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Determinants of long-term care insurance: Are spouses substitutes?

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**DETERMINANTS OF LONG-TERM CARE INSURANCE: ARE SPOUSES
SUBSTITUTES?**

A Thesis Submitted
in Partial Fulfillment
of the Requirements for the Designation
University Honors

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Entitled: Determinants of Long-Term Care Insurance: Are Spouses Substitutes?

has been approved as meeting the thesis or project requirement for the Designation
University Honors.

Date Dr. Bryce Kanago, Honors Thesis Advisor, Department of Economics

Date Dr. Jessica Moon, Director, University Honors Program

Abstract

As the U.S. population continues to age due to medical advancements and the aging of the largest generation in the history of the U.S. (baby boomers), the number of people in long-term care facilities has increased significantly; however, the percentage of people with long-term care insurance is small. Research conducted in the early 2000s focused on factors such as availability of children, risk aversion, health status, age, having Medicaid, and other variables that describe personal attributes to explain why the market is so small. This paper will use recent data from the Health and Retirement Study to determine whether or not having a living spouse is a substitute for having long-term care insurance. In particular I investigated this question for those classified as middle baby-boomers. I found that being married has a positive and statistically significant impact on the whether or not an individual has long-term care insurance.

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1. Introduction

The baby boomer generation is reaching an advanced age. As they age, premiums for long-term care insurance rise rapidly and the risk of being denied long-term care insurance coverage if their health declines. Approximately 10,000 baby boomers reach the age of 65 every single day, and that will continue to happen until the year 2030 (US Census, 2009).

Approximately 70% of all of those baby boomers will need long-term care services at some point in the future (U.S. Department of Health and Human Services, 2017). Additionally, 37% of all individuals will be admitted into a long-term care facility at some point in their lifetime. This data suggests two things; one, it is puzzling why the market for long-term care insurance is so small considering people are naturally risk averse; and two, there must be some factors at work, like individuals substituting spousal care for long-term care insurance, that are suppressing the demand for long-term care insurance. While 37% of people enter a long-term care facility for approximately a year, 59% of people receive in-home unpaid help, presumably from family members or friends (U.S. Department of Health and Human Services, 2017). Given that the majority of people receive unpaid help, one would assume that it would be a deterrent that people consider while deciding whether or not to purchase long-term care insurance. If one does not believe that they will need to use a long-term care facility because they have people willing to help them out for free, certainly they will not purchase long-term care insurance. One's spouse is an obvious first choice for most people to have help them perform everyday activities since, in most cases, spouses live together.

Pauly stated "the implicit cost of quality adjusted spouse-provided care may be less than the cost of market-purchased nursing home care," meaning that the expense of long-term care or insurance for it exceeds the opportunity cost that spouses face from taking care of their loved

ones (Pauly, 1990, p. 162). Also, some people may not purchase long-term care insurance because they fear that their loved ones will not help them if they need it since they could just utilize their insurance and enter into a long-term care facility. However, some seniors fear impoverishing their spouse due to long-term care expenses, so this should theoretically encourage people to purchase long-term care insurance (Pauly, 1990, p. 161). Based on this framework, it is reasonable to assume that people who are not especially wealthy (can easily afford long-term care) or poor (qualify for Medicaid to pay for long-term care) should be purchasing long-term care insurance at higher rates and that having a living spouse should have a major impact on most people's decision on whether or not to purchase long-term care insurance. This study found that the variables that determine whether or not someone has purchased long-term care insurance that are positive and statistically significant include age, whether or not someone is black, how well educated they are, and their marital status. The variables that were statistically significant and negative include a married individuals' amount of wealth, whether or not someone is Hispanic, and one's age.

2. Literature Review

Amy Finklestein and Kathleen McGarry (2006) took a look at what drove individuals to purchase long-term care health insurance. Their data came from a survey that collected information about older individuals, the Asset and Health Dynamics cohort of the Health Retirement study, between the years of 1995-2000. The authors found that a person who was more risk averse and cautious was more likely to purchase long-term care insurance. The variable that the study constructed to measure an individual's risk aversion focused on how often an individual wore a seatbelt. The more often a person wore a seatbelt, the more risk averse they

were. Lastly, the study found that those who are wealthier are also more likely to purchase long-term health insurance. This could be the case because those with extra wealth can afford a luxury insurance like long-term care insurance or because they have more on the line when it comes to losing their fortune before they die. The possibility of passing one's wealth to one's family members through inheritance may motivate someone to purchase long-term health insurance, as long-term care is typically expensive and may exhaust one's wealth. In 2016 nursing home care costs were estimated to be \$6,844 a month for a semi private room and \$7,689 a month for a private room (U.S. Department of Health and Human Services, 2017).

