NBER WORKING PAPER SERIES

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Working Paper 10782
http://www.nber.org/papers/w10782

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
September 2004

We thank David Cutler, John Cutler, Cheryl DeMaio, Robert Gagne, Estelle James, Kathleen McGarry, JaneMarie Mulvey, Dennis O'Brien, Ben Olken, Al Schmitz, Karl Scholz, Jonathan Skinner, Mark Warshawsky, Steve Zeldes, and participants at the University of Wisconsin, the NBER Public Economics meetings, the Risk Theory seminar and the American Risk and Insurance Association annual meeting for helpful comments and discussions. We are especially grateful to Jim Robinson for generously sharing his data on long-term care utilization, and to Norma Coe for exceptional research assistance. We are grateful to the Robert Wood Johnson Foundation, TIAA-CREF and the Campus Research Board at the University of Illinois at Urbana-Champaign for financial support. The views expressed herein are those of the author(s) and not necessarily those of the National Bureau of Economic Research or the IMF.

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NBER Working Paper No. 10782
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JEL No. H0, I11, G22, J14

ABSTRACT

Long-term care represents one of the largest uninsured financial risks facing the elderly in the United States. Whether the small size of this market is driven primarily by supply side market imperfections or by limitations to demand, however, is unresolved, largely due to the paucity of data about the structure of the private market. We provide what is to our knowledge the first empirical evidence on the pricing and benefit structure of long-term care insurance policies. We estimate that the typical policy purchased by a 65-year old has an average pricing load of about 18 percent and has a very limited benefit structure, covering only one-third of the expected present discounted value of long-term care expenditures. These findings are consistent with the presence of supply side market imperfections. However, we also find enormous gender differences in pricing – typical loads are 44 cents on the dollar for men but better than actuarially fair for women – that do not translate into differences in coverage. And, although purchased policies provide limited benefits, we demonstrate that more comprehensive policies are widely-available at similar loads, but are rarely purchased. These findings suggest that while supply-side market imperfections exist, they are not the primary cause of the small size of the private long-term care insurance market.

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1. Introduction

As the baby-boom generation approaches retirement, concerns about financial security in retirement are increasing in importance as a public policy issue. One of the largest uninsured financial risks facing the elderly in the United States today is expenditures for long-term care, such as home health care and nursing homes. Expenditures for long-term care were $135 billion in 2004, representing 8.5% of total health expenditures *for all* ages and about 1.2% of GDP. Importantly, only 4 percent of these expenditures are paid for by private insurance, while one-third are paid for out of pocket (CBO, 2004). By contrast, in the health sector as a whole, private insurance pays for 35 percent of expenditures and only 17 percent are paid for out of pocket (National Center for Health Statistics, 2002).

The limited insurance coverage for long-term care expenditures has important implications for the welfare of the elderly. Its importance will only become more pronounced as the population continues to age and as medical care costs continue to rise. Indeed, the Congressional Budget Office projects that real long-term care expenditures will triple by 2040 (CBO, 1999).

Standard insurance theory suggests that the random and costly nature of long-term care expenditures makes this precisely the type of risk for which risk averse individuals would find insurance valuable. As a result, an extensive theoretical literature has proposed a host of potential explanations for the limited size of the private long-term care insurance market (see Sloan and Norton, 1997 or Norton, 2000 for a review of this literature). An important divide in these explanations is whether they assume that the limited size of the market is due primarily to factors that limit *demand* for private insurance (such as the public Medicaid program, the informal insurance provided by family members, or limited consumer rationality) or to *supply side* market failures (such as asymmetric information, imperfect competition, or uninsured aggregate risks).

Conceptually, it is possible to learn about the existence and importance of supply side market imperfections by studying the characteristics of the insurance policies that are offered and purchased in the private market. This is because the major potential supply side limitations, including high transactions costs, imperfect competition, asymmetric information, or the aggregate risk of rising costs, have at least one of two empirical implications. First, these imperfections may cause prices to be higher than actuarially fair levels. Second, these imperfections may cause contracts to offer a constrained set of benefit options that are less than fully comprehensive; we refer to a restriction on the comprehensiveness of offered insurance contracts as "quantity rationing."

Unfortunately, the literature thus far has been hampered by the paucity of relevant information about the basic characteristics of the private long-term care insurance market. In addition to limiting our economic understanding of the causes of the small market size, the lack of evidence impairs informed public policy making as well. For example, concerns about perceived high prices in this market have recently motivated the introduction of generous tax subsidies to long-term care insurance at both the federal and state level (Wiener et al., 2000; Cohen and Weinrobe, 2000) as well as proposals for further expansion of these subsidies (Lewis et al., 2003). Yet we know of no evidence on whether prices are substantially above actuarially fair levels in this market, let alone whether this is an important factor in explaining the market's limited size.

