

Long-term care and nursing home coverage: are adult children substitutes for insurance policies?

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Abstract

Recent theoretical work suggests that in some cases, parents will forego the purchase of long-term care insurance and rely on child-provided care in old age. This paper uses data from the Asset and Health Dynamics survey and the Panel Study of Income Dynamics to examine whether the availability of children and other potential caregivers explains why so few elderly persons have long-term care insurance. In contrast to the notion that family members serve as substitutes for long-term care insurance, variables measuring the availability of informal caregivers have no statistically significant effect in models of insurance ownership and models of intentions to purchase insurance. © 2001 Elsevier Science B.V. All rights reserved.

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1. Introduction

Despite the high cost of chronic care and the increasing life spans of older Americans, few elderly are privately insured for long-term care expenses. Estimates suggest that the cost of a 1-year stay in a nursing home averages between \$40,000 and \$50,000 a year. While a 65-year-old has a 39% chance of entering a nursing home at some time during the rest of his or her life, less than 5% of the elderly have insurance policies covering nursing home care. Traditional explanations for the low level of private coverage include the high premiums for these policies relative to the low incomes of the elderly, and the inability of many elderly persons to anticipate their long-term care needs later in life (Wiener et al., 1994). Another suggested explanation is the presence of the Medicaid program, which may

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serve as a substitute for private financing when elders exhaust their own savings (Pauly, 1990). On the supply side, moral hazard and adverse selection may act as disincentives for insurance companies to aggressively market long-term care insurance policies. However, these and other explanations fall short of fully explaining the low level of coverage for nursing home care (Cutler, 1996).

Pauly (1990) offers an additional hypothesis: families with children rationally decide to forego the purchase of long-term care insurance due to intrafamily moral hazard. Parents who prefer to receive care from children will decline to purchase insurance, since this creates a disincentive for children to provide care. Instead of purchasing insurance, parents will rely on the bequest motive to induce children to provide care. While, empirical patterns do not entirely support the theory that intergenerational transfers from parents to children are made in exchange for care,¹ an element of the Pauly explanation finds some support in the literature. Evidence from studies of caregiving in the US shows that adult children act as significant providers of long-term care. Patterns of caregiving may lend some support to the claim that children may be perceived as substitutes for long-term care insurance, but this idea has not been sufficiently explored in the existing literature.²

Does the presence of children help to explain why so few elderly purchase long-term care insurance? The analysis presented in this paper aims to answer this question by employing data from two sources — a sample of elderly individuals from the Study of Asset and Health Dynamics (AHEAD) and a sample of adults aged 50 and over from the Panel Study of Income Dynamics (PSID). Actual purchase of long-term care insurance and intentions to purchase long-term care insurance are examined, with a focus on how the availability of caregivers in the form of family members affects these decisions. Results show that the availability of informal caregivers such as children has no statistically significant effect on the likelihood of long-term care insurance ownership. Similarly, the relationship between one's attitudes about family-provided caregiving and one's intentions to purchase insurance is not consistent with the role of intrafamily moral hazard as a deterrent to insurance purchase. Thus, the results provide little support for the hypothesis that family members serve as substitutes for long-term care insurance, and suggest that intrafamily moral hazard probably does not play a significant role in explaining the low levels of private insurance coverage for long-term care.

This paper proceeds as follows. In the next section, theoretical models pertaining to informal provision of insurance and intrafamily moral hazard are described. This is followed by a review of previous research on the factors associated with the purchase of long-term

¹ The evidence on the motivations behind bequest behavior is mixed. Bernheim et al. (1985) found evidence that children who visit and call more frequently received larger bequests. Yet, Wilhelm (1996) reported that over three-fourths of bequests made by decedents are divided equally among heirs, which suggests that a large portion of bequests are independent of child behavior. Further examination of unequal bequests provided evidence consistent with the exchange motive. Two studies examining inter-vivos transfers, however, found evidence in support of altruistic motives for transfers, both finding that families transfer funds to their less well-off children (McGarry and Schoeni, 1995a,b).

² Substitution between family-provided long-term care and market-provided long-term care has been examined previously. For examples, see Christianson (1986), Edelman and Hughes (1990), Greene (1983), and Tennstedt et al. (1993).

care insurance, and a description of an empirical analysis of the substitutability between children and long-term care insurance. The last section concludes.

2. Theories of children as substitutes for insurance

The notion of intrafamily moral hazard expressed by Pauly (1990) — that parents rationally decide not to purchase insurance for long-term care when children are present — has some similarity to theories in population and development economics regarding savings behavior. For example, several population scholars have examined whether fertility in developing countries is motivated by parents' desire to provide security for their old-age (e.g. Cain, 1981, 1983; Nugent, 1985). Nugent (1985) asserted that the perception of children as old-age security assets is heightened by several circumstances, including uncertainty about the necessary assets to protect against disability, inefficiencies in insurance markets, and cases where market-provided services are not in the form that is desired. Several of the conditions cited by Nugent may apply to long-term care provision in the US. Rising costs of long-term care and advancing life expectancies both contribute to uncertainty regarding the assets required to cover the costs of long-term care. The problems of adverse selection and moral hazard, and their possible deleterious effects on the market for long-term care insurance, have been noted above.

Researchers outside the fields of population and development have also written about the role of children as informal mechanisms of insurance. Pollak (1985) noted that family members may have significant advantages in the provision of insurance for old-age over both the market and the state. Families may be more efficient providers of insurance, because they benefit from limited adverse selection, lower monitoring costs, and limits to opportunistic behavior enforced by cultural norms and loyalty. Cochrane (1991) also addressed the role of informal insurance, focusing on whether consumption patterns of individuals reveal the presence of full insurance in the face of exogenous shocks such as illness and job loss. Full insurance can consist of formal institutions such as unemployment insurance, as well as informal insurance mechanisms including transfers from family members. His empirical examination offered support for full insurance in some but not all situations examined.