Jeffery R. Brown and Amy Finklestein (2008) analyzed the relationship between Medicaid and the private market for long-term health care insurance. The study noted how those who are most likely to purchase insurance are risk-averse. The paper concluded that because they will be likely eligible for Medicaid, the least wealthy 66% of individuals are unmotivated to purchase long-term care insurance; the implicit tax that the government put on private insurers affected the cost of their service and made it less desirable. This means that some individuals may have found long-term care insurance more desirable had Medicaid not provided a similar service. It makes long-term care insurance seem too expensive for the limited additional benefits one would receive compared to using Medicaid (in which they are already forced to pay for). The study admitted that it could not gauge how much reforms to Medicare might improve the market for long-term health care insurance, but it hypothesized that the growth would not be substantially large due to other factors keeping demand low. These factors include the potential to rely on one's children or asymmetric information leading to a market failure which makes insurance expensive for those who perceive they are less likely to use it.

Jennifer Mellor (2001) examined if the market for long-term care insurance is small because many elderly individuals look towards other caregivers, like their children, to take care of them instead of long-term care facilities like assisted living. While Mellor included a variable for marriage in her model, she did not consider a living spouse to be a possible substitute for long-term care insurance. An individual's spouse did not meet the necessary standards set by her definition of intrafamily moral hazard because their service is not influenced by the possibility of receiving an inheritance or compensation of any sort. The study found that, despite theoretical models suggesting that having a future caregiver in mind may have a significant effect on the market, there was actually no statistically significant evidence suggesting that availability of an alternative care-giver had an effect on whether or not an individual purchased long-term health care insurance. When the study differentiated individuals who were impoverished from individuals who were wealthy, it found that those who were impoverished were more likely to plan on using their family to take care of them in their old age instead of purchasing long-term care health insurance. While it found that expectations about future family care had no effect on whether or not those who were wealthy purchased long-term care health insurance. The study found that poor health has a small, but statistically significant, impact on whether someone purchases long-term care health insurance. Lastly, it found that assets, income, and education, all of which are correlated with wealth, were statistically significant.

3. Theory of Spouses as a Substitute

Mellor's definition of intrafamily moral hazard was given by Pauly (1990, p. 529), "that parents rationally decide not to purchase insurance for long-term care when children are

present.” Mellor’s study did not focus on the effect spouses might have because her definition of intrafamily moral hazard did not include spouses. For the purpose of this study, we alter the definition of intrafamily moral hazard to: individuals are less likely to purchase insurance for long-term care when their spouse is living. Pauly provided two different scenarios concerning the effect of a spouse passing away on one’s purchase of long-term care insurance. The first scenario was that the spouse who passed away did not contribute much to the couple’s overall income. In this scenario, Pauly stated that when one’s spouse passes away, the surviving spouse’s individual consumption is able to go up since they have a similar level of income (or net worth) without the expense of supporting another person. Because of this, Pauly hypothesized that people would not purchase long-term care insurance unless they felt that their wealth would be threatened by the high costs of long-term care. The second situation that occurs is if one’s spouse passes away and is a significant contributor to the overall income of the household, it will be more likely that the living spouse will purchase long-term care insurance because they do not have any other safety net if they were to become unable to support his or herself.

As mentioned in the introduction, Pauly stated that a major fear of older individuals is impoverishing their spouse due to the cost of long-term care facilities. This may make an individual more inclined to purchase long-term care insurance. Counter to this point, some individuals may avoid buying long-term care insurance because they fear that their family members will not assist them if they have the ability to use their insurance and enter a long-term care facility (Pauly, 1990).

This study differs from Mellor’s (2001), Pauly’s (1990), or Zweifel and Strüwe’s (1998) on an important assumption. In this study, an individual is not assumed to be purely self-

interested, which is what is suggested by the writers mentioned above. Instead, a respondent is assumed to also be interested in the well-being of his or her spouse as well.

