Moral Hazard and Long-Term Care Insurance

R. Tamara Konetzka, University of Chicago Daifeng He, College of William and Mary Jing Guo, American Institutes for Research John A. Nyman, University of Minnesota

April 2014

Funding: National Institute on Aging, R01AG041108

Abstract

In both public programs and private long-term care insurance markets, estimation of the degree of moral hazard in utilization of covered services is central to pricing and long-run sustainability, yet there is remarkably little evidence on the degree to which moral hazard exists. We use US Health and Retirement Study data from 1996-2010 to assess moral hazard in nursing home and home care use in the presence of insurance, employing bivariate probit models with instrumental variables to estimate consistent effects. We find evidence of significant moral hazard in nursing home use, in contrast with the lack of a moral hazard effect in Medicaid-funded nursing home use from prior studies, perhaps because Medicaid-funded nursing home care might be considered an inferior good. Public policies designed to encourage LTCI purchase and to cover long-term care services should consider the additional spending associated with moral hazard and potentially incorporate disincentives to socially inefficient spending.

Moral Hazard and Long-Term Care Insurance

Introduction

The financing of long-term care (LTC) will become increasingly challenging as the US population ages and the prevalence of chronic conditions grows. Since the passage of prescription drug coverage for seniors, LTC is arguably the single largest uninsured health risk facing the country, with expenditures totaling \$135 billion in 2004 and expected to double in several decades (Congressional Budget Office 2004). Nursing home care costs more than \$70,000 per year on average (MetLife Mature Market Institute 2008), and only a small minority of individuals can finance an extended stay out of pocket (Bernard, Banthin et al. 2009). Medicaid, the largest public payer of LTC, is straining state budgets.

LTC insurance (LTCI) is often posited as one solution to the financing challenge because an increase in private responsibility could offset some of the public burden, but only 13% of elderly individuals have LTCI. In the presence of this fairly small private market, the US government in 2010 passed a national LTCI insurance program called the CLASS Act as part of health reform, which was intended to be a self-sustaining, premium-financed, disability-model national insurance program for long-term care services. It was repealed after policymakers found the mandated terms of the program made it impossible to avoid adverse selection and meet the sustainability requirement. The demise of CLASS has once again shifted focus to private LTCI markets.

A rigorous estimate of moral hazard in LTCI has been markedly absent from these policy debates and the research literature. Yet, an estimate of the extent that insurance affects subsequent utilization of services is crucial to the design of any public program and to the sustainability of the private LTCI market. Our paper examines the changes in utilization behavior that occur once people acquire LTCI, thereby providing a rigorous estimate of moral hazard in LTCI markets.

Background

Well-known demographic trends point to an increasing need for health care services in coming decades, especially among elderly individuals with long-term care needs (CDC 2003). People with long-term care needs generally have chronic conditions and associated functional and/or cognitive limitations that require assistance with activities of daily living (e.g., bathing, dressing, toileting, transferring, eating) or instrumental activities of daily living (e.g., housekeeping, using a telephone, preparing meals, money management). These types of needs can be served in a variety of settings. Long-term care can be provided in the home (formally or informally), in a nursing home, in an assisted living facility, or in an adult day care center, among others. It is often availability of financing—not level or type of need—that determines the setting of care (Kane, Kane et al. 1998; Stone 2000). Medicare pays for short-term rehabilitation in a nursing home but not for chronic care; Medicaid (as a payer of last resort, with strict income and asset requirements) traditionally paid only for nursing home care; increasingly, home- and community-based alternatives are also covered by state Medicaid programs.

Current evidence on private LTCI prevalence suggests that younger, healthier, and more educated people are more likely to have LTCI, and that there is some relationship, most likely nonlinear, between purchase of LTCI and income and assets (Sloan and Norton 1997; McCall, Mangle et al. 1998; Mellor 2001; Cramer and Jensen 2006). While those in the lowest income and asset groups are not likely to purchase LTCI because it is expensive (generally several thousand dollars per year) and because they face a lower "price" of Medicaid in terms of spending down assets to qualify (Brown and Finkelstein 2008), those in the highest income and asset groups may also not purchase insurance because they can self-insure. Therefore it is often the middle income and asset groups that are the most likely purchasers. Earlier studies cited Medicaid crowd-out, underestimation of risk, and the presence of adult children or

bequest motives as potential reasons for non-purchase but found mixed or inconclusive empirical results (Sloan and Norton 1997; McCall, Mangle et al. 1998; Mellor 2001; Cramer and Jensen 2006); (Pauly 1990; Zweifel and Struewe 1998; Lindrooth, Hoerger et al. 2000; Mellor 2000; Mellor 2001). Many of these studies were limited by reliance on cross-sectional analyses.

More recent studies have taken advantage in exogenous variation in Medicaid policy and state and federal tax policies to move toward causal inference. These studies generally find that Medicaid crowd-out is substantial and that tax subsidies for purchase of private LTCI are not cost-effective in mitigating crowd-out (Brown, Coe et al. 2007; Brown and Finkelstein 2008; Goda 2011). Thus, while significant puzzles remain in explaining limited demand for private LTCI, important advances have been made.

