Portfolio Holdings by the Elderly

by

Michael D. Hurd

RAND

SUNY, Stony Brook

NBER

December, 1999

Financial support from the National Institute on Aging through grant 1P20-AG12815-05 to RAND is gratefully acknowledged
Many thanks to Angela Merrill for excellent research assistance

1. Introduction

As evidenced by the large public programs aimed at the elderly, their economic status has been and remains a matter of public concern. However, because of the demographic trends it is likely that reductions in benefits will be made, so it is of considerable importance to understand the potential for the elderly to support themselves through their own savings. Although the elderly have substantial wealth, portfolio holdings have, for the most part, been rather restricted. For example, in 1992 67% of aged household units had some income from assets but just 20% of aged household units had income from dividends.[1] Had the elderly invested more in common stocks their assets today would be larger. Even now, were the newly retired to shift investments toward stocks, and were the average rates of return over the past 50 years to be realized in the future, the capacity of the elderly to support themselves would be greater. Despite the higher rates of return, however, at least over time periods of several years investments in the stock market are at considerable risk. Therefore, it is questionable whether the retired elderly ought to invest substantially in the stock market. The study of portfolio choice will give evidence about the degree of investment risk undertaken by the elderly and of the determinants of the investment choices they have made. Such a study could help understand the desirability of further stock market investment.

A second reason for studying portfolio choice by the elderly is the active discussion about investing some of the Social Security trust funds in the stock market. Depending on who will bear the risk, this investment could have the effect of causing the elderly to invest indirectly in the stock market, even though, as revealed by their own investment choices, they do not desire further stock investments. An extension is the proposal to privatize all or part of the Social Security system with either mandated portfolios or with self-directed portfolios. As with investments of the Social Security trust funds in the stock market, the first case may require the elderly to invest more in the stock market than they wish. In the second case, one would like to understand what the likely portfolio choice would be so as to be able to predict the path of wealth.

A third reason for studying portfolio choice by the elderly is that as a group they control a substantial fraction of the household wealth: their investment choices could influence the future course of markets. In particular, the study of portfolio choice could illuminate the validity of the concern about "asset meltdown" as the baby-boom generation retires. For example, if the elderly choose to hold their assets in money-market funds, not only will they have less wealth on average but the effects on markets as they dissave will be different than if they held stocks.

According to finance theory, the portfolios of the elderly will differ from the portfolios of the nonelderly. The most obvious reason is that the elderly face substantial mortality risk, which increases sharply at advanced old age. Under the life-cycle model, consumption and wealth will decline with age, at least for ages past a particular age that depends on rates of return and utility function parameters. Such declining consumption and wealth may influence portfolio choice. Because of high mortality risk the elderly have a shorter time horizon than the nonelderly, and in the case of a couple the time horizon for the couple as a unit is even shorter.

---

[1] An aged unit is a single person or couple in which at least one person is aged 65 or over.

The elderly have large annuity income flows, and the risks associated with those flows are quite different from the risks of earnings. Social Security is the most important income source for most elderly persons: Social Security is indexed, and there is minimal risk that, once an elderly person has retired, the Social Security benefit will be changes. In nominal terms, pension income is rather certain because of the funding requirements and guarantees of the Pension Benefit Guarantee Corporation. However, most pension income is not indexed, and so has inflation risk. This risk is quite different, and possibly smaller than the risk associated with the earnings streams of typical workers.

The elderly face a much a higher risk of health care consumption than the nonelderly, but a large fraction of the cost is covered by Medicare, and, in addition many of the elderly have Medigap insurance that fills in most of the uncovered expenses. An exception would be the risk of nursing home admission and the associated costs.

Both the elderly and nonelderly may desire to leave a bequest, but in the case of the nonelderly the time horizon is so great that a bequest motive will not alter behavior. For the elderly, however, a bequest motive could extend the time horizon, reducing or eliminating any effects of mortality risk.

Because some elderly have substantial wealth, they may be better able to make risky investments.

Although the study of portfolio choice by the elderly is important both from the point of view of public policy and from a scientific point of view, the study is complicated by life-cycle effects that happen simultaneously with portfolio choice. Under the life-cycle model wealth will decline with age so that we should observe reductions in assets regardless of allocation. Several assets provide service flows as well as providing an investment vehicle. The most important of these is housing, which is held by the young elderly in greater concentrations than in any other age group. Another example is checking accounts, and even savings accounts and money market accounts because of the ability to write checks against them.

Some assets require personal attention such as a business, and in some cases real estate. A declining ability with age to provide the personal input could cause these assets to be sold even though portfolio theory would say they should be retained.

Study of portfolio choice based on data from the 1990s is complicated by large changes in asset prices. To the extent that the price changes were unanticipated, total asset holdings and the change in asset holdings will not conform to a life-cycle model: for example, the large increases in the value of stocks during the 1990s could lead to an increase in wealth even though the life-cycle model calls for a decrease. Ex post portfolio allocation could differ from theoretical predictions if there are transaction costs associated with reallocation or simply inertia. There are surely large transaction costs associated with the buying or selling of housing, a business and real estate.

A second complication is that expectations about future rates of return both as to level and variation are likely to have changed in the 1990s. This would cause a reallocation of assets even if the other observable determinants of asset allocation such as wealth level were unchanged.

A third complication is that the availability of financial instruments increased over the 1990s and the costs of acquiring some of the instruments decreased. If the availability and costs changed in an important way over the period of empirical study, observed portfolio reallocation could have been caused by these changes rather than by the factors discussed by finance theory

such as the level and variability of rates of return.

It is beyond the scope of this paper to investigate all the possible causes of portfolio reallocation by the elderly. Rather it will focus on the main factors that are associated with the elderly but not with the nonelderly: mortality risk, pension and Social Security income, marital status, and indicators for a bequest motive. The frame of reference will be the life-cycle model augmented with portfolio selection.

The next section gives a brief review of the main implications of the life-cycle model when there is only one asset which has a known a fixed rate of return. Section 3 has information about the data, and Section 4 has results.

2. Life-cycle model

To find whether portfolio theory predicts the actual portfolios of the elderly it is necessary to account for asset holdings in the absence of portfolio choice: many of the determinants of portfolio choice are also determinants of the level of, and change in, wealth. I will briefly review the determinants of consumption and wealth according to a simple version of the life-cycle model. In that model there is only one asset, and its rate of return is known with certainty (Yaari, 1965). An individual maximizes expected lifetime utility by choosing a consumption path. The only uncertainty is the date of death. Resources are bequeathable wealth and a stream of annuity income such as Social Security which cannot be borrowed against. Individuals may use up their bequeathable wealth and then live solely from annuity income, which would lead to a corner solution in the utility maximization. An extension of the model allows for a bequest motive for saving.

The first-order conditions show that consumption will decline with age as long as

$$h_t + r - r > 0$$

where h_t is mortality risk at time t, r is the subjective time rate of discount, and r is the fixed interest rate. Because h_t increases approximately exponentially, the inequality will be satisfied should someone live sufficiently long. If the inequality is satisfied so that consumption does decline, wealth must decline: otherwise wealth will continue to grow, and a global condition for utility maximization will be violated. Should an individual live long enough, wealth will eventually be consumed and the person will live off of annuities.[2]

An increase in mortality risk will increase the rate of decline of consumption and the change in the slope of the consumption path will increase the initial level of consumption, causing the rate of dissaving to increase. The magnitude of the effect depends on the level of risk aversion: if individuals are highly risk averse, both consumption and the rate of dissaving will change little in response to the increase.

An increase in wealth will increase consumption and delay the age at which wealth is completely consumed, but its effect on the rate of dissaving is ambiguous. An increase in the annuity stream will increase consumption but its effect on the rate of dissaving is also ambiguous.

