves the wealth of whites increased at a greater rate than the wealth of blacks. Leaving aside the category "other" which is based on just 46 observations, in almost every case whether classified by age, education or race/ethnicity the group with the greatest wealth in wave 1 had the highest growth rate between the waves. The implication is that wealth inequality increased across demographic groups as well as within demographic groups.

Those without children had higher growth in wealth, even though they had lower levels of wealth at wave 1. According to the life-cycle theory of the effects of a bequest motive

on saving, those with a stronger bequest motive should have a larger increase in wealth. This result offers no support for a bequest motive.

Those who owned stocks in wave 1 gained more absolutely than those who did not own stocks, but less in percentage terms. We will study in more detail transitions in stock ownership below.

The obvious conclusion from this table is that those groups with higher levels of wealth in wave 1 had higher rates of growth in wealth between the waves. Inequality in wealth increased. Whether this increase was the result of active saving (refraining from consumption) or the result of passive saving (rates of return on investments) cannot be determined from these data. Of course, there is likely to be a persistent personal taste for saving that results in higher wealth at wave 1 as well as higher rates of accumulation between the waves: those who saved at a high rate in the past are likely to continue to save at a high rate. At the same time, however, those with more wealth tend to invest their portfolios in assets that yielded higher rates of return, so that over a long period of time their wealth will increase at a higher rate.

Table 6 has the distributions of wealth in waves 1 and 2, and it shows directly the change in wealth inequality. All the quantile points below the 50th percentile declined whereas the points at the 75th or above all increased. For example, for someone to have remained at the 95th percentile in the wealth distribution his or her wealth would have increased by 16% in real terms. To have remained at the 25th percentile wealth would have declined by 26%. These tabulations make obvious that changes in the top of the distribution are responsible for the growth in mean wealth. Nonhousing wealth shows the greatest increase in inequality, but there is even an increase in housing wealth inequality. For example, even though the median housing wealth declined by 12 percent, the 90th percentile increased by 19 percent.

As far as the components of nonhousing wealth are concerned, we see increases at the top of the distribution of cash and, especially, of stocks (Table 7). Even the 95th percentile of

the distribution of real property decreased, most likely because of the overall decumulation of real property as shown in Table 3.

The distributions of wealth by change in marital status confirm what prior research has shown. Those who remained married between the waves had higher wealth in wave 1 than those who either were widowed or divorced between the waves, and at the mean their wealth increased (Table 8).[11] Average wealth of those with a marital transition decreased slightly whereas mean wealth of those with no transition increased. The median fell substantially, 19.6%. The wealth of those who were widowed or divorced was greater in wave 2 than those who were single in both waves, so that the new singles increased the wealth of the overall group of singles.

To find the explanation for the decline in wealth at widowing that had been observed in prior research, the NBF administered a module to those who were widowed between the waves. It asked about expenses associated with the death of the spouse. Eighty-five percent of widows or widowers who were asked about expenses were willing to talk about their experiences to interviewers (n=621).[12] Their mean wealth was $144,188 in wave 1 and $142,571 in wave 2, for an annual decrease of 0.13 percent. Their median wealth declined by 2.8 percent annually, from $104,449 to $82,104. Sixty five percent of widows report that their deceased spouses had wills; seventy percent received something from the estate and only five percent report that someone else received more than $1,000.

Prior research has found large wealth drops associated with widowing with the suggestion they may be related to death expenses. In the NBDS, widows spent an average of $7,974 on death expenses.[13] Some of this was spent on the funeral itself ($5,541). In general, out of pocket medical expenses associated with widowhood were

[11] About 2/3 of the transitions from married to single were because of widowing and the remainder because of divorce.

[12] Only 734 were asked about expenses. It is not clear from the documentation why 497 widows or widowers were not asked.

[13] The expenses were incurred at some time between 1982 and 1991. We have inflated them to 1999 dollars so that they are comparable with the wealth numbers in our tables. We assumed that 1987 was the average year for the expense, and hence inflated by the 1999 to 1987 CPI-U ratio (1.47). These costs are similar to costs reported in AHEAD, where they were reported to be about $9,400 (Hurd and Smith, 2001)

low: under $513 on average, including households who paid nothing. Estimated costs only over households that incurred the specific expense were $4844 to hospitals and $4287 to doctors. Home care and other medical expenses (unspecified) were even less common (on the order of 3 percent) and about the same magnitude. Approximately the same fraction had nursing home related out-of-pocket expenses (3.5 percent), but if they did, the costs were high: $22,296. Other death expenses, such as legal fees, probate costs, and inheritance taxes were incurred by 17 percent of the sample and averaged about $10,681 if incurred.

To estimate the effects of widowing on wealth we compare the change in wealth associated with widowing to the change in wealth of couples where there was no widowing. Over the two waves the wealth of couples increased by 7.9% at the mean and decreased by 0.8% at the median. Among widows or widowers wealth decreased by 1.1% at the mean and by 21.4% at the median. Thus widowing is associated with a decrease of about 9.0% of wealth at the mean relative to what would be expected and 20.6% at the median. Costs associated with the death of the spouse were $7,974 at the mean and $5,866 at the median or 5.5% and 5.6% of mean and median wealth respectively. Thus, at the mean death costs were a significant fraction of the unexplained drop. At the median, they are a small fraction most likely because most people had few costs.

We conclude that as in prior research widowing is associated with a decline in wealth relative to the change in the wealth of intact couples. The average expenses associated with the death of the spouse were about $8,000, which is a relatively small fraction of total wealth (about 5.5%). However, the expenses were more than half of the decline, and they were unequally distributed with a small fraction of widows or widowers having large expenses.

Any conclusions about change in economic inequality should take into account retirement income. In the first part of Table 9, households are sorted into retirement income (pension and Social Security income) quartiles according to their position in

wave 1 for the reports of wave 1 wealth averages, and according to their position in wave 2 for the reports of wave 2 wealth averages. For example, average wealth in wave 1 among those in the lowest retirement income quartile in wave 1 was $97.9 thousand and average wealth in wave 2 among those in the lowest retirement income quartile in wave 2 was $85.4 thousand. The results show an increasing disparity in total economic resources in the population: those in the lowest retirement income percentile in wave 2 had less wealth relative to the higher quartiles than did those in wave 1. The pattern is similar whether we consider non-housing wealth or housing wealth.

In the second part of the table households are sorted according to their position in the first wave only. Thus within a retirement income quartile the comparisons are true panel comparisons. We find that mean wealth increased in each of the quartiles, and that with the exception of the lowest quartile, the percentage gain increased with retirement income. The reconciliation of these results with those from the top panels of the table is that between the waves some households lost retirement income and so transited to a lower retirement income quartile. Those households had lower wealth in wave 2. Of course, within a retirement income quartile there are large differences between mean and median wealth (not shown) as we have shown in previous tables.

Table 10 shows wealth and wealth change as a function of home ownership transitions and of stock ownership transitions. Those who moved between the waves had lower wealth initially and greater dissaving than those who did not move. However, as will be seen in the lower part of the table, initial wealth and wealth change are very different according to the transition into or out of home ownership.

Those who rented in both waves were 17% of the sample. They had low wealth, especially at the median, and although average wealth increased the level was so low that the increase could finance very little consumption. Those who owned the same home in both waves had high initial wealth and an increase of about 11.5% in total wealth.

As far as ownership rates are concerned, there was a net outflow from home owning of about 5.2% of the population or a 6.6% net hazard rate out of home ownership.

Those who transited from owning to renting or from renting to owning had large changes in wealth, which indicates that the housing transition was not just a rearranging of their portfolios. The transition from renting to owning was accompanied with an approximate doubling of wealth. An interpretation is that buyers had large windfall gains either in rates of return or possibly an inheritance, and used some of the wealth to purchase housing. The transition from owning to renting was accompanied by a decline in wealth of about 50% indicating that this transition is the result of economic distress.

Similar patterns are shown in stock ownership transitions: those who owned in both waves had much greater wealth than those who did not own in either wave, and they gained about $40,000 between the waves. Those who transited from owning to not owning lost about $53,000 in wealth whereas those who went from not owning to owning gained about $62,000 in total wealth. Those who did not own in either wave, which comprise most of our sample (57%), probably experienced normal or anticipated rates of return on their investments. In that case their wealth paths would have followed a life-cycle path. At the median the wealth of this group decline by 19% or 2.5% per year, which is a rate of decline that has been found in other panel studies of wealth change.