A less populated but crucial area of study related to purchase behavior is that of adverse selection, a major concern to insurers. Under adverse selection, potential purchasers have more information about their own health than what is available to insurers, such that actual purchasers are sicker than what insurers would expect given an actuarially fair premium. Finkelstein and McGarry (2006) find empirical evidence for this type of adverse selection in purchase of LTCI, but find that it is balanced by favorable selection into insurance by individuals who are more risk-averse (but healthier). Thus, the overall insured pool is not sicker than what insurers expect when calculating premiums. Two other recent studies address adverse selection in the context of policy lapse, which can be seen as dynamic adverse selection. Finkelstein, McGarry and Sufi (2005) find evidence for dynamic adverse selection, but using more data, a refined definition of lapse, and testing for a broader variety of covered services, Konetzka and Luo (2009) find that lapse is driven more by financial reasons than health-related reasons, resulting in a *healthier* insured pool remaining.

Moral hazard is a crucial part of the equation but is particularly understudied. While the research discussed above moves toward a better understanding of consumers' purchase (and lapse)

behavior, insurance ownership is only one factor in the status of the market. Equally important is how insured individuals behave once they become insured. The significance of moral hazard – defined as additional (and potentially socially inefficient) utilization of LTC services due to the presence of insurance -- parallels the significance of adverse selection. Both are important because they could alter the cost of the insurance and thus the amount of the payout relative to the premiums. The premiums for LTCI are set in part by estimating the expected long-term care spending of the insurance-buying population. If the payouts are greater than they are expected to be, either (1) because adverse selection has generated a disproportionate number of the sickly among the enrollees, or (2) because moral hazard has generated (2a) a larger number of eligible individuals or (2b) a greater amount of spending per enrollee (due to increased utilization) than would be expected without insurance, then the financial viability of the insurance program would be called into question. Indeed, many LTC insurers pulling out of the market in recent years have noted higher-than-expected claims experience as a fundamental motivation.

Cutler (Cutler 1993) discusses both adverse selection and moral hazard (as well as long-term inter-temporal risk) as important concerns of insurers in LTCI markets, leading to strict underwriting, indemnity policies, high administrative loads, and consequently expensive premiums that may not seem of good value to potential purchasers. However, rigorous empirical evidence on moral hazard in LTCI is sparse. A recent review of the literature on LTCI cites zero papers on the subject (Brown and Finkelstein 2009). The studies of lapse discussed above examined utilization when insured, but as these were in the context of lapse conditional on already having purchased LTCI, the results are unlikely to be generalizable to the broader moral hazard question.

Two papers contribute the most direct evidence on the subject of moral hazard in LTC. Grabowski and Gruber (2007) use variation in state Medicaid eligibility policies to proxy for the "price" of nursing home care (that is, more generous Medicaid policies make nursing home care cheaper). They

find no evidence of a moral hazard effect, an unexpected result. However, the paper is limited in terms of the broader moral hazard question in two important ways. First, it examines nursing home use only. Almost all LTCI policies cover home care as well as nursing home services, and greater choice of services may be a primary reason for LTCI purchase. Relatedly, there may also be important tradeoffs between using home care and using nursing home services that are not the same in Medicaid and private LTCI markets. Second, it examines only Medicaid-funded nursing home use. We posit that Medicaid-funded nursing homes may be considered an inferior good in the presence of potential substitutes, such as home care and assisted living, for all but the sickest nursing home residents, and that the type of nursing home care that may be purchased with private funds or LTCI is a higher-quality good. This is consistent with the health services literature showing that 1) nursing homes that serve mainly Medicaid residents are of substantially poorer quality (Nyman 1988; Grabowski 2004; Mor, Zinn et al. 2004; Konetzka and Werner 2009); and that 2) use of nursing homes by racial minorities and individuals of low income and socioeconomic status has increased in recent decades, as more affluent and white individuals substituted increasingly available and more desirable assisted living care (Akamigbo and Wolinsky 2007; Smith, Feng et al. 2007; Smith, Feng et al. 2008). Thus, viewed as an inferior good, it is not surprising that Medicaid-funded nursing home use does not respond significantly to price changes, i.e., we should not expect substantial moral hazard. Non-Medicaid nursing home care and home care, on the other hand, may be considered a normal good in that lower price and greater income should lead to greater demand for it as a desirable product. This is also consistent with evidence on the effect of income on LTC utilization showing that home health care use increases with greater income but nursing home use does not (Goda, Golberstein et al. 2010). Thus, the bulk of the moral hazard effect in LTCI is likely to be found in home care and privately funded nursing home care, yet little empirical evidence exists to assess this effect.

The second paper that is directly relevant to our study is Li and Jensen (2011). They examine utilization of nursing home care, home care, and informal care for people with long-term care insurance vs. those without insurance, finding that individuals with long-term care insurance are more likely to use nursing home care. To address selection bias, they use a bivariate probit with several instrumental variables, tax itemization status and the percent of wealth that is housing wealth. Our paper is similar in important ways, as we also employ bivariate probit models with instrumental variables using Health and Retirement Study data. However, their study is limited to the use of public-use Health and Retirement Study data without geographic identifiers and considers only the simultaneous holding of LTCI and the use of LTCI-covered services. Thus, they use only static individual-level attributes as instruments; this leaves the analysis potentially susceptible to omitted variables bias in terms of individual-level attributes that may be correlated with both long-term care use and the instruments and in terms of omitted state-level policy changes.

Our paper addresses the limitations of the existing literature by examining utilization of both nursing home care and home care using multiple waves of the Health and Retirement Study with geographic identifiers, enabling better instruments to control for selection bias. Rather than examining the holding of LTCI, we model LTCI purchase, which allows the use of stronger instruments based on changes over time in state tax treatment of LTCI. We then examine utilization of long-term care services in subsequent waves of the survey as a function of prior LTCI purchase.

