Preliminary and incomplete– comments welcome

The link between individual expectations and savings: Do nursing home expectations matter?[1]

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Abstract

Long-term care is an important issue facing older Americans. Those who reach age 65 have a 40% chance of entering a nursing home, and about 10% of those who enter will stay there for at least five years. The costs of a stay are high with on average US$70,000 annually for a private room. Long-term stays in nursing homes are, therefore, not likely, but very expensive. In this paper, we examine individual expectations about future nursing home entry and study the relationship between these expectations and savings behavior, using data from the Health and Retirement Study. We find a clear relation between subjective expectations and probability of future nursing home entry, but no effect of these expectations on savings behavior for the majority of individuals. Only those with small positive non-housing wealth, which lies under the threshold for Medicaid eligibility, increase their savings rate in response to an increase in expectations. A plausible explanation for this might be that there is only little dissaving in order to qualify for Medicaid and that the fact that most respondents are old and live off a fixed income which makes it difficult for them to increase their savings enough to make a difference.

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1 Introduction

Long-term care is an important issue facing older Americans. Those who reach age 65 have a 40% chance of entering a nursing home, and about 10% of those who enter will stay there for at least five years.[3] About 1.6 million Americans were in a nursing home in 2004, of which 72% were women. The cost of a stay are high; on average there are estimated at US$60,000 and US$70,000 annually for a semiprivate and a private room, respectively, and may vary widely between regions (MetLife 2004).[4] Long-term stays in nursing home are, therefore, not likely, but very expensive.

Medicaid, the only governmental program that pays for this type of care, has strict asset and income requirements for eligibility, although it gives spouses of residents in nursing homes an allowance not subject to these eligibility requirements. Individuals are more likely to enter a nursing home with increasing age and often have some form of dementia: studies have found dementia among as much as half of those admitted to a nursing home (Banaszak-Holl et al. 2004; Magaziner et al. 2000).

Individuals might prepare financially for the case of admission into a nursing home in two ways: by increasing their saving, decreasing their saving so as to benefit from Medicaid earlier, and or by taking out private long-term care insurance. Individuals wanting to insure themselves against nursing home risk face a variety of obstacles: high premiums, which rise rapidly with age, rate increases, often no inflation protection, time and upper limits of benefits, and denied coverage because of pre-existing conditions. Long-term care insurance finances only about 3% of nursing home cost (Johnson and Ucello 2005).

The Health and Retirement Study (HRS) asks respondents, besides a wide variety of other questions, about their subjective probability of entering a nursing home in the future. This allows us to study the relation between individual expectations and behavior as well as actual admission to a nursing home.

Specifically, we are interested in two questions: First, do individuals have a sensible idea about their probability of entering a nursing home? Second, is individual

[3] U.S. Department of Health and Human Services, cited by the official governmental website for Medicare, http://www.medicare.gov.

[4] This number might increase in the future due to longer life expectancies and lower birth rates, but might decrease because of medical advances and increased emphasis on home care. For example, aging could decrease nursing home demand if it raises the supply of non-market care supplied by elderly women to elderly men (Lakdawalla and Philipson 2002).

savings behavior affected by these expectations? We are especially interested in gaining insight in the questions if individuals lack knowledge or if they have the knowledge but don't act, or if they do not need to act.

This study gives insights into individual decisions which involve a rather complex process of assessing nursing home entry risk, the necessity to save, and then actually execute these decisions.[5] Research in behavioral economics has shown that individuals tend to overweight low probabilities and have a tendency to procrastinate in executing unpleasant decisions (see, for example, O'Donoghue and Rabin 2001, and Frederick, Loewenstein, and O'Donoghue 2002). The probability of entering a nursing home falls in both of these categories – the probabilities given in general are low, and the decision to save more is unpleasant. In addition, future nursing home entry, and the connected factor of aging, might be something individuals would rather not think about too much.

Subjective expectations have been used more and more in economics as they have become available through surveys since the beginning of the 1990's (see Manski 2004 for an introduction and literature survey, and Bernheim 1990). They give additional information about individual decision processes, above and beyond objective variables such as age or income, and can be used to relax (or validate) assumptions on expectations (see, for example, Benitez-Silva and Dwyer, forthcoming, and Dominitz 2001).

There have been some challenges regarding the validity of subjective expectation data solicited through surveys. The survey questions are in most cases asking for the subjective probability of an event. Answers to these types of questions are often rounded (such as 25% rather than 23%), influenced by anchors in the questioning (such as initial values in unfolding bracket questions or previous questions), and there is also in some cases bunching at the answer of 50%, probably suggesting underlying uncertainty rather than a 50/ 50 chance. Other problems include answers above 100 or negative answers, and, depending on the question, a relatively high number of "don't know" or "refuse" answers. Answers that have these characteristics are difficult to interpret, and these problems are difficult to test for and solve in empirical estimations, although recently there has been some progress on

[5] We disregard in this paper the distinction between information and knowledge, although it is the latter that influences expectations. This distinction goes beyond the scope of this paper, but see the Information-Knowledge Symposium (2005) in EconWatch 2(1) for some discussion of the distinction.

some of the issues involved (van Soest and Hurd 2004a and 2004b). In addition to these problems, most questions do not elicit measures of the degree of the uncertainty, and interpersonal comparability of such answers might be limited (Dominitz and Manski 1997). Although we share these concerns, and will address them as possible in our analysis, we believe that the use of subjective expectation data can give a better understanding of individual behavior and decision-making, and therefore is of value for both research and policy-making, its limitations notwithstanding.

There has been a variety of research using subjective expectation data, which has shown that expectations are often linked to the probability of outcomes (see, for example, Hurd and McGarry 2002, Maestas 2004, and Stephens 2004). There is also a still small but growing literature analyzing the link between subjective expectations and economic behavior (see also Hamermesh 2004). For example, Nicholson and Souleles (2001) relate income expectations of medical students and their specialty choices, and find that a higher income expectation increases the probability of a specialty being chosen, even if students are misinformed. In a similar approach, Stephens (2004) links job loss expectations, outcomes, and consumption behavior. Although he finds a clear link between job loss expectations and outcomes, he finds no clear link to consumption behavior. Hurd, Smith, and Zissimopoulos (2004) find a link between subjective survival probabilities and retirement and social security claiming, although the effects are small.

We are extending this literature in several ways. First, we are looking at the subjective expectation of entering a nursing home in the future, which is an important and relevant risk for older individuals. Second, we analyze not only how well these expectations predict future nursing home entry, but we also analyze the effect of these expectations on savings behavior.

Our results show a clear relation between expectations of entering a nursing home and actual probability of entering one in the future. We find only little reaction to nursing home expectations in savings behavior. Specifically, we only find small negative effects of expectations on savings rates for individuals with zero or negative wealth, and positive effects for individuals with very low non-housing wealth, that is for individuals with less than US-$1,200. This implies that we find neither evidence for systematic dissaving nor for increased savings of the majority of individuals in response to changing nursing home expectations.

We proceed as follows. First, we assess if the subjective nursing home probabilities predict actual outcomes to assess the validity of the expectation variable. Then, we analyze if these expectations influence savings behavior, under special consideration of the heterogeneity of the respondents. We end with conclusions and suggestions for further research.

2 The Data and Sample Selection

We are using data from the Health and Retirement Study (HRS), from 1992-2002 and from all available cohorts.[6]

The HRS is a biennial survey which was started in 1992 with a national sample of 7,600 households with at least one individual born between 1931 and 1941. Both these individuals and their spouses are interviewed biennially. Blacks, Hispanics, and Florida residents are oversampled. The HRS is a comprehensive survey that collects information in a variety of areas, including demographics, health, retirement and pensions, and a variety of subjective expectations. In 1998, two more birth cohorts and their spouses were added, the Children Of The Depression (CODA), born between 1924 and 1930, and the War Babies (WB), born between 1942 and 1947. In 1998 the HRS was merged with its companion study, the Study of Assets and Health Dynamics Among the Oldest Old (AHEAD). AHEAD is, as the HRS, a national panel study and oversamples the same populations. It was started in 1993 with an initial sample of 7,447 respondents born in 1923 or earlier and their spouses, and again conducted in 1995.[7]

The main variable of interest to us in this paper is the subjective probability of entering a nursing home (from now on referred to as "nursing home expectation"). To understand our sample selection, we will first describe this variable.