Table 11 shows that, as expected, indicators of poor health increase with age. For example in wave 1, 4.4% of our sample had a limitation in one of the activities of daily living (ADL) whereas in wave 2, 8.7% had a limitation. Functional limitations are listed in the note to the table, and the distribution of those having limitations shifted toward more limitations. The prevalence of disease conditions increased and in some cases increased substantially. For example the percentage that had a cancer almost tripled between the waves. Unfortunately the self-assessed health scale on general health was only asked in the NBF, so no panel comparison is possible.

As has been widely found in the literature, wealth is associated with better health as in wave 1 (Table 12). The change in wealth is generally associated with better health especially at the wealth medians, although the relationship is not always monotonic. The NBF asked whether they had been any large expenses (more than $1000) in any single episode since wave 1. The respondent could choose from a list of types of expenses, and we show several in the table. The table shows that about 17% of our sample had out-of-pocket medical expenses of more than $1,000 in at least one episode, but their wealth level was greater in wave 1 than the rest of the sample, and the rate of wealth increase was not appreciably different from those without these expenses. An implication is that health care expenditures are a normal good, and despite the fact that the wealthier are healthier, they consumed more health care services. Wealth levels and changes in wealth associated with large funeral expenses are similar. Just 1.4% of the sample had large expenses for long-term care, and so the sample size is not adequate to make any reliable statements about wealth levels or change.

Table 13 shows wealth levels and changes associated with other large expenditures or receipts. As far as the expenditures are concerned, we note that those with the expenditures had much greater wealth than those who did not. For example, parents who gave more than $1,000 to a child had about $170,000 more wealth than those who did not. Receiving more than $1,000 from a child is rather infrequent (1.6% of the sample) and it is associated with low wealth and a sharp wealth decline. Both of these findings are in accord with the literature on transfer behavior, and they support altruistic compensatory transfer behavior: intervivos transfers tend to go to those who have fewer resources.[14]

The categorization of health care spending into just two categories (more than $1,000 or less) as in Table 12 is very coarse, and it may obscure changes in wealth associated with health care expenditures. Furthermore it is based on a nine-year recall, which is likely to

[14] Even though we have no data on the economic position of the children this interpretation is likely to be valid: Despite the correlation in economic status across generations, it is likely that wealthy parents have children that are less wealthy than they are and that poor parents have children that are not as poor so that the observed patterns are consistent with compensatory altruistic behavior: transfers flow from the more wealthy to the less wealthy.

introduce considerable observation error. We extended the analysis of the association between health expenses and wealth by using linked Medicare data. Although the Medicare records only show the amount spent by the Medicare system on behalf of each beneficiary, that amount should be related to out-of-pocket expenditures. Thus a classification by Medicare expenditures may be a better classification into high and low out-of-pocket spending than the self-reports as used in Table 12.

The Medicare expenditure data are only available for the retired worker sample, so we first found how the sample differs when it includes only the Retired Worker beneficiaries. We found that the two groups were fairly similar in terms of wealth change over the period (not shown).

From the point of view of the life-cycle model, it is important to distinguish between unexpected health care expenditures that should lead to a drop in wealth, and persistent expected health care expenditures that should be treated like any other expenditure and will not necessarily lead to a decline in wealth.[15] To find whether patterns of spending tended to persist over the years between the waves we divided the period into two sub-periods, 1984-87 and 1988-91. We summed the real annual inpatient and outpatient expenditures over the years in each sub-period for the Retired Worker sample, and categorized respondents into terciles of expenditures (high, medium, low) and no expenditure separately by marital status (recognizing that the expenditures for married couples included both the respondent and spouse). Table 14 shows the transition rates between Medicare spending categories.

A surprisingly large fraction of the sample (17%) had no Medicare spending in the first sub period and about 8% had no spending in either period. The rates of persistence in each spending category are fairly high when there was no change in marital status. For example the transition rate from low to high is 20.3% among intact couples and 21.9%

[15] The tradeoff between consumption across time periods is determined by intertemporal parameters such as the interest rate, the time rate of discount and risk aversion, not by the allocation of expenditures within a time period unless that allocation affects risk aversion. Thus in the constant relative risk aversion utility function, persistent and expected high health care expenditures are financed by reducing spending on other categories of goods, not on consuming more in a time period.

among singles whereas the transition rates from high to high are 46.0% and 47.% respectively. One notable exception is when one spouse dies. Then the transition rate from high to none is 40.1%. A possible explanation is that the spouse died during the first sub-period, incurring high expenses.

Our conclusion from Table 14 is that there is considerable persistence in spending with those having low spending in one sub-period tending to have low spending in the other sub-period. For example, 80.5% of the sample either remained in the same spending category or changed by only one category. Therefore, we expect that over the entire sample there will be only limited association of the level of Medicare spending and a change in wealth.

Table 15 shows that there is some association between Medicare spending category and wealth change at least for some demographic groups. For example, among singles those in the highest spending category had about a five percent decline in average wealth and a 41% decline in median wealth between waves and there is approximately a monotonic relationship between spending category and wealth change. Among couples who were widowed between the waves, those in the highest spending category had greater spending declines that those in the other categories. However, among intact couples there is no relationship between spending category and wealth change.

We conclude that there is some evidence that high Medicare spending is associated with wealth change but that the relationship is not strong. This conclusion is consistent with the view that most spending is either anticipated or relatively small.

Under the life-cycle model the rate of dissaving will be higher among those facing high mortality risk. The NBDS does not have a measure of subjective mortality risk, so we used an estimate of actual mortality risk to explain dissaving. The first step of our method was to regress separately by marital status actual survival from wave 1 to wave 2 on sex, life expectancy, education, whether ever married, wealth and income quartiles. In an additional specification we added wave 1 health conditions and ADL limitations.

These results are shown in Appendix Tables 1 and 2. Of wealth, income and education, only education is a consistent and significant predictor of survival. Many of the disease conditions are strong predictors of survival.

In the second step of our method we used the predicted survival rates to categorize respondents into high, medium, and low likelihood of survival. Then we found wealth change as a function of the predicted survival rate. These results are in Table 16. Among married respondents at the median there is a consistent relationship between the predicted survival rate and dissaving but not at the mean. Among unmarried respondents, we find higher savings rates among those predicted least likely to survive which is not consistent with the life-cycle model. Thus, overall we find no consistent relationship between the rate of dissaving and predicted mortality risk at the individual level. It is still an open question as to whether the NBDS cohort as a whole dissaved at a rate that would be predicted by the LCM.

Comparison of wealth change with life-cycle predictions

Although the life-cycle model predicts dissaving at some age, that age depends on utility function parameters, mortality risk and the rate of interest. Of course, actual wealth change will depend not only on anticipated wealth change, which may be well approximated by the predictions of the life-cycle model, but also on stochastic events such as unusual rates of return on assets and unusual health care expenditures. As we have seen out-of-pocket health care expenditures were apparently not large for many people and even when they were wealth change was not strongly associated with indicators of large health costs. However, wealth increased for those in the upper part of the wealth distribution whereas it declined for those in the lower part of the wealth distribution, which may have been the results of larger-than-expected rates of return on the types of assets held by the well-to-do.

We based our predictions on the model previously estimated over the RHS by Hurd (1989). In that model the determinants of wealth change are bequeathable wealth,

annuities (both real and nominal), mortality risk, the interest rate, and utility function parameters. Our methods was to use for each single person in our data set wave 1 data on these determinants of wealth change to predict wave 2 wealth.

Table 17 shows the actual and predicted mean and median wealth in waves 1 and 2.[16] These are population distributions and therefore show wealth change at the population level. The actual rate of dissaving as measured by the median was about 2.2% per year, and it was almost exactly predicted by the model. The model predicted dissaving for almost all; however, those in the upper part of the wealth distribution saved, and because that group holds most of the wealth, actual mean wealth increased.