---

[2]Of course, if someone has no annuities, wealth will only be exhausted at the greatest age to which someone could possibly live.

A bequest motive flattens the consumption path and reduces initial consumption causing more wealth to be held.

The model for couples predicts that an increase in mortality risk will increase the rate of dissaving and that a bequest motive will decrease it. As in the model for singles the effects of an increase in wealth or an increase in annuities are ambiguous for the rate of dissaving.

The effect on dissaving of marital status itself depends on the economic resources of couples and singles, on parameters of the utility function, and on returns-to-scale in consumption (Hurd, 1995). Thus, the theory does not say whether couples will dissave more or less rapidly than singles.

As an empirical matter, in a number of panel data the elderly do dissave as shown in the following table. Furthermore, couples dissave less rapidly than singles. Because the difference in dissaving could be caused by differences in economic resources, utility function parameters, or on returns-to-scale in consumption, without further detailed estimation the results cannot be used to place bounds on important parameters such as returns-to-scale in consumption.

Average real bequeathable wealth change in panel data

Data set	annual real rate	source
1963, 1964 Federal Reserve*	-1.2%**	Mirer, 1980
NLS Mature Men	-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

*Survey of Financial Characteristics of Consumers and Survey of Changes in Family Financing.
**Median wealth change

3. Data

The data for this paper come from the study of the Asset and Health Dynamics among the Oldest-Old (AHEAD). This study is a biennial panel survey of individuals born in 1923 or earlier and their spouses (Soldo, Hurd, Rodgers and Wallace, 1997). At baseline in 1993 it surveyed 8222 individuals representative of the community-based population except for oversamples of blacks, Hispanics and Floridians. Wave 2 was fielded in 1995. This paper will be based on data from waves 1 and 2.

The main goal of AHEAD is to provide panel data from the three broad domains of

economic status, health and family connections. For this paper the most important variables are measures of asset holdings. In both waves, the financial respondent was asked for a complete inventory of assets and debts and about income sources.[3] Through the use of unfolding brackets, nonresponse to asset values was reduced to levels much lower than would be found in a typical household survey such as the SIPP.[4] AHEAD has data on 10 types of assets, on mortgages and on "other debt." Housing wealth is house value minus mortgage value. Total wealth is housing wealth plus nonhousing wealth minus other debt.[5]

AHEAD queries about sources of income. This paper will use measures of the annual Social Security income of a couple and of a single person, and measures of annual pension income and annuity income.

AHEAD has innovative questions about subjective probabilities, which request the respondents to give the chances of future events. This paper will use observations on the subjective probability of survival. The form of the question is as follows:

> [Using any] "number from 0 to 100 where "0" means that you think there is absolutely no chance and "100" means that you think the event is absolutely sure to happen ... What do you think are the chances that you will live to be at least *A* ,"

where *A* is the target age. *A* is 80, 85, 90, 95, or 100 if the age of the respondent was less than 70, 70-74, 75-79, 80-84, 85-89 respectively. The question was not asked of those 90 or over or of proxy respondents. Responses to this question vary appropriately with known mortality risk factors and they predict actual mortality (Hurd, McFadden and Merrill, 1998).

4. Results

Table 1 shows cross-section wealth in wave 1 of AHEAD. In this table and in others except where noted, the observations are of persons. In the case of couples if each spouse is age-eligible, each will contribute an observation to the table. For example, if one spouse is 70-74 and the other is 75-79 the wealth of the couple enters the mean in each of the age bands 70-74 and 75-79. Therefore, the interpretation of the table is the wealth of the household in which a person

---

[3]For couples, the financial respondent is the spouse reported by the respondents to be most knowledgeable about the finances of the couple. For singles the financial respondent is the (sole) respondent.

[4] A nested composite imputation procedure was used to handle non-response to asset and total income questions. Asset ownership, unfolding brackets, and asset amounts were imputed sequentially. Dollar amounts are based on cross-wave imputation in which a reported value from one wave is used as a covariate in finding the nearest neighbor in the other wave.

[5] The survey questions that were used in waves 1 and 2 are given in the Appendix.

lives.[6] Wealth includes housing wealth, financial wealth and other nonfinancial wealth.

The table shows that couples have somewhat more than twice the wealth of singles whether measured by the mean or median. Wealth declines with age. The age profile is due to differences in the lifetime wealth of the cohorts, wealth change with age among survivors (life-cycle effects), and the tendency of the more well-to-do in a cohort to have higher survival rates (differential mortality).

Table 2 shows for each of the assets the rate of ownership, which is the percentage of households that own each asset, and the fraction of total wealth in each asset.[7] The headings in the table are, in some cases, shorthand for a more extensive list of assets. For example, "checking and savings" refers to "checking or savings accounts, or money market funds." The exact coverage can be found in the Appendix.

Among both singles and couples the ownership rate of housing declines steadily with age. Because cohort effects are unlikely to be strong enough to produce such a decline, the ownership rate indicates that the rate of home owning declines with age, a life-cycle effect. This conclusion is reinforced by a comparison of home ownership in the cohort of 1906-1911 as measured in 1979 in the Retirement History Survey with the rate in AHEAD. In the RHS when the cohort was 68-73, 70.6% of households owned a home (Hurd and Shoven, 1985); in AHEAD wave 1 when the cohort was 83-88, 64,1% of the cohort owned a home (not shown). Accounting for differential mortality would dampen the reduction, so the true life-cycle effect is larger. This finding is at odds with the literature on life-cycle home ownership. For example, Venti and Wise (1989) conclude that the elderly do not reduce ownership or equity as they age. Their conclusions are based on the RHS, and likely differ from these because the RHS sample had not yet reached the ages at which asset reduction occurs.

Among singles the ownership rates of real estate and businesses decline with age as would be the case if their ownership required some level of personal input that becomes more difficult with age. However, the ownership rates of financial assets such as stocks, bonds and CDs also decline with age even though they can be held with little active personal input. The most obvious explanation is connected with the lower levels of wealth at advanced age. If there are indivisibilities of ownership or fixed costs, less wealth will be associated with fewer types of assets. If housing and checking provide service flows that most households require, ownership will be concentrated in those assets at lower levels of wealth. With respect to checking this explanation is reasonably well supported by the data on the holdings of checking accounts by singles, and somewhat less so for couples, although the magnitude of the wealth decline with age is considerably greater for couples than for singles. An additional factor is that especially among older singles, a considerable fraction are fairly recently widowed women who will retain checking accounts unless they take action. A final factor may simply be the highly selected sample of married people aged 85 or over: in wave 1 there were just 289 married people in that age group,

---

[6]In this paper a household is either a single person or a couple. The assets of other economically interdependent persons, whether related or not, are not included.

[7]The fraction of total wealth is the total wealth in the asset divided by total wealth, not the average of the fractions.

or 7.7% of all age-eligible married people.

IRA ownership declines sharply with age, partly a cohort effect: IRAs were not widespread until the 1980s when the older persons of the AHEAD cohort was already retired. IRAs can still be acquired after retirement by rolling over a DB or DC pension plan into an IRA, or by having a younger spouse retire with a pension cash-out that is rolled into an IRA, but among the oldest cohorts this would have been a rare event. The implication is that the current rate of IRA ownership by age is not a good guide to future ownership rates.

The fraction of wealth in each asset varies with age in a rather different manner from the rate of ownership. For example, the fraction in housing is almost constant with age whereas the ownership rate declines steadily. The fraction in financial assets is constant or even increases with age. A mechanical explanation is that IRAs which account for about nine percent of the assets of couples were not available to older couples. A somewhat more behavioral explanation is that with increasing age singles and couples sell housing, business and real estate and transfer the receipts into financial assets. In addition as the less well-to-do reduce their assets they eliminate small holdings of financial assets, thus reducing the ownership rate.