The respondents were asked one of the following questions, depending on their age:

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[6] The HRS and AHEAD are sponsored by the National Institute of Aging and conducted by the University of Michigan. We are using the data files produced by the RAND Center for the Study of Aging (RAND HRS Data, Version D, and enhanced fat files). The RAND HRS Data file is an easy to use longitudinal data set based on the HRS data. It was developed at RAND with funding from the National Institute on Aging and the Social Security Administration. We are using the public use data set. The 2002 data taken from the enhanced fat files is Early Release data. These data have not been cleaned and may contain errors that will be corrected in the Final Public Release version of the dataset.

[7] See Juster and Suzman (1995) and the HRS website at http://hrsonline.isr.umich.edu/ for an overview of the HRS and AHEAD.

"What is the percentage chance that you will ever have to move to a nursing home?"

or

"What is the percentage chance that you will move to a nursing home in the next five years?"

Starting with HRS 1994, the respondents were given a definition of nursing homes, which was as follows:

"Nursing homes are institutions primarily for people who need constant nursing supervision or are incapable of living independently. Nursing supervision must be provided on a continuous basis for the institution to qualify as a nursing home. Please don't include stays in adult foster care facilities or other short-term stays in a hospital."

In the first two waves of AHEAD the following sentence was added before the question instead of the previous explanation:

"*Of course, nobody wants to go to a nursing home, but sometimes it becomes necessary*."

The tone of the questions allows for the interpretation that respondents did not confuse nursing homes with, for example, assisted living facilities.[8]

All respondents in the waves from 1993 to 2002 were asked one of these two questions; in 1992, only a small subsample of the respondents was asked. The earlier waves of the HRS and AHEAD have some variations in who was asked which of the two questions. In 1993, 1994, and 1995 all respondents were asked about the probability that they would enter a nursing home in the next five years. In the following years, only respondents over age 69 (1996) or 64 (1998 onwards) were asked this; the younger respondents were asked the probability of *ever* entering a nursing home. To account for this change in wording, taking into account the age structure of the respondents, we only consider the answers to the question of entering within the next five years and from 1993 to 2002. In addition, the questions were only asked if the respondent herself, rather than a proxy respondent, answered the survey. Excluding these respondents, and one respondent with most of the demographic information missing, our working sample includes 15,412 respondents, including

[8] See also Bassett (2004, 12).

those who answered "don't know" or "refuse" to the question about nursing home expectations within in the next five years.[9]

3 Do subjective nursing home expectations matter?

The first question to ask when using subjective expectation data is if the expectations have predictive power for the actual outcome. We will assess this by using multivariate analysis to see if the subjective probability of entering a nursing home is an economically and statistically significant predictor for actual entry.[10] We start this section with an overview of the responses to the nursing home expectation question and of the factors affecting nursing home entry.

3.1 The expectations about nursing home entry

So what are the reported subjective probabilities of nursing home entry? Table 1 shows the means by wave as well as the percentage of focal point answers. The means lie between 11.5% and 14%, and are slightly higher for women (not shown), who also have a higher risk of nursing home entry. They are also significantly higher for those individuals with worse self-reported health. Correlations between self-reported health status and subjective probability of nursing home entry range between 12% and 14%, and the relationship is strictly monotonic in all waves. For example, the mean of subjective nursing home expectation of those in excellent or very good health in wave 4 is 9.49%, while those reporting poor or fair health have a mean of 15.56%.

Individual answers range from 0 to 100, with rounding to the nearest 5% between the values of 15 and 95. Focal point answers of 0 and 50 are relatively common. An answer of zero could mean a very low probability assigned to entering a nursing home, and indeed we find some evidence, especially in later waves, that those individuals are in better health than others. An answer of 50% could mean that individuals assign a 50% chance to entering a nursing home (that is, give a relatively

[9] The respective numbers by cohort are as follows: AHEAD 7558, CODA 2217, HRS 5496, WB 37, overlap cases AHEAD and HRS 104.

[10] Another way to check the validity of explanations is to see whether expectations and actual entry are influenced by the same variables. Lindrooth, Hoerger and Norton (2000), using the first two waves of AHEAD, have found that the covariates explaining expectations about nursing home entry are consistent with the characteristics of those entering a nursing home., Holden, McBride and Perozek (1997) found similar evidence using the first wave of HRS.

high probability) or could be an expression of high uncertainty. Very few respondents gave an answer above 50%; less than 5% with the only exception being wave 3, with 7%. The mean of subjective health status is higher (that is, assessed health is worse) for those with a 50% chance than for those with a lower chance, and lower than for those with a higher than 50% chance of entering a nursing home. These statistically significant differences give some support for the thesis that the 50% might be the result of rounding rather than of uncertainty.[11]

Table 1: Summary Statistics of the Subjective Probability of Moving to a Nursing Home in the next 5 Years

	Mean Probability				Answers (in %)			
	All	Self-reported health			0	>0 & <50	50	>50
		Very good or excellent	Good	Poor or fair				
Wave 2 (N=9357)	11.47 (0.22)	8.69 (0.30)	11.10 (0.39)	15.60 (0.48)	64.07	22.61	9.43	3.89
Wave 3 (N=5607)	17.30 (0.33)	14.13 (0.48)	17.56 (0.57)	21.01 (0.68)	50.86	28.86	13.39	6.88
Wave 4 (N=8249)	12.20 (0.23)	9.48 (0.33)	11.81 (0.39)	15.56 (0.47)	62.42	22.58	11.86	3.14
Wave 5 (N=8158)	14.04 (0.24)	11.59 (0.34)	13.73 (0.42)	18.03 (0.54)	55.00	28.52	12.20	4.23
Wave 6 (N=8302)	13.74 (0.24)	11.12 (0.33)	13.68 (0.40)	17.53 (0.52)	53.67	30.53	11.91	3.88

Note: Standard error of the mean in parenthesis. In waves 4, 5, and 6 only individuals 65 and above were asked this question, in wave 2 every respondent, and in wave 3 those at or above age 70. Includes all cohorts. AHEAD 1993 was added to wave 2 HRS and AHEAD 1995 to wave 3 HRS. See text for sample selection. There are between 2 and 5 respondents per wave in the working sample with a missing self-reported health variable. Less than 1% of all respondents gave a 100% probability. Total N = 15089.

Non-response rates are relatively low. Refusal rates were very low with under 1% in all waves, while "don't-know" rates were under 10%.[12] It is interesting to look a the pattern over time of these item non-responses by individual. Looking at the entire sample of individuals who answered "don't know" or "refuse" to any of the nursing home probability questions, we find the following. Only between 16% and 23% of individuals, depending on the wave, gave the same answer ("don't know" or "refuse")

[11] We conduct our analyses both with and without these observations to account for the possibility of the answers of 50% being the expression of uncertainty rather than rounding.

[12] These rates are not clear for wave 2 AHEAD, where there are no specific missing codes for refused and "don't know" answers.

in the next wave. A few respondents (under 10 in each wave and for both questions) switched to the other non-response, that is from "don't know" to "refuse" or the other way around. The biggest percentage of respondents gave a numerical answer in the next wave, between 40% to 50%. Around one third of the respondents did not answer the question in the next wave, but not more than of the general population did not answer because they went into a nursing home.