In addition to these population simulations, we predicted the wealth path of a representative person. We used median values for the explanatory variables. Figure 1 shows the predicted path of annuities, consumption and wealth, and median actual wealth in wave 2. Initially the annuity flow was $8.3 thousand but declined due to inflation: Based on the observed fraction of annuities that are nominal we assumed that 73% of annuities were real and that 27% were nominal and their real value would decline by 3.83% per year, the geometric average inflation rate over the simulation period. Because $r - r$ was estimated to be 0.041 in Hurd (1989), the path of consumption will increase until mortality risk is approximately 0.041.[17] This happens at about age 75.[18] Initially the change in wealth is approximately zero, but then wealth begins to decline. The model predicts that at age 90 wealth will reach zero, and after that time a survivor would have to leave consume from annuity income. The probability of a 64 year-old surviving to 90 is about 0.20.

At wave 2 when a 64 year-old in 1982 would have been 73, predicted wealth was $39.3 thousand. Actual wave 2 median wealth as shown on the graph was $40.1 thousand. We conclude that the typical saving behavior in the NBDS conformed to the life-cycle model.

[16] Of course, the mean and median of the predicted distribution in wave 1 are the same as the actual because the actual variables were used for each individual in prediction.
[17] This statement is true in the absence of a bequest motive. The estimated bequest motive is so small as not to be noticeable.
[18] The life table is a unisex life table from 1990.

Said differently, the model parameters estimated from the RHS predict well the typical wealth path over the 1980s even though they were fitted to data from the 1970s.

Conclusions

The major objective of this research was to find whether wealth change in the NBDS is consistent with the life-cycle model. As measured at the median we found that wealth declined over the nine years of the NBDS at an annual rate of about 0.8%. While this rate is somewhat lower than has been found in other data sets, the sample is relatively young so that the life-cycle model would not predict rapid dissaving. However, mean wealth increased due to increases in wealth of those with above average wealth in wave 1. A behavioral explanation for the difference between the change in the median and the change in the mean is persistence in saving behavior at the individual level: those who saved at high rates in the past continued to save at high rates over the years of the panel. Because high savers will have more income from assets and are likely to have more income from Social Security and pensions, there will be a positive interaction between saving rates and economic resources with the result that mean wealth increases even as median wealth decreases. However, at some more advanced age even the high savers should begin to dissave, but this is possibly beyond the age observed in the NBDS. Another behavioral explanation is the positive correlation between SES and longevity: those with more wealth believe they will live longer so that under the life-cycle model they will begin to dissave at a relatively advanced age. In a somewhat limited way we tested this hypothesis by classifying people into categories by predicted survival rates, but we found little relationship between predicted survival and the change in wealth. We offer two explanations for the lack of a relationship. First our covariates explain little of observed mortality over the nine years of the NBDS, so our classification mechanism has little power. Second, wealth change should depend on subjective survival, which may differ substantially from our classification. Because of these limitations we believe it is an open question as to the strength of the reaction to survival probabilities.

A third reason for the difference between changes in the median and in the mean of wealth is that the rates of return on assets held by the more wealthy were unusually large. Indeed the S&P500 increased by about 118% in real terms or at an 8.9% annual real rate of return over the period. To the extent that the NBS respondents in wave 1 did not anticipate such large rates of return, they would have under-consumed, causing the rate of wealth change to be larger (algebraically) than it was intended to be. We found some evidence to support this view: Mean wealth increased by about 1.36% per year among those who owned stocks in both the NBS and NBF whereas mean wealth decreased by 0.08% per year among those who owned no stock in either survey. As measured by the medians the differences are even greater: 0.69% and –2.51%. Because those who owned stocks in both waves (about 23% of the sample) had about 3.5 times as much wealth as those who owned no stock in either wave, such an interaction between rates of return and wealth could cause median wealth to decline even as average wealth increased.

As far as the quantitative predictions of the life-cycle model are concerned, our simulations predicted a change in median wealth that is remarkably similar to the actual change in the median. For the reasons we have already discussed, the life-cycle model did not predict well the change in mean wealth.

We found a net reduction in home ownership of 5.7 percentage points which represents a net annual hazard rate out of home owning of 0.84%. Hurd (forthcoming) found an annual net rate of decline of ownership of 0.8% based on AHEAD ages 70-74. These findings provide evidence of housing decumulation as measured by the ownership rate that is broadly consistent with the LCM.

We found little relationship between health care costs and wealth decline. We have two explanations for the lack of a relationship. Out of pocket costs of more than $1000 per episode were infrequent most likely because the population was covered by Medicare for almost all of the years of between the NBS and NBF. As measured by costs covered by Medicare, which we assumed to be an indicator for out of pocket costs, we found persistence in costs at the household level. In that case, even fairly high levels of health

care expenditures would be normal expenditures which would be financed out of a reduction in other goods rather than higher total consumption. Thus wealth would not decline at an above average rate; rather consumption of other goods would be lower.

As in many other studies we found that wealth declined at the death of a spouse. The explanation for the decline is partly found in expenses connected with the death: on average such expenses as funeral costs, medical expenses and legal fees accounted for about half of the decline. Even though in some individual cases the costs associated with the death were probably large and responsible for economic distress, on average the costs were about 5.5% of wealth, which would not appear to be an important factor in any economic decline associated with widowing.

APPENDICES

1. The NBDS

The NBDS has a complete enumeration of asset types and holdings. There is a complete enumeration of income, particularly pension income and Social Security benefits. It has information on other inflows such as transfers from others and inheritances and other outflows such as intervivos transfers (typically to children) and "large" expenditures by category. There are a number of mortality indicators such as age, health status, disease conditions, functional limitations and SES indicators. Except in the case of co-residence the information about family structure is limited to the number and ages of children.

Other covariates or explanatory variables that are useful in understanding wealth change are detailed health conditions (self-assessed health status but only in the NBF, performance measures, disease conditions, and ADL and IADL limitations), an indicator of large (more than $1,000) out-of-pocket medical expenses, work status and earnings, and indicators for dissaving.

The NBF has extensive information about the events surrounding widowhood: health care and funeral costs, income change, bequests, and pension survivorship benefits (ex ante and ex post). The NBDS includes administrative data on Social Security benefits. These are important explanatory variables in the life-cycle model, and in the NBDS they are observed without error. It has summary Medicare data than can proxy for out-of-pocket health care expenses.

The major weakness of the NBDS is that the population represented is not the U.S. population for any age group. It is the population receiving initial Social Security benefits in June, 1980-May, 1981. Thus, the NBS is a choice-based sample, and the characteristics of those who chose Social Security benefits at a particular age are not likely to be the same as those who did not chose benefits. Take, for example, asset levels, and consider the most favorable circumstance for measuring assets in the population: the population is static in the sense that each succeeding cohort reaches retirement age with the same level and distribution of assets as other cohorts. Suppose that those with higher assets retire earlier and take Social Security benefits. Then, asset levels among 62 year-olds in the NBS will be greater than average for their cohort. The rest of the cohort will eventually retire and take benefits, and in the NBS the older new beneficiaries represent the part of the population that did not take benefits at age 62. However the asset levels of the two groups are unlikely to be the same because the older NBS group may have accumulated assets as they aged past 62. For example, the observed asset levels in the NBS among newly retired 65 year-olds will be greater than the current wealth of the 62 year-olds who did not retire and who will eventually retire at 65. That is, the wealth of the NBS retired-worker sample cannot be aggregated across age groups to give average cross-section wealth in the U.S. population.

A further difficulty is differential mortality: those that survive tend to come from higher socio-economic status. Thus, the 65 year-old new beneficiaries may have accumulated assets since they were 62, and, disproportionately, the poorer of their cohort will have died before receiving Social Security benefits.

Notwithstanding these difficulties, the population represented by the NBS does not diverge substantially from the U.S. population. Furthermore, even though some average characteristics may differ, the NBS sample should still follow the life-cycle model if that model is relevant for the population. Thus it is worthwhile to base a study of the relevance of the LCM on the NBDF.

2. Estimation of the probability of survival

Some respondents were missing in wave 2 and it is unclear if they were alive. The results are not substantively different whether we assume they were alive or whether they were dropped from the estimations.

