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# Family Structure and Long-Term Care Insurance Purchase

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## **Abstract**

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## **Keywords**

Aged, Aged, 80 and over, Family, Family Relations, Female, Humans, Income, Insurance, Long-Term Care, Male, Marital Status, Middle Aged, Models, Theoretical, Parents, United States

## **Disciplines**

Medicine and Health Sciences



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## Family Structure and Long-Term Care Insurance Purchase

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### Abstract

While it has long been assumed that family structure and potential sources of informal care play a large role in the purchase decisions for long-term care insurance (LTCI), current empirical evidence is inconclusive. Our study examines the relationship between family structure and LTCI purchase and addresses several major limitations of the prior literature by using a long panel of data and considering modern family relationships, such as presence of stepchildren. We find that family structure characteristics from one's own generation, particularly about one's spouse, are associated with purchase, but that few family structure attributes from the younger generation have an influence. Family factors that may indicate future caregiver supply are negatively associated with purchase: having a coresidential child, signaling close proximity, and having a currently working spouse, signaling a healthy and able spouse, that LTC planning has not occurred yet, or that there is less need for asset protection afforded by LTCI. Dynamic factors, such as increasing wealth or turning 65, are associated with higher likelihood of LTCI purchase.

### Keywords

Family structure; spouse; children; inter-generational; heterogeneity; long-term care insurance purchase

## I. Introduction

In Europe, policymakers focus on expanding public long-term care insurance (LTCI) schemes to meet rising demand for long-term care (LTC) (Swartz *et al.*, 2012; Sharom *et al.*, 2013; Swartz, 2013; Costa-i-Font and Courbage, 2011). However, with the demise of the Community Living Assistance Services and Supports (CLASS) Act as a part of American

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health care reform, there are no indications that a public scheme would be tenable in the U.S. Instead, policymakers argue for an expanded private LTCI market in order to reduce public expenditures and increase access to LTC for the elderly. From the empirical literature, we know that key demand-side factors such as price, Medicaid, wealth, (mis)information about LTC coverage, risk preferences and perceptions, informal care availability, bequest motives, precautionary saving, tax incentives, and limited individual rationality may all influence private LTCI ownership.<sup>1</sup> Supply side factors such as asymmetric information, imperfect competition, high administrative costs, and risk selection by insurers also influence private LTCI ownership.<sup>2</sup> While numerous, these supply and demand factors have not fully explained the low uptake of LTCI in the U.S., currently with coverage of around 15% among 65+ year olds.

One under-examined factor in demand for LTCI purchases is the role of family structure and informal care supply (Brown and Finkelstein, 2011). We define family structure as the familial relationships between the potential purchaser and his or her family members and define informal care as the Family Caregiver Alliance does: a broad range of assistance to an older person or adult with a chronic or disabling condition provided by a relative, partner, friend, or neighbor who has a significant personal relationship with the care recipient. Without a doubt the modal group of informal caregivers in the U.S. is adult children, but spouses play the primary role for married elders. Pauly (1990) hypothesized that parents prefer children to care for them, and thus predicts that parents will forgo purchasing LTCI in order to have their children provide informal care (avoiding intrafamily moral hazard). Empirical tests of whether the presence of available caregivers reduces LTCI purchases have thus far produced little supporting evidence, and yet we know that considerations of family are important when planning for LTC (Sperber *et al.*, 2014).

Potential LTCI purchasers are healthy by design: they need to pass medical underwriting screeners for private LTCI. Thus, empirical LTCI purchase models that consider the *future* informal care supply may provide a more complete picture of the influence of family on LTCI purchase. Future supply of informal care is likely a function of both family structure, capturing both who is willing and able to provide care, and measures that reflect the opportunity costs of future caregivers' time. For example, a spouse working means she is not available in the present to care for the potential purchaser, but it may signal that she is healthy and can be a source of LTC in the future when care might be needed.

Recent changes in family structure may also influence purchase by changing the sources of informal care in the future. Family structure has changed dramatically, with lower birth rates and increasing female labor force participation, geographic dispersion, and divorce. A glimpse at twenty years of HRS data illustrates changes in family structure among those in the population on the cusp of needing LTC, 60–80 year olds, and in those likely to provide LTC, roughly 55–70 year olds, that are likely to affect both the demand for care and the

<sup>1</sup>For the demand side factors, see Sloan and Norton, 1997; Norton, 1995; Johnson et al, 2005; Brown, Coe and Finkelstein, 2007; Brown and Finkelstein, 2008; Courbage and Roudaut, 2008; Courtemanche and He, 2009; Davidoff, 2009; Lockwood, 2011; Goda, 2011; Brown, Goda, McGarry, 2012.

<sup>2</sup>For supply side, see Norton 2000; Finkelstein and McGarry, 2006; Finkelstein, McGarry and Sufi, 2005; Brown and Finkelstein, 2004; 2007, 2011; Oster, Shoulson, Quaid, and Dorsey, 2010; Barr, 2010.

supply of caregivers. Table I highlights that not only is family smaller in 2010 compared to 1995/6, but family structure has changed. The prevalence of step children has increased over time; in 1995/6, 9% of 60 year olds had step children, which increased to 28% by 2010, potentially indicating different reciprocity arrangements. These trends may be examples of what Costa-Font (2010) has described as a weakening of familism, which in turn may cause increased demand for LTCI coverage among the elderly.