Another question of interest is by how much individuals changed their responses from wave to wave. About half of all respondents did not change their answer from one wave to another (see Table 2 for a comparison of waves 4 and 5). There is no clear pattern of different reports of health changes for those who gave a higher or lower probability than in the previous wave, but there are many other possible causes for a change in expectations. Something to keep in mind when considering changes of probability over time is that also the time frame of the question (within the next five years) changes. Since the question asks only about the total probability within the next five years, individuals might have different probabilities over this period, such as a high probability for the next year after a recent fall, and the probabilities might therefore change because the period for which the probability applies is also changing.

Table 2: Comparison of the Subjective Probabilities of Moving to a Nursing Home in the next 5 Years (Wave 4 and Wave 5)

Probability comparison	**% of total respondents**
Wave 4 p.> wave 5 prob.	19.97
Prob. in wave 5 = 0	10.90
Prob. in wave 5 > 0	9.06
Wave 4 p.< wave 5 prob.	29.41
Prob. in wave 4 = 0	19.17
Prob. in wave 4 > 0	10.24
Wave 4 p.= wave 5 p.	50.62
Both prob. = 0	42.73
Both prob. = 0.5	4.00
Both prob. = 1.0	0.10
Both prob. = some other value	3.79

Note: Includes only respondents who answered the question in both interviews. N= 6300. Including +/- 1 in the "=" category changes the results only very slightly.

3.2 Variables affecting nursing home entry

There is a variety of well-established predictors of future nursing home entry (see Freedman 1996, Friedman et al. 2005, Banaszak-Holl et al 2004, and Russell et al 1997). These include age, gender, income, net worth, and education. Education, low income and age have been found to be positively associated with nursing home entry, while net worth is negatively associated. Women are more likely to be admitted than men. Ethnicity also plays a role; Whites are more likely to be admitted into a nursing home than African-Americans, Asians, and Latinos. Individuals living alone are more likely to be admitted, as are individuals without living children [13] or living siblings. Physical and mental health variables are important predictors, including having activity-of-daily-living impairments (ADL's) or instrumental-activity-of-daily-living impairments (IADL's), being cognitively impaired, and having a combination of the latter and number of ADL's. There is also some evidence that individuals in rural areas are more likely to enter a nursing home, which could be related to the higher quality of nursing home care there (Phillips et al 2004). In addition, having been previously admitted to a nursing home is a significant predictor of future nursing home entry.

These variables translate into the following variables available in HRS and AHEAD (see Table A1 in the appendix for summary statistics – **still to come**): Age, gender, race (white, black, other), education dummies, a dummy for low household income, net worth (including or excluding housing), marital status, number of living children, number of living siblings, number of ADL's (dummies for none, 1-3, and 4 or more) and number of IADL's (dummies for 0, 1, and 2-3),[14] and self-reported survival expectations.[15] We also know if the respondent has entered a nursing home since the last wave or is currently living in one and self-reported health status (on a 1 to 5 scale with 1 being excellent, 3 being good, and 5 being poor), self-reported change in health (from 1 – much better – to 5 – much worse). We collapse these variables for our analyses into dummies for being in fair/ poor health and being in

[13] This might be restricted to not having a daughter, results differ in this respect; see Russell et al (1997, 575) for an overview of the literature.

[14] The ADL's included in this measure are having some difficulty bathing, dressing, eating, getting in and out of bed, and walking across a room. The IADL's included in this summary measure are having some difficulty using the phone, managing money, and taking medicine.

[15] Since the wording of this question differed by age of respondents, and asked either for the survival probability to age 75, age 85, or of approximately the next 10 years, we did not use it in the analyses that follow since sample sizes become very small.

worse health. Unfortunately, there is no information in the public use HRS data available about the state of residence and the degree of urbanization of the residence.

3.3 Do expectations have predictive power for nursing home entry?

To assess if nursing home expectations are a good predictor of actual nursing home entry, we use only the AHEAD cohort and as the baseline the expectations in wave 2. This is the earliest possible wave allowing us to follow individuals as long as possible; using the AHEAD cohort allows us to use the answers in wave 3, which were asked of the HRS respondents only if they were at or above age 70, which the vast majority of them was not.

We apply two different measures of actual entry into a nursing home. The first measure is having been or still being in a nursing home since the last interview. This measure includes short-term stays: about two thirds of all stays are shorter than 30 days, a number that is increasing over time to 72% in wave 6. Note that such-defined short-term stays may be ongoing stays. In what follows, we use this measure both with (Measure 1a) and without short-term stays (Measure 1b) to check for robustness. Measure 2 is "living in a nursing home" at the time of the interview. Of those answering yes to this question, 10%-14% have left the nursing home in the next wave; out of those, about 25% die before the following wave. Between 34% and 40% are still in a nursing home in the next wave, and 48% have died.

The question about nursing home expectations asks about the probability of a move to a nursing home, so that the second measure is probably the more accurate comparison. However, since moving does not imply a final move, we think that the two measures can be thought of as boundaries of the actual event in question.

A look at the mean nursing home expectation by actual entry is informative (see Tables 3a and 3b). Table 3a shows the subjective probabilities for those who had a nursing home stay since the last stay (and might still be there at the time of the interview) and those who did not, while Table 3b shows them for those who were currently living in a nursing home at the time of the interview and those who did not. The means are 5%-7% higher for those who actually entered a nursing home before the next wave than for those who did not. The overall mean subjective probability given in wave 2 for entering a nursing home in the next five years (13.8%) is between the subjective probabilities given by the two different measures of actual entry, and

closer to the actual entry percentage after 5 years as measured by nursing home stays (14.4%) than as measured by living in a nursing home (8.7%).

Table 3a: Mean Subjective Nursing Home Probabilities by Actually Having Been In One

	Overall Probability	Entry 1 wave later *	No entry 1 wave later *	% entry 1 wave later	Cumulative entry as % of initial sample
Wave 2 (N=5545)	13.77% (0.31)	19.21% (1.74)	13.52% (0.31)	4.38%	4.38%
Wave 3 (N=4165)	17.15% (0.38)	23.67% (1.87)	16.75% (0.38)	5.81%	9.49%
Wave 4 (N=3207)	14.66% (0.40)	20.27% (1.92)	14.24% (0.41)	6.89%	14.41%
Wave 5 (N=2603)	17.55% (0.47)	21.99% (1.85)	17.10% (0.49)	9.10%	19.62%

Standard error of the mean in parenthesis. Working Sample: AHEAD and overlap cohort with answer to subjective nursing home probability within next 5 years in wave 2, initial sample includes only those with non-missing observations of nursing home entry in the following wave. Entry 1 wave later defined as having been or still being in a nursing home since last wave.
**The means are statistically different at the 1% level (unequal variances permitted) with the exception of wave 5, which is at the 1.1% level.*

Table 3b: Mean Subjective Nursing Home Probabilities by Currently Living in One

	Overall Probability	Entry 1 wave later *	No entry 1 wave later *	% entry 1 wave later	Cumulative entry as % of initial sample
Wave 2 (N=5561)	13.76% (0.31)	18.92% (2.35)	13.64% (0.31)	2.36%	2.36%
Wave 3 (N=4165)	17.15% (0.38)	24.37% (2.53)	16.91% (0.38)	3.22%	5.64%
Wave 4 (N=3207)	14.66% (0.40)	21.85% (2.89)	14.41% (0.40)	3.37%	8.71%
Wave 5 (N=2608)	17.57% (0.47)	23.92% (2.93)	17.30% (0.48)	4.03%	11.83%

Standard error of the mean in parenthesis. Working Sample: AHEAD and overlap cohort with answer to subjective nursing home probability within next 5 years in wave 2, initial sample includes only those with non-missing observations of nursing home entry in the following wave. Entry 1 wave later defined as living in a nursing home at the time of the interview.
** The means are all statistically different at the 3% level (unequal variances permitted).*

Another interesting question is whether the proportion of actual entry differs for those who gave a high versus a low subjective probability. Table 3c shows that the proportion is higher for those who gave a probability higher than 49, but that for those

who gave a probability below, there is no clear pattern. Interestingly, those who answered "don't know" or "refuse" had a proportion of entry as high (or higher) as those who gave a probability above 49%.