Theoretical Framework

Moral hazard is usually defined in a health insurance context as the additional healthcare that is consumed because of being insured. It is important to distinguish *ex post* from *ex ante* moral hazard and to understand how these types of moral hazard would be manifested in a long-term care insurance

context. *Ex ante* refers to the increased likelihood that person would become sufficiently ill or dependent to be eligible for payment under a policy because they have insurance. *Ex ante* moral hazard can be manifested by those insured persons who allow themselves to become more dependent, knowing that if they do, insurance would cover the cost of some of their care. Intuitively, this type of *ex ante* moral hazard behavior is probably rare with long-term care insurance.

Ex post moral hazard is the type that is most often associated with health insurance and refers to the increased consumption of long-term care services by those who are eligible for payment relative to those who are not. *Ex post* moral hazard is manifested in a long-term care context by an insured person who is more likely to spend time in a nursing home or to receive formal home health care, compared to one who is not insured. Ex post moral hazard could also be manifested by the person who opts to obtain care in a more desirable setting, because the person's choice set has been expanded due to the availability of the insurance payoff. The increase in formal home health care, compared to no care or care at home by informal caregivers such as relatives, or the increase in private nursing home care, compared to either Medicaid nursing home care or possibly informal care at home, are examples of this type of moral hazard.

Both types of moral hazard contribute to the demand response to long-term care insurance, but it is likely that most of the moral hazard that is observed with LTCI will be of the *ex post* variety. The typical LTCI payoff can be represented by (1) an eligibility test and (2) a per diem payment, paid to the individual, that could be used to pay for long-term care services only, either formal nursing home care or formal home health care. The demand for LTCI stems in part from the risk avoidance, that is, the receipt of an insurance payout that covers the private payments for these services that would have been made without insurance. The demand for LTCI, however, also derives in part from the moral hazard itself, that is, from the ability of the beneficiary to gain access to a more favorable set of long-term care options as a result of the increase in income represented by the insurance per diem--"favorable" being defined by

the preferences of the individuals who purchase long-term care insurance (Nyman 2003). Moreover, the demand for private long-term care insurance is also likely to derive from the access to a more favorable set of options vis a vis the characteristics of the public (Medicaid) long-term care options in the state. For example, it has been observed that nursing homes catering to private patients are often more desirable on a number of characteristics than those catering to public patients (Nyman 1988; Grabowski 2004; Mor, Zinn et al. 2004; Konetzka and Werner 2009). If the public program produces generally undesirable options, this would increase the demand for insurance that generates access to private options.

Data

We use data from the Health and Retirement Study (HRS), a nationally representative, longitudinal study of persons over age 50 and the only publicly available, longitudinal, national data set that includes consistently worded questions on LTCI. The HRS consists of five birth cohorts who entered the study in different calendar years. Once they enter the study, respondents are interviewed every two years. The sample for each cohort was derived from the same stratified, multistage area probability design in which blacks, Hispanics, and Floridians were over sampled. The initial cohort response rates ranged from 70 percent to slightly over 80 percent; re-interview rates for all cohorts at each wave have been between 92 and 95 percent. The HRS is sponsored by the National Institute of Aging (grant number NIA U01AG009740) and is conducted by the University of Michigan (Health and Retirement Study 2008). We use data from waves 3 to 10 (1996-2010) of members of the Original HRS Cohort (born 1931-1941), the AHEAD cohort (born prior to 1924), the War Baby Cohort (born 1942-1947), and the Children of the Depression Cohort (born 1924-1931). These waves asked consistently worded questions about LTCI and the cohorts span the age groups most relevant to ownership and use of LTCI. Prior to 1996, the LTCI questions were subject to substantial measurement error (Finkelstein and McGarry 2006)

and therefore these waves will not be used. For convenience, we refer to the combined cohorts simply as the HRS.

Because our analysis approach requires linking the HRS data to state- and market-level instruments, we use the restricted geocode data. The geocode data include state, county, zip code, census tract, and urban-rural continuum. Matching to the HRS is nearly 100%. We also use RANDcalculated variables for assets, income, and potentially some of our controls. The RAND Center for the Study of Aging developed longitudinally consistent data sets from the HRS surveys, including imputations of missing wealth and income data (RAND HRS Data 2009). To conduct our instrumental variables analyses, we link the HRS using these geocodes to longitudinal data on state Medicaid and tax policies collected by the investigators from the literature (Grabowski and Gruber 2007; Goda 2011) and from manual searches of state websites.

Sample

We start with data on all respondents from all cohorts during 1996-2010, resulting in a sample of approximately 30,000-35,000 individuals. We then focus only on individuals that do not have insurance in the baseline wave of any 2-wave set as these are the respondents who are eligible for purchase. This excludes respondents who say they have LTCI throughout our panel, which is necessary because our instruments are appropriate for modeling new purchase and not the holding of existing policies. We limit our sample to those eligible for purchase of LTCI according to general underwriting standards. We therefore exclude individuals over the age of 80; those with memory problems, stroke, poor self-rated health or functional impairment at baseline; and those with prior nursing home or home care use. In order to capture individuals who have some probability of purchasing LTCI near the beginning of our panel and some probability of utilizing LTC near the end of the panel, we also exclude

individuals on Medicaid at baseline, those in the bottom quartile of the income distribution at baseline, and those under the age of 50. Our final sample includes 15,665 observations, described in Table 1.