Table 3 shows real panel wealth by marital status transition. In this table wave 1 wealth is greater than wave 1 wealth as shown in Table 1 because of differential mortality: Table 3 only includes survivors to wave 2. The effect for couples can be seen by comparing the wave 1 wealth of couples that survived to wave 2 with wave 1 wealth of couples in which one spouse died. For example, among those aged 70-74 the surviving couple had mean and median wealth of $251.5 and $150.5 whereas the couples in which a spouse died had wealth of $212.6 and $90.5.

To avoid double-counting couple households when calculated the wealth of "all," one of the spouses is chosen according to the following selection rule: if just one spouse is age-eligible that spouse is chosen; if just one spouse survives to wave 2 that spouse is chosen provided he or she is age-eligible; otherwise one is chosen at random. Therefore, the table represents the wealth of households in which at least one age-eligible spouse survives to wave 2. This selection rule will be followed in later tables as noted.

The main feature of Table 3 is that wealth increased between the waves, especially as measured by the mean. Among couples mean wealth increased by 32%, and the median increased by 19%. Among singles the increase was smaller, 23% at the mean. Median wealth among singles was small and showed little change between waves. These results are distinct from panel wealth change based on the RHS, SIPP and other data as discussed in Section 2, and they show the difficulty of studying life-cycle behavior during periods when ex post rates of return on assets are substantially different from historical rates. The gains in wealth could not have been due to saving out of conventionally measured income: for example, total income over the two years of the panel was about $42 thousand, yet average wealth increased by $42.2 thousand. Among couples the gap is even larger: wealth increased by about $76 thousand yet total income was about $56 thousand.

The main unusual price change was in the stock market: over the two years of AHEAD a composite measure of the total return on stocks was about 32% real with all of the gain in the

second year of the panel.[8] The historical rate (since 1950) was about 10% per year. Corporate bonds also had a much higher return than historical averages: they had a real return of about 14% over the two years of AHEAD compared with a historical rate of about 1.6% per year. They were especially volatile having a negative return of 13% in the first year between waves 1 and 2 and a positive return of 27% over the second.

A second finding is that wealth increased even when there was a widowing. For example, mean wealth increased by 22%. Results based on the RHS showed fairly large declines in wealth at widowing, and they were used to explain the high rate of poverty that accompanies widowhood (Hurd and Wise, 1989). Whether this difference is due to the different ages of the RHS population, to differences in rates of return on assets, or to some other factor remains to be determined by further study.

Table 4 shows the panel change in wealth by asset type. Housing shows a decline in amount and as a fraction of total wealth. There was a large increase in the total in checking but a very stable fraction of wealth, both for all and for each marital status transition. The increases must have been the result of a re-balancing of portfolios because the real rate of return on this type of asset was about one percent; yet, say for couples, the increase in wealth was 34%.

The value of stock holdings more than doubled, and the share increased by about eight percentage points. The increase suggests either active additions to stocks and mutual funds or that the AHEAD population achieved above average returns: applying the observed rate of return on the S&P Composite would approximately increase wave 1 stock wealth to $29 thousand rather than to the observed $47 thousand.

Wealth in CDs also increased substantially. The magnitude of the increase implies active additions because rates of return on CDs could not have accounted for the increase.

Rates of asset ownership

Because of volatility in asset prices, it is difficult to understand portfolio allocation by studying changes in the value of each type of asset. An alternative, which will be followed in the rest of this paper, is to study asset ownership because transitions in ownership represent behavior by the AHEAD respondents, rather than being partially the result of price changes. Table 5 shows panel rates of ownership in waves 1 and 2. For example the rate home ownership in waves 1 and 2 among singles who survived from wave 1 to wave 2 was 66% and 64.3%. Among couples in which both spouses survived the rates were 90.6% and 88.6%. The columns labeled "steady-state" show the steady-state rate of ownership that would eventually occur were the panel transition rates between waves 1 and 2 to remain constant. The steady-state rates are calculated as

$$\frac{T}{T+1}$$

[8]AHEAD wave 1 was fielded in October of 1993 and completed in April of 1994. For examples of rates of return in the stock and bond market I will use December 31, 1993 and December 31, 1995 as the approximate interview dates.

and

$$T = \frac{1 - P_{00}}{1 - P_{11}}$$

where P_{00} is the transition probability from not owning in wave 1 to not owning in wave 2, and P_{11} is transition probability from owning in wave 1 to owning in wave 2. For example among singles in wave 1 who survived to wave 2, 66% owned a house in wave 1, and among them 93% continued to own in wave 2. Among the 34% who did not own in wave 1, 7% became owners by wave 2. The ownership rate in wave 2 declined to 64% because more left the state of "owner" than entered that state. If the transition rates persist, the decline will continue and eventually the ownership rate will reach 53.4%. Because the steady-state rates do not depend on the initial rates of ownership, they are independent of initial conditions.

Among singles the pattern of housing ownership by age is approximately the same in cross-section as in steady-state: both show substantial declines with age. Because of variation in the steady-state with age, which is caused by variation in the age-specific transition probabilities, the actual age path of 70-74 year-old singles will be determined by a sequence of the age-specific transition probabilities, but among those that survive well past age 85, the ownership rate will eventually reach 39%. This rate is somewhat lower than the observed rate of 48.7%, but the difference is to be expected because very old singles include a large number who were widowed in their 70s, and they entered widowhood with higher rates of home-owning than existing singles. For example, 10.4% of married people aged 75-79 at baseline died between the waves. Their rate of home-owning was 84.6% in wave 1. Singles aged 75-79 had a rate of home-owning of 61.6% in wave 1, so the newly widowed will tend to increase the rate of home-owning among singles.[9] In steady-state the infusion of greater ownership would not matter, but the system takes many years to reach steady-state as evidenced by the rather small fraction of the gap between baseline and steady-state that is covered by wave 2.

The age pattern among couples is similar to that of singles but the levels are higher and in cross-section there is less variation with age. Because of differential mortality a shallow age path among couples is to be expected: the persistent depletion from the population of couples of those households that have low rates of home-owning will increase the average rate of ownership among the survivors. The steady-state age path, which represents the path that would be followed by survivors in steady-state, is much steeper, declining by about 23 percentage points. The overall conclusion is that the observed housing transition rates are consistent with both the cross-section rates and the RHS cohort comparison, and indicate declining home ownership with age.

The pattern of real estate ownership is similar to that of housing.

Among couples the rate of business ownership is fairly high and it increased between the waves. The level is consistent with a pattern of older workers or the recently retired switching to

[9]Of course there may be an unusually high rate of home sales following widowing, which would reduce this effect.

self-employment late in life. A possible explanation for the panel increase in business ownership is rising levels of health which make late-in-life work more feasible.

Ownership rates of financial assets (checking, stocks, CDs and bonds) decline with age, although there is some variation in the pattern depending on marital status and type of asset. For example, among singles checking is almost constant with age whereas it declines among couples. As discussed in connection with housing, the cross-sectional age pattern of ownership among singles is complicated by the constant infusion of the newly widowed, who have more assets than the existing stock of singles.

The most important aspect of the ownership rates of financial assets is, in distinction to nonfinancial assets, that they all showed increases between the waves, and, as a result, the steady-state rates are higher than either the wave 1 or wave 2 rates. Unlike the situation with nonfinancial assets, the observed rates of transition are not consistent with the cross-section rates: the steady-state rates predict that ownership rates will increase as households age, yet financial asset ownership declines with age in cross-section. For example, according to the steady-state rates, singles aged 70-74 would increase their rate of ownership of stocks from 15.6% to 45.8% were they to survive to advanced old age. Yet, just 11.3% of singles aged 85 or over own stocks. The newly widowed could bring higher rates to the population of singles, but at baseline their rates of ownership are not high enough to raise the rate among singles to such high levels. The steady-state ownership rates of stock among couples is also much higher than baseline rates and are not consistent with the observed levels in cross-section. The obvious conclusion is that neither ownership rates nor the rates of transition have been constant.