Other studies have also included the variable marriage, but found it to be insignificant. For example, Cramer and Jenson's study (2006) cited Pauly's study (1990) and predicted that marriage should increase one's propensity to buy long-term care insurance because couples fear depleting their spouse's assets. While this prediction is made, the variable proved to be statistically insignificant in their study. Another theory that is relevant is that spouses serve as substitutes for nursing home care. Activities of Daily Living (ADL) and Instrumental Activities of Daily living (IADL) are activities that one must be able to perform by oneself in order to live independently and maintain social relationships. ADLs are "those skills required to manage one's basic physical needs" (Edemekong et al., 2020, para. 5). The activities that are measured include bathing, dressing, eating, getting out of bed, and walking across the room. IADLs differ from ADLS because they are "more complex activities that are related to the ability to live independently in the community" (Edemekong et al., 2020, para 5). The activities that are measured include using the phone, managing one's money, taking medications, grocery shopping, and the ability to make warm meals.

Some of the common ADLs and IADLs like cooking, cleaning, managing money can be done by a spouse who is in better health, so that may deter individuals with spouses who are able to provide care from purchasing long-term care insurance, because they expect to utilize less paid long-term care services. The assumption that one's spouse will outlive him or herself might be questionable and less likely to occur than one's child outliving him or herself. This might create the expectation that the variable for having a living spouse will be small and less significant than having children who help. The one thing that might make it more significant is

the fact that couples know that they will always physically be with each other and vowed to help each other out until death does them part. Given that children often move away and have their own lives, it is often not possible for them to take care of their elderly parents (because they have their own family to take care of or other responsibilities).

Another possibility that some older individuals may be concerned with is burdening their spouse as well as their children with taking care of them if they were to ever need it. This concern raises the likelihood that a person buys long-term care insurance.

If one's spouse is already providing care and helping them with some essential daily activities, an individual might decide that their spouse can continue to take care of them as they age, and therefore they will be less likely to purchase long-term care insurance. Another possible factor is that if one is already in need of help from their spouse, they may figure that their condition is likely to worsen, and because they do not want to further burden their spouse, they will purchase long-term care insurance (if the insurance company accepts their application given that they are highly likely to use their insurance). Some insurance companies offer a discount to couples (married or partnered) who purchase long-term care insurance together, therefore increasing the likelihood that married individuals purchase long-term care insurance (American Association for Long-Term Care Insurance, 2020). These positive and negative forces may counteract each other and make the variable statistically insignificant even if marriage has a large part to play in most people's decision to purchase long-term care insurance.

4. Data, Model and Variable Descriptions, Variable Discussion

Data

The data was collected from the Health and Retirement Study (HRS) from the year of 2016. The cohort of individuals that this study focused on were "middle baby boomers" or those

who were on average 65 years old when they finished taking the survey. Although my sample is more recent and my cohort is different, most of the variables used in this study match the ones used in the study by Jennifer Mellor (2001). Because of the numerous questions in the survey, the *Rand HRS Longitudinal File 2016* codebook was used to identify the necessary variables. The file cleans up the data, provides an easy to understand and formulated naming convention for the variables, and has computed values for multiple variables, like total assets (total assets minus total debts). The variables that were taken from this file include: Highest Level of Education, Years of Education, Marital Status, Age, Level of health (self-reported), Race, whether one is White or Hispanic, Female, Total Household Income, Net Assets, Assistance with Activities of Daily Living, and Assistance with Instrumental Activities of Daily Living. While this covers the majority of the variables used in Mellor's study, two are still missing: current help and future help. These two variables came from the HRS 2016 Core data set.