Appendix Table 1
Determinants of the probability of survival, couples
(N=7000)

	Coefficient	Z-statistic	Coefficient	Z-statistic
Intercept	-0.383	-0.823	-0.454	-0.953
Female	0.631	3.856	0.472	2.807
Life Expectancy	0.085	2.593	0.115	3.427
Wealth Quartiles				
Second	0.075	0.859	0.091	1.024
Third	0.124	1.342	0.167	1.768
Highest	0.114	1.142	0.166	1.623
Income Quartiles				
Second	-0.154	-1.747	-0.174	-1.930
Third	-0.222	-2.430	-0.278	-2.972
Highest	-0.037	-0.360	-0.080	-0.765
Year of Education				
9-11	-0.084	-0.966	-0.153	-1.710
12	0.118	1.487	0.050	0.608
12+	0.369	4.139	0.316	3.379
Health Conditions				
Blind			-0.287	-2.762
Eye condition			-0.045	-0.419
Deaf			0.187	2.078
Missing limb			-0.524	-1.341
Arthritis			0.271	4.091
Stiffness			-0.067	-0.799
Nervous sys. disease			-0.455	-2.085
Other paralysis			-0.730	-2.862
Lung			-0.450	-5.309
Diabetes			-0.355	-4.725
Cancer			-0.989	-6.996
Emotional problems			-0.028	-0.247
Heart or stroke			-0.482	-5.425
Heart problem now			-0.269	-4.101
ADLS			-0.271	-1.881

Appendix Table 2
Determinants of the probability of survival, singles
(N=3148)

	Coefficient	Z-statistic	Coefficient	Z-statistic
Intercept	-3.235	-5.432	-3.529	-5.763
Female	0.523	2.658	0.379	1.851
Life expectancy	0.239	5.786	0.276	6.454
Ever married	0.253	2.218	0.344	2.940
Wealth Quartiles				
Second	-0.282	-2.045	-0.288	-2.046
Third	-0.103	-0.711	-0.087	-0.589
Highest	-0.210	-1.309	-0.252	-1.538
Income Quartiles				
Second	0.267	1.898	0.263	1.833
Third	-0.168	-1.181	-0.179	-1.229
Highest	0.101	0.643	0.136	0.849
Year of Education				
9-11	0.041	0.314	0.015	0.113
12	0.185	1.461	0.127	0.961
12+	0.242	1.809	0.166	1.184
Health Conditions				
Blind			-0.175	-1.154
Eye condition			0.390	2.329
Deaf			0.377	2.523
Missing limb			-1.053	-1.911
Arthritis			0.094	0.905
Stiffness			-0.208	-1.699
Nervous sys. disease			0.284	0.831
Other paralysis			-0.423	-1.061
Lung			-0.418	-3.372
Diabetes			-0.017	-0.139
Cancer			-0.772	-3.329
Emotional problems			-0.173	-1.173
Heart or stroke			-0.234	-1.553
Heart problem now			-0.334	-3.258
ADLS			-0.562	-2.666

3. Wealth imputations

We studied very carefully both the method of imputation for missing wealth items and the outcomes, and both the cross-section imputations and the longitudinal imputations that are part of the public use data set. This section reviews our investigation. It began with a study of the imputations for housing wealth, which are relatively easy to study because the rate of item nonresponse is low and because the distribution of value is not nearly as skewed as it is for other types of wealth.

In the NBS, the (cross-section) imputed home equity amounts are close to the non-imputed home equity amounts as should be the case with well constructed imputations. This is not true in the NBF where the cross-sectional imputations are much lower than the average actual reported values. However, the longitudinal imputations come much closer to the non-imputed values. The following table shows the problem. Among those not imputed the change in home value between the NBS and NBF is reasonable. However, among those imputed with cross-sectional imputes the change is from $55.7 thousand to $6.4 thousand. The longitudinal imputes are very reasonable.

Appendix Table 3
Home Equity of Home Owners ($1982)

	NBS		NBF		NBF	
	Cross-sectional		Cross-sectional		Longitudinal	
	Mean	N	Mean	N	Mean	N
Home ownership						
Not imputed	56,168	7112	59,752	4784	64,319	4784
Imputed	60,235	34	12,616	17	44,574	17
Debt on home						
Not imputed	55,945	6899	60,196	4708	64,252	4708
Imputed	63,116	247	24,670	93	64,354	93
Market value of home						
Not imputed	56,251	6297	65,058	4338	65,181	4338
Imputed	55,717	849	6,368	463	55,218	463

Note: The not-imputed means are different for the two NBF summaries because the longitudinal imputation sample is a little different from the cross-sectional imputation sample. In this table, the cross-sectional imputation flags are used for both summaries.

We compared home equity and market value in NBS and the 1984 SIPP, and NBF and 1993 AHEAD. We found NBS and SIPP to be similar, but NBF to be much lower than AHEAD. This comparison confirmed the apparent under-imputation of home value in NBF based on the SSA longitudinal imputations.

The following table reports for both the NBS and NBF nominal average asset wealth using the SSA cross-sectional imputations and the longitudinal imputations from the NBDS web site. From our earlier comparisons of housing and mortgage values in the NBF, we knew that the longitudinal imputations of home equity were more accurate than the cross-sectional ones. However, the large differences in the NBF between the two series for financial assets attracted our interest, because ownership and dollar values of financial assets increased dramatically over the period and we wanted to make sure this was not the result of incorrect data. For example, the longitudinal imputations are considerably higher than the cross-sectional imputations for financial assets, with total financial assets 34.5% higher than in the cross-sectional imputations. In the absence of documentation for how the longitudinal imputations were constructed, we decided to construct our own longitudinal imputations for comparison.[19]

Appendix Table 4
Averages using SSA-provided imputations, cross-section and longitudinal

	NBS		NBF	
Assets	cross-section	longitudinal	cross-section	longitudinal
Home equity	$44,431	$44,819	$60,079	$66,284
Savings and checking	6,404	6,473	7,815	11,288
Money market and CDs	18,154	16,620	20,372	25,991
Stocks and bonds	11,705	11,127	20,878	29,449
Ira (R and spouse)	2,688	2,361	4,859	5,800
Business	14,330	13,442	7,609	9,218
Other property	7,547	8,066	8,577	11,752
Total financial assets	38,952	36,582	53,924	72,528
Property assets, excl. home	21,877	21,508	16,326	20,971
Property assets	66,309	66,327	76,556	87,255
Net worth, excl. home	60,830	58,090	70,250	93,499
Net worth	105,263	102,908	130,482	159,783
N	8,954		8,954	

For our imputations we used households that appear in both the NBS and NBF waves, from the Retired NBDS file and the Other Aged NBDS file.

We employed a method of imputation that has been referred to as "predictive mean matching" (see Little, 1988). This method imputes missing values by using an outcome value from within the data set for a "similar" person; this method can be viewed as an extension of "hot-decking." One of the primary benefits of this imputation procedure is that it is variance preserving.

To introduce "predictive mean matching," consider an outcome y_i that is related to a vector of predictors X_i,

$$(1) \quad y_i = f(X_i, \beta).$$

[19] There is documentation for imputing asset ownership, but not asset values or asset income, nor for income ownership and amounts.

Suppose that the vector X_i is observed for all individuals in the sample but the outcome y_i is missing for a sub-set of individuals. Denote the set of individuals for whom y_i and X_i are available as J and denote the set of individuals for whom only X_i is available as K. For predictive mean matching, we first obtain an estimate of the parameter vector $\hat{\beta}$ from the individuals for whom a complete set of data is available (i.e., $i \in J$). Second, for every individual in the sample, we calculate a predicted outcome,

$$(2)\ \hat{y}_i = f(X_i, \hat{\beta}).$$

Third, for every individual k for whom the outcome must be predicted ($k \in K$, the "donees"), a "donor" individual j is selected from the sample without missing information ($j \in J$) so that the predicted values of the donor and the donee are "nearest." Finally, the *actual* value of the donor is then assigned to the individual who requires an imputed value. Formally, let y_k be the imputed value for person k. Then, the predictive mean matching method defines $y_k = y_{j*}$, where $j*$ is the j that solves the expression

$$(3)\ \min(\hat{y}_j - \hat{y}_k)^2 \quad \forall\ j \in J.$$

This assignment process is then repeated for all k in K.