The large increase in stock holdings between the waves is the result of a high rate of new ownership by the large fraction that did not own in wave 1: 80.2% of wave 1 households did not own stock in wave 1, and, as shown in the following table, 13.6% had become owners by wave 2. The rate of transition out of ownership was somewhat higher (16.1%) but the fraction of the wave 1 population with stocks (19.8%) was so low that the rate of stock holding increased substantially. The table also shows rather high differential mortality: the mortality rate among owners was 7.1% but among nonowners it was 11.4%.

Rates of transition of stock ownership status (percent)

Status in wave 1	Status in wave 2					
	Not owner	Owner	Died and single in wave 1	Died and married in wave 1	Attrition and other	Total
Not owner (80.2%)	69.0	13.6	6.6	4.8	5.5	100.0
Owner (19.8%)	16.1	72.9	3.2	3.9	3.9	100.0

The rate of ownership of IRAs increased somewhat in the younger age groups, and the steady-state rates predict further increases (Table 5).

Analysis of transitions

These transitions do not control for influences on transitions that may be related to age: for example, according to portfolio theory wealth itself may influence portfolio choice, and wealth declines with age. Analyzing all 11 assets is not practical, and is likely not to be revelatory because some are held by few people and some make up very small fractions of the portfolios. Rather the analyses will be restricted to the transitions of ownership of housing, checking, stocks, and CDs.

Housing is the most important asset for most of the elderly. It differs from most other assets in that it provides a service flow, the transaction costs in terms of money, physical effort and personal attachment are substantial, ownership provides tax advantages, and health conditions may make ownership impractical. Checking accounts provide a service flow, and they carry very little risk in that the interest rate is short-term and varies with the rate of inflation. Stocks have high average rates of return but with high variance over short or even medium terms. CDs have short maturities which are adjusted to reflect variation in short-term interest rates, so to the extent that short-term rates vary with the inflation rate, CDs have little risk. From the point of view of portfolio theory, the comparison of holdings of stock with the holdings of CDs is most revelatory because the other assets have features that may obscure the pure portfolio choice. If the elderly dissave as called for by the life-cycle model, people will reduce holdings of stocks and CDs, and the relative reduction should be determined by portfolio theory.

The analytical method will be to relate transitions in ownership to covariates that are thought to determine asset changes. The covariates are of two types: variables that under the life-cycle model would cause variation in the rate of asset decumulation; and variables that under portfolio theory would influence the relative balance between types of assets. According to a simple version of life-cycle model (only one asset), decumulation and, therefore, transitions into and out of ownership will be influenced by mortality risk, the flow of annuities with some distinction between Social Security and pensions due to the differential indexing for inflation,

wealth, marital status, and a bequest motive. The effects on wealth decumulation are signed under the life-cycle model only for mortality risk and a bequest motive. The other variables could cause the rate of wealth decumulation either to increase or decrease depending on utility function parameters and, in the case of couples, on returns to scale in consumption. In addition changes in the anticipated rate of return on assets will affect the consumption path, but the effects are uncertain: an increase in rates could cause either an increase or decrease in the rate of dissaving.

Under portfolio theory the same variables should affect portfolio balancing, although the effect of mortality is indirect, operating though the decline in consumption that is caused by mortality risk. Social Security income is a riskless source of resources allowing households to take on more portfolio risk; pension income is somewhat risky, but to the extent that inflation rates are uncorrelated with the rates of return on other assets, it should allow greater risk in the portfolio. Depending on the form of the utility function wealth itself can lead to greater risk taking. Married people and persons with a bequest motive have a different time horizon from singles and from people who lack a bequest motive, and this may cause variation in portfolio choice.

An additional complication is that a number of assets have features that make them imperfect substitutes for other assets. Housing and checking are examples, but real estate and businesses are likely to be imperfect substitutes. IRAs have tax aspects and they cannot be established at advanced ages except under special circumstances.

Table 6 has results from the logistic estimation of the probability of the transition from owning housing to owning housing and from not owning housing to owning housing. The own-to-own transition is calculated over 3541 observations on households that owned housing in wave 1. Singles and couples are combined, but only one observation on a couple is selected, following the selection rule outlined earlier. Separate estimations by marital status produce similar results but with larger standard errors, so they are not reported. The wealth quartiles are the quartiles of singles or couples as appropriate. The average transition probabilities were 0.938 for own-to-own and 0.070 for not own-to-own.

Consider first the transition from owning to owning. As in the cross-tabulations age effects are strong: among those 90 or over the probability of continuing to own is about 25% lower than among those 70-74. Couples are about 17% more likely to continue to own than singles. There is a positive association with wealth with the highest quartile about 18% more likely to retain housing than the lowest quartile.[10] The implication is that the less well-to-do are more likely to sell a house, possibly to finance nonhousing consumption. Neither pensions nor Social Security has an effect among singles, but among couples pension income of $10,000 per year increases the retention rate by about 20%. If the AHEAD respondents have children the retention rate is reduced, a result that is not consistent with a bequest motive. The subjective survival probability increases the retention rate, which is consistent with the Life-cycle model: variation from 0 to 1 increases the rate by 13%. The variables that indicate missing data or proxy interview often indicate poor health. Typically they are associated with dissaving, although in this table they have little effect.

The transition to ownership shows no age effects, but otherwise has the same general

[10]As shown at the bottom of the table, the rate in the lowest quartile is 0.927.

pattern as the transition from owning to owning: higher wealth is associated with greater ownership in wave 2 as is the subjective survival probability.

Table 7 has similar results for transitions involving checking accounts. With the exception of the top age band, age has little effect on the retention rate. The transitions increase sharply in wealth. Pension and Social Security income increase the transitions for singles but not for couples.

The transition from not owning to owning shows a small increase for those who are in their 80s. The effect at 90 is approximately zero: those aged 90 or over were not queried about the subjective survival probability, so the total "age 90 effect" is the sum of the coefficients on the indicator for age 90+ and the indicator for missing subjective survival probability (0.68 ! 0.71). Pension and particularly Social Security income increase substantially the transition to ownership: for example, $1,000 in Social Security income increases the rate by 18%. Generally the same variables that increase the retention rate increase the rate of new ownership.

Although the transition probabilities for stocks and mutual funds (Table 8) show one significant age coefficient (age 75-79), it is hard to see any overall trend with age, particularly on the rate of new acquisition. As with housing and checking wealth effects are substantial: for example those in the highest quartile had about a seven-fold greater probability of new acquisition than those in the lowest quartile. Among singles, pension and Social Security income increase the probability of purchasing, and the effect of a high level of Social Security income is about as large as the wealth effects. Apparently with the growing availability of mutual funds in the 1990s, the reduction in transaction costs, and, possibly, the very large gains in the stock market in the year prior to AHEAD wave 2, a substantial number of the more well-to-do in the AHEAD cohort became new stock owners.

Table 9 has the logistic estimations for CD transitions. Age has no systematic effect on the retention of CDs. The wealth effects are weaker than for the other financial assets and none is significant.

The transition probabilities from owning to owning and from not owning to owning can be summarized by the steady-state ownership rates that the transition probabilities imply. The method is to calculate a baseline steady-state probability of owning from the estimated logistic transition models, and then successively to alter the baseline transition probability models by the estimated effects of each covariate and recalculate the steady-state rate of ownership. The effect of a covariate can be summarized as the probability of ownership relative to the baseline probability.