Model and Variable Descriptions

I used a probit model to determine the impact of the variables on the probability of a respondent having a long-term care insurance policy. As previously mentioned, it is the same regression technique that was used by Mellor (2001). This model is as follows:

$$\text{Prob} (\text{LTCInsurance} = 1) = \Phi (\text{Education} + \text{Married} + \text{Age} + \text{HealthStatus} + \text{Black} + \text{Hispanic} + \text{Female} + \text{Income} + \text{MarriedIncome} + \text{Wealth} + \text{MarriedWealth} + \text{ADL} + \text{IADL} + \text{ADLHelp} + \text{IADLHelp})$$

As previously mentioned, the age group I focused on are respondents who are “middle baby boomers” or on average aged 65 at the end of the survey. In Mellor’s (2001) study, when compared to respondents aged 77 (on average), those aged 65 were more likely to have long-term care insurance. This could be due to higher levels of education, the increase in availability and information about long-term care insurance, the fact that if one is already 77 that there is more certainty that they will not use long-term care, or other unknown factors. Also, it was expected that the results from using middle aged baby boomers might differ from any of the results in Mellor’s paper (2001) thanks to the fact that many, if not all, of the people surveyed were not old enough to be surveyed when the last paper was written. Because these individuals are younger and may have had a parent or an older friend who had long-term health insurance or because they have more exposure to new technology, like the internet, it is likely that they will be more knowledgeable of the existence of long-term care insurance and therefore more apt to purchase it. **Table 2** on page 16 shows the descriptive statistics for each variable.

LTCInsurance is the dependent variable and it indicates whether or not a person has long-term care insurance. If the person does have long-term care insurance, then the dependent variable equals 1 and is equal to 0 otherwise. The independent variable *Education*, equals the respondents’ number of years of education. The levels of education vary from 1 - 17. Anything over 16 is marked as 17+ years of education, or recorded as 17, often indicating a graduate degree of some sort. The variable *Married* is one’s current marital status with their partner. The marital status can take one of eight values, married: 1, married but spouse is absent: 2, partnered: 3, separated: 4, divorced: 5, Separated/Divorced: 6, Widowed: 7, or Never Married: 8. For the purposes of this study, the variable *Married* equals 1 if married or partnered and is equal to 0 for anything else.

The variable *Age* is a respondent's age in months when they finished taking the survey. The study does this by taking the total number of years and months that have gone by since one's birth and putting them in terms of years (in decimal form). For consistency and accuracy, the variable for age indicates the age of a respondent at the end of the interview rather than the beginning, middle, or end. In most cases, the majority of the interview was filled out towards the end, so this is a more accurate measure of the respondents' true age when answering the survey questions.

The variable *HealthStatus* stands for self-reported health status. The variable takes on a value from one to five; 1 being "excellent health" and 5 being "poor health." Numbers two, three, and four are between excellent and poor health status, the lower the number, the better the health. For the purposes of this study *HealthStatus* is a dummy variable. If the respondent's answer is less than a 5, the variable equals 0; whereas if it is 5, it equals 1. The variable *Black* identifies the race of an individual. The variable can take one of two values, if the respondent's race is black then the variable equals 1; otherwise the variable equals 0. Another race variable *Hispanic* is used to determine whether or not someone is Hispanic in addition to the other race that he or she listed. If one is Hispanic the variable equals 1; if not, it equals 0.

The variable *Female* indicates a respondent's gender. A respondent's gender can take one of two values: male or female. If the respondent is a female, the variable will equal 1, and if they are a male the variable will equal 0. The variable *Income* represents total household income. This variable is the sum of all types of income. The variable *MarriedIncome* is an interactive variable. It equals a respondent's total household income times the dummy variable *Married*. The variable *MarriedIncome* is included because household income might have a different effect on a married person's willingness to buy long-term care insurance when compared to a single person. A single

individual, who has a similar level of household income to a married couple, may be less likely to have long-term care insurance as they may be better able to afford to pay for long-term care. This is because a married couple's income is split between two people. The opposite could also be true. It is possible that a single individual, who has a similar level of income to a married couple, can better afford a luxury like long-term care insurance, therefore is more likely to purchase long-term care insurance.

The variable *Wealth* represents a respondent's total household wealth. It is a cumulative variable as well, meaning that all of the relevant assets, outside of IRAs, that are part of wealth are summed together and any debt that a respondent has is subtracted to create the variable "total wealth." The variable *MarriedWealth* is another interactive variable. The value of *MarriedWealth* equals total wealth times the dummy variable *Married*. Similar to *MarriedIncome*, this variable allows us test if the amount of a respondent's wealth has a different effect on a married person's willingness to buy long-term care insurance compared to someone who is single.