This basic imputation procedure is extended in two dimensions here. First, the imputation procedure, including both the prediction component and the donor component, can be applied separately to sub-sets of the data. We imputed values separately by marital status: married in both waves of the survey, not married in either wave, and those who changed status.[20] We imputed households separately by marital status because not only the wealth levels of married households is higher on average than single households, but dissaving decisions over time are likely to differ as well, because the mortality of two individuals (the couple) is considered jointly. Second, even though the initial predictive model might be pooled across various categories of individuals to obtain better predictive models, a donor could be selected from a smaller sub-set of individuals.

For almost every wealth component, individuals were asked, "Do you own X?" As Appendix Tables 5 and 6 show, most individuals answered this question. For those who did not, largely a phenomenon observed for financial assets, we used exactly the same predictive mean matching procedure, except that the outcome variable is dichotomous. Then, in a second step for the positive-value individuals, we repeated the predictive mean matching but now only for those who have the asset (either by direct response or through imputation). These values were imputed using the following predictors, i.e., X_i: age, sex, education dummies (less than high school, high school, some college, college graduate, and post-graduate), and an indicator for non-white race. Again, all imputations are estimated separately by marital status. We also exploit the panel nature of the data. If the wealth element was not imputed in the other wave of the survey, we use ownership status and value of holdings as a predictor in the imputation.[21]

The imputations matter for analyzing wealth and wealth change, because of the extent of unanswered wealth questions (higher in the NBS than in the NBF). Appendix Tables 5 and 6 report the distribution of asset ownership, and the extent to which ownership, asset value and asset income were imputed. Ownership is less frequently imputed than value, and both are more

[20] This category is largely households that were widowed; very few marriages occurred over the observed period and so these households were pooled with the widowed.

[21] Where both values were imputed, we relied solely on cross-sectional demographic information to impute the predicted mean value with which to match a donor case.

frequently imputed for financial assets than for property. Items marked NA, or not applicable, were not imputed.

Appendix Table 5
Imputation in the NBS: Percent of population

	Own asset	Ownership imputed	Asset value imputed	Asset income imputed
Money Market Accounts	27.1	4.5	11.1	14.0
Certificates of Deposit	35.0	4.9	12.7	17.1
Savings/Credit Union	69.0	4.7	18.5	29.6
Checking Accounts	81.6	4.3	17.5	21.7
Bonds	16.1	2.0	6.9	12.0
Stocks and Mutual Funds	17.6	2.1	8.0	7.5
IRA/KEOGH (Respondent)	10.8	0.7	2.4	1.5
IRA/KEOGH (Spouse)	6.7	0.8	2.2	1.4
Own or Buying Home	80.1	0.4	9.1	2.4
Business Equity	6.4	0.5	2.3	NA
Professional Practice Equity	1.1	0.5	0.9	NA
Farm Equity	5.9	0.5	2.2	NA
Own or Buying Other Property	12.7	0.6	2.5	1.5
Other Income	6.5	1.1	NA	1.7
Roomers and Boarders	1.4	0.3	NA	0.4
Loan Repayment	5.6	0.7	NA	1.2
Life Insurance (Respondent)	71.6	0.8	NA	NA
Life Insurance (Spouse)	50.9	1.3	NA	NA
Vehicles	87.1	0.4	NA	NA

Appendix Table 6
Imputation in the NBF: Percent of population

	Own asset	Ownership imputed	Asset value imputed	Asset income imputed
Money Market Accounts	26.9	2.5	9.7	13.2
Certificates of Deposit	42.1	2.6	13.3	19.8
Savings/Credit Union	47.1	2.5	13.3	22.3
Checking Accounts	85.7	1.8	14.9	17.7
Bonds	17.2	1.3	6.3	4.0
Stocks and Mutual Funds	24.3	1.5	10.8	10.0
IRA/KEOGH (Respondent)	12.2	0.8	2.9	2.6
IRA/KEOGH (Spouse)	7.4	0.7	2.2	2.0
Own or Buying Home	75.2	0.3	8.2	1.7
Business Equity	3.1	0.5	1.7	NA
Professional Practice Equity	0.4	0.5	0.6	NA
Farm Equity	4.5	0.5	1.7	NA
Own or Buying Other Property	10.2	0.5	1.8	1.4
Other Income	2.1	0.8	NA	1.0
Roomers and Boarders	1.1	0.4	NA	0.4
Loan Repayment	5.6	0.6	NA	1.2
Life Insurance (Respondent)	63.0	0.8	NA	NA
Life Insurance (Spouse)	31.1	1.2	NA	NA
Vehicles	81.1	0.4	NA	NA

The tables show that asset holdings changed between waves. Fewer respondents owned homes and held life insurance. Many fewer households had saving accounts, and many more held CDs, stocks and mutual funds. This financial diversification might have been expected, as financial instruments evolved over the decade between surveys. This is especially true of stocks and mutual funds ownership, which grew by 38%.[22]

We concluded that the large increases in financial wealth over the period do not appear to be an artifact of imputation procedures but instead were a genuine response to economic forces: Over the survey period, the stock market increased threefold (as measured by the increase in the value of the S&P 500). Thus we would expect to see stock wealth grow over time. Our longitudinal imputations, compared below to the cross-sectional imputations show that we estimate large increases in financial wealth over time, even larger than in the cross-sectional imputations estimates.

[22] 11.4% of the sample owns stocks and mutual funds in both waves, and 71.2% do not own them in either survey. However, there is considerable movement between waves of the survey: 5.6% of the sample divests itself of stocks and mutual funds between 1982 and 1991, and another 11.8% invests between waves.

Appendix Table 7
Average wealth, nominal dollars

	NBS		NBF	
Assets	SSA cross-section	RAND longitudinal	SSA cross-section	RAND longitudinal
Home equity	$44,431	$44,224	$60,079	$65,861
Savings and checking	6,404	5,478	7,815	8,378
Money market and CDs	18,154	14,989	20,372	24,443
Stocks and bonds	11,705	10,494	20,878	27,077
Ira (R and spouse)	2,688	2,361	4,859	5,601
Business	14,330	12,641	7,609	8,370
Other property	7,547	7,099	8,577	9,749
Total financial assets	38,952	33,323	53,924	65,499
Property assets, excl. home	21,877	19,740	16,326	18,120
Property assets	66,309	63,964	76,556	83,981
Net worth, excl. home	60,830	53,063	70,250	83,619
Net worth	105,263	97,287	130,482	149,480
N	8,954		8,954	

Overall, the RAND net worth imputations result in an estimate for the NBS that is lower than the cross-sectional imputations, and an estimate for the NBF that is higher. We note that the comparison between the cross-sectional imputations and RAND's longitudinal imputations is provided for expository purposes; we do not consider the cross-sectional imputations a "gold standard" against which to compare our imputation results. Comparing our measure of net worth in the NBS to the 1984 SIPP defined over a similar sample, our estimate is about 87% as high as the SIPP measure of net worth. Comparing the NBF to AHEAD, our estimate of net worth is about 81% as much as in AHEAD.

Appendix Table 8 compares our imputation results to the NBS and NBF based on the cross-sectional imputations and to the averages for non-imputed data: These results are not weighted with the sample weights, which is why the averages differ from those in other tables.