Table 10 has the relative probability of holding housing, checking, stocks, and CDs in steady-state as a function of the covariates. For example, those aged 75-79 are predicted to have a relative rate of owning housing that is 10.3% greater than those aged 70-74. In that the baseline predicted steady-state probability is 0.533 (last row of table) the difference in rates is 5.5 percentage points. The probability is higher among 75-79 year-olds because both the transition rates from owning to owning and the transition rates from not owning to owning are higher than they are for 70-74 year-olds (Table 6).

Housing ownership has a clear downward trend with age. Checking has no relation to age. Both stocks and CDs have higher ownership rates at 75-79 compared with 70-74, but at greater ages there is no clear pattern. Couples will have higher ownership rates in steady-state

than singles: under the assumption that the financial variables adequately control for wealth and income effects, these result indicate that couples hold more diversified portfolios than singles. Higher wealth is associated strongly with greater rates of asset ownership, particularly for stocks and CDs. Among singles, pension income and Social Security income increase ownership rates; with one exception the effects are smaller for couples. Those with children have lower rates of ownership. The subjective survival probabilities show no consistent pattern.

Portfolio theory and portfolio choice

The clearest test of the applicability of portfolio theory to the observed portfolio choices by the elderly comes from a comparison of the determinants of the holdings of stocks with the determinants of the holdings of CDs. Both types of assets have fairly small transactions costs; neither produces a flow of services and neither requires an active involvement of the holder of the asset. The rate of return on stocks is high and the variance is high over the short to medium term. The rate of return on CDs in low and the variance is low.

Of the variables that explain the rates of asset ownership, portfolio theory gives the most straightforward prediction about the relative effects of Social Security income, and a somewhat less straightforward prediction for pension income. Under the assumption that Social Security income is certain, those with relatively high levels should assume more risk. In that an increase in Social Security also increases resources, which as implied by the coefficients on wealth will, by itself, increase stock and CD ownership, the relevant comparison is the effect on stocks relative to the effect on CDs.

Table 10 shows that, indeed, increases in Social Security income are associated with higher stock ownership relative to CD ownership: for every $1,000 of Social Security income stock ownership increases by 6.6% (relative to baseline) compared with 3.8% in CD ownership. Because baseline stock ownership rates are higher than baseline CD rates, the relative increase translates into larger percentage point differences: an increase of $1,000 in Social Security income is associated with a 2.9 percentage point increase in stock holdings and with 1.4 percentage point increase in CD holdings (not shown). Thus, for example, a single person with average Social Security income ($7.24 thousand) is about 21 percentage points more likely to hold stocks than a single person with no Social Security income and about 10 percentage points more likely to hold CDs, for a difference of 11 percentage points. Among couples the effects of Social Security income are reduced relative to singles: it has almost no effect on the holdings of CDs and increases stock holdings be about 4% relative to baseline. In terms of percentage points, Social Security increases stock holdings by about 1.9 percentage points and CD holdings by 0.3 percentage points. This differential is almost the same as the differential for singles.

Portfolio theory predicts that risky income will cause less of a risky asset to be held when the risks to the income and to the asset are positively correlated. It is not clear whether the correlation is positive in the case of pension income and stocks. Most pension income is not indexed, so it is at risk from increases in inflation. Although in the long-run stocks are likely to be effectively indexed, over the short and medium terms they may not be, and at least over some historical periods the stock market did not perform well when inflation was accelerating. If this were the case, pension income and stocks would have positively correlated risk; then we would

expect smaller increases in stock holdings relative to CDs resulting from an increase in pension income than in the case of Social Security income. As shown in Table 10 the data are not contradictory simply because pension income has almost no effect on either stock or CD holdings.

Greater wealth is associated with higher rates of ownership of all assets. This is consistent with the view that there are fixed costs of ownership, which could be monetary or informational. However, portfolio theory suggests that people with more wealth should hold a greater share of risky assets if they exhibit decreasing absolute risk aversion. A comparison between CDs and stocks shows that the steady-state rate of ownership increased at about the same rate for each type of asset as wealth increased.

The effect of the subjective survival probability is quite different for ownership of stocks versus CDs: both respondent and spouse subjective survival probabilities increase ownership rates of stocks but both decrease rates for CDs. Conditional on the life-cycle model, this finding is consistent with portfolio theory if there is decreasing absolute risk aversion. High survival probabilities flatten the consumption path causing more wealth to be held, and the higher wealth will lead to holding more risky assets. However, this interpretation is rather tenuous in view of the lack of a differential wealth effect as directly measured.

5. Conclusion

Although not connected with the theory of portfolio choice, a notable finding is that home owning declined in the panel both in value and in the rate of ownership. The finding is consistent across age groups and by marital status, and persisted after controlling for covariates via logistic estimation of transition probabilities. These results suggest that downsizing of home owning is the norm, and that prior contradictory findings were due to inadequate data.

A second notable finding is the large increase in bequeathable wealth in the panel. In view of the substantial increases in asset prices, an increase is not surprising. However, it is not obvious how to find desired or anticipated saving rates from the observed changes in wealth in the AHEAD panel.

The theory of portfolio choice received some support from the comparison of the steady-state rate of owning CDs versus owning stocks as a function of Social Security income. Other tests provided weak or little support.

Appendix

The following has the survey questions that measured asset holdings in AHEAD. The words in all capitals are interviewer instructions.

AHEAD wave 1

F25. Do you (and your (husband/wife/partner)) own your (house/apartment/home), rent it, or what?

K2. Do you (or your (husband/wife/partner)) have any real estate (other than your main home), such as land, a second home, rental real estate, a partnership, or money owed to you on a land contract or mortgage?

K4. What about the value of what you (or your (husband/wife/partner)) own for transportation, like cars, trucks, a trailer, a motor home, a boat, or an airplane -- what are they worth altogether, minus anything you still owe on them?

K5. Do you (or your (husband/wife/partner)) own part or all of a business?

K7. Do you (or your (husband/wife/partner)) have any Individual Retirement Accounts, that is, IRA or Keogh accounts?

K10. (Aside from anything you have already told me about,) Do you (or your (husband/wife/partner)) have any shares of stock in publicly held corporations, or mutual funds?

K12. (Aside from anything you have already told me about,) Do you (or your (husband/wife/partner)) have any money in checking or savings accounts, or money market funds?

K14. (Aside from anything you have already told me about,) Do you (or your (husband/wife/partner)) have any money in certificates of deposit, government savings bonds, or Treasury bills?

K16. (Aside from anything you have already told me about,) Do you (or your (husband/wife/partner)) have any corporate, municipal, government, or foreign bonds, or any bond funds?

K21. Do you (or your (husband/wife/partner)) have any other savings or assets, such as jewelry, money owed to you by others, a collection for investment purposes, or an annuity that you haven't already told me about?

[IWER: EXCLUDE THE CASH VALUE OF ANY LIFE INSURANCE POLICIES]

K23. And do you (or your (husband/wife/partner)) have any debts that we haven't asked about, such as credit card balances, medical debts, life insurance policy loans, loans from relatives, and so forth?

AHEAD wave 2

F3. Do you (and your Husband/Wife/Partner) own your home, rent it, or what?

J14. Do you (or your Husband/Wife/Partner) have any real estate (other than your main home or second home), such as land, rental real estate, a partnership, or money owed to you on a land contract or mortgage?

J17. Do you (or your Husband/Wife/Partner) own part or all of a business or farm?

J20. Do you (or your Husband/Wife/Partner) currently have any money or assets that are held in an Individual Retirement Account, that is, in an IRA or KEOGH account?

J36. (Aside from anything you have already told me about..) Do you (or your Husband/Wife/Partner) have any shares of stock or stock mutual funds?

J40. (Aside from anything you have already told me about..) Do you (or your Husband/Wife/Partner) have any corporate, municipal, government or foreign bonds, or bond funds?