In addition to these trends, opportunity costs are changing over time, contributing to the concern that informal care supply will not keep up with demand (Redfoot *et al.*, 2013) due to changing roles in families. Female labor force participation is much higher now than in past generations, and recent increases in participation rates have been driven by women age 55 and over. Near elderly and newly elderly women are prime sources of informal care (Juhn and Potter, 2006). Factors such as paid work for women change the relative costs of becoming an informal caregiver among adult daughters, and by extension, demand for substitutes, such as LTCI. Changing family roles may also come from increased geographical dispersion. Table 1 shows that fewer 60 year olds had a living child within 10 miles in 2010 than in 1995. Increased travel time to care for a parent, along with higher opportunity costs of that time, could substantially increase the cost associated with becoming an informal caregiver.

Our study examines the relationship between family structure, opportunity cost of future informal care providers, and LTCI purchase and addresses several major limitations of the prior literature by 1) using a long panel of data from the Health and Retirement Study, enabling us to examine LTCI purchase; 2) paying particular attention to nuanced measurement of family structure that reflects modern families; 3.) testing the possibility of cross-generational ( $G_0$ =parents of potential purchaser;  $G_1$ =purchaser,  $G_2$ =children of potential purchaser) influences; and, 4) creating inclusion criteria that reflect medical underwriting requirements.

In the second section of the paper we review key theories about the role of family in LTCI and planning, as well as their current empirical support. In section three we discuss the data, measures and sample selection of individuals eligible to purchase LTCI. In section four we present the modeling approach and section five the results. In section six we discuss our conclusions that marriage and spouse's work, education and relative age all affect an individual's LTCI purchase. Dynamic factors, such as recently turning 65 or entering a higher net worth category, are associated with increased likelihood of purchase. Family structure attributes of children are not associated with purchase; however, factors that may indicate higher future informal care supply are associated with lower probability of purchase. For example, having a coresident child or a working spouse (marking good health of a spouse and an in-home source of future informal care) are associated with reduced LTCI purchase.

## II. Theory and Supporting Empirical Evidence

The prominent theoretical models in this area are Pauly (1990) and extensions by Zweifel and Struwe (1998) who use a standard utility framework: LTCI will be purchased if the

expected utility with insurance is greater than the expected utility without insurance. Assuming imperfect annuity markets, Pauly's model predicts that low demand for LTCI may be rational under several scenarios, including: single elderly with no bequest motive; with a spouse present; and with adult children and a possible bequest motive. With respect to intra-family dynamics, the model suggests that parents who prefer care provided by their children will rationally decide to forego the purchase of LTCI due to intrafamily moral hazard: the child will be less likely to provide care in the presence of insurance because the parent faces a lower marginal price of covered formal services. Instead, parents who prefer informal care will rely on to the promise of bequests or financial transfers to induce children to provide that care (Norton and Van Houtven, 2005).

While Pauly's model is appealing in many aspects, the existence or extent of intrafamily moral hazard remains debatable and we have an incomplete picture of the incentives motivating children to care for their parents (Checkovich and Stern, 2002; Engers and Stern, 2002; Heidemann and Stern, 1999; Neuharth and Stern, 2002; Stern, 1995; Stern *et al.*, 2006; Skira, In press; Brown, 2006), and do not know how LTCI changes their incentives. In addition, the model posits that parents prefer to receive care from children, but this may be an outdated notion, or a function of the type of care task one is considering. With the rise of home health care coverage in most LTCI plans (which may help avoid an undesirable nursing home entry), as well as changing familial expectations and a desire not to burden one's children, evidence is emerging that parents often do not prefer care from a child over formal care (Brown *et al.*, 2012; Sperber *et al.*, 2014). These and other alternative motives, such as preferences of parents, may depend on the opportunity costs facing their children and may explain why previous attempts to test Pauly's theory empirically have not been conclusive. We do not explicitly test Pauly's model or whether preferences lean in favor of formal care over informal care. However, we add to the literature by explicitly examining the associations of modern family structure and the opportunity cost of future informal caregiver's time with the LTCI purchase decision of eligible older adults.

### Empirical Tests of the Key Theories

Mellor (2001) is the primary study testing Pauly's theory of the role of family in LTCI decisions, finding, contrary to expectations, that presence of children was not significantly associated with owning a LTCI policy. However, the study used a measure of insurance from the early years of HRS that was later shown to be subject to measurement error (Finkelstein and McGarry, 2006) and included a relatively short panel of data, limiting statistical power. Other researchers have controlled for family structure while pursuing other main predictors of interest in their models of LTCI ownership, purchase, or lapse, with no strong pattern of consistently significant predictors (Kumar *et al.*, 1995; Sloan and Norton, 1997; McCall *et al.*, 1998; Cramer and Jensen, 2006; Schaber and Stum, 2007; Kim, 2009; Stum, 2008; Konetzka and Luo, 2010; Coste *et al.*, 2008; Costa-Font, 2010; Bernet, 2004; Caro *et al.*, 2010; Coe *et al.*, 2013).