Appendix Table 8
Average Wealth: Comparison of imputation methods

	A	B	C		
	Original data	Non-imputed data only	RAND imputed data	C/A	C/B
NBS Assets					
Money Market and CD Accounts	$19,458	$13,978	$15,884	0.82	1.14
Savings/Credit Union/Checking Accounts	6,791	5,482	5,788	0.85	1.06
Stocks, Bonds and Mutual Funds	12,334	8,135	10,335	0.84	1.27
IRA/KEOGH (Respondent)	1,969	1,612	2,023	1.03	1.25
IRA/KEOGH (Spouse)	828	475	598	0.72	1.26
Home Equity	44,497	43,945	44,443	1.00	1.01
Business/Professional/Farm Equity	17,472	11,248	14,357	0.82	1.28
Other property	7,824	6,595	7,387	0.94	1.12
Value financial assets	41,380	31,492	34,628	0.84	1.10
Equity real property	69,793	61,668	66,187	0.95	1.07
Equity real property, excl. home	25,296	17,689	21,744	0.86	1.23
Net worth, excl. home	66,677	48,961	56,372	0.85	1.15
Net worth	111,175	90,881	100,815	0.91	1.11
NBF Assets					
Money Market and CD Accounts	$21,265	$21,904	$25,417	1.20	1.16
Savings/Credit Union/Checking Accounts	7,994	8,591	8,698	1.09	1.01
Stocks, Bonds and Mutual Funds	22,616	19,700	31,669	1.40	1.61
IRA/KEOGH (Respondent)	3,372	3,211	3,955	1.17	1.23
IRA/KEOGH (Spouse)	1,458	1,253	1,560	1.07	1.24
Home Equity	59,626	64,420	65,646	1.10	1.02
Business/Professional/Farm Equity	8,493	6,402	8,578	1.01	1.34
Other property	8,407	8,494	9,482	1.13	1.12
Value financial assets	56,706	57,979	71,300	1.26	1.23
Equity real property	76,910	78,543	83,706	1.09	1.07
Equity real property, excl. home	17,103	14,767	18,060	1.06	1.22
Net worth, excl. home	73,809	72,717	89,360	1.21	1.23
Net worth	133,617	133,399	155,006	1.16	1.16

There are two overall results of particular interest. The first is the cross-sectional imputations overestimate asset values in the NBS and underestimate them in the NBF, as shown by the ratio C/A, thereby underestimating the amount of wealth change between the two surveys. The second result confirms patterns we knew from other surveys of wealth: that wealthier respondents tend not to answer wealth questions. Comparing column C to column B (or the ratio in the right-most column), we see that the imputed averages are always higher than the averages calculated only over non-imputed responses.

4. Comparisons of NBS and NBF with SIPP and AHEAD

We used SIPP and particularly AHEAD for comparisons with the NBDS.[23] The AHEAD is a biennial panel that represents the cohorts born in 1923 or earlier and their spouses. At baseline in 1993, 8223 subjects were interviewed about income, assets, health, family linkages, and, to a limited extent, employment. The AHEAD is representative of its respective cohorts. Because the AHEAD interviewed some of the same cohorts as the NBF, but two years later, we use AHEAD to compare the characteristics of the NBF sample with the characteristics of the population.

As expected, the demographic characteristics of the NBS and NBF are not representative of the population because of the method of obtaining the sample. For example, the NBS is concentrated between the ages of 63 and 67, though the sample ranges from 61 to over 75. Ages in SIPP and AHEAD, in contrast, are more uniformly distributed. This age difference means that the samples differ in predictable ways. The NBS and NBF tend to have more men, more married couples, and are more likely to own a home:

Appendix Table 9
Characteristics of the NBS, SIPP, NBF and AHEAD: percent of population

	NBS	SIPP	NBF	AHEAD
Male	44.53	40.70	41.63	39.80
Female	55.47	59.30	58.37	60.20
Married men	37.41	29.90	31.65	28.20
Married women	36.55	22.30	26.58	15.00
Widowed men	2.23	5.10	4.62	8.20
Widowed women	12.38	27.90	23.50	38.10
Other men	4.89	5.70	5.36	3.50
Other women	6.55	9.20	8.29	7.10
Owns home	80.14	71.70	77.09	74.10
Doesn't own	19.86	28.30	22.91	25.90

Note: The NBS and NBF data include the Retired Worker public use file and the Other Aged file.

As a result of our initial examination of the demographic characteristics of the NBS and NBF relative to the population surveys, we added the Other Aged file to our sample, in addition to the Retired Beneficiaries. This was because women were especially underrepresented in our initial sample relative to the population. Widows remain underrepresented, and married women over-represented, in the NBS and NBF. This is not simply due to the younger age of the NBDS data: comparing the samples by age, the NBDS data still have more women and married individuals than SIPP or AHEAD.

[23]The AHEAD is described in Soldo, Hurd, Rodgers and Wallace, 1997.

REFERENCES

Browning, Martin and Annamaria Lusardi, 1996, "Household Saving: Micro Theories and Micro Facts," *Journal of Economic Literature*, XXXIV, pp 1797-1855.

Friedman, Benjamin M. and Mark Warshawsky, 1988, "Annuity Prices and Saving Behavior in the United States," in *Pensions in the U.S. Economy*, Eds.: Zvi Bodie, John B. Shoven and David A. Wise. Chicago: University of Chicago Press, pp 53-77.

Grad, Susan, 1996, "Income of the Population 55 or Older, 1994," SSA publication 13-11871, Office of Research and Statistics, Social Security Administration, Washington, D.C.

Hoynes, Hilary, Michael D. Hurd and Harish Chand, 1998, "Household Wealth of the Elderly under Alternative Imputation Procedures," in *Inquiries in the Economics of Aging*, David Wise, ed., Chicago: University of Chicago Press, pp. 229-257.

Hurd, Michael D., 1987, "Savings of the Elderly and Desired Bequests," *The American Economic Review*, 77 (3), pp. 298-312.

Hurd, Michael D., 1989, "Mortality Risk and Bequests," *Econometrica*, 57 (4), 779-813.

Hurd, Michael D., 1990a, "Research on the Elderly: Economic Status, Retirement, and Consumption and Saving," *The Journal of Economic Literature* 28:565-637.

Hurd, Michael D., 1990b, "The Joint Retirement Decision of Husbands and Wives," in *Issues in the Economics of Aging*, D. Wise (editor), The University of Chicago Press, pp. 231-254.

Hurd, Michael D., 1995, "Mortality Risk and Consumption by Couples," presented at the IFS-Bank of Portugal Conference on The Microeconomics of Saving and Consumption Growth, Lisbon, November, and NBER Working Paper 7048.

Hurd, Michael D., forthcoming, "Leaving Bequests: by Accident or by Design?" in *Death and Dollars*, Alicia Munnell and Anika Sunden, eds. Washington: The Brookings Institution Press.

Hurd, Michael D., Daniel McFadden and Angela Merrill, 2001, "Predictors of Mortality among the Elderly," in *Themes in the Economics of Aging*, David Wise, editor, Chicago: University of Chicago Press, pp 171-197.

Hurd, Michael D. and James P. Smith, 2001, "Anticipated and Actual Bequests," in *Themes in the Economics of Aging*, David Wise, editor, Chicago: University of Chicago Press, pp 357-389.

Hurd, Michael D. and David A. Wise, 1989, "The Wealth and Poverty of Widows: Assets Before and After the Husband's Death," in *The Economics of Aging*, D. Wise (editor), The University of Chicago Press, pp. 177-199.

Little, Roderick (1988). "Missing-Data Adjustments in Large Surveys," *Journal of Business and Economics Statistics*, 6(3), 287-301.

McGarry, Kathleen and Robert Schoeni, 1995. "Transfer Behavior in the Health and Retirement Study: Measurement of the Redistribution of Resources within the Family." *The Journal of Human Resources* 30:S184-S226.

Modigliani, Franco and Brumberg, Richard, 1954, "Utility Analysis and the Consumption Function: An Interpretation of Cross-Section Data," in K. Kurihara, ed., *Post-Keynesian Economics,* New Brunswick: Rutgers University Press.

Soldo, Beth, Michael Hurd, Willard Rodgers and Robert Wallace, 1997, "Asset and Health Dynamics among the Oldest-Old: An Overview of the Survey," *Journal of Gerontology*.

Venti, Steven F. and David A. Wise, 1989, "Aging, Moving and Housing Wealth," in *The Economics of Aging*, Ed: David A. Wise, Chicago: The University of Chicago Press, pp. 9-48

Venti, Steven and David Wise, 2001, "Aging and Housing Equity: Another Look." Working Paper 8608. Cambridge, Mass.: National Bureau of Economic Research (November).

Yaari, Menahem E., 1965, "Uncertain Lifetime, Life Insurance and the Theory of the Consumer," *Review of Economic Studies*, 32, pp 137-150.

Table 1

Previous empirical evidence on dissaving

Data Set*	Annual Real Rate of Wealth Change	Source
1963, 1964 Federal Reserve**	-1.2%	Mirer, 1980
NLS Mature Men 1967-1976	-5.0	Diamond and Hausman, 1984
RHS 1969-1979 (Singles)	-4.5	Hurd, 1987
RHS 1969-1979 (Couples)	-1.6	Hurd, 1987
SIPP 1984, 1985 (Singles)	-3.9	Hurd, 1991
SIPP 1984, 1985 (Couples)	-1.8	Hurd, 1991

Note: *The results are drawn from the following data sets: the Survey of Financial Characteristics of Consumers and Survey of Changes in Family Financing (Federal Reserve), National Longitudinal Survey (NLS), Retirement History Survey (RHS), Survey of Income and Program Participation (SIPP). **These results based on changes in median wealth.