Key variables

Dependent variables: Utilization. To define utilization of LTC services, we use questions in HRS that ask directly about use of home health care and nursing homes. The nursing home question asks whether the respondent has been a patient overnight in a nursing home, convalescent home, or other long-term health care facility since the previous wave. Follow-up questions ask about number of times and number of nights in total. Importantly, we also include nursing home use for respondents who move permanently to a nursing home by the next wave; these respondents are not included in the standard nursing home question because they receive a different survey. Similarly, the home health question asks the respondent whether any medically trained person has come to his/her home to help him/her, but with no information on duration. Medically trained persons are defined to include professional nurses, visiting nurse's aides, physical or occupational therapists, chemotherapists, and respiratory oxygen therapists. We define home health use as a dichotomous variable indicating use or non-use.

A key challenge in using HRS to model moral hazard is separating services that are typically covered under private LTCI (or Medicaid) from those that are short-term Medicare services. Medicare covers rehabilitation of up to 100 days in a nursing home following an acute hospital stay with a substantial copayment after the 20th day, but the vast majority of stays for this purpose are less than 30 days. Medicare does not pay for chronic care in a nursing home, which is what private LTCI policies and Medicaid cover. Similarly, Medicare pays for short-term home health care following a hospital stay but not for longer-term home care, which is the type of home care covered by private LTCI and Medicaid. HRS questions ask whether services were covered by insurance do not distinguish by specific payer other than Medicaid. In the case of nursing home use, we use duration of use as proxy to separate

Medicare-covered services from other. Because we do not have duration for each stay separately but rather total nights and total number of stays, we consider average use of nursing home care greater than 30 days to be utilization that is potentially covered under LTCI or Medicaid. In the case of home health care, no data on duration is available, so the home care utilization variable is measured with error and may include some home health care not covered by LTCI.

Key Independent variable: LTCI. Respondents in all waves in our sample are asked: "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?" In our main specifications, LTCI purchase is defined as answering "yes" to this question during the given wave and "no" in the previous wave. This question is not asked of individuals who are residing in nursing homes at the time of survey, but we assume that individuals who entered a nursing home permanently were not able to purchase a policy directly before entering due to strict underwriting.

Control variables. In all analysis we control for a rich set of individual and household variables available in the HRS that are known or hypothesized to play a role in LTC utilization, such as baseline indicators of health status, family structure, income and assets, age, sex, and race. The HRS includes detailed data on household income and assets, all based on self-report. Total household income includes individual earnings, household capital income, pensions, SSDI payments, retirement income, unemployment/workers compensation, government transfers, and other income. Household wealth includes net value of real estate, vehicles, businesses, IRA/Keogh accounts, stocks, mutual funds, investment trusts, bonds and bond funds, housing and the value of bank accounts, certificates of deposit, Treasury bills, and government bonds less debt. Health status indicators include self-rated health and diagnoses. We also include controls for whether a respondent is a Medicare beneficiary or a

Veteran (thus potentially having access to alternative payment sources) and for Black race and Hispanic ethnicity as these were the attributes that were oversampled in the design of the HRS.

Empirical Approach

We assess the effect of purchasing LTCI vs not purchasing LTCI on subsequent LTC utilization, controlling for differences between purchasers and non-purchasers, and attribute the difference to moral hazard. The obvious challenge in this estimation is that LTCI purchase is not exogenous; people who have LTCI may be different from people who do not have LTCI in unobservable ways. Unless the endogeneity is addressed, the estimated effect is subject to selection bias. We therefore estimate a bivariate probit model using instrumental variables to provide an unbiased estimate of the effect of LTCI purchase on subsequent LTC utilization. We are interested in jointly estimating the general equations:

Purchase $_{it} = \gamma_0 + \gamma_1 Tax_{it} + \gamma_2 X_{it-1} + \lambda_t + State_i + \varepsilon_{it}$

Utilizatio $n_{t+1...3} = \beta_0 + \beta_1$ Purchase $i_t + \beta_2 X_{i_t-1} + \lambda_t + State_i + \varepsilon_{i_t}$

where our main coefficient of interest is β_1 and we control for a vector of individual- and market-level covariates X, state fixed effect, and time dummies λ .

<u>Instrumental variables.</u> We use several instruments in combination. Our primary instrument set reflects changes in state tax treatment of LTCI over time, specifically whether a state offers a tax deduction or credit for LTCI in a particular year. Significant variation across states and over time exists from state to state in subsidies for purchase of LTCI that result in state-to-state variation in propensity to purchase LTCI (Goda 2011). Federal subsidies have also changed during the time period of the panel (Courtemanche and He 2009). Because these subsidies often apply only to individuals who itemize on

their federal tax returns, itemization allows for additional individual-level variation (Courtemanche and He 2009). Finally, we changes over time in state Medicaid eligibility and coverage policy. Significant variation exists from state to state in Medicaid income and asset eligibility rules that, when applied to individuals based on marital status and baseline assets, result in not only state-to-state variation but variation among individuals within a state in propensity to purchase LTCI (Brown, Coe et al. 2007). Thus, all of our instruments are drawn from existing evidence in the literature that support their validity and strength in predicting LTCI purchase, and we find that they have substantial face validity in terms of the exclusion restriction.