Building on the Pauly (1990) concept of intrafamily moral hazard, Zweifel and Strüwe (1998) developed a theoretical model to explain the low rates of insurance coverage for long-term care in industrialized countries. Their model is a two-generation principal-agent model in which a self-interested parent chooses the amount of long-term care insurance to purchase. Both the child and the parent also choose consumption amounts, and the child additionally decides how much care to provide to the parent, if the risk of long-term care materializes. The child's decision to provide care comes at the cost of time spent working, but also leads to a higher bequest for the child by reducing the parents' expenditure on market-based care. The model suggests that under certain conditions, the more insurance purchased by the parent, the less caregiving the child will provide.³ Thus, because the parent receives utility from child-provided care, the model also suggests that the purchase

³ Specifically, this relationship holds if the child earns a low wage. As Zweifel and Strüwe note, most children who provide long-term care do not participate in the labor market.

of insurance reduces the parent's utility. This result is taken as an indication that social programs that establish mandatory long-term care insurance may result in welfare loss for older population groups, and that other policy options (such as means tested programs) should be explored.

In sum, several researchers have offered hypotheses regarding the substitution of children for insurance. The next section reviews empirical work on the factors associated with long-term care insurance purchase.

3. Quantifying the effect of children on long-term care insurance coverage

A number of research studies have quantified the provision of care to elderly parents by family members. Since long-term care does not involve technology-intensive medical care, a large percentage can be provided informally (outside the market) by family members. Cantor (1989) reports that 80–90% of the care provided to impaired elderly persons is carried out by family members (pp. 106–107). Several other studies have found that a significant amount of informal care is provided to elders by family members, namely, spouses and children. The number of children has been shown to affect the incidence and amount of informal long-term care. Soldo et al. (1989) found that the number of hours spent providing care increased with the total number of caregivers; Wolf et al. (1997) reported that as more siblings join in the provision of care to an elderly parent, other siblings lessen their contribution somewhat, but not so much as to offset the added care completely. Other evidence of the role of children in providing care comes from studies of the living arrangements of the elderly, which have shown that measures of the availability of children decrease the likelihood that elderly adults live in institutional settings (Hoerger et al., 1996).

In contrast, a smaller body of research has examined the decision to purchase long-term care insurance. Although none of the studies described below is a direct test of the role of informal caregivers in the purchase of long-term care insurance, a few include variables representing children or child characteristics in the analysis.

Two studies (Cohen et al., 1993; Kumar et al., 1995) used data obtained from several insurance companies about individuals who had purchased private insurance for long-term care and those who declined to purchase such policies when approached by insurance agents. This type of data has advantages over public use microdata, since it contains detailed information on the policies, but it also has a limitation. Individuals approached by agents are a non-random population; they are more likely to have higher incomes and to be in better health than most elderly individuals. Since no correction for selectivity was made, the results of these studies may not be generalizable to the elderly population. Kumar et al. (1995) included a dummy variable representing whether any of the individual's children lived within 25 miles. This variable had a significant negative effect on the decision to purchase long-term care insurance. However, distance between children and parents is an endogenous measure, and its relationship with insurance coverage may reflect the choices of living arrangements by the elderly or their children when the need for care arises.

Another empirical study of the factors influencing long-term care insurance is Sloan and Norton (1997), which estimated models of long-term care insurance using both the AHEAD survey and the Health and Retirement Study (HRS). Their paper focused on the role of

Table 1
AHEAD caregivers, by relationship to recipient ($n = 3160$)

Relationship	No.	%
Wife	654	20.7
Husband	288	9.1
Female non-resident child	425	13.4
Female household member	323	10.2
Male non-resident child	163	5.2
Male household member	141	4.5
Spouse of female non-resident children and female household members	24	0.8
Spouses of male non-resident children and male household members	129	4.1
Grandchild	153	4.8
Other relative	172	5.4
Other individual	387	12.2
Professional	284	9.0
Not otherwise identified	17	0.5

several factors in the decision to purchase insurance, such as adverse selection, crowd-out by Medicaid, and bequests. In a model of insurance using the AHEAD survey, the authors found that the number of the respondent's children had no significant effect on long-term care insurance coverage. Using HRS data, the authors found no significant relationship between insurance purchase and the respondent's belief that leaving an inheritance was somewhat or very important. Neither of these relationships (between insurance and attitudes about bequests, and between insurance and the number of children) provides a direct test of the effect of informal care on the probability of having long-term care insurance.⁴

McCall et al. (1998) examined the purchase of a particular type of long-term care insurance policies that are available through public–private partnerships for long-term care. Partnership policies are available in four states that participate in the program; purchasers of these policies qualify for liberalized Medicaid eligibility when private insurance coverage runs out. In a logistic regression of partnership purchase, individuals who believed that they “had no one to count on if they got too sick to care for themselves due to a long-term illness or disability” were significantly more likely to buy a partnership policy. This model was estimated using a sample of partnership purchasers pooled with a random sample of the population from each participating state.

This paper will extend this previous research by using representative samples of elderly adults and adults aged 50 and over from two national surveys — the AHEAD survey and the PSID. In addition, various measures of the availability of caregivers, including children and other family members and friends are used. Table 1 shows that while children represent a substantial fraction of all caregivers (perhaps as much as one-third), a sizable number

⁴ Both Kumar et al. (1995) and Sloan and Norton (1997) also included characteristics of state Medicaid programs in models of long-term care insurance. Kumar et al. (1995) found that Medicaid estate recovery programs and income limits are positively associated with having long-term care insurance. Also, as Medicaid per diem rates increase, individuals are less likely to purchase long-term care insurance. Sloan and Norton (1997) reported evidence of Medicaid crowd-out: a measure of the likelihood of becoming eligible for Medicaid (determined by income from pensions and annuities) was negatively associated with having long-term care insurance.

of caregivers report themselves to be other family members as well as friends. Almost 5% of caregivers are spouses of children or other household members, another 4.8% are grandchildren, and an additional 5.4% are other relatives.