DO NOT COUNT GOVERNMENT SAVINGS BONDS OR TREASURY BILLS.

J44. (Aside from anything you have already told me about..) Do you (or your Husband/Wife/Partner) have any checking or savings accounts or money market funds?

J47. (Aside from anything you have already told me about..) Do you (or your (husband/wife/partner)) have any money in Certificates of Deposit, Government Savings Bonds, or Treasury Bills?

J51. Do you (or your Husband/Wife/Partner) own anything for transportation, like cars, trucks, a trailer, a motor home, a boat, or an airplane?

J52. Do you (or your Husband/Wife/Partner) have any other savings or assets, such as jewelry, money owed to you by others, a collection for investment purposes, rights in a trust or estate where you are the beneficiary, or an annuity that you haven't already told us about?

EXCLUDE THE CASH VALUE OF ANY LIFE INSURANCE POLICIES

J81. And do you (or your Husband/Wife/Partner) have any debts that we haven't asked about, such as credit card balances, medical debts, life insurance policy loans, loans from relatives, and so forth?

References

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, and NBER Working Paper 7048

Hurd, Michael D., Daniel McFadden and Angela Merrill, 1998, "Predictors of Mortality among the Elderly: Wealth, Income, Education and Subjective Survival Probabilities," presented at the American Economic Association Annual Meetings, Chicago, January, 1998, and at the NBER Conference on the Economics of Aging, The Boulders, AZ, May, 1999.

Hurd, Michael D. and John B. Shoven, 1985, "Inflation Vulnerability, Income, and Wealth of the Elderly, 1969-1979," in *Horizontal Equity, Uncertainty, and Economic* Well-Being. Eds.: Martin David and Timothy Smeeding. Chicago: The University of Chicago Press, 125-172.

Soldo, Beth, Michael Hurd, Willard Rodgers and Robert Wallace, 1997, "Asset and Health Dynamics among the Oldest Old: An Overview of the AHEAD Study," *The Journals of Gerontology*, Series B, 52B. Special Issue, May, pp 1-20

Venti, S. and D. Wise, 1989, "Aging, Moving, and Housing Wealth," *The Economics of Aging*. D. Wise. Chicago, University of Chicago Press.

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

Table 1
Wealth in wave 1 (thousands)

	Single			Married		
Age	Observations	Mean	Median	Observations	Mean	Median
70-74	1060	122.3	51.2	1713	245.3	142.0
75-79	1008	107.1	51.0	1064	237.1	120.0
80-84	857	90.4	42.5	662	199.8	112.6
85+	739	85.0	28.2	297	163.6	81.0

Table 2
Asset ownership rate (percent) and fraction of total wealth

	Singles		Couples	
Asset type and age band	Ownership	Fraction	Ownership	Fraction
House				
70-74	64.8	0.453	90.0	0.378
75-79	61.6	0.481	86.7	0.378
80-84	58.9	0.467	82.4	0.385
85+	48.2	0.428	74.7	0.410
Real estate				
70-74	13.7	0.145	29.2	0.143
75-79	12.4	0.165	24.6	0.158
80-84	12.4	0.126	23.6	0.140
85+	10.3	0.112	13.8	0.074
Business				
70-74	3.3	0.034	8.6	0.042
75-79	2.0	0.019	6.3	0.042
80-84	1.9	0.014	3.5	0.033
85+	0.8	0.020	2.1	0.008
Checking and savings				
70-74	70.4	0.101	82.1	0.085
75-79	69.0	0.106	80.4	0.107
80-84	70.6	0.135	78.3	0.124
85+	65.3	0.133	71.6	0.138
Stocks and mutual funds				
70-74	14.8	0.089	28.7	0.126
75-79	13.6	0.094	25.3	0.131
80-84	13.3	0.110	23.6	0.133
85+	10.4	0.137	21.1	0.193

CD				
70-74	18.0	0.050	27.9	0.042
75-79	18.4	0.056	25.4	0.051
80-84	16.4	0.077	25.6	0.082
85+	16.0	0.101	19.7	0.098
Bonds				
70-74	4.1	0.024	8.3	0.032
75-79	3.9	0.020	9.0	0.030
80-84	3.5	0.031	7.3	0.030
85+	3.0	0.034	6.9	0.044
IRA				
70-74	15.9	0.053	36.6	0.090
75-79	5.3	0.015	16.7	0.035
80-84	1.9	0.004	10.2	0.018
85+	0.8	0.004	4.2	0.010
Transportation				
70-74	66.2	0.035	93.4	0.048
75-79	62.3	0.036	91.9	0.051
80-84	52.8	0.029	88.0	0.038
85+	37.2	0.019	75.1	0.030
Other				
70-74	8.2	0.018	15.2	0.020
75-79	6.8	0.012	13.8	0.016
80-84	5.3	0.011	10.6	0.022
85+	6.8	0.015	5.2	0.008
Debt				
70-74	17.9	0.004	17.6	0.009
75-79	15.3	0.004	14.9	0.003
80-84	10.8	0.003	8.8	0.004
85+	4.9	0.002	6.6	0.005
Number of observations				
70-74	*1062*		*1698*	
75-79	*1009*		*1060*	
80-84	*856*		*660*	
85+	*740*		*289*	

Table 3
Wealth in waves 1 and 2, panel (thousands, 1993$)

			Mean		Median	
Marital transition	Age	Number	Wave 1	Wave 2	Wave 1	Wave 2
Married to married						
	70-74	1433	251.5	315.0	150.5	167.6
	75-79	817	248.0	310.9	129.5	158.6
	80-84	484	212.1	323.1	119.5	164.8
	85+	184	188.8	324.6	100.3	109.5
	all	2918	240.0	315.8	135.0	160.8
Single to single						
	70-74	901	130.1	150.9	53.0	57.0
	75-79	845	107.9	138.1	53.1	57.4
	80-84	684	96.1	120.9	45.1	42.7
	85+	542	92.0	114.9	31.5	38.0
	all	2972	109.0	133.8	47.5	49.4
Married to single						
	70-74	101	212.6	206.8	90.5	116.8
	75-79	90	147.8	189.9	86.6	86.0
	80-84	68	168.2	196.6	82.3	99.7
	85+	32	137.4	325.2	70.3	46.5
	all	291	173.9	212.3	86.0	91.7
All						
	70-74	1961	191.4	229.2	95.0	106.7
	75-79	1392	161.1	202.8	75.1	86.0
	80-84	1074	134.8	183.8	65.0	64.4
	85+	675	110.2	155.2	41.0	47.5
	all	5102	160.5	202.7	76.0	83.6

Table 4
Average wealth by asset type and fraction of total wealth in asset (thousands 1993$)

	Wave 1		Wave 2	
Asset and marital transition	Wealth in asset	Fraction	Wealth in asset	Fraction
House				
married to married	88.5	0.369	84.4	0.267
married to single	72.5	0.417	62.4	0.294
single to single	49.8	0.457	47.0	0.351
all	69.1	0.397	65.3	0.292
Real estate				
married to married	35.7	0.149	31.4	0.099
married to single	21.1	0.121	37.1	0.175
single to single	16.0	0.147	13.0	0.097
all	25.5	0.147	23.2	0.104
Business				
married to married	10.3	0.043	25.0	0.079
married to single	2.2	0.012	9.9	0.047
single to single	2.1	0.019	6.3	0.047
all	6.0	0.035	15.3	0.068
Check				
married to married	24.2	0.101	32.4	0.103
married to single	18.7	0.108	23.6	0.111
single to single	12.1	0.111	14.4	0.108
all	18.1	0.104	23.5	0.105
Stock				
married to married	31.5	0.131	67.6	0.214
married to single	27.2	0.157	36.3	0.171
single to single	11.5	0.105	27.2	0.203
all	21.7	0.125	46.6	0.208
CD				
married to married	12.8	0.053	24.2	0.077
married to single	11.0	0.063	25.5	0.120
single to single	7.1	0.065	13.0	0.097
all	10.0	0.057	18.9	0.084
Bond				
married to married	7.5	0.031	18.7	0.059
married to single	8.0	0.046	3.5	0.016
single to single	3.1	0.028	4.4	0.033
all	5.4	0.031	11.2	0.050
IRA				
married to married	15.2	0.063	18.2	0.058
married to single	5.6	0.032	6.1	0.029
single to single	2.8	0.026	3.2	0.024
all	8.8	0.050	10.4	0.046