In order to capitalize on our instruments for purchase while still capturing subsequent utilization, we pool two-wave transitions in the first 5 waves of our panel (1996-1998; 1998-2000; 2000-2002; and 2002-2004), including only individuals who do not have insurance in the first year of the transition (t-1) and modeling purchase as those who obtain insurance by the second year. Individuals may be included in more than one transition. Utilization is defined in the 3 waves following each 2-wave transition, e.g. for purchase during the 1998-2000 transition, we examine utilization in 2002, 2004, and 2006. This strategy allows for enough of the sample to become sick enough to utilize LTC after purchasing, despite being healthy at the time of purchase. We limit utilization to 3 subsequent waves so that exposure time is constant for all observations.

Following our main estimation, we conduct a number of robustness checks and falsification tests. First, we run "naïve" probit models with the endogenous purchase indicator to assess whether our approach resulted in substantially different estimates. Next, returning to our bivariate probit models with instrumental variables, we test the effect of LTCI purchase on any nursing home use, relaxing the assumption that average duration be at least 30 days. Then, we exploit a follow-up question to the LTCI question that asks whether the policy covers nursing home care only, home care only, or both. The vast majority of respondents reply that both are covered, such that it is not feasible

to estimate the model among those with only one covered service. However, we re-estimated our nursing home model excluding individuals with home care coverage only and re-estimated our home care model excluding individuals with nursing home coverage only. Finally, we conduct a series of falsification tests on other types of utilization not covered by LTCI policies: outpatient surgery, dental visits, doctor visits, and hospital admissions, all measured dichotomously as use or no use since the prior wave. If our main instrumental variables approach failed to address selection bias, we might expect to see spurious results of LTCI purchase on these outcomes.

Results

Table 2 displays the results of our main bivariate probit models. The first two columns reflect the joint estimation of LTCI purchase and nursing home use, and the second two columns represent the joint estimation of LTCI purchase and home care use. In the purchase estimations, our instruments are as expected in direction and jointly significant at the p<.01 level. The results from the remaining independent variables are consistent with prior literature: Individuals with children are less likely to purchase because they have a potential alternative to formal care. Those with higher income and assets are more likely to purchase. People in poorer health are less likely to purchase, given underwriting standards and pricing.

The estimates of nursing home and home care utilization are of primary interest. We find a significant and positive effect of LTCI purchase on subsequent nursing home utilization, indicating the presence of moral hazard. We do not see a positive effect of LTCI purchase on home care use, and in fact the coefficient is negative and significant in our main specification. The effects of other included variables are consistent with expectations: Individuals in poorer health are more likely to use nursing

home care and home care. Income and assets are negatively associated with nursing home use and not associated with home care use.

Marginal effects from our main specification and various robustness checks are displayed in Table 3. LTCI purchase leads to a 9 percentage-point increase in the probability of nursing home use (with average length of stay at least 30 days) and to a 19 percentage-point decrease in the probability of home care use. "Naïve" probit models that do not address the endogeneity of LTCI purchase show no significant effect on either outcome. When we relax the length-of-stay requirement in the nursing home utilization measure, the marginal effect becomes somewhat larger and noisier than in our base specification, losing statistical significance; a noisier estimate may be expected in that short-term postacute stays are likely included, which are generally reimbursed by Medicare or private insurance. Finally, when purchasers who reported having home-care-only policies were excluded from the nursing home estimation, the moral hazard estimate was larger and significant. (This was estimated without the length of stay restriction in order to meet requirements for convergence of the bivariate probit.) Importantly, when purchasers with nursing-home-only policies were excluded from the home care estimation, the magnitude of the decrease in home care utilization was smaller and nonsignificant.

Results of the falsification tests are displayed in Table 4. When the same model is applied to utilization outcomes not covered by LTCI, we see no significant effect on three of the four outcomes: outpatient surgery, dental visits, and doctor visits. Thus, the instrumental variables are plausibly addressing the endogeneity of purchase. A negative and significant effect is found for whether or not the respondent had a hospital admission. Although one significant effect was found, it is in the opposite direction of the selection bias that would cast doubt on the nursing home moral hazard results. In addition, hospital admission is the weakest example of the four in terms of services that are unrelated to LTC, as short-term nursing home or home care use is common after a hospital stay.

Discussion

We find evidence of significant moral hazard in nursing home use. Importantly, this is in contrast with the lack of a moral hazard effect in Medicaid-funded nursing home use from Grabowski and Gruber, which looked only at Medicaid-funded nursing homes. Medicaid-funded nursing home care might be considered an inferior good, in which case the lack of a moral hazard effect is less surprising. In this paper, we examine the private LTCI market only and find a significant effect after addressing the endogeneity of LTCI purchase.

The lack of a moral hazard effect (and even a negative effect) of LTCI purchase on home care utilization has several possible explanations. First, because most policies have maximum benefits, individuals may choose to delay onset of use for the less expensive services. It is plausible that policyholders consider the tradeoffs between the two types of care relative to the costs and decide to trigger benefits only when health status requires expensive nursing home care, foregoing or paying for home care out of pocket. Second, our data on home care utilization contain measurement error in that, unlike nursing home care, data on the duration of care is not collected. If this measurement error is correlated with purchase, bias may result.