In the first part of the analysis, I examine how actual ownership of long-term care insurance is affected by the availability of a non-spouse informal caregiver (as assessed by the respondent). Spouses are not examined here, since theories about intrafamily moral hazard rely on the potential caregiver's response to bequests as an incentive to provide care, and it is a reasonable assumption that spouses are less sensitive to this concern. If having a family member or friend available to provide care is negatively associated with the probability of owning long-term care insurance, this would be consistent with intrafamily moral hazard playing a role in the decision to purchase insurance. At the same time, however, the presence of intrafamily moral hazard may result in making those with insurance less likely to have a caregiver on-hand. For this reason, I estimate bivariate probit models of insurance ownership, and identify the model by instrumenting for available caregivers. The identifying variables are generated from child characteristics, namely, sex of the child. Daughters have been shown in numerous studies to be much more likely to provide care to elderly parents than sons, and to provide more care. Among the AHEAD caregivers described in Table 1, as many as 23.6% are daughters, while at most 9.7% are sons. Caregivers who are the daughters of the care recipient spend an average of 6 hours each day providing care, while caregivers who are sons spend 4.2 h (Stephens and Christianson, 1986, pp. 46–47). Controlling for other factors, Wolf et al. (1997) found that daughters were 9 percentage points more likely than sons to provide care, and that daughters provided 10 hours more of care per month than did sons (p. 108).

In the second part of the analysis, I focus not on actual purchase of insurance, but on the respondent's reported intent to purchase a given insurance policy for long-term care. Because actual purchase reflects not only the buyer's preferences, but also supply-side considerations, this measure provides a cleaner test of the effect of informal caregiving availability on the buyer's preferences for insurance. In this analysis, I examine how the desire for insurance is affected by the respondent's belief that his or her family will provide care at home. Both sources of data used in the analysis are described in greater detail below.

4. Actual coverage for long-term care

To examine the effect of the availability of informal caregivers on actual insurance coverage for long-term care, I use data from the AHEAD among the oldest old.⁵ AHEAD is a nationally representative longitudinal study of community-based persons aged 70 and older (in 1993) and their spouses. The survey contains a wide variety of information on health conditions, insurance coverage, family composition, and financial resources for 8222 individuals in 6052 households.

⁵ The specific version used in the analysis is version 2.1 from wave I, collected in 1994 and released in March of 1998.

All respondents in the AHEAD survey were asked a group of questions regarding their health insurance in addition to Medicare. The health insurance section begins by asking the respondent:

“Do you have any (other) type of health insurance coverage?”

Individuals who responded affirmatively were then asked:

“What type of coverage do you have; is it basic health insurance, a supplement to Medicare (medigap) or to other health insurance, or long-term care insurance, or what?”

Respondents reported as many types of coverage as applied, and 188 individuals (or 2.3% of all respondents) reported that they had a long-term care insurance policy. While this number is lower than the HIAA estimate of between 4 and 5% of elderly individuals, the mean age of the AHEAD sample (77 years) is consistent with a lower percentage of individuals with long-term care policies (HIAA, 1992). The AHEAD survey does not contain more detailed information on the policy, such as the daily benefit, benefits period, or features like inflation protection.

AHEAD respondents who did not report owning a long-term care insurance policy when asked this question were then asked if any of their policies included long-term or nursing home care. Of those who responded to the second question, 954 individuals (12.2%) reported having some policy that included long-term care or nursing home care. It is unclear how the respondents interpreted this question. Responses are not consistent with individuals reporting provisions for long-term care through Medicare supplemental insurance (Medigap) or through life insurance riders. Only 36% of the 954 individuals who replied with a ‘yes’ to the second question also reported medigap coverage. In contrast, about 75% of the Medicare-eligible population own medigap policies, and a study by Rice et al. (1997) showed that three-quarters of those policies included an option for additional coverage of skilled nursing home facility (SNF) care. Further, the SNF coverage option provides only a \$95 per day patient payment for days 21–100 in a skilled nursing facility, and only when the stay is preceded by a Medicare-covered hospital stay, so it does not offer complete coverage for most nursing home stays.

The response to the second question could reflect coverage for long-term care through life insurance policies with accelerated death benefit (or living benefit) riders. These riders allow the policyholder to gain early access to death benefits to cover long-term care needs. Coverage is often conditional on the diagnosis of a specified ‘dread disease’ or terminal illness, and is usually limited to 50% of the death benefit. Given that the median cash value of life insurance policies for individuals over age 65 is only \$5000, accelerated death benefit riders would fall short of covering the costs of long-term care (US Bureau of the Census, 1997).

It is unlikely that respondents were referring to Medicare, since prior to the insurance questions in this section of the AHEAD survey respondents were informed that they were being asked about health insurance other than Medicare. Medicare does not cover nursing home stays, but Medicaid provides coverage for recipients who meet the minimum income standard and ‘spend down’ their assets. Of the 954 affirmative responses, only 15 also reported Medicaid coverage. Because, the responses to the second question are inconsistent with these other known sources of long-term care insurance, the main results reported in

this paper are based on analysis using the first question on long-term care insurance. A discussion of results using the second measure appears later in the paper.

Various other determinants of long-term care insurance are included in the model. Long-term care insurance coverage is expected to vary directly with the income of the respondent and inversely with the premium of the policy. Since the premium of the policy is not included in the survey, age is included in the model as a proxy for price.⁶ Premiums for long-term care insurance policies become increasingly higher with age, so both linear and quadratic terms are used. It is expected that as age increases the probability of ownership decreases at an increasing rate. Age is admittedly an imperfect proxy for price, yet there is no information in the data set regarding the date when the policy was purchased.

Another determinant of long-term care insurance is wealth. The high cost of nursing home care can quickly exhaust savings and other financial assets. Eligibility for Medicaid is based on an individual's asset levels; in many states, assets must be \$2000 or less for eligibility. For this reason, long-term care insurance can also be seen as a way to protect the household's assets. Assets are included in the model using both linear and quadratic terms.