The variable *ADL* is a dummy variable. This variable takes all of a person's possible assisted Activities of Daily Living (ADLs) into account. If a respondent indicated any level of difficulty with any of the activities then the variable *ADL* equals 1; if not, the variable equals 0. The variable *IADL* is a dummy variable. This variable takes all of a person's possible assisted Instrumental Activities of Daily Living (IADLs) into account. If a respondent indicated any level of difficulty with any of the activities then the variable *IADL* equals 1; if not, the variable equals 0.

The variable *ADLHelp* indicates whether or not a respondent receives help from their spouse with any Activities of Daily Living. The respondent is asked to identify who helps them

the most and they are given seven opportunities to name people. In this model, the relative amount of care that one's spouse provides is not differentiated, rather if a spouse provides any level of help the variable *ADLHelp* equals 1. If the spouse does not provide any help for any Activity of Daily Living previously mentioned, the variable equals 0. This variable is included because someone who has a spouse to help them might, other things the same, be less likely to have long-term care insurance.

The variable *IADLHelp* indicates whether or not a respondent receives help from their spouse with any Instrumental Activities of Daily Living. There are one of six different levels of care that could be provided by one's spouse. Similar to *ADLHelp*, the level of care is not differentiated, but rather just that the care is provided by a spouse, since it could indicate the future behavior of one's spouse if the respondent was ever to need more assistance in the future. In this model *IADLHelp* is a dummy variable and it will equal 1 if the respondent's spouse provides any level of help for any Instrumental Activity of Daily Living previously mentioned, and 0 if the spouse does not.

Variable Discussion

The survey collected answers from both respondents and their spouses. However, since single persons have no spouses, it is not possible to factor in characteristics of spouses in the model. Because of this, Mellor's study (2001) also did not include variables for spouses' responses. One assumption made is that, on average, the respondent knows his own health, wealth, and ADLs/IADLs better than his or her spouse.

There are some interesting differences between the means of the variables used in my study (2016) versus the means of the variables Mellor's study (2001) that should be noted. The

average age of the sample of respondents that is used in this study is five years older than the average in Mellor's study. Unsurprisingly, the average education of adults this age has increased since 2001. With more education, since it is a positive and statistically significant predictor of long-term care insurance purchase, one might predict that the percentage of people purchasing long-term care insurance would go up as well. This prediction would be correct as it increased nearly 8 percentage points (from 2.3% to 10.4%). This increase is probably not solely due to the difference in the average years of education between the two cohorts, as many other factors are at play. Family income is surprisingly drastically different; perhaps that is due to less people being able to afford to fully retire, inflation increasing the nominal values of incomes, or because people's life expectancy is longer so they are retiring later and continuing to maintain their income from their career even into their late sixties. It is also important to note that one might expect the new cohort to have a higher level of income since they have a higher level of education on average. Finally, differences in income and wealth can be driven by a couple of very high observations. A couple of outliers in this dataset include a respondent whose income was \$2,395,273, and a respondent whose wealth was \$16,758,800.

Similar to family income, the average net worth of individuals has increased almost 4.7 times the amount it was in 2001. It would be reasonable for one to assume that both of these increases (income and wealth), like the increase in education, would increase the purchase of long-term care insurance, as long as they outpace the cost increase of insurance.

Table 1 The Means From the 2016 Variables Used in This Study

Variable	Definition	Mean
LTC Policy: LTCInsurance	The proportion of people who purchased long-term care insurance.	0.104
Age: Age	The average age of a respondent in months.	769.535
Years of Education: Education	The average number of years of education a respondent has.	12.953
Family Income: Income	A respondent's average amount of household income (in thousands of dollars).	79.290
Net Worth: Wealth	The average amount of a respondent's assets less their debts (in thousands of dollars).	360.752
Poor Health: HealthStatus	The proportion of respondents who reported that they had the worst possible health.	0.069
Any ADLs: ADL	The proportion of respondents who reported struggling with any IADLs	0.162
Any IADLs: IADL	The proportion of respondents who reported struggling with any ADLs.	0.079
Nonwhite: Black and Hispanic	The proportion of Black and Hispanic respondents.	$0.258 + 0.203 = 0.461$ Black + Hispanic = Total
Female: Female	The proportion of respondents who are female.	0.565
Married: Married	The proportion of respondents who are married.	0.674

The mean of the variable self-reported health status is around a percentage point and a half smaller than in Mellor's data. Members of the 2016 sample report similar levels of need to those in 2001 when it comes to performing ADLs, but surprisingly less than half the amount needed with IADLs. If IADLs are a positive and significant indicator of long-term care insurance, this could decrease the amount that is purchased.