Our finding of moral hazard in nursing home use has several possible implications. One is that public policies designed to encourage LTCI purchase and to cover long-term care services should consider the additional spending associated with moral hazard and potentially incorporate disincentives to socially inefficient spending by policyholders. However, the current moral hazard literature is marked by inadequate attention to the welfare effects of moral hazard, which depend crucially on the extent to which the increased utilization in the presence of insurance is efficient (based on income effects) or inefficient (based on price effects). Services that would be bought anyway under a no-strings-attached cash transfer equal to the price of the covered service are efficient, while those that would not be

bought with a cash transfer but are instead induced by the price effects of insurance coverage are inefficient. Theoretical work in this area has engendered significant attention both in academia in the popular press (Nyman 1999; Nyman 1999; Nyman 2001; Nyman 2004; Gladwell 2005; Nyman 2008), but the empirical evidence base lags significantly behind. Due to limitations of the data, these welfare effects cannot be assessed in our analysis. Disentangling the welfare effects of increased utilization of long-term care services is an important area of further research.

	Overall	LTCI Purchasers	LTCI	
	(N=16,665)	(N=1,011)	Nonpurchasers	
			(N=14,654)	
Purchased LTCI (%)	6.5	100.0	0.0	
Used nursing home (%)	2.4	2.7	2.4	
Used nursing home >30 days(%)	0.9	0.8	0.9	
Used home care (%)	8.8	7.6	8.9	
Age	61.29	61.35	61.29	
Female (%)	51.4	52.7	51.3	
Black race (%)	8.2	8.6	8.1	
Hispanic (%)	4.4	2.5	4.6	
High school graduate (%)	83.7	87.1	83.5	
College graduate (%)	25.1	33.6	24.5	
Married (%)	86.4	87.2	86.3	
At least one child (%)	96.0	94.8	96.0	
On Medicare (%)	25.9	24.2	26.0	
Veteran (%)	5.0	4.8	5.0	
Self-rated health fair	9.3	7.3	9.5	
Self-rated health good (%)	30.6	28.4	30.7	
Self-rated health very good (%)	39.8	42.1	39.6	
Ever high blood pressure (%)	36.9	38.5	36.8	
Ever diabetes (%)	8.8	9.0	8.8	
Ever cancer (%)	8.3	7.1	8.3	
Ever lung disease (%)	4.0	3.4	4.1	
Ever heart disease (%)	11.7	9.9	11.8	
Ever psychiatric condition (%)	5.4	5.8	5.4	
Ever arthritis (%)	42.0	40.9	42.1	
Income quartile 3 (%)	26.2	28.6	26.1	
Income quartile 4 (highest) (%)	24.5	29.4	24.1	
Asset quartile 3 (%)	16.2	19.8	15.9	
Aasset quartile 4 (highest) (%)	15.3	19.9	15.0	
Base year 1996 (%)	33.0	32.0	33.1	
Base year 1998 (%)	24.3	26.0	24.2	
Base year 2000 (%)	22.8	26.2	22.5	
Base year 2002 (%)	20.0	15.7	20.3	

Table 1. Summary of the Pooled Sample, 1996-2010

	Nursing Home Estimation			Home Care Estimation				
	Purch	ase	Use	Use Purchase		ase	Use	
Purchased LTCI			2.324	**			-1.111	**
			(0.940)				(0.521)	**
Instruments								
Tax deduction	0.255	***			0.242	* * *		
	(0.081)				(0.085)			
Tax credit	0.077				0.074			
	(0.083)				(0.082)			
Itemized at baseline	0.073	**			0.070	*		
	(0.037)				(0.037)			
Medicaid asset rule for a couple	0.006				0.005			
	(0.004)				(0.004)			
Medicaid asset rule for single	-0.009				-0.007			
	(0.006)				(0.006)			
Control Variables	4 202	ىلد بلد	4 005			*	0 747	
Age	-1.787	* *	-1.005		-1.617	*	0.717	
	(0.881)	باد باد	(1.421)		(0.889)	ъ.	(0.812)	
Age squared	0.030	* *	0.015		0.028	*	-0.011	
	(0.014)	**	(0.022)		(0.014)	**	(0.013)	
Age cubed	0.000	ጥጥ	0.000		0.000	* *	0.000	
Constant (formals, 1)	(0.000)	**	(0.000)		(0.000)	*	(0.000)	
Gender (female=1)	0.074	4.4.	0.057			-1-	0.013	
	(0.035)		(0.086)		(0.035)		(0.043)	
васк гасе	0.065		0.086		0.061		0.065	
Hispanic	(0.061)	*	(0.161)	**	(0.061)	**	(0.066)	
Hispanic	-0.179		-0.505		-0.195		-0.040 (0.10E)	
High school graduate	(0.090)		(0.245)		(0.097)		(0.105)	**
Tigh school graduate	(0.000		(0 102)		(0.001		(0.152	**
College graduate	0.050	***	0.103)		0.030	***	0.034)	
conege graduate	(0.108		(0 102)		(0 039)		(0.048	
Marital status	0.057		-0 157		0.061		-0 040	
	(0.051)		(0 119)		(0.051)		(0.054)	
Has at least one child	-0 146	*	-0.093		-0 125		-0 138	
	(0.080)		(0.199)		(0.081)		(0.094)	
On Medicare	-0.068		-0.053		-0.064		0.131	**
	(0.059)		(0.117)		(0.059)		(0.063)	**
Veteran	0.003		0.046		0.010		0.057	
	(0.074)		(0.154)		(0.074)		(0.077)	
Self-rated health fair	-0.081		0.458	***	-0.070		0.261	***
	(0.072)		(0.129)		(0.072)		(0.080)	***
Self-rated health good	-0.029		0.305	***	-0.037		0.201	***
-	(0.050)		(0.109)		(0.050)		(0.060)	***
Self-rated health very good	-0.004		0.211	**	-0.001		0.086	
	(0.044)		(0.102)		(0.044)		(0.048)	
Ever high blood pressure	0.062	*	0.026		0.072	**	0.101	***
	(0.035)		(0.086)		(0.035)		(0.038)	***
Ever diabetes	0.061		0.063		0.061		0.212	***
	(0.057)		(0.111)		(0.058)		(0.060)	***