Education is also included in the model since research findings show that individuals with greater education levels are more likely to purchase individual health insurance policies (Marquis and Long, 1995; Cartwright et al., 1992). Other factors associated with purchasing long-term care insurance pertain to the individual's perceived need. Perceived need can be measured by health status, in which case one should expect a direct relationship between poor health status (or disability) and insurance. A negative relationship between poor health status and insurance coverage might be observed if policies are more difficult to purchase for sick individuals because of screening and eligibility restrictions for preexisting conditions. This would suggest that risk segmentation exists in the market for long-term care insurance, with only low risks pooled together. Race is also included in the model, since previous research has found that whites use more days of nursing home care than nonwhites, either because of discrimination by nursing homes (Falcone and Broyles, 1994), or because blacks have been shown to have a greater availability of informal caregivers among family members (Burton et al., 1995). Finally, since spouses (especially wives) provide a significant amount of care, marital status and sex are also included in the model. An interaction term is used to identify the combined effect of being a married female on having long-term care insurance.

To control for regional differences in the price of long-term care that would affect insurance premiums, geographic measures of the individual's residence are included. An urban indicator variable and three regional indicator variables for the southern, central, and western regions of the US are included. The omitted category represents residence in the eastern US. Finally, three state Medicaid policy variables are included. These are the amount of assets an individual can retain and qualify for Medicaid, the monthly allowance for personal needs while in a Medicaid-covered nursing home, and a dummy variable equal to 1 if the state has an estate recovery program in place.

Several observations were dropped due to missing values. Twenty-four observations had missing data for the dependent variable. Another 330 observations had missing values for

⁶ Wiener et al. (1994) compared the average annual premium for an individual long-term care insurance policy that included inflation protection and some non-forfeiture benefits. The annual premium for a policy with these options was \$2525 when purchased by a 65-year-old and \$7675 when purchased by a 79-year-old.

Table 2
AHEAD survey data variable definitions and means ($n = 7775$)

Variable	Definition	Mean (S.D.)	Means by LTC policy (S.E.)	
LTC policy	Equal to 1 if respondent reports having a LTC insurance policy	0.023 (0.15)	0	1
Age	Age at interview	76.39 (6.78)	76.42 (0.08)	74.85 ^a (0.42)
Education	Years of education	10.78 (3.75)	10.73 (0.04)	13.04 ^a (0.23)
Household income	Household income from all sources (in \$000s)	25.76 (31.01)	25.56 (0.36)	34.85 ^a (1.81)
Net worth	Sum of all assets including housing equity, less debt (in \$000s)	182.20 (403.39)	178.41 (4.60)	347.13 ^a (36.19)
Poor health	Equal to 1 if respondent reports health status as poor	0.13 (0.34)	0.13 (0.004)	0.03 ^a (0.014)
Any ADLs	Equal to 1 if respondent reports a need for help with at least one ADL	0.29 (0.45)	0.29 (0.005)	0.17 ^a (0.029)
Any IADLs	Equal to 1 if respondent reports a need for help with at least one IADL	0.29 (0.46)	0.30 (0.005)	0.19 ^a (0.029)
Nonwhite	Equal to 1 if race is nonwhite	0.16 (0.36)	0.16 (0.004)	0.06 ^a (0.018)
Female	Equal to 1 if respondent is female	0.63 (0.48)	0.63 (0.006)	0.61 (0.036)
Married	Equal to 1 if respondent is married	0.56 (0.50)	0.55 (0.006)	0.64 ^a (0.036)
Current help	Equal to 1 if respondent currently receives unpaid help from a family member	0.17 (0.38)	0.17 (0.004)	0.07 ^a (0.018)
Future help ($n = 6379$)	Equal to 1 if respondent reports having a friend or family member willing and able to provide help in future if needed	0.51 (0.50)	0.51 (0.006)	0.43 ^a (0.039)

^a This indicates that the difference in means across groups is statistically different from 0 at the 1% level of significance.

questions about informal caregivers, and six observations were dropped for missing data for other explanatory variables. An additional 89 individuals were removed from the sample, because they lived in communities that provided nursing care. The resulting sample includes 7775 observations.

The definitions and means of all variables are reported in Table 2 for the full sample and for samples separated by insurance status. Some 2.3% of the respondents have long-term care insurance. Mean annual household income from all sources is \$25,760; net worth (defined as the sum of all assets, including housing equity, less debt) has a mean of \$182,200.⁷ Means for both income and net worth are higher among those who have insurance for long-term care, and the differences are significant. In the full sample, the average age is close to 77 years; individuals have on average 11 years of education. Sixteen percent of the sample are nonwhite and 63% are female. Health status is measured in several ways, first by an indicator variable equal to one if the respondent's self-reported health status is listed as poor on a scale ranging from poor to excellent. Poor health status was reported by 13% of all

⁷ The AHEAD survey employs new survey methodologies in the collection of data on income and wealth. These methodologies substantially decrease biases arising from missing data on components of income and wealth. As a result, measures of income and wealth from other household surveys, such as the current population survey, tend to be underestimated when compared to AHEAD survey data (Gustman and Juster, 1995). It should also be noted that the median values for income and wealth are far below the means reported here.

respondents. Additional measures of health status include whether the respondent reported difficulties in any of six activities of daily living (ADLs) or five IADLs (instrumental ADLs). The mean for both dummy variables is 29%.

Depending on health status, AHEAD respondents were asked either one or two questions about informal care. All respondents were asked if they currently had someone to help them carry out an ADL or IADL. Based on this response and the response to a follow-up question, a variable ‘current helper’ was defined as equal to 1 if the respondent has a current helper that is not a spouse (spouses were not counted as current helpers since intrafamily moral hazard is specifically attributed to children, or more broadly to those who can be manipulated by bequests). Seventeen percent of the sample reported currently having a non-spouse helper.

Individuals not receiving help with an ADL or IADL at the time of the survey were asked this question:

“Suppose in the future you (or your husband/wife/partner) needed help with basic personal care activities like eating and dressing. Do you have relatives or friends (besides your husband/wife/partner) who would be willing and able to help you over a long-period of time?”

Of the 7775 individuals in the sample, 6379 answered this question; 51% of these reported that they did have a relative or friend who would be willing and able to help in the future. The results described below use both the current help and the future help measures separately, although the future help measure is preferred, because it pertains to respondents before the onset of need. Need has an independent effect on insurance coverage, and the interactive effects of need and caregiver availability are unclear.