Overall, the current literature has at least four major limitations preventing us from understanding the role of family structure and informal care in LTCI purchase. First, like in the broader LTCI literature, most studies are cross-sectional, making it impossible to look at

family structure at the time of LTCI purchase. Second, most studies have focused on LTCI ownership and not the purchase decision. Whereas ownership is important because it determines a person's risk of out-of-pocket expenses on LTC, purchase is important when looking for policy levers that may stimulate private LTCI demand. In a study of adverse selection in the life insurance market, He (2009) demonstrated that timing is key: the risk profile of the individual must be matched to the decision to purchase insurance *at the time of purchase* in order to reach accurate conclusions. The few studies focused on purchase had other limitations, such as focusing on the group insurance market, which comprises only 20% of the market (Schaber and Stum, 2007; Stum, 2008); using a cross-sectional design (Kumar *et al.*, 1995); or focusing on partnership program purchases (McCall *et al.*, 1998), precluding strong conclusions about purchase decisions for the broader population.

Third, we develop definitions of family structure that have either not been considered or not considered consistently within one purchase model. Including 'presence or number of children' or 'marital status' alone does not reflect the complicated family structures of modern life. Specifically, no studies we reviewed considered spousal characteristics beyond the presence of a spouse, and it may be the relative age of one's spouse or the health of one's spouse that indicate future need for out of home LTC. Systematic examination of a broader set of family structure measures may greatly impact the ability to detect associations with purchase and form appropriate conclusions. Fourth, the traditional approach has modeled mainly static factors influencing purchase, although dynamic factors may influence purchase differently. For example, wealth is a key determinant of LTCI take-up (Brown and Finkelstein, 2007) and of lapse (Konezka and Luo, 2010), but no attention has been given to how changes in wealth may be associated with LTCI purchase. Similarly, age certainly affects demand, but turning 65, the traditional retirement age, may be associated with greater retirement planning, including LTC planning and LTCI purchase. The failure to correctly specify the measure and the model also could explain why hypotheses with considerable face validity, such as in Pauly's theory of intrafamily moral hazard, have not been borne out in empirical results.

### III. Data

**Health and Retirement Study (HRS)**—We use data from eight waves of the HRS (1996–2010), a publicly available, nationally representative bi-annual survey of the near elderly in the U.S. Respondents were ages 51–61 when they entered the sample initially, old enough to have formed expectations and decisions about LTC planning and LTCI purchase. We include all HRS cohorts and the precursor to the HRS, the Assets and Health Dynamics Among the Oldest Old (AHEAD) cohort. We link the HRS to the restricted *Cross-Wave Geographic Information (State)* file to obtain respondents' state of residence and to control for state-level variation in LTCI tax incentives and other unobserved state attributes.

**State Tax Incentive data**—We link data collected from state tax subsidy programs for private LTCI from 1996–2010 (Goda, 2011).



## Sample

As we focus on LTCI purchase, we use observations from individuals with at least two consecutive HRS interviews, who report not having private LTCI in the first year of any two-year transition ( $t-1$ ), and answer the LTCI question at time  $t$ . We also intentionally define a cohort of potential purchasers that are healthy enough to be potentially eligible to purchase a LTCI policy: never observed to be in a nursing home, must not have low cognition, and must be 78 or under when first observed ( $t-1$ ),<sup>3</sup> and must not be disabled, defined to be consistent with LTCI private policy screens as no ADL or IADL limitations and no history of stroke. Further, we eliminate individuals who may have LTC coverage in the Veterans Affairs health care system or through Medicaid. Finally, we limit purchase to the initial purchase, due to concerns that repeated switching reflects reporting error rather than true lapse and repurchase. For most models, the LTCI eligible sample comprises of 55,577 person-wave observations representing 16,428 individuals and 11,332 households (Table II).

## Measures

**Dependent variable**—Respondents answer the following question: “Not including government programs, do you now have any long term care insurance which specifically covers nursing home care for a year or more or any part of personal or medical care in your home?” LTCI purchase is defined as responding yes in time  $t$  and no in time  $t-1$ .

**Explanatory variables: family structure and opportunity cost of future caregiver’s time**—We greatly expand the family structure variables by including individual spousal ( $G_1$ ) and parent ( $G_0$ ) characteristics; the other main studies examined child ( $G_2$ ) characteristics only (Mellor, 2001; Cramer and Jensen, 2006).<sup>4</sup> For  $G_1$  characteristics, models control for marital status (divorced/separated, widowed, never is reference) and relative age of one’s spouse. A respondent’s parents’ characteristics ( $G_0$ ) include whether the parents are deceased, marking possible experience with LTC. The respondent’s children’s characteristics ( $G_2$ ) include presence of biological children and step children.<sup>5</sup> Because of the strong relationship between health and wealth, candidate variables that reflect health and ability of a spouse providing care the future include characteristics like spouse working and spouse education. Candidate characteristics of the  $G_2$  generation that likely represent opportunity costs of future caregiving include whether any children are coresidential, marital status of children, whether any children work for pay, educational attainment of children, any children living within ten miles of  $G_1$  respondent, and categorical child family income. As a caveat, these variables may be endogenously determined, given that children may adapt their behaviors once they know what their parent’s needs for LTC will be, although our sample is young and healthy enough that the need for LTC is unlikely to be known. Similarly, financial ties with children, such as

<sup>3</sup>While some studies of purchase have an upper age limit of 70, we followed Hendren (2012) so as not to exclude any purchasers of LTCI. For example, our data showed that 224 persons age 76–80 purchased LTCI, 194 of whom purchased it for the first time.