Table 3c: Entry Proportion by Subjective Nursing Home Probability Range Given in Previous Wave

Subjective Nursing Home Probability in Previous Wave	1995		1998		2000		2002	
	Measure of Entry [1]		Measure of Entry [1]		Measure of Entry [1]		Measure of Entry [1]	
	1	2	1	2	1	2	1	2
"Don't know" or "refuse"	8.85%	6.00%	10.73%	7.27%	10.19%	6.43%	12.11%	7.02%
0	3.88%	2.09%	5.46%	3.03%	6.39%	3.27%	8.54%	3.85
1-25	3.61%	2.02%	5.60%	2.93%	6.26%	2.27%	8.36%	3.55%
26-49	4.79%	1.60%	5.88%	2.71%	5.26%	3.51%	8.40%	1.68%
50	6.94%	3.61%	7.99%	4.79%	8.76%	4.77%	11.13%	5.56%
> 50	7.25%	4.56%	11.96%	6.44%	15.89%	10.60%	15.70%	8.67%
All	4.95%	2.82%	6.56%	3.68%	7.45%	3.94%	9.65%	4.57%
N	6359	6377	4968	4967	4056	4058	3252	3261

Ahead and overlap cohort only. Question about nursing home probability within the next five years in wave 2 and information about the respective measure in the following wave (not cumulative).

[1] Measure 1: having been in a nursing home since last wave; Measure 2: currently living in nursing home at the time of the interview. See text for more detail.

Table 3d shows cumulative entry for the five years between 1993 and 1998 by the range of nursing home probability given in 1993. For both measures, the cumulative probability is higher for those who were in a higher range, and as we could see in the previous table, those who answered "don't know" or refuse", had a higher cumulative entry probability than those in lower ranges.

Table 3d: Subjective Nursing Home Probabilities by Probability Range in Wave 2 Versus Cumulative Entry 2 waves later

	Cumulative entry as % of initial sample	
Measure of Entry [1]	**1**	**2**
Overall Probability	9.40% (0.003)	5.77% (0.003))
Range		
0	7.53% (0.004)	4.48% (0.003)
1-25	7.30% (0.007)	4.44% (0.006)
26-49	10.60%	5.53%

	(0.021)	(0.016)
50	11.95% (0.012)	6.91% (0.017)
51-100	14.15% (0.020)	9.75% (0.017)
Don't know/Refuse	15.50% (0.011)	10.30% (0.010)

Standard error of the mean in parenthesis. AHEAD and overlap cohort with answer to subjective nursing home probability within next 5 years *in wave 2 and information about the respective measure in any of the two following waves. N=7362.*
[1] Measure 1: having been in a nursing home since last wave; Measure 2: currently living in nursing home at the time of the interview. See text for more detail.

Multivariate analysis gives a better picture of the predictive power of subjective probabilities. Table 4a and 4b show probit estimations of nursing home entry in different years given a smaller and a wider set of covariates of the first wave of single AHEAD respondents in 1993. Note that this type of estimation does not take into account sample selection due to the death of respondents.[16] We can see that even after taking into account the other known variables affecting nursing home entry, the nursing home expectation has a small but in most cases statistically significant effect on actual entry. To get an idea about the size of the effect, consider an individual "at the means". In the full model, such an individual has a 0.3%-point higher probability of living in a nursing home in 1998 if the expected probability of moving to a nursing home given in 1993 earlier was 10% higher. The responding average probability of living in a nursing home is 5.79%. Excluding health measures increases the effect of subjective probability on actual entry, as is to be expected since the subjective probability and these measures are positively correlated.

The smallness of the effects is not particularly surprising, since it has been found that answers to expectations questions exhibit a significant amount of unobserved heterogeneity, such as optimism, of the respondents (Bassett and Lumsdaine 2001, Kézdi and Willis 2003). As to other covariates, the health variables are by far the most important predictors. Entry probability is decreasing with the number of living children and the number of living siblings.

[16] If individuals who died gave both a higher subjective probability and had a higher risk of nursing home entry, the effect of subjective probability for actual entry would be downward biased.

Table 4a: Probit Models for Actual Nursing Home Entry (Coefficients)

	Measure of Entry					
	1995		1998		2000	
Measure of Entry [1]	**1**	**2**	**1**	**2**	**1**	**2**
Covariates in 1993						
NH Probability	0.004 (0.001)**	0.002 (0.002)	0.004 (0.001)*	0.004 (0.002)**	0.004 (0.002)**	0.005 (0.002)*
Age	0.052 (0.007)*	0.061 (0.008)*	0.069 (0.007)*	0.072 (0.007)*	0.080 (0.007)*	0.079 (0.008)*
Female	- 0.024 (0.104)	- 0.004 (0.132)	0.114 (0.104)	0.050 (0.115)	- 0.024 (0.108)	- 0.004 (0.121)
White	0.073 (0.116)	0.015 (0.141)	0.031 (0.105)	0.023 (0.117)	0.058 (0.109)	0.121 (0.124)
HS	- 0.105 (0.101)	- 0.110 (0.126)	0.044 (0.092)	0.064 (0.102)	- 0.059 (0.098)	- 0.091 (0.109)
More than HS	- 0.102 (0.103)	- 0.134 (0.130)	- 0.069 (0.098)	- 0.148 (0.111)	0.020 (0.099)	- 0.041 (0.109)
Constant	- 5.652 (0.556)*	- 6.672 (0.690)*	- 6.736 (0.547)*	- 7.160 (0.610)*	- 7.347 (0.590)*	- 7.566 (0.648)*
N	2317	2321	1952	1952	1623	1624
Log Likelihood	- 549.58	- 338.90	- 670.87	- 524.88	- 625.98	- 496.99

*Ahead and overlap cohort and singles only. Standard errors in parenthesis. *, **, and *** denote statistical significance at the 1%, 5%, and 10%-level, respectively. Excluding expectations of nursing home entry of 50% changes the results only slightly. Excluding stays under 30 days in measure 1 changes only the results for 2000, lowering the coefficient for the nursing home probability and turning it statistically insignificant. The probit for a measure of entry in 2002 yields statistically insignificant coefficients for the nursing home probability.*

[1] Measure 1: having been in a nursing home since last wave; Measure 2: currently living in a nursing home at the time of the interview. See text for more detail.

Table 4b: Probit Models for Actual Nursing Home Entry (Coefficients)