Transportation				
married to married	11.4	0.048	10.0	0.032
married to single	6.6	0.038	4.9	0.023
single to single	3.3	0.030	3.1	0.023
all	7.3	0.042	6.5	0.029
Other				
married to married	4.6	0.019	5.6	0.018
married to single	2.0	0.012	4.1	0.019
single to single	1.6	0.015	2.6	0.020
all	3.1	0.018	4.1	0.018
Debt				
married to married	1.6	0.007	0.8	0.003
married to single	0.5	0.003	1.2	0.006
single to single	0.3	0.003	0.5	0.004
all	0.9	0.005	0.7	0.003

Note: Based on 2918 observations married to married; 291 observations married to single; and 2972 observations single to single.

Table 5
Rate of asset ownership (percent), waves 1, 2 and steady-state

	Singles			Couples		
Age and asset type	Wave 1	Wave 2	Steady-state	Wave 1	Wave 2	Steady-state
House						
70-74	66.0	64.3	53.4	90.6	88.6	72.1
75-79	62.6	61.7	56.4	86.9	85.3	76.2
80-84	58.9	54.0	27.6	85.1	80.1	54.0
85+	48.7	46.9	39.1	76.1	73.0	48.9
Real Estate						
70-74	14.5	12.1	9.0	29.9	23.2	15.7
75-79	12.4	9.9	7.4	24.3	18.9	13.6
80-84	14.1	9.4	6.1	24.0	18.8	13.9
85+	11.1	7.8	6.3	12.8	8.4	4.7
Business						
70-74	3.8	4.4	5.3	9.1	10.4	11.9
75-79	1.8	3.1	3.9	6.5	8.9	12.4
80-84	2.3	3.8	4.4	4.0	8.2	16.8
85+	0.7	3.0	8.8	1.8	2.7	2.9
Check						
70-74	72.0	77.3	81.6	83.8	89.1	91.7
75-79	70.5	77.7	82.5	80.6	87.9	90.5
80-84	70.3	79.1	84.0	78.1	86.2	89.8
85+	68.3	74.2	76.2	70.8	81.4	85.0
Stock						
70-74	15.6	23.9	38.2	29.9	39.6	53.8
75-79	14.5	21.4	36.9	26.2	37.4	59.2
80-84	13.2	19.6	29.5	25.7	36.2	54.9
85+	11.3	20.7	45.8	20.8	29.2	47.0
CD						
70-74	18.8	24.9	31.3	28.7	34.5	38.8
75-79	19.0	27.0	35.1	25.9	39.7	49.4
80-84	16.7	25.6	32.3	27.5	39.7	47.0
85+	17.2	25.8	31.7	19.0	29.6	41.3
Bond						
70-74	4.7	7.3	10.9	8.6	12.4	16.0
75-79	3.9	6.0	7.7	9.6	12.3	14.4
80-84	3.4	4.8	6.5	8.4	11.8	13.9
85+	3.5	4.1	4.3	7.1	14.6	16.2
IRA						
70-74	17.3	19.4	28.4	37.2	39.3	46.6
75-79	5.5	6.0	8.2	17.4	19.1	26.0
80-84	2.2	2.5	2.8	11.7	11.5	10.9
85+	0.6	1.3	1.3	4.0	2.7	1.0

Transportation						
70-74	67.9	62.1	28.1	94.3	91.2	85.7
75-79	62.8	55.5	25.7	92.5	86.8	62.3
80-84	54.8	45.4	11.9	90.4	82.2	63.0
85+	38.6	25.1	0.8	77.4	62.4	16.0
Other						
70-74	9.1	6.4	5.2	16.1	13.5	12.6
75-79	7.4	5.6	5.1	14.5	11.2	9.8
80-84	5.4	5.4	5.4	11.5	10.2	9.5
85+	7.0	4.4	3.6	5.8	5.3	5.1
Debt						
70-74	17.8	17.6	17.5	17.7	17.9	18.1
75-79	15.4	12.3	11.1	15.3	13.1	12.2
80-84	10.8	9.4	8.8	8.7	10.4	11.1
85+	5.7	5.0	4.7	7.1	5.3	4.4

Table 6
Logistic estimation of transition probabilities, Housing

	Own wave 1 to own wave 2			Not own wave 1 to own wave 2		
	estimate	asymptotic t	relative risk	estimate	asymptotic t	relative risk
Constant	2.51	5.87	–	-3.89	8.20	–
Age 70-74	–	–	–	–	–	–
Age 75-79	0.05	0.28	1.02	0.19	0.68	1.16
Age80-84	-0.60	3.19	0.80	-0.35	1.02	0.75
Age85-89	-0.61	2.54	0.80	0.40	1.17	1.36
Age90 or over	-0.74	1.86	0.75	-0.02	0.03	0.99
Single	–	–	–	–	–	–
Married	0.68	1.70	1.17	1.54	2.51	2.69
Lowest wealth quartile	–	–	–	–	–	–
Second	0.28	1.02	1.08	0.09	0.31	1.07
Third	0.37	1.31	1.10	0.69	1.99	1.66
Highest	0.72	2.41	1.18	0.39	0.88	1.34
Pension income ‘000	-0.01	0.62	1.00	0.04	1.67	1.03
Social Security income ‘000	0.01	0.55	1.00	0.02	0.59	1.02
Married × pension income	0.05	2.22	1.02	-0.02	0.32	0.99
Married × Social Security income	-0.04	0.96	0.99	-0.15	1.87	0.89
Has children	-0.60	2.55	0.80	0.50	1.61	1.46
Subjective survival probability (0-1)	0.49	1.96	1.13	1.15	3.22	2.20
Spouse subjective survival probability	0.25	0.63	1.07	-0.94	1.09	0.45
Proxy interview in wave 1	0.13	0.41	1.04	0.61	1.73	1.57
Spouse proxy interview in wave 1	0.16	0.38	1.05	-0.50	0.74	0.66
Subjective survival probability missing	-0.09	0.40	0.97	-0.10	0.25	0.92
Spouse subjective survival probability missing	0.25	0.54	1.07	-0.48	0.56	0.67
Average probability		*0.938*			*0.070*	
Average probability 1st wealth quartile		*0.927*			*0.070*	
Number of observations		*3541*			*1415*	