Table 3 reports results from several probit models of long-term care insurance ownership, where the explanatory variable of interest is current help. Marginal effects are reported; the standard errors used to calculate *t*-statistics are based on robust variance estimates, which account for the fact that observations are not independent within households. Since married couples contribute two observations to the sample and share the same values for variables such as income and assets, observations are clustered around households. The first column reports results from a model where the caregiver variable is the only explanatory variable. Without controlling for respondent characteristics, the presence of a caregiver significantly lowers the probability of having long-term care insurance by 1.7 percentage points (or 74%). However, a substantial reduction of more than 50% occurs in the size of this effect with the addition of demographic variables (e.g. age and sex), and the effect becomes insignificant. As other explanatory variables — income, wealth, health status, and area characteristics — are added to the model, the size and significance of the caregiver effect are further reduced (see columns 2–5). Taken at face value, the full model suggests a much smaller effect of caregiver availability on long-term care insurance ownership (a 13% reduction), but this effect is not significantly different from zero.

Several of the control variables have statistically significant marginal effects.⁸ Education, household income, and net worth have positive and significant effects on the likelihood

⁸ Not reported in tables, the marginal effects of region dummies for western, southern and central US states are positive and significant. A dummy variable for residence in a metropolitan statistical area (MSA) has a negative, but insignificant effect. None of the three Medicaid policy variables had a statistically significant effect.

Table 3

Probit models of the effect of current help on LTC insurance coverage (AHEAD sample: $n = 7775$)^a

Explanatory variable	1	2	3	4	5
Current help	−0.017 (3.87)	−0.007 (1.44)	−0.005 (1.27)	−0.004 (0.77)	−0.003 (0.56)
Age		0.006 (2.12)	0.006 (1.91)	0.005 (1.90)	0.005 (1.91)
Age squared		−0.00005 (2.25)	−0.00004 (2.01)	−0.00004 (2.00)	−0.00004 (2.00)
Education		0.003 (6.16)	0.002 (4.02)	0.002 (3.84)	0.002 (4.13)
Nonwhite		−0.008 (1.60)	−0.005 (1.11)	−0.005 (1.11)	−0.003 (0.72)
Female		0.004 (0.78)	0.006 (1.26)	0.006 (1.21)	0.005 (1.09)
Married		0.005 (0.94)	0.003 (0.62)	0.003 (0.61)	0.0008 (0.08)
Married × female		−0.005 (0.90)	−0.007 (1.31)	−0.006 (1.28)	−0.005 (1.14)
Household income			0.0005 (2.86)	0.0005 (2.86)	0.0005 (2.85)
Household income squared			−0.000004 (2.28)	−0.000004 (2.27)	−0.000004 (2.23)
Net worth			0.00002 (3.33)	0.00002 (3.21)	0.00002 (3.09)
Net worth squared			−3.5 e-9 (1.85)	−3.3 e-9 (1.79)	−2.92 e-9 (1.73)
Poor health				−0.009 (1.94)	−0.008 (1.85)
Any ADLs				−0.001 (0.39)	−0.002 (0.55)
Any IADLs				0.002 (0.47)	0.001 (0.30)
Likelihood of log	827.69	−790.93	−772.35	−769.86	758.94

^a The results reported in column 5 are based on a model that also includes controls for residence in an MSA, region dummy variables and three state Medicaid policy variables. Marginal effects and absolute values of t -statistics reported.

of having insurance. Poor self-reported health status is the only one of the three health measures to have a significant effect; it decreases the likelihood of insurance coverage by 0.8 percentage points (or 35%). Age and its square and years of education enter into the model significantly. Age has a positive and significant effect, suggesting it is not a strong proxy measure for the size of insurance premiums.

In Table 4, I report results using the sample of AHEAD respondents not currently in need of assistance with ADLs or IADLs. The explanatory variable of interest here is a measure of the availability of caregivers should the need arise in the future. As in Table 3, this variable has a negative and significant effect on insurance ownership when it enters into the model alone, although not as large as the effect of current helpers (a 34% reduction compared to 74%). In this case too, when additional covariates are added, the effect of caregiver availability becomes smaller and statistically insignificant. As shown in columns 2–5, the effect ranges from a 13 to 17% reduction in the likelihood of having insurance, but is statistically insignificant. The size and direction of the marginal effects for most of the control variables are very similar to the results reported in Table 3.

Both measures of informal help used here are likely to be affected themselves by insurance. It may be the case that respondents currently in receipt of help from a family member or friend were those who lacked insurance coverage. Additionally, if intrafamily moral hazard is present, the respondents who purchased long-term care insurance may then report the absence of persons willing to help in the future. To address these concerns, I next instrument for informal caregiver availability with child characteristics, and estimate bivariate probit models. Characteristics of children were reported by one member of each AHEAD household, and using this information I defined variables measuring the number of children and whether the household has at least one female child. Other child characteristics are available in the survey, such as marital status, the number of hours worked per week, and the distance between the homes of the child and parent. Stern (1995) shows that once the endogenous nature of these child characteristics is accounted for, only distance continues to have a significant effect on parent's co-residence with the child, a substantial form of caregiving. Using distance in this case would require instrumenting for it as well, so sex of the child is the preferred instrument.

Table 5 shows the first stage of the bivariate probit model, where the caregiver measures are used as dependent variables in separate models.⁹ As shown in the first three columns, only one of the two identifying variables for current help (the number of children) enters significantly in the model. The instruments have much larger and more significant effects in the probit model of future help, seen in columns 4–6. Having at least one daughter is particularly important in naming a future helper. Respondents with one or more daughters were between 10 and 16 percentage points (25–31%) more likely to report having a caregiver available in the future.

Table 6 shows the results from bivariate probit models.¹⁰ The upper half of the table focuses on the measure of current help; the lower half examines the role of future help on

⁹ Some observations were lost due to missing data on sex of the children.