Results and Discussion

Table 2 reports results from a probit regression where the dependent variable equals 1 if a respondent has long-term care insurance and 0 otherwise. Some of the results run contrary to past studies, while some others stay consistent. This could be due to the fact that some studies did not include a variable for marital status. In other studies wealth is a positive and significant indicator of one purchasing long-term care insurance. In this study, the coefficient on wealth was positive but not quite statistically significant at the 10% level.. Interestingly, when one looks at the total wealth variable adjusted to account for only married individuals, the variable becomes significant at the 5% level, and the direction of the variable's coefficient changes. It may be that when a married individual is wealthy they may not feel like they need insurance to pay for long-term care because they can afford to pay for it on their own.

Income and *MarriedIncome* are both statistically insignificant. Contrary to these findings, Mellor's study (2001) found that both total income and total wealth were statistically significant and positive predictors of whether or not one has purchased long-term care insurance.

It is possible and likely that this *Income* and *Wealth* are both correlated with *Education* and this perhaps takes away from their significance. It would not be advisable to run a regression without *Education* since the variable is commonly significant and important, therefore making the model inaccurate without it. The correlation between *Education* and total *Income* is 0.2553,

the correlation between *Education* and *Wealth* is 0.1937, and the correlation between income and wealth is 0.4193.

Table 2 Determinants of Having Long-Term Healthcare Insurance

Variable	Coefficient	t-stat	P-Value
Income	0.00103	1.21	0.228
MarriedIncome	-0.00012	-0.14	0.889
Wealth	0.00019	1.62	0.106
MarriedWealth	-0.00025**	-2.11	0.035**
Married	0.30829***	3.57	0.000***
Black	0.12340*	1.69	0.091*
Hispanic	-0.21075**	-2.14	0.033**
Female	0.09762	1.54	0.123
Education	0.09528***	7.24	0.000***
Age	0.00204***	3.27	0.001***
HealthStatus	-0.13676	-0.95	0.344
ADL	0.05585	0.52	0.606
IADL	0.09178	0.67	0.506
ADLHelp	0.06999	0.33	0.740
IADLHelp	-0.17874	-0.84	0.399

N= 3,530

Pseudo R² = 0.0722

Note: * means that the coefficient is statistically significant at the 10% level, ** means that the coefficient is statistically significant at the 5% level, *** means that the coefficient is statistically significant at the 1% level.

The physical characteristics of respondents that were statistically significant were *Hispanic, Black, and Age*; the other, *Female*, was not. *Age* is positive and statistically significant, which makes sense considering as one gets older, they become more likely to either have declining health or see themselves coming closer to the age where they may need long-term care services. Similar to both of the studies done by Finkelstein and McGarry, K. (2006) and Mellor (2001), this study found the number of years of education to be a statistically significant and positively correlated predictor of whether or not one purchases long-term care insurance. The variable, years of education, has the highest z-score and is significant at the 1% level of significance. This finding suggests that the more educated a person is, the more likely they are to

know about or seek out insurance for long-term care. Another possibility is that people who pursue more education are aurally more risk averse. Higher amounts of education provide job security and future financial security.

HealthStatus, the self-reported health status of an individual, was not a statistically significant variable. This finding is contrary to Mellor's study which found a weak, but positive and statistically significant correlation between poor health status and the purchase of long-term care insurance. This might suggest that if one was in poor health they were more likely to have purchased long-term care insurance because they were more likely enter into a long-term care facility, and therefore reap the benefits of having insurance. However, this might not be the case; some people in poor health might not expect to live long lives. Also, these individuals might not be eligible for insurance, or may have to pay greater premiums which would deter them from purchasing the insurance. It is very possible that these factors may have offset each other.