To begin filling this void, this paper provides, to our knowledge, the first estimates of the loads on private insurance policies and the share of expenditure risk covered by these policies. To do so, we develop an analytical framework for estimating the pricing load and the comprehensiveness of private long-term care insurance contracts. We implement these frameworks using detailed actuarial data on the distribution of long-term care expenditure risk and market-wide survey data on the characteristics of typical policies. We also investigate the extent to which supply-side market failures are important in understanding the limited size of the private market.

The key findings of this paper are that supply side limitations do exist in this market, but that these limitations are *not* primarily responsible for the limited size of the market. The evidence for the existence of supply side imperfections is that commonly purchased policies exhibit high average prices and limited benefits. Our central pricing estimates indicate that the typical policy purchased by a 65-year old (which is roughly the average age of purchase) and held until death has a load of 0.18. In other words, on average, an individual who buys a long-term care insurance policy will get back only 82 cents in expected present discounted value benefits for every dollar paid in expected present discounted value premiums. This is substantially higher than the typical load of 0.06 to 0.10 on purchased acute health insurance policies (Newhouse, 2002). With regard to quantity, we find that typically purchased policies cover only one-third of the expected present discounted value of long-term care expenditures.

However, we present several additional pieces of evidence that suggest that these high prices and limited benefits are *not* the primary cause of the small size of the private long-term care insurance market. We find enormous differences in loads based on gender, yet these large pricing differentials do not translate into differences in coverage. Loads on the typical policy purchased are 44 cents on the dollar for 65 year-old men, and *better* than actuarial fair prices (a load of –0.04 cents on the dollar) for women. Despite these better than actuarially fair prices for women, insurance coverage rates for elderly women are very low and similar to those of elderly men at about 10 percent. Nor can these findings be explained solely by high within-household correlation in coverage decisions. In well over half of married households where at least one spouse has insurance, the other spouse does not have insurance.

In addition, we find that although the typical *purchased* policy provides only limited coverage, insurance companies *offer* policies that cover a substantially larger share of long-term care expenditures. We demonstrate that there are widely available policies that will cover about 90 percent of the expected present value of expenditures for a 65 year old. Moreover, these policies are available at similar loads to the less comprehensive policies that are typically purchased; thus for women, they are available at prices that are at least actuarially fair. This suggests that the limited benefits in purchased policies reflect a lack of demand for more comprehensive policies, rather than a market failure in their supply.

This paper proceeds as follows: In section 1, we show how information on the pricing and comprehensiveness of policies can be used to distinguish demand-side explanations for the market's small size from explanations routed in supply-side market failures. Section 2 provides descriptive statistics on the structure and pricing of long-term care insurance policies. We develop our analytical framework for measuring pricing loads and benefit comprehensiveness in section 3, and the data for implementing these approaches are described in section 4. In section 5, we provide our central empirical estimates of loads and comprehensiveness of typical policies purchased. In section 6, we provide evidence suggesting that, despite the existence of supply side imperfections, the limited market size is not driven primarily by these supply side factors. Section 7 concludes.

1. Theories of Limited Market Size

A variety of theoretical explanations have been proposed to explain the extremely limited proportion of the elderly who purchase private long-term care insurance market (see Sloan and Norton, 1997 or Norton, 2000 for a detailed review of this literature). These theories can be broadly classified into two categories: factors that limit the demand for private insurance, and supply side limitations to the market.

On the demand side, problems of limited consumer rationality may limit demand for private long-term care insurance. For example, individuals may have difficulty understanding low-probability, high-loss events (see e.g. Kunreuther, 1978), or may simply avoid having to think about the unpleasant possibility of ending up in a nursing home. Another major factor that may limit demand for private long-term care insurance is the availability of imperfect but cheaper substitutes. These may come in the form of government assistance (e.g., the Medicaid program), financial transfers from children, or unpaid care provided directly by family members in lieu of formal paid care (Pauly, 1990). These are all likely to be imperfect substitutes for comprehensive private insurance. For example, Medicaid's income and asset eligibility requirements place substantial restrictions on individuals' abilities to smooth consumption over time and across states of care, as well as to bequeath upon death, and thus provides only limited consumption smoothing benefits (Brown and Finkelstein, 2004). Nevertheless, an imperfect but publicly- or family-funded source of long-term care insurance has the potential to substantially reduce demand for private insurance coverage. Pauly (1989, 1990) provides a stylized model that demonstrates this theoretical possibility.