	Measure of Entry					
	1995		1998		2000	
Measure of Entry [1]	**1**	**2**	**1**	**2**	**1**	**2**
Covariates in 1993						
NH Probability	0.002 (0.002)	0.001 (0.001)	0.003 (0.001)**	0.003 (0.002)***	0.003 (0.002)***	0.004 (0.002)**
Age	0.043 (0.007)*	0.048 (0.009)*	0.063 (0.007)*	0.065 (0.008)*	0.075 (0.008)*	0.074 (0.008)*
Female	- 0.087 (0.109)	- 0.049 (0.138)	0.070 (0.106)	0.009 (0.118)	- 0.055 (0.110)	- 0.024 (0.124)
Low income	- 0.174 (0.144)	0.022 (0.165)	- 0.001 (0.123)	0.072 (0.133)	0.187 (0.124)	0.215 (0.135)
Health worse since last year	0.234 (0.100)**	0.234 (0.125)***	0.013 (0.099)	0.017 (0.161)	0.023 (0.107)	0.046 (0.117)
Fair or poor health	0.380 (0.095)*	0.183 (0.119)	0.263 (0.090)*	0.199 (0.101)**	0.195 (0.096)**	0.174 (0.105)
White	0.151 (0.124)	0.089 (0.154)	0.108 (0.111)	0.118 (0.123)	0.149 (0.114)	0.233 (0.137)***
HS	- 0.053 (0.107)	- 0.073 (0.135)	0.097 (0.096)	0.131 (0.107)	- 0.017 (0.102)	- 0.045 (0.114)
More than HS	- 0.040 (0.112)	- 0.097 (0.140)	0.008 (0.105)	- 0.058 (0.119)	0.073 (0.101)	0.017 (0.117)
1 IADL	0.408 (0.128)*	0.472 (0.147)*	0.334 (0.136)**	0.510 (0.141)*	0.131 (0.163)	0.214 (0.172)
2-3 IADL's	0.251 (0.281)	0.549 (0.321)***	0.034 (0.356)	0.346 (0.358)	0.284 (0.412)	0.612 (0.498)
1-3 ADL	0.179 (0.103)***	0.098 (0.128)*	0.246 (0.099)*	0.237 (0.110)**	0.091 (0.111)	0.070 (0.121)
4 and more ADL	- 0.124 (0.346)	dropped – predict failure perfectly	0.194 (0.347)	- 0.065 (0.420)	0.441 (0.445)	0.352 (0.648)
# of living children	- 0.050 (0.022)**	- 0.086 (0.031)*	- 0.064 (0.031)*	- 0.074 (0.024)*	- 0.03 (0.02)	- 0.039 (0.023)***
# of living siblings	- 0.041 (0.024)***	- 0.065 (0.032)**	- 0.001 (0.020)	0.017 (0.022)	- 0.037 (0.021)***	- 0.027 (0.024)
Constant	- 5.050 (0.624)*	- 5.593 (0.767)*	- 6.353 (0.593)*	- 6.758 (0.664)*	- 7.011 (0.631)*	- 7.246 (0.695)*
N	2314	2290	1949	1949	1620	1621
Log Likelihood	- 516.99	- 318.19	- 651.48	- 505.41	- 614.84	- 486.86

*Ahead and overlap cohort and singles only. Standard errors in parenthesis. *, **, and *** denote statistical significance at the 1%, 5%, and 10%-level, respectively. Excluding expectations of nursing home entry of 50% changes the results only slightly. Excluding stays under 30 days in measure 1 changes only the results for 2000, turning the coefficient for nursing home probability statistically insignificant. The probit for a measure of entry in 2002 yields statistically insignificant coefficients for the nursing home probability.*

[1] Measure 1: having been in a nursing home since last wave; Measure 2: currently living in a nursing home at the time of the interview. See text for more detail.

A random-effects probit analysis, taking advantage of the panel aspect of the data, shows a strong consistency of the size of the coefficients for different specifications of actual entry. Table 5a and 5b show the results of random-effects probit estimation of actual entry for a smaller and wider set of variables using the three different measures of actual entry explained earlier: entry with and without short-term stays, and currently living in a nursing home. Note that the first two measures refer to having been in a nursing home since the last wave. The size of the coefficients is rather stable and, albeit bigger than in the case of a simple probit, still relatively small and statistically significant. For the case of entry three waves later, the coefficients for measures 1a and 1b are statistically insignificant and those for measure 2 similar to the results for 2 waves later (results not shown).

Table 5a: Random-Effect Probit Models of Actual Nursing Home Entry (Coefficients shown)

	1 wave later			**2 waves later**		
Measure of Entry [1]	**1a**	**1b**	**2**	**1a**	**1b**	**2**
NH Probability	0.0046 (0.001)*	0.0044 (0.001)*	0.0044 (0.001)*	0.0055 (0.001)*	0.0074 (0.002)*	0.0060 (0.002)*
Constant	- 1.580 (0.050)*	- 1.613 (0.028)*	- 1.721 (0.030)*	- 1.816 (0.087)*	- 2.420 (0.144)*	- 2.680 (0.183)*
# of observations	7545	7545	7554	5064	5064	5071
# of groups	3306	3306	3310	2586	2586	2588
Log Likelihood	- 2293.21	- 1767.26	-1514.05	-1900.08	-1560.23	-1404.64

*Ahead and overlap cohort and singles only. Standard errors in parenthesis. *, **, and *** denote statistical significance at the 1%, 5%, and 10%-level, respectively. Excluding expectations of nursing home entry of 50% changes the results only slightly.*

[1] *Measure 1a: having been in a nursing home since last wave; Measure 1b, 1a excluding stays under 30 days; Measure 2: currently living in a nursing home at the time of the interview. See text for more detail.*

Table 5b: Random-Effect Probit Models of Actual Nursing Home Entry (Coefficients shown)

	1 wave later			2 waves later		
Measure of Entry [1]	**1a**	**1b**	**2**	**1a**	**1b**	**2**
NH Probability	0.0028 (0.001)*	0.0028 (0.001)*	0.0029 (0.001)*	0.0035 (0.001)**	0.0051 (0.002)**	0.0038 (0.002)**
Fair or poor health	0.198 (0.051)*	0.142 (0.051)*	0.095 (0.055)***	0.275 (0.083)*	0.252 (0.103)**	0.161 (0.110)
1 IADL	0.457 (0.077)*	0.460 (0.073)*	0.536 (0.076)*	0.775 (0.130)*	0.967 (0.160)*	1.059 (0.167)*
2-3 IADL's	0.424 (0.141)*	0.375 (0.135)*	0.581 (0.133)*	0.365 (0.252)	0.537 (0.290)***	0.474 (0.307)
1-3 ADL	0.456 (0.057)*	0.456 (0.055)*	0.433 (0.059)*	0.579 (0.090)*	0.610 (0.111)*	0.707 (0.122)*
4 and more ADL	0.357 (0.143)**	0.412 (0.135)*	0.353 (0.143)**	0.543 (0.251)**	0.841 (0.230)*	0.525 (0.318)***
# of living c hildren	- 0.069 (0.013)*	- 0.073 (0.013)*	- 0.076 (0.014)*	- 0.124 (0.022)*	- 0.167 (0.030)*	- 0.184 (0.033)*
# of living siblings	- 0.059 (0.014)*	- 0.036 (0.013)*	- 0.054 (0.015)*	- 0.098 (0.023)*	- 0.097 (0.030)*	- 0.101 (0.032)*
Constant	- 1.494 (0.063)*	- 1.605 (0.051)*	- 1.693 (0.055)*	- 1.578 (0.102)*	- 2.109 (1.560)*	- 2.297 (0.168)*
# of observations	7541	7541	7550	5061	5061	5068
# of groups	3305	3305	3309	2585	2585	2587
Log Likelihood	- 2167.78	- 1650.96	-1396.28	-1805.07	-1476.42	-1322.85

*Ahead and overlap cohort and singles only. Standard errors in parenthesis. *, **, and *** denote statistical significance at the 1%, 5%, and 10%-level, respectively. Includes the following additional covariates (results not shown): dummy for low income, and flags for missing children and siblings information. Excluding expectations of nursing home entry of 50% changes the results only slightly.*

[1] Measure 1a: having been in a nursing home since last wave; Measure 1b, 1a excluding stays under 30 days; Measure 2: currently living in a nursing home at the time of the interview. See text for more detail.

4 Do expectations influence savings behavior?

Not much evidence has been found that subjective expectations affect economic behavior in a significant way above and beyond other observable factors (see, for example, Hurd, Smith and Zissimopoulos 2004). Because of the evidence that these expectations have explanatory power for the actual event even when controlling for other factors, the question of why more links to behavior have not been found warrants more investigation. One possible explanation is that individuals do not act according to their expectations. Another explanation would be that the expectations have a too small of an effect to be distinguishable.

We are interested in the effect of the expectation of entering a nursing home on savings behavior. This effect should be different for individuals expecting to be eligible for Medicaid or to be relatively close to eligibility and those who do not, and would differ depending on when in the future individuals expect to enter the nursing home.