Table 2
Demographic characteristics of our NBDS sample

Sample size	5090
Earliest birth year	1914
Mean birth year	1917
Latest birth year	1920
Mean age	64
%Female	58.8
%White	88.8
%Black	8.1
%Latino	2.3
%Other	0.9
%Married 1st survey	76.7
%Married 2nd survey	47.5
%Have children	86.1
Average number of children	2.6
%Less than high school	47.1
%High school diploma	30.8
%Some college	12.6
%Completed 4-year degree	9.5

Source: Authors' tabulations from the NBDS
Notes: Weights are used for the analysis.

Table 3
Real wealth characteristics
means and medians

	Wave 1	Wave 2	Annual change (%)
Total wealth	158305	168923	0.75
	101661	94676	-0.83
Non-housing wealth	83473	91662	1.09
	23911	24097	0.09
Cash	35691	38956	1.01
	14828	12844	-1.67
Stocks, bonds, IRAs	22031	34523	5.21
	0	0	
Real property (excluding home)	25752	18180	-4.04
	0	0	0.00
Housing wealth	74831	77261	0.37
	62151	55044	-1.41

Source: Authors' tabulations from the NBDS data files.
Notes: The first and second entries are the mean and median, respectively. Weights are used for the analysis. Dollar values were deflated using the CPI-U to 1999 dollars.

Table 4
Prevalence and conditional means of underlying wealth components

	Percent Owners Wave 1	Percent Owners Wave 2	Average Annual Change	Mean Value for Owners Wave 1	Mean Value for Owners Wave 2	Average Annual Change
Wealth Components						
Housing	81.3	75.6	-0.84	92015	102247	1.22
Other real property	11.5	9.2	-2.59	91985	104466	1.48
Business, farm and profess. practice	8.0	4.9	-5.68	191051	173588	-1.11
Savings, checking accounts	88.4	89.4	0.13	10714	11148	0.46
Money market accounts, CDs	50.3	51.5	0.27	52091	56333	0.91
Stocks, bonds	25.9	29.7	1.59	72093	100831	3.89
IRAs, KEOGHs	10.1	9.0	-1.34	33126	50456	4.88

Source: Authors' tabulations from the NBDS data files.
Note: Weights are used for the analysis. Dollar values were deflated using the CPI-U to 1999 dollars.

Table 5
Total real wealth

Group	N	Wave 1 Mean	Wave 2 Mean	Annual Change (%)	Wave 1 Median	Wave 2 Median	Annual Change (%)
Total	5090	158305	168923	0.75	101661	94676	-0.83
W1 married							
Yes	3547	179765	191052	0.71	114807	110236	-0.47
No	1543	87756	96178	1.06	51793	42166	-2.38
W1 age groups							
Age 61-65	2902	155113	162353	0.53	98285	90003	-1.02
Age 66-69	2188	167175	187188	1.31	110491	108865	-0.17
Education							
Less than HS	2356	98504	95472	-0.36	68375	59937	-1.53
Completed HS	1520	163232	171567	0.58	120504	112535	-0.79
Some college	685	235477	272725	1.70	148990	161463	0.93
Completed college	529	336872	387390	1.62	198453	222623	1.33
Race/ethnicity							
White	4464	171655	182876	0.73	109973	104584	-0.58
Black	456	41875	42553	0.19	23479	18103	-3.01
Latino	124	71616	97535	3.58	34528	29968	-1.64
Other	46	105122	106915	0.20	60425	62016	0.30
Have children							
Yes	4355	163037	172006	0.62	86330	82016	-0.59
No	735	128991	149830	1.74	103585	97859	-0.66
W1 home owner							
Yes	4081	185429	191221	0.36	120850	112657	-0.81
No	1009	29788	63279	8.74	1726	2484	4.22
W1 stock/bond owner							
Yes	1344	290428	303203	0.50	179721	175162	-0.30
No	3746	111856	121717	0.98	80451	73392	-1.06

Source: Authors' tabulations from the NBDS data file.
Note: Weights are used for the analysis. Dollar values were deflated using the CPI-U to 1999 dollars.

Table 6
The distribution of wealth

NBDS Wealth Percentiles	Total Wave 1	Total Wave 2	Non-housing Wave 1	Non-housing Wave 2	Housing Wave 1	Housing Wave 2
5th	28	0	0	0	0	0
10th	3280	1101	7	15	0	0
25th	43161	31803	2253	1835	20717	2446
50th	101661	94676	23911	24097	62151	55044
75th	183864	198220	84595	88070	103586	97856
90th	320252	371853	183571	222011	153652	183480
95th	467861	544936	312483	363291	207171	244640

Source: Authors' tabulations from the NBDS data files.
Note: Weights are used for the analysis. Dollar values were deflated using the CPI-U to 1999 dollars. See the text for definition of the wealth components

Table 7
The distribution of non-housing wealth

NBDS Wealth Percentiles	Cash Wave 1	Cash Wave 2	Stock/Bond Wave 1	Stock/Bond Wave 2	Real Prop Wave 1	Real Prop Wave 2
5th	0	0	0	0	0	0
10th	0	6	0	0	0	0
25th	1519	1223	0	0	0	0
50th	14828	12844	0	0	0	0
75th	46613	47680	2244	4893	0	0
90th	95817	108865	28486	66053	51793	24464
95th	132589	152900	69920	134552	138114	91740

Source: Authors' tabulations from the NBDS data files.
Note: Weights are used for the analysis. Dollar values were deflated using the CPI-U to 1999 dollars.

Table 8
The Distribution of Total Wealth by Marital Status

	M-M		M-S		S-S	
	Wave 1	Wave 2	Wave 1	Wave 2	Wave 1	Wave 2
Sample Size	2191	2191	1278	1278	1621	1621
5th	5179	2446	392	64	0	0
10th	26242	18348	14372	1223	0	0
25th	69057	64218	48599	30580	4411	1835
50th	126031	124767	102196	81954	51962	42200
75th	222364	245435	180066	184092	115769	116204
90th	381022	432157	298499	331488	211613	251246
95th	574036	644015	482536	470076	296082	391791
Mean	200065	215923	153300	152473	85710	99183
Std. deviation	520585	535343	236352	310796	136090	181991

Source: Authors' tabulations from the NBDS data files.
Note: Weights are used for the analysis. The percentile distributions were calculated separately by marital status. Dollar values were deflated using the CPI-U to 1999 dollars.
We divide the sample into those who were married in both periods (M-M), those who were single in both periods (S-S), and those who changed marital status, most of whom were widowed (M-S). There is not sufficient sample size to divide M-S into those who married over the period and those who were widowed.

Table 9
Mean real wealth by retirement income percentile

	Total Wealth		Non-Housing Wealth		Housing Wealth	
Retirement Income Quartile	Wave 1	Wave 2	Wave 1	Wave 2	Wave 1	Wave 2
Wave 1 or 2						
Lowest	97930	85378	48900	42927	49030	42451
2	145750	156152	78234	81492	67516	74659
3	163582	169604	80079	90013	83503	79591
Highest	225879	264510	126629	152183	99250	112327
Wave 1						
Lowest	97930	111867	48900	58796	49030	53070
2	145750	147389	78234	78047	67516	69342
3	163582	170895	80079	91808	83503	79087
Highest	225879	245454	126629	137942	99250	107512

Source: Authors' calculations from the NBDS data files.
Notes: Retirement income consists of Social Security, public and private pensions, and government transfers. Dollar values were deflated using the CPI-U to 1999 dollars. The first panel classifies according to retirement income in wave 1 for wave 1 wealth and to retirement in wave 2 for wave 2 wealth. The second panel classifies according to wave 1 retirement income

.