On the supply side, four market problems have been suggested as potential explanations for the small size of the market. Three are problems that may be common to many insurance markets: high transactions costs, imperfect competition, and asymmetric information (either adverse selection or moral hazard). The fourth – the uninsured aggregate risk of rising long-term care costs – is specific to insurance markets with an undiversifiable component to the risk.

The focus of this paper is to distinguish at a broad level whether the limited market size is due primarily to demand side or supply side explanations. Rather than test each of the individual hypotheses separately, our approach is motivated by the observation that each of these four supply-side problems has at least one of two empirical implications. First, the price of private insurance will substantially exceed actuarially fair levels. Second, policies will be quantity-rationed through some form of benefit limitation. In other words, individuals may be willing to purchase more comprehensive policies at existing loads, but such policies are not offered.[1]

Transactions costs may stem from the unavoidable costs of insurance sales and claim processing. They may be exacerbated by imperfection competition (e.g., a form of X-inefficiency) or by the cost of gathering and verifying detailed health information at the time of purchase or time of claim in order to try to reduce any information asymmetries. While both transaction costs and imperfect competition may – by raising prices – reduce the quantity of insurance demanded in equilibrium, neither will produce quantity rationing per se.

Asymmetric information – in the form of either adverse selection or moral hazard – may produce quantity rationing. This quantity rationing may take the form of an unraveling of the insurance market so that policies are not offered (e.g. Akerlof, 1970). Or it may be on the intensive margin through the use the use of co-payments and deductibles that limit the amount of insurance provided (Rothschild and Stiglitz, 1976). In addition, if the population of insured individuals is above-average risk relative to the general population, asymmetric information will raise the price of insurance above the actuarially fair price for the population as a whole.

Finally, Cutler (1996) has argued that a substantial component of long-term care expenditure risk is the intertemporal aggregate risk of increased long-term care costs. This cannot be diversified through the

[1] Naturally, anything that raises prices above actuarially fair levels may contribute to an equilibrium with limited quantities, but we reserve the term “quantity rationing” to situations in which individuals demand more comprehensive benefits at existing prices but such policies are not available in the market.

traditional insurance approach of pooling idiosyncratic risks because, if medical costs rise, it will affect the entire insurance pool. The presence of aggregate risk may therefore raise premiums because companies charge a "risk premium" in order to be compensated for bearing this aggregate risk (Froot, 1999). Alternatively, insurance companies may instead limit policies to cover only the idiosyncratic risk – for example by capping the dollar amount of payment per day in care – which is thus a form of quantity rationing (Cutler, 1996).

In this paper, we provide empirical evidence on the extent to which these supply-side market imperfections are relevant by examining the pricing and benefit comprehensiveness of policies that are currently available in the market. Doing so allows a first opportunity to assess the importance of these factors in limiting market size.

2. Descriptive Statistics on the Long-Term Care Insurance Market

Before developing a formal analytical framework for estimating pricing and comprehensiveness, we present some descriptive statistics on the long-term care insurance market and the structure and pricing of long-term care insurance policies.

2.1 Who has private long-term care insurance?

Table 1 presents statistics on private long-term care insurance ownership rates among individuals aged 60 and over from the 2000 Health and Retirement Survey. Only about 10 percent of the elderly have private long-term care insurance. Coverage rates are similar for men and women, slightly higher for married than single individuals, and increase substantially with asset levels. These basic findings appear in many other data sources as well (e.g. HIAA, 2000a and Cohen, forthcoming). Data from a survey of long-term care insurance buyers indicate that most purchasers are elderly; among individuals aged 55 and older, the average age of buyers in 2000 was 67, and one-fifth were 75 or older (HIAA, 2000a).

In contrast to the market for health insurance for acute medical expenditures, the vast majority (about 80 percent) of private long-term care insurance contracts are sold through the individual (non-group market).[2] We therefore focus in this paper on the non-group market; all subsequent statistics refer exclusively to this market. The market first began in the early 1980s (HIAA, 2001), but for a long time was extraordinarily small. By 2001, annualized in force premiums collected had reached $5.3 billion (LIMRA, 2001).

2.2 The structure of private long-term care insurance contracts

Table 2 presents information on the characteristics of typical policies purchased in 2000. All of these policies are written for an individual; in the long-term care insurance market, one cannot buy a "joint" policy to insure both members of the couple.