<sup>4</sup>We do not report results for  $G_3$  characteristics, those on the grandchildren, such as whether the respondent gave transfers or cared for grandchildren, because they were across the board non-significant.

<sup>5</sup>The term ‘biological children’ includes biological and adopted children. This term is intended to distinguish children that the parent considers his or her own from an early age most likely, from step children, in which familial ties, and hence informal care obligations, may be weaker (Pezzin and Schone, 1996, 2008).



whether a respondent gave financial transfers or named a child on a will are important to consider but are potentially endogenous.

The explanatory variables included in the final econometric models were revised based on preliminary analysis. Interestingly, despite our hypothesis that opportunity costs of children would be associated strongly with purchase, we eliminated most of them, due to their nonsignificance or high correlation with included variables. In particular, whether the child is working and how far the child lives from the parent, although theoretically of interest, were found to have no association with LTCI purchase (or on other key predictors).

**Individual control variables**—Other control variables at time  $t-1$  are respondent age, sex, race (black, other, white as reference), Hispanic, education, wealth, household income and self-rated health.<sup>6</sup> In addition, all models control for dynamic changes in wealth and life course factors, such as turning age 65, which is a common age for retirement and a common time to plan for the future. The changes in these attributes could influence purchase decisions differently than simply controlling for a baseline level of age or wealth. We also control for number of times the respondent appears in the sample.

**State level variables**—We control for the presence of a tax credit or a tax deduction in a respondent's state in time  $t-1$ , which is expected to increase likelihood of purchase by reducing the effective price of the policy. Similarly, we create an indicator variable for whether a state counts LTCI premiums towards medical expenses, deductible to the same extent as on the federal return (Courtemanche and He, 2009; Goda, 2011).<sup>7</sup>

#### IV. Methods

We model LTCI purchase in time  $t$  as a function of family structure, opportunity costs of future potential caregiver's time and other characteristics in  $t-1$ , such as whether a respondent lives in a state with LTCI tax incentives:

$$Purchase_{it} = \alpha_0 + \alpha_1 family_{it-1} + \alpha_2 endogenous\ family_{it-1} + \alpha_3 X_{it-1} + s_{it-1} + \lambda_{t-1} + \varepsilon_{it} \quad (1)$$

We estimate this equation using probit models with individual- ( $X_{it-1}$ ) and family-level controls ( $family_{it-1}$ ), opportunity costs of future potential caregiver's time and other potentially endogenous factors like estate planning ( $endogenous\ family_{it-1}$ ), state tax incentives for LTCI and state fixed effects ( $s_{it-1}$ ), and wave dummies ( $\lambda_{t-1}$ ).<sup>8</sup> The family-level variables capture potential intrafamily decision-making and informal care availability, including spousal characteristics, either as a substitute for LTCI or to control for differences in life expectancy.<sup>9</sup> State fixed effects control for unobservable time-invariant state

<sup>6</sup>We explored in preliminary analyses, indicators of health problems such as heart attacks, lung disease, high blood pressure. Because they were nonsignificant individually and jointly, we simply control for being in fair or poor health in  $t-1$ .

<sup>7</sup>We thank Gopi Shah Goda for the use of her tax incentive data base, used in Goda (2011) and updated.

<sup>8</sup>We explored cohort dummies in initial analyses, but they are omitted from the final specification because they were never significant.

<sup>9</sup>In related work, Coe, Skira, and Van Houtven (2013) examine the effect of information about long-term care (expectations or experience) on purchase, but we are not able to include those variables in this work because of data limitations (e.g. expected use of a nursing home in the future is only asked of individuals 65 and above and we wanted to examine persons under age 65).

characteristics such as state nursing home quality, costs of LTC and residents' taste for insurance that may vary systematically (Goda, 2011). Wave dummies account for time trends in purchases. All models report standard errors clustered on the household level. Our hypotheses test the significance and magnitude of the coefficients on family structure.

While the time  $t-1$  predictors of transitions between uninsured and insured states allow conclusions about the general role of family structure and its interactions, these attributes may have been present years before the time of purchase. This begs the question of what drives purchase at the point of the decision unanswered, so we also include time-varying attributes.

For comparison purposes we compare our model to a naïve family structure model based on Mellor (2001) and Cramer and Jensen (2006), which includes number of children and whether there is a daughter. Finally, we restrict the set of family structure variables in the model, excluding those that may be endogenously determined (e.g. parent within ten miles of any child, spouse work behavior).<sup>10</sup>

## V. Results

### Descriptive Results

Across all waves, 16.7% of individuals who were eligible for LTCI ever purchased it. Reflecting contractions in the LTCI market, the wave-to-wave purchase rate decreased over time, with new first purchases of 6.3% in 1998, 4.4% in 2004, and 3.1% in 2010, among 50–70 year old sample members. In Table III we describe the sample when we first observe them, by those who purchased LTCI and those who never purchase LTCI. 78 percent of purchasers were married compared to 71 percent of nonpurchasers. Family size ( $G_2$ ) did not differ significantly by purchase status. Purchasers were more likely to have a will or trust, but as expected, among those with a will or trust, purchasers and non-purchasers were similarly likely to name a child as a beneficiary (.80 and .79). As expected, we see differences across purchase status by net worth and household income; purchasers also report better self-rated health (Table IV).