Table 7
Logistic estimation of transition probabilities, Checking and Saving

	Own wave 1 to own wave 2			Not own wave 1 to own wave 2		
	estimate	asymptotic t	relative risk	estimate	asymptotic t	relative risk
Constant	0.85	3.05	–	-1.39	4.89	–
Age 70-74	–	–	–	–	–	–
Age 75-79	0.15	0.98	1.04	-0.07	0.41	0.95
Age80-84	0.08	0.45	1.02	0.29	1.59	1.25
Age85-89	-0.02	0.09	0.99	0.38	1.74	1.34
Age90 or over	-0.75	2.83	0.75	0.68	1.96	1.65
Single	–	–	–	–	–	–
Married	0.54	1.63	1.14	1.49	4.20	2.63
Lowest wealth quartile	–	–	–	–	–	–
Second	0.49	3.43	1.13	0.66	4.19	1.63
Third	1.40	7.88	1.29	1.18	6.21	2.24
Highest	1.68	8.63	1.32	1.19	4.24	2.26
Pension income ‘000	0.05	2.33	1.02	0.09	2.77	1.07
Social Security income ‘000	0.05	1.99	1.01	0.21	7.78	1.18
Married × pension income	-0.04	1.56	0.99	-0.01	0.26	0.99
Married × Social Security income	-0.02	0.57	0.99	-0.13	2.96	0.90
Has children	0.04	0.27	1.01	-0.33	1.73	0.76
Subjective survival probability (0-1)	-0.24	1.19	0.93	-0.16	0.73	0.88
Spouse subjective survival probability	1.02	2.68	1.24	0.13	0.31	1.11
Proxy interview in wave 1	-0.47	2.24	0.85	-0.58	2.53	0.61
Spouse proxy interview in wave 1	-0.21	0.72	0.93	-0.63	1.72	0.59
Subjective survival probability missing	-0.28	1.45	0.91	-0.71	3.81	0.55
Spouse subjective survival probability missing	-0.17	0.50	0.95	-0.72	1.82	0.54
Average probability		*0.906*			*0.539*	
Average probability 1st wealth quartile		*0.794*			*0.400*	
Number of observations		*3701*			*1255*	

Table 8
Logistic estimation of transition probabilities, Stocks and Mutual funds

	Own wave 1 to own wave 2			Not own wave 1 to own wave 2		
	estimate	asymptotic t	relative risk	estimate	asymptotic t	relative risk
Constant	-0.61	0.99	–	-3.98	15.14	–
Age 70-74	–	–	–	–	–	–
Age 75-79	0.50	2.18	1.34	0.05	0.45	1.05
Age80-84	-0.01	0.02	1.00	0.02	0.15	1.02
Age85-89	0.15	0.45	1.10	0.24	1.34	1.26
Age90 or over	1.36	1.71	1.93	0.16	0.51	1.17
Single	–	–	–	–	–	–
Married	0.42	0.88	1.28	1.15	4.28	3.04
Lowest wealth quartile	–	–	–	–	–	–
Second	1.20	2.50	1.83	0.78	4.52	2.14
Third	1.34	2.95	1.92	1.48	8.90	4.13
Highest	2.03	4.49	2.29	2.10	12.31	7.19
Pension income ‘000	-0.01	0.27	1.00	0.03	2.40	1.03
Social Security income ‘000	0.03	0.98	1.02	0.11	5.72	1.11
Married × pension income	0.01	0.42	1.01	-0.02	1.05	0.99
Married × Social Security income	-0.00	0.08	1.00	-0.05	1.75	0.96
Has children	-0.30	1.21	0.82	-0.09	0.72	0.91
Subjective survival probability (0-1)	0.10	0.33	1.06	0.09	0.57	1.09
Spouse subjective survival probability	0.20	0.50	1.13	0.05	0.22	1.05
Proxy interview in wave 1	-1.15	2.74	0.42	-0.84	3.46	0.44
Spouse proxy interview in wave 1	0.17	0.36	1.11	-0.44	1.62	0.65
Subjective survival probability missing	-0.16	0.43	0.90	-0.57	3.06	0.57
Spouse subjective survival probability missing	-0.72	1.46	0.60	-0.29	0.97	0.75
Average probability		*0.808*			*0.152*	
Average probability 1st wealth quartile		*0.519*			*0.048*	
Number of observations		*954*			*4002*	

Table 9
Logistic estimation of transition probabilities, Certificates of deposit

	Own wave 1 to own wave 2			Not own wave 1 to own wave 2		
	estimate	asymptotic t	relative risk	estimate	asymptotic t	relative risk
Constant	0.13	0.28	–	-3.27	14.58	–
Age 70-74	–	–	–	–	–	–
Age 75-79	-0.01	0.04	1.00	0.31	2.84	1.27
Age80-84	-0.07	0.37	0.98	0.33	2.72	1.29
Age85-89	-0.30	1.17	0.91	0.41	2.63	1.37
Age90 or over	0.22	0.45	1.06	0.71	2.97	1.69
Single	–	–	–	–	–	–
Married	-0.01	0.04	1.00	1.34	5.78	2.44
Lowest wealth quartile	–	–	–	–	–	–
Second	0.10	0.27	1.03	1.06	7.22	2.10
Third	0.68	1.90	1.17	1.84	12.74	3.06
Highest	0.63	1.75	1.16	1.83	12.07	3.05
Pension income ‘000	0.00	0.32	1.00	0.01	0.97	1.01
Social Security income ‘000	-0.01	0.48	1.00	0.08	4.94	1.07
Married × pension income	-0.00	0.18	1.00	-0.01	1.04	0.99
Married × Social Security income	0.02	0.53	1.01	-0.07	3.26	0.94
Has children	0.27	1.67	1.08	-0.25	2.17	0.81
Subjective survival probability (0-1)	-0.30	1.35	0.91	-0.45	3.19	0.68
Spouse subjective survival probability	-0.06	0.19	0.98	-0.31	1.41	0.78
Proxy interview in wave 1	-0.30	0.92	0.91	-0.80	4.09	0.51
Spouse proxy interview in wave 1	-0.05	0.15	0.98	-0.11	0.47	0.92
Subjective survival probability missing	-0.24	0.88	0.92	-0.54	3.60	0.63
Spouse subjective survival probability missing	-0.26	0.66	0.92	-0.08	0.30	0.94
Average probability		*0.654*			*0.199*	
Average probability 1st wealth quartile		*0.512*			*0.068*	
Number of observations		*1059*			*3897*	

Table 10
Relative probability of holding assets in steady-state fitted from logistic estimation: effects of characteristics

		Asset			
Explanatory variables and average values		house	check	stock	CD
Age 70-74	0.39	1.000	1.000	1.000	1.000
Age 75-79	0.27	1.103	1.015	1.264*	1.155*
Age80-84	0.21	0.603*	1.027	1.005	1.139*
Age85-89	0.10	0.909*	1.020	1.184	1.086*
Age90 or over#	0.03	0.609	0.826	1.395	1.075*
Single	0.59	1.000	1.000	1.000	1.000
Married	0.41	1.671*	1.099*	1.661*	1.601*
Lowest wealth quartile	0.26	1.000	1.000	1.000	1.000
Second	0.25	1.159	1.081*	1.848*	1.549*
Third	0.25	1.410*	1.137*	2.024*	2.048*
Highest	0.25	1.435*	1.146*	2.187*	2.022*
Pension income '000	3.47	1.013	1.012*	1.010*	1.005
Social Security income '000	7.24	1.013	1.019*	1.066*	1.038*
Married × pension income	2.25	1.013*	0.994	0.995	0.993
Married × Social Security income	3.00	0.917	0.988*	0.976	0.969*
Has children	0.84	0.955*	0.980	0.830	0.986*
Subjective survival probability (0-1)	0.33	1.563*	0.952	1.089	0.674*
Spouse subjective survival probability (0-1)	0.14	0.696	1.104*	1.118	0.823
Proxy interview in wave 1	0.08	1.298	0.864	0.324	0.533
Spouse proxy interview in wave 1	0.05	0.850	0.907	0.864	0.925
Subjective survival probability missing	0.13	0.917	0.883	0.669	0.653
Spouse subjective survival probability missing	0.06	0.898	0.903	0.599	0.864
Baseline steady-state probabilities		*0.533*	*0.853*	*0.436*	*0.360*

Includes the effects of "Subjective survival probability missing" because those aged 90 or over were not asked that question so they all have a missing value.

* One or both of the underlying coefficients significant at the 5% level. Not indicated for the last four variables.