¹⁰ When the two-equation procedure was carried out using two-stage least squares, the results were similar to the bivariate probit results in terms of the signs and significance levels of the informal caregiver variables. Similarly, linear probability models yield similar results to the probit model results.

Table 4

Probit models of the effect of future help on LTC insurance coverage (AHEAD sample: $n = 6379$)^a

Explanatory variable	1	2	3	4	5
Future help	−0.008 (1.89)	−0.004 (1.20)	−0.004 (1.12)	−0.004 (1.22)	−0.003 (1.05)
Age		0.008 (1.83)	0.006 (1.53)	0.005 (1.47)	0.005 (1.47)
Age squared		−0.00005 (1.93)	−0.00004 (1.60)	−0.0004 (1.53)	−0.00004 (1.53)
Education		0.004 (5.48)	0.002 (3.27)	0.002 (3.11)	0.002 (3.42)
Nonwhite		−0.010 (1.66)	−0.006 (1.13)	−0.006 (1.11)	−0.004 (0.72)
Female		0.003 (0.39)	0.005 (0.91)	0.005 (0.84)	0.004 (0.73)
Married		0.004 (0.64)	0.002 (0.29)	0.001 (0.22)	−0.001 (0.08)
Married × female		−0.006 (0.73)	−0.007 (1.17)	−0.007 (1.14)	−0.006 (1.00)
Household income			0.0007 (2.98)	0.0007 (2.98)	0.0006 (2.95)
Household income squared			−0.000005 (2.29)	−0.000005 (2.29)	−0.00005 (2.24)
Net worth			0.00002 (3.17)	0.00002 (3.05)	0.00002 (2.99)
Net worth squared			−3.8 e-9 (1.71)	−3.53 e-9 (1.64)	−3.2 e-9 (1.64)
Poor health				−0.013 (2.16)	−0.012 (2.17)
Any ADLs				−0.002 (0.47)	−0.002 (0.59)
Any IADLs				0.005 (1.09)	0.004 (0.96)
Likelihood of log	−760.20	−729.91	−709.55	−706.06	−696.80

^a The results reported in column 5 are based on a model that also includes controls for residence in an MSA, region dummy variables and three state Medicaid policy variables. Marginal effects and absolute values of t -statistics reported.

Table 5
Probit models of current and future help (AHEAD sample)^a

Explanatory variable	Dependent variable is current help			Dependent variable is future help		
	1	2	3	4	5	6
Age	−0.018 (5.44)	−0.019 (5.46)	−0.018 (5.45)	0.007 (0.50)	−0.0002 (0.01)	0.004 (0.29)
Age squared	0.0001 (6.22)	0.0001 (6.19)	0.0001 (6.21)	−0.00007 (0.69)	−0.00002 (0.26)	−0.00005 (0.48)
Education	−0.004 (6.19)	−0.004 (6.64)	−0.004 (6.20)	−0.014 (5.87)	−0.016 (7.08)	−0.014 (6.13)
Household income	0.0003 (1.70)	0.0003 (1.78)	0.0003 (1.71)	0.0003 (0.65)	0.0005 (1.03)	0.0003 (0.72)
Household income squared	−0.000001 (1.42)	−0.000001 (1.43)	−0.00001 (1.42)	−0.000001 (0.75)	−0.000001 (1.02)	−0.000001 (0.81)
Net worth	−0.00004 (2.29)	−0.00004 (2.41)	−0.00004 (2.34)	0.00003 (0.88)	0.00002 (0.54)	0.00003 (0.85)
Net worth squared	2.2 e-9 (2.09)	2.4 e-9 (2.25)	2.3 e-9 (2.14)	−4.6 e-9 (1.62)	−3.2 e-9 (1.12)	−4.4 e-9 (1.57)
Poor health	0.021 (3.44)	0.021 (3.52)	0.022 (3.54)	−0.081 (3.20)	−0.084 (3.29)	−0.083 (3.23)
Any ADLs	0.049 (9.02)	0.049 (9.02)	0.049 (9.01)	−0.075 (4.23)	−0.074 (4.20)	−0.075 (4.23)
Any IADLs	0.365 (28.17)	0.367 (28.20)	0.367 (28.16)	−0.058 (3.09)	−0.063 (3.34)	−0.061 (3.23)
Nonwhite	0.007 (1.13)	0.007 (1.18)	0.006 (1.01)	0.082 (3.75)	0.094 (4.30)	0.089 (4.01)
Female	0.006 (0.90)	0.006 (0.95)	0.006 (0.96)	−0.043 (1.70)	−0.046 (1.83)	−0.043 (1.69)
Married	−0.256 (7.05)	−0.255 (7.04)	−0.254 (7.00)	−0.244 (4.34)	−0.236 (4.16)	−0.249 (4.41)
Married × female	0.017 (1.58)	0.015 (1.46)	0.016 (1.49)	0.035 (1.23)	0.037 (1.30)	0.037 (1.30)
Number of children	0.002 (2.27)		0.002 (2.25)	0.037 (9.51)		0.026 (5.93)
At least one daughter		0.001 (0.27)	−0.005 (0.93)		0.159 (9.78)	0.104 (5.51)
Likelihood of log	−1524.34	−1519.36	−1516.85	−4206.26	−4183.96	−4160.08
Sample size	7775	7737	7737	6379	6344	6344

^a All models also include controls for MSA and region and three state Medicaid policy variables. Marginal effects and absolute values of *t*-statistics reported.