### Main results

Table V shows the naive specification (Model 1) of family structure; Model 2 includes a richer set of family structure; and Model 3 contains all family structure variables, variables that reflect the opportunity costs of future caregivers' time, and other potentially endogenous variables, such as financial transfers to adult children.

**Effect of family structure on LTCI purchase**—In the naive family structure model we find that, whereas number of children is not associated with purchase, having a biological daughter is negatively associated with purchase (half a percentage point) ( $p < 0.10$ ). In addition, married males are more likely to purchase LTCI but neither marriage nor gender is independently significant. We compared the marginal effects of the variables that were common to Models 2 and 3 to see if they changed by the addition of the additional

<sup>10</sup>We thank Gopi Shah Goda and Meghan Skira for this suggestion.

potentially endogenous variables. In all cases but one (age difference between respondent and spouse), the marginal effects attenuated slightly. Because we cannot disentangle whether this change came from reducing omitted variable bias or increasing bias from endogeneity, we opt to highlight Model 3 results.

In Model 3, we find that several family attributes are significantly associated with purchase, but that the  $G_2$  characteristics from the naïve model lose significance. Considering characteristics of one's own generation ( $G_1$ ), married persons, separated and divorced persons ( $p < 0.10$ ), and widowed persons ( $p < 0.10$ ) all have a higher likelihood of purchase compared to those who never married. Possibly reflecting the lower likelihood of using formal care and lower associated value of the policies, men are less likely to purchase LTCI ( $p < 0.10$ ). This is in contrast to prior work on LTCI ownership that found no difference between men and women (Brown and Finkelstein, 2007). In addition, we find a differential positive relationship for married males, who have a 1 percentage point higher likelihood of purchase.

Spousal characteristics also are related to LTCI purchase in interesting ways. *A priori*, a spouse's age could be associated with either an increase or decrease in LTCI demand. Younger spouses could decrease LTCI demand by being more able and more likely to be living to provide informal care when the respondent needs care. On the other hand, younger spouses could increase LTCI demand because their longer life expectancy increases the importance of protecting the family assets. Empirically, the latter attribute seems to be stronger, but the effect on purchases is small; being five years older than one's spouse is associated with an increased probability of LTCI purchase of 0.3 percentage points. Having a highly educated spouse (college graduate) also increases the probability of LTCI purchase by 1 percentage point, which also could be due to the desire to protect the family assets for the longer lifespan associated with higher education. A spouse working full or part-time, on the other hand, is associated with a reduced probability of purchase of 0.6 percentage points. This could reflect the fact that the spouse does not need as much asset protection afforded by LTCI, that LTC planning has not yet occurred, or that a spouse working signals a future healthy source of informal care.

Prior research has found that biological children are much more likely to provide informal care than step children (Pezzin and Schone, 1999; Pezzin *et al.*, 2008), but we do not find that having biological children or step children are associated with LTCI purchase directly. Having a coresident child is associated with a decrease in the likelihood of purchase, which could reflect informal care availability, resources going to a disabled child at home and not a LTCI policy, or a wealth effect if intergenerational coresidence is to pool economic resources, making a person unlikely to afford private LTCI.

Contrary to the exchange theory, naming a child on a will does not have a differential impact on the likelihood of purchasing LTCI above and beyond having a will at all. The effect of a will, therefore, is likely capturing wealth or a planning-for-the-future effect.

**Association of dynamic attributes with LTCI purchase**—Many of the characteristics that predict LTCI purchase – such as spouse education – are not time-varying

for individuals over the age of 50. To investigate why LTCI purchase occurs at a particular time, we consider whether economic factors from  $t-1$  that were important in LTCI purchase decisions were influential if they changed between  $t-1$  and  $t$ . Turning age 65 between  $t-1$  and  $t$  increases the likelihood of purchase by 1.6 percentage points. This likely reflects societal norms that encourage long-term planning around the traditional retirement age. Moving up the asset distribution increases the likelihood of purchase, especially out of the lowest quartile in which LTC most likely would have been covered by Medicaid. Moving up the asset quartiles from third to the top quartile is also significant, which, combined with the level effect of wealth, shows that, while self-insurance may be more likely for the very wealthy, self-insurance is not more likely for the top quartile of wealth. This is consistent with Brown and Finkelstein (2008) who estimate a positive willingness to pay for insurance for households up to \$3 million (which is the top 1 percent of wealth in our sample).

**Other effects on LTCI purchase**—Across all models and focusing on the fully specified Model 3, the results with respect to non-family variables are generally consistent with other research on LTCI ownership and purchase (Table V). Higher income, higher asset, and more educated individuals are more likely to purchase LTCI. A finding that does not match past literature (albeit on ownership) is that blacks are 1.5 percentage point more likely to purchase LTCI than whites.