Table 2. Bivariate Probit Estimations of Long-Term Care Use on LTCI Purchase

		_				_		
Ever cancer	-0.103	*	0.052		-0.084		0.007	
	(0.060)		(0.143)		(0.060)		(0.065)	
Ever lung disease	-0.013		0.004		-0.003		0.272	***
	(0.086)		(0.159)		(0.087)		(0.085)	***
Ever heart disease	-0.071		-0.211		-0.079		0.032	
	(0.055)		(0.129)		(0.054)		(0.056)	
Ever psychiatric condition	0.067		0.339	**	0.078		0.116	
	(0.072)		(0.153)		(0.071)		(0.073)	
Ever arthritis	-0.015		0.026		-0.023		0.135	***
	(0.034)		(0.077)		(0.035)		(0.041)	***
Income quartile 3	0.079	**	-0.136		0.073	*	0.043	
	(0.040)		(0.091)		(0.040)		(0.040)	
Income quartile 4	0.071		-0.253	**	0.063		0.037	
	(0.046)		(0.128)		(0.045)		(0.048)	
Asset quartile 3	0.189	* * *	-0.012		0.184	***	0.007	
	(0.048)		(0.092)		(0.049)		(0.059)	
Asset quartile 4	0.155	* * *	-0.170		0.165	***	0.046	
	(0.052)		(0.128)		(0.051)		(0.060)	
Asset quartile missing	0.309	* * *	-0.121		0.304	***	-0.024	
	(0.059)		(0.099)		(0.062)		(0.068)	

***p<.01; **p<.05; *p<.10. All models include state and time fixed effects. Robust standard errors clustered on the individual. Instruments jointly significant at p<.001 in both estimations.

	Marginal Effect			
Model	Nursing Home Use	Home Care Use		
Base Model from Table 2: Bivariate probit regressions of utilization on LTCI purchase	0.092* (0.050)	-0.188* (0.112)		
Naïve models (simple probits without instruments)	-0.001 (0.004)	-0.007 (0.008)		
Measuring nursing home use without length of stay restriction	0.112 (0.090)			
Excluding purchasers of home-care-only policies (nursing home use of any length)	0.127* (.071)			
Excluding purchasers of nursing-home-only policies		-0.133 (.140)		

Table 3. Marginal Effects of LTCI Purchase from Base Model and Alternative Specifications

***p<.01; **p<.05; *p<.10. All models include state and time fixed effects. Robust standard errors clustered on the individual.

Table 4. Falsification Tests:Bivariate Probit Regressions of Health Care Utilization Not Covered by Long-Term Care Insurance

	Coefficient on D-D Estimator		
	Coefficient	Marginal Effect	
	(std.error)	(std.error)	
Dependent Variable (dichotomous indicator of			
utilization in past two years)			
Outpatient Surgery	0.543	0.206	
	(0.628)	(0.235)	
Dental Visit	0.606	0.163	
	(0.801)	(0.219)	
Doctor Visit	-0.801	-0.133	
	(0.817)	(0.143)	
Hospital Admission	-0.899*	-0.322*	
_	(0.522)	(0.187)	

***p<.01; **p<.05; *p<.10. All models include state and time fixed effects.

References

- Akamigbo, A. B. and F. D. Wolinsky (2007). "New evidence of racial differences in access and their effects on the use of nursing homes among older adults." <u>Med Care</u> **45**(7): 672-679.
- Bernard, D. M., J. S. Banthin, et al. (2009). "Wealth, income, and the affordability of health insurance." <u>Health Aff (Millwood)</u> **28**(3): 887-896.
- Brown, J. R., N. B. Coe, et al. (2007). "Medicaid Crowd-Out of Private Long-Term Care Insurance Demand: Evidence from the Health and Retirement Survey." <u>NBER Working Paper Series</u> <u>#10989</u>.
- Brown, J. R. and A. Finkelstein (2008). "The interaction of public and private insurance: Medicaid and the long-term care insurance market." <u>American Economic Review</u> **98**(3): 1083-1102.
- Brown, J. R. and A. Finkelstein (2009). "The Private Market for Long-Term Care Insurance in the United States: A Review of the Evidence." Journal of Risk and Insurance **76**(1): 5-29.
- CDC. (2003). "Public health and aging: trends in aging--United States and worldwide." <u>Morbidity and</u> <u>Mortality Weekly Report</u>, 52, from

http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5206a2.htm.