Table 6
Results from bivariate probit models of long-term care insurance and informal help measures (AHEAD sample)^a

	Probit coefficient	Bivariate probit coefficients in LTC-I model with alternate instruments		
		Number of children	Daughter	Number of children, daughter
Coefficient on current help (<i>t</i> -statistic)	−0.088(0.56)	−0.591 (1.61)	−0.575 (1.56)	−0.572 (1.58)
ρ (<i>p</i> -Value)		0.35 (0.12)	0.32 (0.14)	0.32 (0.13)
Coefficient on future help (<i>t</i> -statistic)	−0.079(1.05)	0.122 (0.32)	0.494 (1.47)	0.306 (0.93)
ρ (<i>p</i> -Value)		−0.126 (0.59)	−0.358 (0.09)	−0.245 (0.23)

^a Absolute values of *t*-statistics are shown in parentheses. All models include controls for age and its square, years of education, household income and its square, net worth and its square, race, sex, marital status, poor health status, difficulties for any ADLs and IADLs, region, MSA and three state Medicaid policy variables.

long-term care insurance. The first column reports the coefficient of each variable from a probit model; the next three show the estimated coefficient from bivariate probit models using alternative instrumental variables. Although the bivariate probit coefficients on current help are negative and approach statistical significance with *t*-statistics ranging from −1.56 to −1.61, these are suspect since the instruments had little explanatory power in the first stage. The instruments do a much better job explaining future help; here, the bivariate probit coefficients on future help are positive, though insignificant. These suggest that even after accounting for the potential bias caused by reverse causality, there is no evidence to suggest that having available informal caregivers such as family members and friends has any negative effect on the probability of owning long-term care insurance among the non-impaired elderly.

As suggested by Zweifel and Strüwe, children are motivated to provide care to parents by the possibility of receiving a higher bequest. For this reason, intrafamily moral hazard may be a deterrent to purchasing insurance only among wealthy individuals. To test this, I estimated the same set of models reported in Tables 4–6 on various subsamples of individuals with net worth greater than \$10,000, \$30,000, \$50,000 and \$100,000. The results did not differ substantively from those reported in Table 6. Even among the relatively wealthy, there is little evidence that the future availability of informal caregivers acts to deter insurance purchase.¹¹

As noted earlier, there is a second question on long-term care insurance in the AHEAD survey. Although this question suggests a level of coverage for long-term care that is not consistent with estimates from other sources, it is worth examining the results of models

¹¹ For example, restricting the sample to those with wealth greater than \$50,000 generated subsamples of 4921 and 4453 observations in the current help effect and the future help effect estimations, respectively. The coefficient on current help in a bivariate probit model of long-term care insurance was −0.92 (with a *t*-statistic of −2.58), but the coefficient for the identifying variable (daughter) was small and insignificant (0.01, *t* = 0.19) in the current help model. The dummy variable for daughter has a much larger coefficient and is significant in models of future help (0.42, *t* = 8.34); the coefficient on future help in bivariate probit models of long-term care was 0.48 with a *t*-statistic of 1.51. A similar pattern appears in the results using wealth cutoffs at \$10,000, \$30,000 and \$100,000.

using this measure as a dependent variable. Interestingly, models based on this measure yield little support for the negative influence of available caregivers on long-term care insurance ownership. For example, in single equation probit models, the presence of a caregiver had a negative and significant effect on long-term care insurance ownership, but having available caregivers in the future had a positive and significant effect. When the sample was restricted to those with higher levels of wealth, the significant negative effect of current help on insurance ownership disappears (both the magnitude of the marginal effect and the *t*-statistic are reduced).¹² Results from bivariate probit models provide no evidence of a significant relationship between either of the informal help measures and the second measure of long-term care insurance.

5. Intentions to purchase long-term care insurance

Actual purchase reflects not only the buyer's desire for long-term care insurance, but the availability of this type of insurance from sellers. The market for long-term care insurance has been growing, but the number of insurance companies selling this type of insurance was only 75 in 1985, and 135 in 1992. In addition, potential buyers are under scrutiny by insurers; coverage can be denied to those already displaying some evidence of disability. For this reason, actual purchase may understate the buyer's true desire for insurance, and may not be the best choice for testing the effect of informal care on buyers' demand for insurance. To isolate the preferences of the buyer alone, I next use a measure of long-term care insurance from a 1990 supplement to the PSID.

Respondents to the PSID aged 50 and over were asked to complete a self-administered questionnaire on health, health care coverage, and long-term care coverage. The survey asked respondents how likely each would be to purchase a given policy for long-term care insurance; respondents also commented on statements representing a range of attitudes about coverage for long-term care and the provision of care. To measure the effect of attitudes regarding family care, I focus on the response to the following true or false statement: "my family will take care of me at home."

A total of 2429 surveys were collected, but many of these had incomplete responses to several key variables. Many observations had to be dropped for missing data on long-term care insurance (712), and several others were dropped for missing data on demographic characteristics such as age, education, race (79). When matched to the state-level variables, another four respondents were dropped for missing state identifiers. The resulting sample consists of 1634 observations; of these 162 reported already having insurance that covered long-term care expenses. These were coded as being very likely to purchase long-term care insurance.¹³

Means of all explanatory variables are shown in Table 7, as well as the mean of a binary measure of long-term care insurance, equal to 1 if the respondent reports being very or

¹² Two samples of respondents were used here, one with wealth greater than \$10,000 and another with wealth greater than \$50,000.

¹³ The results in this section do not differ if the 162 respondents with long-term care insurance are removed from the sample.

Table 7
PSID sample variable means and definitions ($n = 1634$)

Variable	Definition	Mean (S.D.)	Means by LTC policy (S.E.)	
LTC policy	Equal to 1 if respondent reports being very likely or somewhat likely to buy LTC insurance	0.312 (0.46)	0	1
Age	Age at interview	64.23 (9.72)	65.19 (0.30)	62.13 ^a (0.39)
Education	Years of education	11.76 (3.24)	11.40 (0.098)	12.56 ^a (0.133)
Family income	Family income from all sources (in \$000s)	25.909 (47.42)	19.996 (0.92)	39.939 ^a (3.09)
Net worth	Sum of all assets including housing equity, less debt (in \$000s)	77.413 (180.01)	78.964 (5.38)	73.993 (7.94)
Poor health	Equal to 1 if respondent reports health status as poor	0.083 (0.276)	0.092 (0.009)	0.065 ^a (0.011)
Any ADLs	Equal to 1 if respondent reports a need for help with at least one ADL	0.114 (0.318)	0.123 (0.010)	0.094 (0.013)
Any IADLs	Equal to 1 if respondent reports a need for help with at least one ADL	0.189 (0.392)	0.209 (0.012)	0.145 ^a (0.016)
Nonwhite	Equal to 1 if race is nonwhite	0.185 (0.388)	0.190 (0.012)	0.175 (0.017)
Female	Equal to 1 if respondent is female	0.559 (0.497)	0.591 (0.015)	0.488 ^a (0.022)
Married	Equal to 1 if respondent is married	0.684 (0.465)	0.657 (0.014)	0.743 ^a (0.019)
Family care	Equal to 1 if respondent believes family will take care of her/him at home, 0 otherwise	0.204 (0.403)	0.214 (0.012)	0.182 (0.017)
Family care missing	Response to family care statement missing	0.464 (0.499)	0.486 (0.015)	0.416 (0.022)