For a better understanding of this issue, a short overview over the eligibility criteria for Medicaid is necessary at this point. Medicaid finances nursing home stays for about 2/3 of all admitted; 1/3 are eligible for Medicaid upon admission, another 1/3 receive Medicaid for the part of care whose costs exceed their income after depleting their assets paying for their nursing home stay (AARP 2005). Eligibility for Medicaid depends both on income and assets.[17] States have individual rules for eligibility, which are subject to certain federal minimum criteria. In most states, individuals who qualify for Supplementary Social Security Income (SSI) also qualify for Medicaid. The federal SSI limits for individuals are $579 per month in countable income and maximal $2,000 in countable assets. If individuals have more income than this, but not sufficient to cover the nursing home cost, they usually still qualify for Medicaid long-term care services, but have to contribute almost all their income to cover as much of the costs as possible. States are required to protect spouses from losing their income and assets due to a spouse's nursing home stay. Such a spouse is allowed to retain an income of $1,515 per month and assets of the greater of $19,020 or half of the couple's joint assets up to $95,100, and the state may allow the spouse to retain up to $2,378 per month (numbers as of 2004). Of special importance is the definition of countable assets – these exclude housing, that is the principal place of residence, no matter what its value, and income-producing real estate. Asset transfer made in the three-year period before applying for Medicaid results in a penalty period during which Medicaid does not cover nursing home costs.

Means-tested benefit programs have been found to have a negative effect on savings (Powers 1998; Gruber and Yelowitz 1999; Hubbard, Skinner, and Zeldes 1995). One would expect the same effect from the Medicaid eligibility rules for those eligible or close to eligibility, in order to avoid the spending down of assets while in the nursing home before becoming eligible for Medicaid. Individuals can spend

[17] Individuals must also meet the functional eligibility criteria, that is, they must be considered in need of a nursing home stay. These criteria also vary by state (AARP 2005).

money on non-countable assets for Medicaid purposes and, for example, payoff mortgages, invest in home improvements, or a new car. But the effects can also be the opposite if the elderly have welfare aversion; Norton (1995) has found evidence that elderly actually receive transfers in order to avoid Medicaid eligibility rather than spending down their assets to speed up eligibility. Contrary to that, Bassett (2004) has found that increased expectation of entering a nursing home is positively related to increased, albeit small transfers from the elderly to their children. Lee, Kim, and Tannenbaum (forthcoming) found that a small of Medicaid recipients had transferred wealth to family members before becoming eligible, but as in the former case, that the amounts transferred were relatively small. It is also problematic in these types of studies that it is difficult to identify if the transfer were made in order to avoid spending-down of assets before becoming eligible for Medicaid or were simply transfers from parents to children, such as for engagements, new children, or other special gifts.

For those individuals who expect to pay for the costs of the stay themselves, one might expect increased savings in order to prepare for this event without spending down savings meant for other things, and to buy better services such as a private room while in the nursing home. There is also some evidence that people think that individuals covered by Medicaid receive less-quality care (Curry, Gruman, and Robison 2001). In addition, individuals might save in order to avoid going to a nursing home, by being able to afford in-home nursing care or custodial care. This might also hold for individuals with lower income and or wealth, but should be less pronounced since these services are relatively expensive and would require an amount of assets above the means of those in the lowest income and wealth quartile(s).

Lindrooth, Hoerger, and Norton (2000), using the first two waves of AHEAD, have found that the expectations about nursing home entry in the next five years were close to the actual probability. They did not, however, find a difference of entry expectation for the lowest asset quartile, which led the authors to conclude that Medicaid subsidies may have little effect on these expectations.

The time of the expected entry could also be an important determinant of behavior, since individuals are able to change their portfolio in order to avoid paying for nursing homes themselves if this happens before the three-year period for asset transfers takes effect.

If individuals expect to leave the nursing home after a certain period, there is also an incentive to annuitize wealth in order to solely fall under the income criterion and pay part of their income for the nursing home rather than spending down their wealth. Another possibility is to transfer the money to non-countable assets such as housing by paying down the mortgages or increasing the value of the house through renovation. This said, these changes could have taken place much earlier in life then when we observe the individuals. We will, therefore, when appropriate concentrate our analysis on individuals who had a substantial change in subjective nursing home probability between surveys and consider only changes in non-housing wealth. We restrict our analysis to individuals who are singles to avoid confounding effects of changes in marital status. [18]

4.1 Cross-Sectional Evidence of the Link between Savings Behavior and Expectations

Since the impact of expectations on savings should depend on non-housing wealth, it is interesting to see how the two interact.[19] Table 6 shows non-housing wealth and savings by (non-housing) wealth quartile. Median wealth is low for all but the highest quartile. Expressed differently, assuming average cost of $60,000 for an annual stay in a nursing home, median non-housing wealth for all but the highest quartile would not be sufficient to cover a one-year stay.

Table 6: Wealth and Savings by Wealth Quartiles for Singles in 2000*

		Wealth Quartile			
	Overall	**1**	**2**	**3**	**4**
Mean wealth (Std. dev.)	130,715 (367,500)	-2,215 (8,987)	5,381 (4,076)	47,402 (25,151)	457,928 (615,994)
Median Wealth	16,680	0	4170	41,700	274,181
Mean Savings (Std. dev.)	-6,886 (562,860)	6,769 (50,092)	14,133 (104,241)	28,768 (217,300	-75,444 (1,080,174)
Median Savings	-129	55	-465	-5,560	-75,015

** Measured as difference in non-housing wealth between 2002 and 2000 for singles in both years. In 2002 US dollars. N = 4307.*

[18] We will later do some sensitivity analysis to see if retirement status affects the results. Excluding those who do not report themselves as fully retired reduces the sample even further.

[19] Since the primary residence is non-countable for Medicaid eligibility purposes, we only look at non-housing wealth. Housing wealth in general is an important part of wealth, although even if the value of housing is included, wealth levels are still relatively low for all but the highest quartile. For example, median wealth in 2000 including housing for the third quartile was $111,628, and mean wealth $119,628.

Table 7 shows, analog to Table 2, how single respondents' subjective probabilities changed between waves 4 and 5. The percentages are close to those in the entire working sample. Over half of the respondents did not change their reported nursing home expectation. Note that this does not necessarily mean that the respondents did not change their expectations. Between the two waves, two years have passed. Given that the probability of nursing home entry increases with age, and assuming that the respondents take this into account when answering the question, an unchanged expectation actually denotes a slightly lower expectation than before. This effect is mitigated, however, by the rounding of probabilities. Table 7 also shows the median savings rates (defined as savings divided by non-housing wealth) by change in nursing home probabilities. Those with a decrease in probability or with unchanged probability have strongly negative savings rates at the median, while those with an increased probability have a median savings rate of 0%. There is a high variability within each of the groups that we will explore in what follows.

Table 7: Comparison of Subjective Probabilities of Moving to a Nursing Home in the next 5 Years (Wave 4 and Wave 5) - singles

Probability comparison	% of total respondents	Median Savings Rate
Wave 4 prob.> wave 5 prob.	19.47 %	- 22.45%
Wave 4 prob.< wave 5 prob.	29.09 %	0%
Wave 4 prob.= wave 5 prob.	51.44 %	- 16.10%

Note: Includes only single respondents who answered the question in both interviews. N= 2255.

Exploratory regressions give some insights in the relationship between expectations and savings. We measure savings as the difference between the logs of non-housing wealth to reduce the measurement error in wealth. Specifically, we measure savings as the difference in logs of wealth, where the log of wealth = log(wealth+1) if wealth >= 0 and = - log(1-atotar`num') if wealth < 0. We include other covariates known to influence savings: socio-economic status, a dummy for poor or fair self-reported health, a dummy for worsened health since last wave, demographic characteristics (gender, race), health insurance by type, being on Medicare or Medicaid, receiving home nursing care, having long-term care insurance, and bequest motive. Socio-economic status (SES) is proxied through permanent income. We estimate a simple OLS model in which (real) income is regressed on age,

age squared, marital status, race/ethnicity, and education. Then, predicted values based on the regression coefficients serve as a proxy variable for permanent income (Ballah, 1980). Because of the endogeneity of the bequest motive we use the number of living children as a proxy. Since we expect the effects to differ depending on wealth, we run separate regressions for those with negative and zero wealth and for the 10 wealth deciles for positive wealth.[20] Table 8 shows the results for those of the 12 regressions for which the coefficient on nursing home expectation was statistically significant.