- Congressional Budget Office (2004). Financing long-term care for the elderly. Washington, DC, US Government Printing Office.
- Courtemanche, C. and D. F. He (2009). "Tax incentives and the decision to purchase long-term care insurance." Journal of Public Economics **93**(1-2): 296-310.
- Cramer, A. T. and G. A. Jensen (2006). "Why don't people buy long-term-care insurance?" J Gerontol B Psychol Sci Soc Sci **61**(4): S185-193.
- Cutler, D. M. (1993). "Why Doesn't the Market Fully Insure Long-Term Care?" <u>NBER Working Paper</u> <u>Series #4301</u>.
- Finkelstein, A. and K. McGarry (2006). "Multiple dimensions of private information: Evidence from the long-term care insurance market." <u>American Economic Review</u> **96**(4): 938-958.
- Finkelstein, A., K. McGarry, et al. (2005). "Dynamic inefficiencies in insurance markets: Evidence from long-term care insurance." <u>American Economic Review</u> **95**(2): 224-228.
- Gladwell, M. (2005). "The Moral-Hazard Myth: The bad idea behind our failed health-care system." <u>The</u> <u>New Yorker</u>(August 29, 2005.).
- Goda, G., E. Golberstein, et al. (2010). "Income and the Utilization of Long-Term Care Services: Evidence from the Social Security Benefit Notch "<u>NBER Working Paper Series #16076</u>.
- Goda, G. S. (2011). "The impact of state tax subsidies for private long-term care insurance on coverage and Medicaid expenditures." Journal of Public Economics **95**(7-8): 744-757.
- Grabowski, D. C. (2004). "The admission of blacks to high-deficiency nursing homes." <u>Med Care</u> **42**(5): 456-464.
- Grabowski, D. C. and J. Gruber (2007). "Moral hazard in nursing home use." <u>J Health Econ</u> **26**(3): 560-577.
- Health and Retirement Study (2008). Produced and distributed by the University of Michigan with funding from the National Institute on Aging (grant number NIA U01AG009740). Ann Arbor, MI.
- Kane, R. A., R. L. Kane, et al. (1998). The Heart of Long-Term Care. New York, Oxford University Press.
- Konetzka, R. T. and Y. Luo (2009). "Explaining lapse in long-term care insurance markets." Health Econ.
- Konetzka, R. T. and R. M. Werner (2009). "Disparities in Long-Term Care: Building Equity Into Market-Based Reforms." <u>Med Care Res Rev</u>.
- Li, Y. and G. A. Jensen (2011). "The impact of private long-term care insurance on the use of long-term care." Inquiry : a journal of medical care organization, provision and financing **48**(1): 34-50.
- Lindrooth, R. C., T. J. Hoerger, et al. (2000). "Expectations among the Elderly anbout Nursing Home Entry." <u>Health Services Research</u> **35**(5): 1181-1202.

- McCall, N., S. Mangle, et al. (1998). "Factors important in the purchase of partnership long-term care insurance." <u>Health Serv Res</u> **33**(2 Pt 1): 187-203.
- Mellor, J. M. (2000). "Private long-term care insurance and the asset protection motive." <u>The</u> <u>Gerontologist</u> **40**(5): 596-604.
- Mellor, J. M. (2001). "Long-term care and nursing home coverage: are adult children substitutes for insurance policies?" Journal of Health Economics **20**: 527-547.
- MetLife Mature Market Institute (2008). The MetLife market survey of nursing home & assisted living costs. Westport, CT, MetLife Mature Market Institute.
- Mor, V., J. Zinn, et al. (2004). "Driven to tiers: socioeconomic and racial disparities in the quality of nursing home care." <u>Milbank Q</u> 82(2): 227-256.
- Nyman, J. A. (1988). "Excess-Demand, the Percentage of Medicaid Patients, and the Quality of Nursing-Home Care." Journal of Human Resources **23**(1): 76-92.
- Nyman, J. A. (1999). "The economics of moral hazard revisited." J Health Econ 18(6): 811-824.
- Nyman, J. A. (1999). "The value of health insurance: the access motive." J Health Econ 18(2): 141-152.
- Nyman, J. A. (2001). "The income transfer effect, the access value of insurance and the Rand health insurance experiment." <u>J Health Econ</u> **20**(2): 295-298; discussion 299.
- Nyman, J. A. (2003). <u>The Theory of Demand for Health Insurance</u>. Stanford, CA, Stanford University Press.
- Nyman, J. A. (2004). "Is 'moral hazard' inefficient? The policy implications of a new theory." <u>Health Aff</u> (Millwood) **23**(5): 194-199.
- Nyman, J. A. (2008). "Health insurance theory: the case of the missing welfare gain." <u>Eur J Health Econ</u> **9**(4): 369-380.
- Pauly, M. V. (1990). "The Rational Nonpurchase of Long-Term-Care Insurance." <u>Journal of Political</u> <u>Economy</u> **98**(1): 153-168.
- RAND HRS Data (2009). Produced by the RAND Center for the Study of Aging with funding from the National Institute on Aging and the Social Security Administration. Santa Monica, CA.
- Sloan, F. A. and E. C. Norton (1997). "Adverse selection, bequests, crowding out, and private demand for insurance: evidence from the long-term care insurance market." <u>Journal of Risk and Uncertainty</u> 15: 201-219.
- Smith, D. B., Z. Feng, et al. (2008). "Racial disparities in access to long-term care: the illusive pursuit of equity." J Health Polit Policy Law **33**(5): 861-881.
- Smith, D. B., Z. Feng, et al. (2007). "Separate and unequal: racial segregation and disparities in quality across U.S. nursing homes." <u>Health Aff (Millwood)</u> **26**(5): 1448-1458.
- Stone, R. I. (2000). Long-Term Care for the Elderly with Disabilities: Current Policy, Emerging Trends, and Implications for the Twenty-First Century, Milbank Memorial Fund
- Zweifel, P. and W. Struewe (1998). "Long-term care insurance in a two-generation model." <u>The Journal</u> of Risk and Insurance **65**(1): 13-32.