Table 10
Total real wealth and housing and stock ownership

Group	N	Wave 1 Mean	Wave 2 Mean	Annual Change (%)	Wave 1 Median	Wave 2 Median	Annual Change (%)
Moved between waves							
No	3808	162892	181182	1.23	105312	106419	0.12
Yes	1282	145021	132818	-1.02	79416	49540	-5.47
Home ownership across waves							
Rented in both waves	850	21266	25135	1.94	1467	1101	-3.33
Same home	3038	183811	205042	1.27	121195	123421	0.21
Changed homes	497	240189	244372	0.20	149336	152900	0.27
Bought home	219	131103	234455	6.74	52138	107642	8.40
Sold home	486	126958	50130	-10.77	90292	10312	-25.16
Stock ownership across waves							
Owned in neither	2903	90120	89496	-0.08	68366	55044	-2.51
Sold off	445	190230	136925	-3.81	129137	99079	-3.07
Newly invested	569	169206	231427	3.63	125166	160239	2.86
Owned in both waves	1173	317029	356596	1.36	207689	220482	0.69

Source: Authors' tabulations from the NBDS data file.
Note: Weights are used for the analysis. Dollar values were deflated using the CPI-U to 1999 dollars.

Table 11
Health characteristics

	Percent	
	Wave 1	Wave 2
% Needing help with ADLs	4.4	8.7
Difficulty with functional activities		
0	34.7	25.8
1	14.3	13.0
2	12.4	10.8
3	9.3	8.8
4	7.7	8.3
5 or more	19.3	22.5
DK/RF	2.3	10.8
Prevalence of diseases		
Diabetes, digestive disorders, etc.	20.7	25.0
Cancer	3.5	9.7
Chronic lung disease	14.1	18.0
Heart attack or stroke	9.8	20.6
Current high blood pressure	40.0	42.5
Arthritis, rheumatism, etc.	54.2	60.5
General health		
Excellent	NA	8.5
Very good		16.8
Good		28.4
Fair		28.4
Poor		17.9

Source: Authors' tabulations from the NBDS data files.
Notes: Weights are used for the analysis. The functional activities include: walking several blocks, climbing stairs, stooping, standing for long periods, sitting for long periods, lifting 10 lbs., and picking up a dime. The counts are for the number of activities for which any difficulty was reported. For diseases, the percentages represent the number of individuals who reported the problem. N/A represents questions that were not available in a particular wave. DK/RF indicates a response of "Don't Know" or "Refusal" in wave 1; in wave 2, it also includes married respondents who have died between waves.

Table 12
Total real wealth

Group	N	Wave 1 Mean	Wave 2 Mean	Annual Change (%)	Wave 1 Median	Wave 2 Median	Annual Change (%)
W1 needs help with ADLs							
No	4872	159021	169758	0.76	102196	96239	-0.70
Yes	218	142692	150741	0.64	88393	74371	-2.00
W1 functional difficulties							
0	1815	212429	229416	0.89	131251	124767	-0.59
1	752	178711	182580	0.25	119123	113146	-0.60
2	585	143631	152101	0.66	105614	90610	-1.78
3	463	132659	140144	0.64	88738	77239	-1.61
4 or more	1355	97938	105232	0.83	63187	59937	-0.61
DK/RF	120	107804	127613	1.96	54716	48977	-1.28
W2 needs help with ADLs							
No	4632	163736	175941	0.83	104271	99079	-0.59
Yes	458	101550	95592	-0.70	66295	51277	-2.98
Medical expense > $1,000							
No	4206	148417	158904	0.79	94608	88137	-0.82
Yes	884	205123	216367	0.62	132935	125133	-0.70
Long-term care > $1,000							
No	5021	157877	168591	0.76	100823	94431	-0.76
Yes	69	190514	193959	0.21	138287	110088	-2.64
Funeral expenses > $1,000							
No	4859	155791	166266	0.75	100133	93575	-0.79
Yes	231	206996	220406	0.73	130345	129659	-0.06

Source: Authors' tabulations from the NBDS data file.
Note: Weights are used for the analysis. Dollar values were deflated using the CPI-U to 1999 dollars.

Table 13
Total real wealth

Group	N	Wave 1 Mean	Wave 2 Mean	Annual Change (%)	Wave 1 Median	Wave 2 Median	Annual Change (%)
Gave $1,000+ to child							
No	4339	131794	139631	0.67	90637	84646	-0.79
Yes	751	309914	336445	0.95	173005	179199	0.41
Received $1,000+ from child							
No	5007	159224	170443	0.79	102187	96633	-0.65
Yes	83	95851	65716	-4.38	61109	21039	-12.36
Home or car expense > $1,000							
No	3739	127735	131385	0.33	86321	75227	-1.59
Yes	1351	240995	270465	1.34	142430	152900	0.82
Other loss > $1,000							
No	4850	152706	159776	0.52	98665	92719	-0.72
Yes	240	267979	348108	3.03	188268	187972	-0.02

Source: Authors' tabulations from the NBDS data file.
Note: Weights are used for the analysis. Dollar values were deflated using the CPI-U to 1999 dollars.

Table 14
Medicare spending category transition rates by transition in marital status waves 1 to 2

Expenditures 1984-1987	N	Expenditures 1988-1991				
Married to married		None	Low	Medium	High	All
none	184	41.3	31.5	13.0	14.1	100.0
Low	266	7.9	45.1	26.7	20.3	100.0
Med	267	3.7	25.5	37.1	33.7	100.0
High	274	4.4	15.3	34.3	46.0	100.0
Married to single						
none	195	63.1	20.5	11.3	5.1	100.0
Low	269	13.0	43.9	22.7	20.4	100.0
Med	270	15.6	18.5	37.0	28.9	100.0
High	277	40.1	8.3	17.3	34.3	100.0
Single to single						
none	284	37.7	33.8	17.3	11.3	100.0
Low	516	6.0	42.1	30.0	21.9	100.0
Med	516	3.1	28.3	35.3	33.3	100.0
High	531	2.3	18.1	31.8	47.8	100.0

Source: Authors' calculations from the NBDS

Table 15
Wealth and annual wealth change by Medicare spending category and marital status transition

Spending category	N	Means			Medians		
		Wave 1	Wave 2	% change	Wave 1	Wave 2	% change
				Single to single			
None	76	50876	67450	3.27	35046	41589	1.98
Low	302	87451	121123	3.78	64223	57564	-1.27
Med	302	81903	99102	2.21	49203	42812	-1.61
High	311	76695	72511	-0.65	42056	24831	-6.11
All	991	79551	95470	2.11	49030	40366	-2.25
				Married to single			
None	123	130512	133616	0.27	101859	87136	-1.81
Low	293	129758	122747	-0.64	98406	82016	-2.11
Med	293	160670	176312	1.08	113426	102860	-1.13
High	302	178160	146314	-2.28	95644	70527	-3.53
All	1011	152556	146379	-0.48	103586	83789	-2.46
				Married to married			
None	107	159439	168852	0.67	117207	107544	-1.00
Low	574	225920	247870	1.08	119123	121709	0.25
Med	575	190734	200886	0.60	128791	130320	0.14
High	591	189860	199577	0.58	131467	130271	-0.11
All	1847	200029	213808	0.77	126720	124767	-0.18

Source: Authors' tabulations from the NBDS

Table 16
Wealth and wealth change (annual percent) by predicted survival probability and marital status

Predicted survival probability	N	Means wave 1	Means wave 2	Means change	Medians wave 1	Medians wave 2	Medians change
			Married in both waves				
Low	1346	158162	154670	-0.26	107045	98223	-1.00
Med	1248	203593	226160	1.22	117742	115660	-0.21
High	953	175107	188741	0.87	119123	117427	-0.17
All	3547	179765	191052	0.71	114807	110236	-0.47
			Single in both waves				
Low	370	90070	99088	1.11	26216	35473	3.51
Med	522	81182	89279	1.10	51793	37675	-3.69
High	651	90351	98612	1.01	60425	48934	-2.45
All	1543	87756	96178	1.06	51793	42166	-2.38

Source: Authors' tabulations from the NBDS

Table 17
Actual and predicted wealth (thousands 1999$)

	Actual	Predicted
Wave 1		
Mean	87.1	87.1
Median	50.7	50.7
Wave 2		
Mean	94.1	70.8
Median	41.3	41.4

Source: Authors' calculations from the NBDS

Figure 1

Predicted consumption and wealth