Over three-fourths of private policies purchased are designed to cover all forms of long-term care, including expenditures on home care as well as nursing homes, although it is possible to purchase a policy that only covers facility based care or only home based care. Most policies also have a deductible, known as the "elimination period," that specifies the number of days the individual must be receiving care before benefit payments can begin; approximately 70 percent of policies had deductibles of 30 to 100 days. Policies also specify a maximum "benefit period" which limits the total number of days the individual may receive benefits for care expenditures during the lifetime of the policy. Limits of 1-5 years are often specified, although almost one-third of all policies have unlimited (i.e. "lifetime") benefit durations. Another important feature of the policy is whether the benefits are fixed or escalating at a pre-set amount (such as 3 or 5 percent) in nominal terms; about 40% of policies sold in 2000 had this escalation feature (see Table 2).[3]

A feature of private long-term care insurance policies that distinguishes them from the typical health insurance policy is the use of a maximum daily benefit. Specifically, long-term care insurance policies typically pay either a fixed dollar amount per day in care, or reimburse costs up to a maximum daily benefit cap. The average maximum daily benefit purchased for nursing home care in 2000 was $109; the modal benefit was $100.

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[2] The remaining share are sold through employer-sponsored plans or life insurance (HIAA 2000b).

[3] This is termed by the industry "inflation protection" although the nomenclature is misleading. Almost none are actually linked to the CPI (Weiss, 2002).

Finally, for care to be eligible for reimbursement, most private long term care policies require that the individual using the care must satisfy certain health-related criteria known as “benefit triggers.” About 90 percent of recent sales are for policies that use the benefit triggers required by the 1996 Health Insurance Portability and Accountability Act (HIPAA) for a plan to be eligible for tax benefits. These benefit triggers require that the individual must either need substantial assistance in performing at least 2 out of 6 specified activities of daily living and assistance must be expected to last at least 90 days, or the individual requires substantial supervision due to severe cognitive impairment (Wiener et al., 2000; LIMRA, 2002; Lewis et al., 2003). These benefit triggers ensure that any covered care is for a chronic condition (rather than for acute rehabilitative care that Medicare or private health insurance would otherwise pay for).

2.3 The pricing of long-term care insurance contracts

To gain insight into the pricing of these policies, we purchased market-wide data on premiums for non-group long-term care insurance policies in 2002. These data were collected in March 2002 by Weiss Ratings, Inc, in their annual survey of all known companies in the United States that sell long-term care insurance. The responding companies include, among others, all of the top five sellers of long-term care insurance policies; these sellers alone account for two-thirds of industry sales (LIMRA, 2002).

All long-term care insurance policy premiums are paid on a periodic (usually annual) basis and are pre-specified at a constant, nominal amount. At purchase, premiums tend to vary only with age, and with one of three broad, health-related rate categories: preferred, standard or extra-risk. The majority of buyers tend to quality for the standard rate (ALCI, 2001; Weiss, 2002).

Policies are guaranteed renewable and are not experience rated for the individual if he experiences a change in health. However, premiums can be raised for a class of individuals, such as all those holding a particular type of policy or all those above a certain age (AARP, 2002; ACLI, 2001). Thus individuals face some risk of premium increases in the future. Indeed, rate increases have been common in the past (AARP, 2002).

The market has traditionally been largely unregulated. Recently, however, the National Association of Insurance Commissioners (NAIC) has enacted stringent new model regulations – and many states have adopted them – to ensure that rates are set to avoid future premium increases on whole block of business (NAIC, 2002a; NAIC, 2002b; Lewis et al., 2003). To the extent that these regulations are not fully successful at stabilizing rates, thus leaving some risk of future premium increases, the loads we estimate understate the ultimate cost of the policy.

Weiss asks each company to report the "standard" premium for four common policy "scenarios" which they choose to be representative of the entire range of products available. These four scenarios are summarized in Table 3. They are labeled scenarios 1 through 4 in order of increasing benefit generosity. All policies pay a $100 maximum daily benefit and all cover facility care (i.e. nursing home care and assisted living facilities). All scenarios except the least generous cover home care. They differ in terms of their deductible, and their maximum benefit period. For each scenario, Weiss reports premiums for policies that have a constant maximum daily benefit of $100 per day, and policies whose maximum daily benefit starts at $100 but escalates at 5% per year in nominal terms. The data on policy purchases in Table 2 indicate that the typical policy *purchased* is likely to be a constant nominal benefit policy with benefits somewhat less comprehensive than those in scenario 2.[4]

Table 4 presents descriptive information on annual median premiums in 2002 for each of the four scenarios in the Weiss data. For all ages below 85 and all scenarios except scenario 4, the sample includes at least 8 policies.[5] All policies in the sample use the HIPPA-specified benefit triggers discussed above. Prices are not reported by gender because insurance companies do not offer different prices by gender (Society of Actuaries, 2002). This is somewhat puzzling, given the large differences in expected long-term care expenditures between men and women and the absence of regulatory restrictions

[4] A limitation to the data in Table 2 is that they do not permit cross-tabulations by policy characteristic. However, we also examined over 15,000 non-group policies sold to individuals aged 64 to 66 in 2000 or 2001 by one of the top five long-term care insurance companies and reached a similar conclusion.