**How is the changing structure of the American family associated with LTCI purchase?**—In order to put our findings in a broader context, we used our results from Model 3 to predict what purchase rates would be for typical family structure and opportunity cost characteristics in 1998 versus 2010. Specifically, in both years we consider a white 65 year old married white female who has no coresident children and whose parents are deceased. In 1998 she would have been non-working with a nonworking, non-college graduate spouse, with biological children but no step children, providing no financial help to offspring (transfers or educational help). In 2010, she would have been working with a nonworking, college graduate spouse, with biological children and step children, and would be providing financial help to offspring. These changing demographics and related changes in relationships between families are correlated with a 3 percentage point increase in LTCI rates (4.6 To 7.7 percent). With other studies aimed to stimulate LTCI purchase through tax credits showing even more modest increases in purchase, around 2 percentage points, the potential impacts of family structure and demographic change could be substantial.

### Robustness checks

We perform numerous robustness checks of our results. Please see The Appendix.

## VI. Conclusion

In this paper we take advantage of a long panel of nationally representative data with rich family structure measures to consider carefully how family attributes—in the potential purchaser's generation, in the preceding generation, and the following generation— influence LTCI purchase.

In addition to confirming what others have found about wealth and education increasing LTCI purchase, we find that family factors from one's own generation, and more importantly from one's immediate household (e.g. spouse and coresident children), are associated with purchase. Marriage is associated with higher purchase, especially for married males, compared to never-married individuals. The future availability of the spouse to provide informal care is also important; having a working spouse, who is therefore likely healthy and able, is associated with lower likelihood of purchase. However, this finding could also indicate that LTC planning has not yet occurred, or that self-insurance from a spouse's earnings may be the household's LTC plan.

Factors from the younger generation are differentially associated with purchase. Neither having biological children nor having step children is associated with LTCI purchase. Importantly, we also consider whether family characteristics that reflect the opportunity cost of potential future caregiver's time influences purchase. We find that factors that facilitate or constrain the time and availability of one's children are associated with purchase. Namely, having a coresidential child is associated with lower likelihood of purchase.

Our results should be interpreted in view of several data limitations. First, our data sources do not contain the premiums or prices of LTCI policies. To the extent that price is correlated with our key variables of interest, our estimates may be biased. However, to minimize this possibility we omit individuals unable to meet the LTCI underwriting criteria and control for changes in state tax treatment of LTCI premiums and a wide variety of person-level characteristics that determine price. We also include state fixed effects to control for differences in state regulatory policy that affect price. Second, although the HRS is a relatively rich data set and the only nationally available source of LTCI questions over time, the analysis may be subject to omitted variables and measurement error. Third, we only know of successful purchases, not of failed attempts at purchase; ie. we do not observe whether an insurance agent observed health limitations during the underwriting process, leading to rejection of purchase. We also do not know whether a person considered purchasing LTCI, but then did not buy LTCI, either because they were quoted too high a premium or for some other reason.<sup>11</sup> Thus, if family structure (or other variables) is correlated with these unobserved factors, it may be introducing omitted variable bias. We include a vast array of control variables to minimize omitted variable bias and we also test robustness of our results to various definitions of LTCI. We also present a model (Model 3) that includes potentially endogenous variables; thus, our choice to minimize omitted variable bias may introduce endogeneity bias. Finally, our analysis is limited to find associations between family and LTCI purchase due to a lack of exogenous variation in family structure we could exploit to gain causal estimates.

Considering purchases allows us to consider whether family should be included in policy levers to increase coverage. Optimal policies may need to focus on the purchasing couple, since spousal characteristics were consistently strong attributes influencing purchase. Policies focusing on the couple and not children to consider LTCI would be consistent with

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<sup>11</sup>We thank Katherine Swartz for this point.

our recent finding that older parents, especially purchasers, act without consulting adult children in purchase decisions (Sperber et al., 2014).

Overall, we find that family characteristics from one's own generation, particularly about one's spouse, are associated with purchase, but that few attributes from the younger generation have a relationship with purchase, other than having a coresident child. However, overall the changes in family structure that occurred in the last decade or more are associated with changes in purchase patterns over time. Typical modern family and demographic attributes (2010) were associated with a 3 percentage point increase in LTCI purchase compared to someone with typical 1998 characteristics. Finally, although the future availability of informal care will likely always play a role, the persistence of assets and the importance of turning age 65 suggest that LTCI purchase may be driven more by financial status and planning goals than by family structure or the availability of future informal caregivers.

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**Table I**

## Family Structure Characteristics Over Time for 60 and 80 Year Olds

	<u>AHEAD 1995 &amp; HRS 1996</u>		<u>HRS Sample 2010</u>	
	Age 60	Age 80	Age 60	Age 80
Divorced	13%	2%	14%	11%
Widowed	8%	49%	7%	31%
Never married	3%	3%	4%	3%
Biological children				
No children	6%	16%	12%	7%
Children	94%	83%	88%	93%
3 or more children	58%	38%	32%	54%
Stepchildren				
No stepchildren	91%	87%	72%	82%
Stepchildren	9%	13%	28%	18%
3 or more stepchildren	3%	4%	12%	9%
Any child within 10mi	65%	57%	51%	60%
Any child working	97%	94%	93%	95%