Subjective nursing home probability is statistically significant for three of the 12 non-housing wealth groups: those with negative wealth, those with rather little wealth (3. decile, between $3,000 and $5,000), and those in the 8th decile (between $75,000 – $133,000). Those with negative wealth dissave more with increasing nursing home probability, while those in the 3. decile save more. For these, a 1% increase in subjective nursing home probability increases their savings rate by 3%-points. Given the low non-housing wealth, increased savings will have only a small effect on the eligibility for Medicaid and the possible avoidance of going to a nursing home. It is clear, however, that these individuals do not dissave in order to speed up eligibility for Medicaid. We also find a positive, albeit smaller (about half the size) effect for individuals in the 8th decile. This is the non-housing wealth range where we would expect that individuals save more in order to avoid going to a nursing home or to finance a nursing home stay privately. It is not clear from these estimations why exactly individuals in these wealth groups should be reacting to their subjective nursing home probabilities and not others. The small sample sizes do not allow to split the groups further by, for example, changed and unchanged probabilities since the last wave. Cross-sectional analysis also does not take into account individual effects, such as optimism, which could be stronger for certain wealth group than for others. We will address this issue in the next section.

[20] Potential endogeneity of wealth is mitigated by the fact that wealth is mostly the result of savings during the work life, rather than during old-age.

Table 8: OLS Regression for Savings in Wave 3 – Singles by wealth level

Sample	Non-Housing Wealth (in US-$2002)*					
	Negative wealth -81,000 - - 60		3. decile 3,005 – 7,000		8. decile 75,200 – 132,500	
	Coefficient	P-Value	Coefficient	P-Value	Coefficient	P-Value
NH probabiliy	-.058	0.070	.031	0.062	.016	0.031
Log non-housing wealth	-.685	0.308	1.026	0.578	1.885	0.098
Female	-6.678	0.005	2.615	0.083	-.869	0.042
Black	-2.514	0.122	-3.394	0.004	.692	0.525
Other non-white	-11.122	0.017	3.101	0.535	(dropped)	
Medicare	-1.020	0.828	(dropped)		-1.167	0.483
Medicaid	2.9408	0.121	1.809	0.293	-4.871	0.087
Health ins. Gov other	-.3685	0.961	1.376	0.726	.300	0.805
Employer Health Insurance	-.3589	0.886	-.660	0.577	-.202	0.700
Age	.238	0.154	-.024	0.761	-.015	0.694
Bad health	-1.217	0.508	.852	0.434	-.432	0.411
Health change	1.277	0.495	-.869	0.460	-.112	0.820
Home nursing care	1.313	0.527	-1.810	0.205	.893	0.159
LTC insurance	5.984	0.089	2.733	0.140	.641	0.290
Permanent income	.0001	0.033	.00001	0.566	-2.87e-06	0.749
# of living children	.084	0.778	.154	0.492	.036	0.748
Constant	-2.509	0.869	-14.409	0.397	-19.063	0.158
R2	30.58		17.21		10.52 (Prob > F = 0.41)	
N	83		136		170	

*Deciles are measured using positive wealth only. Standard errors in parenthesis. * and ** denote statistical significance at the 1% and 5% level, respectively. Savings is calculated as the difference of the logs of non-housing wealth. See text for more details. We exclude wealth measured in wave 2 because of data quality issues. Also included but not shown: missing flags for long-term care insurance and employer health insurance (all not statistically significant).*

For other positive wealth deciles the coefficients for NH probability are not statistically significant.

4.2 Panel Data Analysis of the Link between Savings Behavior and Expectations

In order to investigate the effect of nursing home probability on savings behavior while taking into account individual heterogeneity, we conduct fixed-effects analysis, and include the same time varying covariates as before. We exclude the dummy for enrollment in Medicaid since this is likely to be endogenous.[21] The model to be estimated is as follows:

$$savings_{it} = \alpha_i + \beta' NH \text{ expectation}_{it} + \lambda' x_{it} + \varepsilon_{it} ,$$

where savings is measured, as before, as the differences of logs of non-housing wealth, and the variables x are dummies for having long-term-care insurance, being enrolled in Medicare, having governmental health insurance other than Medicare and Medicaid, having health insurance from a (former) employer, being in fair or poor health, having been in a nursing home since the last interview, the number of living children, and a continuous variable each for permanent income and the log of non-housing wealth, as well as several flags for missing variables.

Since we expect the wealth level to influence how the subjective nursing home probability affects savings behavior, we conduct the estimations for the whole working sample as well as by (non-housing) wealth range. As before, we use the following wealth categories: negative wealth, zero wealth, and then 10 deciles of positive wealth measured by wave. We exclude wave 2 from our estimation since there are substantial measurement errors in wealth for the AHEAD cohort (Rohwedder et al. 2004) and there is no information available for nursing home probabilities in wave 1.

Furthermore, we estimate our model also for only those in the sample who had a change in nursing home probability in order to avoid that the majority of individuals who do not change the probability overpower the effects for the other individuals. Table 9a shows the results for the entire working sample, and Table 9b for the individuals who changed their probability. Both tables only show the results for the few wealth ranges for which the coefficient for subjective nursing home probability is statistically significant.

[21] Sensitivity analysis if inclusion of a dummy for Medicaid enrollment changes the results to follow.

Table 9a: Fixed-Effects Regression of Savings - Singles (entire working sample)

Sample	All		Negative wealth		1. Decile (of positive wealth in each wave) $1 - $1,147	
	Coefficient (St. E.)	P-value	Coefficient (St. E.)	P-value	Coefficient (St. E.)	P-value
NH probability	0.002 (0.003)	0.559	0.120 (0.057)	0.04	0.023 (0.013)	0.082
Log non-housing wealth	- 1.303 (0.017)	0.000	0.516 (0.921)	0.578	- 1.719 (0.0131)	0.000
LTC insurance	- 0.013 (0.280)	0.962	- 12.064 (6.810)	0.084	0.709 (2.691)	0.793
Medicare	- 0.823 (0.407)	0.043	- 1.520 (14.99)	0.920	- 1.515 (1.703)	0.376
Bad health	- 0.305 (0.160)	0.057	2.530 (3.789)	0.508	0.071 (0.867)	0.935
Was in NH since last wave	0.252 (0.374)	0.464	20.446 (13.161)	0.128	2.333 (2.392)	0.334
Home nursing care	- 0.230 (0.198)	0.245	- 1.552 (4.316)	0.721	0.966 (1.194)	0.421
Constant	11.354 (0.705)	0.000	15.556 (26.200	0.556	8.574 (3.410)	0.014
N	7,586		392		580	
R^2 (within)	0.646		0.294		37.97	

Wealth measured in US-$2002. Savings is measured as the difference of the logs of non-housing wealth. See text for more details. The 99. percentile of savings is excluded from the sample. We exclude wealth measured in wave 2 because of data quality. Also included but not shown: permanent income, number of living children, governmental health insurance (other than Medicaid and Medicare), employer health insurance, missing flags for the number of living children, employer health insurance, and long-term care insurance (all not statistically significant). For other positive wealth deciles and zero wealth the coefficients for NH probability are not statistically significant.