^a This indicates that the difference in means across groups is statistically different from 0 at the 1% level of significance.

somewhat likely to buy long-term care insurance. The mean of this variable is 31.2%, much higher than the AHEAD actual purchase rate of 2.3%. Compared to the AHEAD sample, the PSID respondents are younger and have more education, but have less income and report less wealth. Rates of poor health and difficulties with ADLs and IADLs are all lower among the PSID sample.

There are high numbers of non-responses to the various questions on attitudes regarding long-term care, including the question on whether the family will provide care at home. Almost one-half (46.4%) of the sample did not reply to the family care question, while the rate of non-response to the other attitude questions ranges from 18 to 54%.

In Table 8, I report the results from ordered probit models of intentions to purchase long-term care insurance. In these models I use the full sample of 1634 observations and include a dummy variable equal to one if the family care response is missing, and recode the family care dummy to zero for observations with missing data. The models also include controls for all of the covariates included in the AHEAD analysis (income, net worth, age, education, health status, demographics, region and MSA dummies, and three state Medicaid policy variables). As shown in the first column, the coefficients for family care and the dummy for missing family care are negative and significant, suggesting that those who believe family members will care for them at home are less likely to intend to buy

Table 8

Ordered probit models of long-term care insurance purchase (PSID sample: $n = 1634$)^a

Explanatory variable	1	2	3
Family will provide care at home	−0.188 (2.06)		
Family response missing	−0.219 (3.02)	−0.220 (3.02)	−0.213 (2.87)
Family will provide care \times net worth \leq \$50 K		−0.315 (2.93)	−0.266 (2.45)
Family will provide care \times net worth \geq \$50 K		0.048 (0.35)	0.109 (0.80)
Respondent does not want to go into a nursing home			−0.282 (2.76)
Nursing home response missing			0.080 (0.70)
Likelihood of log	−1780.98	−1777.93	−1771.15

^a Absolute values of t -statistics are reported in parentheses. Models also include controls for age and age squared, income and income squared, net worth and its square, poor health status, marital status, sex, race, years of education, difficulties with an ADL or IADL, urban residence, region of residence and three state Medicaid policy variables.

long-term care insurance. The next column explores this further, by interacting the measure of family care with two dummy variables representing wealth categories. Again, because the theory suggests that children and others are motivated to provide care by the possibility of receiving a higher bequest, intrafamily moral hazard should be evident in the insurance decisions made by the relatively well-off. In contrast, the results show that the negative and significant effect of expectations of family care on insurance exists among those respondents with under \$50,000 in wealth, as seen in column 2 of Table 8.¹⁴ When attitudes regarding nursing homes are added in the third column, the effect of family care among the wealthy becomes smaller still.

6. Conclusion

This paper presents an empirical examination of some of the factors associated with the purchase of long-term care insurance. In other research, there is a great deal of evidence about the role of informal caregivers in the provision of long-term care, and there is some evidence that the care they provide is a substitute for formal market care. In contrast to these patterns and to a theoretical model about intrafamily moral hazard, the results of this paper do not suggest that caregiver availability discourages parents from obtaining market-purchased insurance for long-term care needs. Expectations about future caregiver availability in the form of family and friends have no significant effect on actual ownership of long-term care insurance. Expectations of receiving family care appear to deter the less wealthy from intending to purchase insurance, but have no effect on those with higher wealth and potentially higher bequests. These results strongly counter the suggestion that the elderly decline to purchase insurance, because they perceive children as potential substitutes, who can be encouraged to provide care in exchange for larger bequests.

Poor health was shown to have a negative and weakly significant effect on long-term care insurance, suggesting the presence of risk segmentation in the market for long-term

¹⁴ Similar results are obtained when high wealth is measured using a cutoff of \$10,000.

care. Factors that have significant positive effects on long-term care insurance coverage are assets, income, and education. The importance of assets and income in this model is consistent with existing explanations for low-levels of long-term care insurance coverage among the elderly. Both the high cost of coverage relative to income levels of the elderly, and the fact that the Medicaid program provides coverage for individuals with little wealth have often been cited as key reasons for the lack of long-term care coverage. Insurance for long-term care is of greater value to those with assets to protect from the spend-down process required to become eligible for Medicaid.

The cost of long-term care is a concern not only for private individuals, but also for the public. Long-term care spending in the US was estimated at \$117 billion in 1998, 59% of which was financed by federal and state governments (HCFA, 2000). The high private and social cost of long-term care has prompted policy makers to propose solutions such as tax credits for private insurance, liberalized Medicaid eligibility for those with private insurance, and in Germany, mandatory social insurance for long-term care. However, some existing theories have provided less support for the efficacy of public policies by suggesting that parental concerns about intrafamily moral hazard may counteract any incentives created by policies. Pauly (1990) raises concerns that tax subsidies for long-term care insurance may be less effective owing to the combined contribution of Medicaid and intrafamily moral hazard as deterrents to purchasing private insurance. Zweifel and Strüwe (1998) question the efficiency of social insurance programs given the fact that some families act in their best interest by foregoing insurance and relying on children to provide care. Although the results of this paper are not able to cast light on the larger question of why so few elderly purchase long-term care insurance, the results suggest that the recent policy initiatives to expand private insurance in US and develop social insurance in Germany are not as limited by intrafamily moral hazard as some existing theoretical work suggests.

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