**Table II**

## Sample Restrictions

	Person-Wave Observations	Individuals Observations
Observed and answered LTCI question in 2 consecutive interviews and had no LTCI in $t-1$	92,948	22,742
In year $t-1$ of a two year transition to $t$ ,		
Not disabled <sup>1</sup>	69,221	19,269
No service connected disability for Veterans	69,086	19,240
No Medicaid	65,631	18,549
Not cognitively impaired <sup>2</sup>	63,600	17,965
Not in nursing home now or in prior survey years	62,784	17,861
Age 78 or younger	55,577	16,428

<sup>1</sup>Disability is defined as zero ADL limitations, zero IADL limitations, and no history of stroke

<sup>2</sup>Cognitive impairment is defined as answering 23% or less of the total cognitive measures, or if a proxy interview, a Jorm IQCODE score of 3.30 or higher on the proxy's assessment. (Jorm, 1994)

Table III

## Summary Statistics

Variable Description	Ever purchased LTCI	Never purchased LTCI
	(N=2757)	(N=13671)
Marital Status		
Married	0.78	0.71***
Never married	0.04	0.05
Divorced or Separated	0.12	0.15***
Widowed	0.07	0.10***
Family		
Both parents deceased	0.56	0.58**
Number of living siblings	2.61	2.85***
Offspring		
Have biological child	0.88	0.88
#	2.51	2.58
# daughters	1.22	1.27*
# sons	1.29	1.31
Have step child	0.14	0.15
#	0.34	0.36
Have any child <sup>1</sup>	0.92	0.92
#	2.87	2.96*
# daughters	1.40	1.46*
# sons	1.48	1.50
A child died since t-1	0.02	0.02
Residence		
At least one biological daughter w/in 10 miles	0.25	0.28**
At least one coresident child	0.30	0.33*
At least one biological child with a family income		
Under \$10k	0.29	0.30
\$10k-\$35k	0.47	0.44**
>\$35k-\$70k	0.45	0.41**
Over \$70k	0.21	0.19*
Financial Interdependence		
Gave transfer to any child <sup>2</sup>	0.57	0.53***
R has a will/trust	0.63	0.49***
A child/grandchild a beneficiary	0.50	0.39***
A child/grandchild not a beneficiary	0.13	0.10***

NOTE: Table III measures the population mean at the first nonmissing observation within the sample criteria outlined in Table 2. Means estimated with sample weights.

Statistically different means indicated with \*\*\*, \*\*, \* denoting statistical significance at the 1 percent, 5 percent, and 10 percent level respectively.

<sup>1</sup>Includes any biological children or step-children. Unless specified as a biological child, the term "child" or "children" refers to both biological children and/or step-child.

<sup>2</sup>Transfer is providing at least \$500 to assist with bills, insurance, rent, or medical care; can be gift or loan; includes financial contribution to any of their children's post-secondary education.

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**Table IV**

Other Individual Characteristics

Variable Description	<u>Ever purchased LTCI</u> (N=2757)	<u>Never purchased LTCI</u> (N=13671)
Experience		
Ever used nursing home care	0.002	0.006***
Economic Resources <sup>1</sup>		
Net worth	586599	419980***
1st quartile	0.18	0.26***
2nd quartile	0.25	0.27
3rd quartile	0.28	0.26
4th quartile	0.29	0.21***
Household Income	113790	84806***
Working full-time or part-time	0.60	0.55***
Health		
Functional status <sup>2</sup>		
Any ADL or IADL limitations	0.08	0.10***
Any ADL limitations	0.05	0.07***
# of ADL limitations	0.07	0.12***
Any IADL limitations	0.04	0.05*
# of IADL limitations	0.05	0.07***
Low cognition	0.001	0.006***
Self-reported fair or poor health	0.12	0.18***
Demographics		
Age	59.47	60.19***
Male	0.50	0.49
White	0.89	0.86***
Black	0.08	0.09
Other <sup>3</sup>	0.02	0.05***
Hispanic	0.04	0.08***
Highest level of education completed		
No High School	0.12	0.18***
High School Only	0.31	0.36***
Some College	0.23	0.24
College Graduate	0.34	0.22***
Spouse		
Working for pay	0.55	0.53
College Graduate	0.34	0.23***
Tax Incentives <sup>5</sup>		
Tax subsidy	0.16	0.18
HIPAA Deduction	0.24	0.28***

NOTE: Table IV measures the population mean of individual control variables using sample weights. Each variable is measured at the first non-missing observations within the sample criteria. Ever used nursing home care, functional status, and low cognition are measured at the second non-missing observation.

Statistically different means are indicated with \*\*\*, \*\*, \* denoting statistical significance at the 1 percent, 5 percent, and 10 percent level respectively.

<sup>1</sup> All the economic variables are in constant 2011 U.S. dollars.

<sup>2</sup> Any ADL limitation indicates some difficulty with any of the six ADLs - bathing, dressing, eating, getting in and out of bed, walking, and using the toilet, while any IADL limitation indicates some difficulty with the phone, medicine, money, shopping for groceries, or preparing meals.