Table 9b: Fixed-Effects Regression of Savings: Singles (only if NH probability changed since last wave)

Sample	All		Zero Wealth		1. Decile (of positive wealth in each wave) $6 - $1,147	
	Coefficient (St. E.)	P-value	Coefficient (St. E.)	P-value	Coefficient (St. E.)	P-value
NH probability	0.0004 (0.003)	0.894	- 0.045 (0.027)	0.11	0.072 (0.018)	0.001
Log non-housing wealth	- 1.207 (0.031)	0.000	dropped		- 0.920 (0.5331)	0.103
LTC insurance	- 0.227 (0.407)	0.578	dropped		3.211 (3.375)	0.355
Medicare	- 1.726 (0.798)	0.031	7.840 (5.070)	0.143	dropped	
Bad health	- 0.353 (0.250)	0.158	0.777 (1.884)	0.686	0.435071 (0.177)	0.716
Was in NH since last wave	- 0.114 (0.520)	0.826	- 2.120 (5.468)	0.704	1.085 (3.227)	0.741
Home nursing care	- 0.590 (0.302)	0.051	- 0.883 (2.907)	0.765	0.723 (1.825)	0.697
Constant	11.755 (1.255)	0.000	4.592 (13.999	0.747	6.110 (4.617)	0.203
N	2890		186		183	
R^2 (within)	0.612		0.423		0.628	

Wealth measured in US-$2002. Savings is measured as the difference of the logs of non-housing wealth. See text for more details. The 99. percentile of savings is excluded from the sample. We exclude wealth measured in wave 2 because of data quality issues. Also included but not shown: permanent income, number of living children, governmental health insurance (other than Medicaid and Medicare), employer health insurance, missing flags for the number of living children, employer health insurance, and long-term care insurance (all not statistically significant with the exception of permanent income in the first positive decile). For other positive wealth deciles and zero wealth the coefficients for NH probability are not statistically significant.

We can see from Tables 9a and 9b that nursing home probability has no statistically significant effect on savings if we include all wealth ranges. For the whole sample (Table 9a) we find that two wealth groups have statistically significant coefficients on nursing home probability. Individuals with negative wealth have an increase of their savings rate of 12%-points with every 1% increase in nursing home probability. The effects for individuals in the first positive wealth decile are smaller, but still economically significant with a 2.3%-point increase in their savings rate.

As is to be expected, these latter effects are bigger if we only include individuals who changed their nursing home expectations since the last wave (Table 9b). For these individuals in the first positive wealth decile, the savings rate increases by 7.2%-points. In this sample, the nursing home probability coefficient is not statistically significant for the sample with negative wealth, but instead for the sample with zero wealth. In this case, the savings rate decreases by 4.5%-points. This points to other reasons for the changes in the savings rates for those with negative and zero wealth, unrelated to the nursing home expectation.

In conclusion, these results show that for the vast majority of wealth groups, there is no statistically significant effect of nursing home expectations on savings behavior. The exception are those individuals in the lowest wealth decile (which have wealth under the Medicaid eligibility threshold) who are found to save significantly more with increasing probabilities. If we include also housing wealth in our wealth measures, we find that this effects increases, so individuals in this wealth range increase their relative savings both with respect to non-housing and total wealth. There is no evidence of asset-spend-down in response to increased nursing home probability in order to become eligible for Medicaid. This does not preclude, however, that individuals are dissaving to become eligible for Medicaid independently of their nursing home expectation.

As for other covariates, we find that the changes of the log of non-housing wealth, being in bad health, and being on Medicare are the most important predictor of savings behavior, and that the importance of the covariates changes with wealth range.

We conducted a variety of sensitivity analyses to see if results are sensitive to changes in the sample and of the covariates and for potential endogenous sample selection. Restricting the sample to AHEAD respondents changes the results only slightly, by slightly increasing the coefficient in the whole sample and making the estimates of the coefficients for nursing home probability more precise. Restricting the sample to HRS respondents changes the results somewhat but also decreases the sample size significantly. In particular, it makes the result for the entire sample (all wealth cohorts included) positive (0.020) and statistically significant at the 5%-level, makes the result for the 1. positive wealth decile statistically insignificant and gives a negative coefficient for the second wealth decile (- 0.181) at a statistical significance level of 12%. This is a rather big coefficient, pointing to a big decrease in savings

rates for those individuals at a wealth level of between US-$840 to US-$3440, possibly to avoid accumulating savings that would count towards the Medicaid eligibility criteria. HRS respondents are younger than AHEAD respondents, and might expect a longer nursing home stay if a move to a nursing home might be necessary. Including an additional variable of out-of-pocket health expenditures to control for the fact that health shocks might lead to higher expenditures (and, therefore, less savings) with a time lag, did not change the results in any significant manner. Including wave dummies increased the statistical significance of some results slightly, and also created a negative and statistically significant coefficient of subjective nursing home probability for the 3. wealth decile , but only in the entire sample (corresponding to Table 9a).

Another potential problem is endogenous sample selection through non-random sample attrition. Both individuals who die and those who move to and stay in a nursing home are not observed in consecutive waves. It is likely that these are exactly the individuals who have a change in nursing home probability and therefore also probable changes in their savings behavior, leading us to underestimate the effects of a change in nursing home probability. We checked for this by repeating the estimations for a sample which includes only early waves, so that the problem of endogenous sample selection should be smaller. Due to the data problems for wave 2, the original estimations include 3 waves, waves 3 to 5. Excluding wave 5 results in some interesting changes. For the entire sample (original Table 9a), we find that the coefficient on nursing home probability becomes insignificant for the sample including only those with negative wealth. Furthermore, we find a small negative effect for those with zero wealth (which is borderline statistically significant with a p-value of 15.6%) and a bigger positive effect for the 1. positive wealth decile. We find, as we did in the sample restricted to HRS respondents, a negative and statistically significant effect for the 2. wealth decile. If we restrict our attention to only those who changed their nursing home probability since the last wave (originally Table 9b), we find both a bigger negative effect for those with zero wealth and a bigger positive effect for the 1. positive wealth decile, but no effect for those in the 2. decile.[22]

[22] Measures for subjective survival probability differ by wave and cohort; inclusion of any measure decreased the sample by too much to see how the coefficient on nursing home probability would react.

The sensitivity analysis leads us to the conclusion that there is strong evidence that those with very small wealth increase their savings rate significantly as a reaction to an increased subjective nursing home probability, and that there is only spotty evidence that those with slightly higher wealth decrease their savings rate. There is no evidence supporting the hypothesis that most individuals with low or modest wealth decrease their savings rate and no evidence that individuals with higher wealth levels increase their savings rate as a response to higher perceived risk of entering a nursing home.

5 Conclusions

Long-term care is an important issue facing older Americans because of the relatively high probability of ever entering one and its high cost. In this paper, we examine individual expectations about future nursing home entry and study the relationship between these expectations and savings behavior, using data from the US Health and Retirement Study. Our results indicate that subjective expectations are closely related to actual probability of entry and actual future nursing home entry. We find only a weak link between these expectations and savings behavior and only very weak or no evidence for a decrease in the savings rate for individuals of wealth groups that might be able to speed up eligibility for Medicaid through dissaving. Individuals with positive but very small wealth (under the threshold for Medicaid eligibility) are found to increase their savings rate in response to change in subjective nursing home probability. This weak link between subjective nursing home expectations and savings behavior is similar to the result of others who have studied the link between subjective expectations and economic outcomes, and have also found only a weak relationship.

There are several possible explanations for this disconnect between expectations and savings behavior. One of the possible reasons might be that individuals know their own probability well before we observe them in our data, and take action also at an earlier time. Individuals who perceive that they need more precautionary savings might start doing so at a much younger age than when we observe them, when most individuals are about 70 years of age and live off a fixed income. At this point, even a big change in subjective nursing home probability might not result in a change of savings behavior anymore.

Another possible reason could be that individuals have only limited information about both the cost of nursing homes and about who is paying for nursing home stays. That is, if individuals believe, for example, that Medicare pays for nursing home stays and nursing care at home, then a change in savings might be considered less needed. A recent survey by the AARP found that many elderly are not aware of the fact that Medicare does not pay for nursing home stays over 100 days, and even then only in limited circumstances.

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