The variables for Activities of Daily Living and Instrumental Activities of Daily Living were both statistically insignificant. One might assume being unable to perform these activities raises the expected benefits of insurance, but my study, as well as Mellor's (2001), found that neither of the variables are statistically significant. However, this could also be due to the fact that individuals who struggle with ADLs and IADLs are less likely to qualify for long-term care insurance and more likely to have to pay higher premiums if they do qualify.

The variables that indicate whether or not one receives help from their spouse in Activities of Daily Living and Instrumental Activities of Daily Living (*ADLHelp* and *IADLHelp*) were both statistically insignificant. Other things the same having a spouse who provides help might reduce the benefits of long-term care insurance, however a respondent who receives help from their spouse may not consider that help as a future substitute for long-term care, or the

respondent may not want to burden their spouse by making them a full-time caretaker. Perhaps the activities that they are doing are not as comprehensive or difficult as one would expect out of a long-term care facility if they were to feel like they needed to move into one. Also, if a spouse is able to provide help, it may be that a high level of care is not needed.

Finally, the variable *Marriage* is statistically significant at the 1% percent level. Its coefficient is positive, indicating that if one is married, they are more likely to have purchased long-term care insurance. This finding suggests that marriage is not a substitute for long-term care insurance, but quite the opposite, a compliment. This finding suggests that the average respondent believes that the costs of burdening their spouse financially and physically (making them a full-time caretaker) outweighs the benefits of having that spouse take care of them in the future.

Marginal Effects of Statistically Significant Variables

In nonlinear models, marginal effects of continuous variables can be used to compute the change in the probability of the dependent variable for a one unit change in the independent variables. For dummy variables, the marginal effects measure the difference in the probability of having long-term care insurance if the value of the dummy equals one rather than zero.

As mentioned above, *MarriedWealth*, *Black*, *Hispaninc*, *Education*, *Age*, and *Married* are all statistically significant. A \$100,000 change in *MarriedWealth*, from the mean of \$312,324.6, caused a respondent's probability of having long-term care insurance to increase by about 2.5%. If a respondent was Black, they were 1.932% more likely to have long-term care insurance than otherwise. If a respondent was Hispanic, they were 3.299% less likely to purchase long-term care insurance than otherwise. Each one year increase in a respondent's education, from the mean of

12.95 years, causes a respondent's probability of having long-term care insurance to increase by 1.491%. For every month a respondent's age increases, from the mean of 64 years and 1.5 months, they will be 0.032% more likely to purchase long term care insurance. Lastly, if a respondent was married, they were 4.8% more likely to purchase long term care insurance.

Conclusion

As life expectancy continues to rise and baby boomers begin to age, the demand for long-term care facilities will skyrocket. Despite the high costs of being placed in a long-term care facility, the demand for long-term care insurance is relatively small. This study set out to find whether or not having a living spouse impacted one's decision to have purchased long-term care insurance.

Many of the findings suggest that some of the variables that were assumed to matter the most in either did not matter, or had the opposite effect of what was assumed in the **Theory of Spouses as a Substitute**. The results tell an interesting story about how people rationalize the purchase of long-term care insurance. Unlike other studies, the effects of wealth and income on one's decision to hold long-term care insurance were found to be statistically insignificant. The difference in the impact of wealth for married versus single respondents was statistically significant in a negative direction. Respondents who were Hispanic were statistically significantly less likely to have long-term care insurance, those who were black were statistically significantly more likely to have purchased long-term care insurance, and those who are older were more likely to have purchased long-term care insurance. Contrary to what intuition might suggest and what Mellor's study found, one's self-reported health was not statistically significant.

Factors like ADL's, IADL's, and whether or not a spouse helped out with these activities did not have any statistically significant effect on whether or not someone purchases long-term care insurance. The variable education was positive and statistically significant, suggesting that the more education someone has, the more likely they are to purchase insurance.

The impact that marriage had on an individual's decision to purchase long term care insurance was significant. An important implication of my study is that marital status does matter. Future analyses should account for this and run a separate regression for married individuals that includes the characteristics of a respondent's spouse. The direction of the coefficient on *Married* is positive meaning that marriage is more likely a compliment than a substitute for long-term care insurance. This finding implies that, on average, those respondents who had long-term care insurance believed that the cost of burdening their spouse or partner in the future outweighed the benefit of having their spouse or partner provide care, so that the expected time in long-term care would be less.

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