<sup>3</sup> Other includes American Indian, Alaskan Native, Asian, and Pacific Islander



Table V

## Results

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3
	Naïve	Modern Family Structure	Opportunity Costs & Endogenous
<b>Family Structure (t-1)</b>			
Own generation (G <sub>1</sub> )			
Marital status			
Married	0.00325 (0.00250)	0.0162*** (0.00597)	0.0157*** (0.00605)
Married x Male	0.0160*** (0.00462)	0.00975** (0.00451)	0.00889* (0.00457)
Separated or Divorced		0.0174* (0.00946)	0.0156* (0.00920)
Widowed		0.0202** (0.01000)	0.0183* (0.00976)
Number of living siblings		-0.000277 (0.000427)	-7.33e-05 (0.000427)
Age difference between R & SP		0.000389** (0.000195)	0.000657*** (0.000204)
Working FT   PT			0.00330 (0.00228)
Sp working FT   PT			-0.00672*** (0.00235)
Sp college grad			0.00963*** (0.00274)
Parents' generation (G <sub>0</sub> )			
Both parents deceased		-0.000085 (0.00219)	-0.000125 (0.00219)
Offspring's generation (G <sub>2</sub> )			
Number of all children	-0.000387 (0.000586)		
Have at least one biological daughter	-0.00425* (0.00254)	-0.00340 (0.00282)	-0.00310 (0.00281)
Have at least one biological child		-0.00763 (0.00558)	-0.00926 (0.00587)
Have at least one biological son		0.000480 (0.00290)	0.00104 (0.00288)
Have at least one stepchild		0.00240 (0.00272)	0.00277 (0.00274)
Have at least one coresident child			-0.00561** (0.00242)
Financial Transfers			
Has will & names child as beneficiary			0.0158*** (0.00239)
Has will & does not name child as beneficiary			0.0123*** (0.00366)
Gave financial transfer to any child			0.00115 (0.00221)
<b>Individual control variables (t-1)</b>			
Demographics (t-1)			
Age	0.00620*** (0.00161)	0.00589*** (0.00169)	0.00455*** (0.00167)
Age <sup>2</sup>	-0.000061** (.000013)	-0.000059*** (.000014)	-0.000052*** (.000014)
Under 65	-0.0148*** (0.00430)	-0.0150*** (0.00430)	-0.0159*** (0.00435)
Male	-0.00261 (0.00166)	-0.00402** (0.00189)	-0.00383** (0.00194)
Race			
Black	0.0103*** (0.00377)	0.0108*** (0.00381)	0.0166*** (0.00417)
Other	-0.00992** (0.00479)	-0.00978** (0.00483)	-0.00914* (0.00492)
Hispanic	-0.00219 (0.00465)	-0.00137 (0.00477)	0.00361 (0.00521)
College Graduate	0.0122*** (0.00262)	0.0121*** (0.00263)	0.00774*** (0.00242)

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3
	Naïve	Modern Family Structure	Opportunity Costs & Endogenous
Health endowment (t-1)			
Self-reported poor health	-0.0103*** (0.00263)	-0.0103*** (0.00263)	-0.00898*** (0.00270)
Economic Resources (t-1) <sup>1</sup>			
Net worth			
1st quartile	-0.0331*** (0.00403)	-0.0336*** (0.00402)	-0.0263*** (0.00417)
2nd quartile	-0.0250*** (0.00362)	-0.0255*** (0.00363)	-0.0189*** (0.00364)
3rd quartile	-0.0178*** (0.00348)	-0.0180*** (0.00350)	-0.0140*** (0.00339)
Household Income <sup>2</sup>	0.000208*** (.000051)	0.000203*** (.000051)	0.000177*** (.0000462)
Recent Changes to Financial Situation			
Newly Retired			0.00276 (0.00286)
Spouse newly retired			0.000682 (0.00322)
Missing indicator of newly retired			0.000885 (0.00528)
Missing indicator for Sp newly retired			-0.00191 (0.00451)
Newly 65 since previous wave	0.0125*** (0.00438)	0.0127*** (0.00439)	0.0132*** (0.00443)
Change in net worth			
Moved from net worth 1st quartile to higher quartile	0.0159** (0.00651)	0.0161** (0.00652)	0.0147** (0.00642)
Moved from net worth 2nd quartile to higher quartile	0.0112** (0.00507)	0.0114** (0.00507)	0.00921* (0.00493)
Moved from net worth 3rd quartile to higher quartile	0.0207*** (0.00554)	0.0208*** (0.00554)	0.0189*** (0.00542)
Respondent's duration in the sample	-0.00295*** (0.00108)	-0.00281** (0.00110)	-0.00279** (0.00110)
Time dummies?	Yes	Yes	Yes
State level fixed effects?	Yes	Yes	Yes
Number of person-wave observations	49,201	49,201	49,201

NOTE: Standard errors are robust and clustered on household. \*\*\*, \*\*, \* denotes statistical significance at the 1 percent, 5 percent, and 10 percent level respectively.

<sup>1</sup> All the economic variables are in constant 2011 U.S. dollars.

<sup>2</sup> Household income rescaled by 10,000

<sup>3</sup> Due to a high number of missing observations we recoded the variable to be 0 if equal to missing and then created a missing indicator variable to control for the missing.

Variables not shown include respondent lived in a state with a LTCI tax subsidy and respondent lived in a state with HIPAA deductions for LTCI costs