[5] The Weiss data include a larger sample of companies offering similar policies but we excluded policies when slight differences in policy structure (e.g., different benefit triggers) would make the estimates of loads non-comparable. The smaller sample size for Scenario 4 is not due to limited availability of these policies per se, but rather that Weiss gave the companies a choice to report either Scenario 3 or Scenario 4.

prohibiting gender-based pricing. More generally, it relates to a broader puzzle in many insurance markets are of why firms do not use available information about expected utilization in pricing insurance (see e.g. Finkelstein and Poterba, 2002).

For a medium-generosity policy, such as a Scenario 2 policy covering all types of care with a 60-day deductible, a 4-year benefit period, and a $100 maximum daily benefit, a 65-year old would pay nearly $1,200 annually for a policy with constant nominal benefits. The same policy costs over $2,100 if the maximum daily benefit escalates at a nominal rate of 5% per year. Premiums rise sharply with age, with over a ten-fold premium increase from age 50 to age 85.

Substantial price dispersion across companies is a common feature of many insurance markets, including automobile insurance (e.g. Dahlby and West, 1986), life insurance (e.g. Brown and Goolsbee, 2002) and annuities (e.g. Mitchell et al., 1999). Such price dispersion is also evident in the long-term care insurance market. For example, for the constant nominal benefit, Scenario 2 policy for a 65 year old discussed above, annual premiums range from a low of $1,016 to a high of $2,010 (not shown). While statistics on offer prices may overstate the amount of actual price dispersion if very little business is transacted at the high-end of the pricing distribution, we show below that our estimates of the load are very similar if we restrict our analysis to the top 5 companies.

3. Analytical Framework for Estimating Loads and Comprehensiveness

We define the load, or price, on an insurance contract as the difference between unity and the ratio of the expected present discounted value (EPDV) of benefits to the EPDV of premiums.[6] The higher the load, the lower the expected return for the premium; an actuarially fair policy has a load of 0.

The load for a simple policy with no deductible and an unlimited benefit period is therefore given by:

[6] Our definition of the load is closely related to the "money's worth" concept that has been widely used in other insurance markets, such as annuities (e.g. Mitchell et al., 1999). In fact, the load is simply 1 – money's worth.

$$\text{Load} = 1 - \frac{\text{EPDV(Benefits)}}{\text{EPDV(Premiums)}} = 1 - \frac{\sum_{t=0}^{T}\sum_{s=1}^{5}\left(\frac{Q_{t,s}\min\{X_{t,s}, B_{t,s}\}}{\prod_{j=0}^{t}(1+i_j)}\right)}{\sum_{t=0}^{T}\sum_{s=1}^{5}\left(\frac{Q_{t,s}P_s}{\prod_{j=0}^{t}(1+i_j)}\right)} \quad (1)$$

While equation (1) omits deductibles and maximum benefit periods from the formula for notational simplicity, we account for such features when calculating the loads for actual policies below. All financial inputs are specified in nominal terms. The index *t* denotes calendar time in monthly increments, with purchase occurring at *t=0*. The index *s* denotes the state of care that the individual is in; we allow for five states of care: 1) receiving no paid care, 2) receiving paid home care, 3) residing in an assisted living facility, 4) residing in a nursing home, and 5) dead. The middle three states involve long-term care expenditures. $Q_{t,s}$ denotes the probability of being in health state s at time t, given that the individual was out of care at the age of purchase (a requirement of most policies).[7]

Because a typical insurance policy reimburses covered per-period care expenditures $(X_{t,s})$ up to a maximum per-period benefit amount $(B_{t,s})$, the per-period benefits are $\min\{X_{t,s}, B_{t,s,}\}$. i denotes the nominal short-term interest rate used to discount from period t back to period t-1 (with $i_0 = 0$). P_s denotes the per-period, nominal long-term care insurance premium. These premiums vary with the state of care (*s*) since an individual does not pay premiums when receiving benefits, but are constant over time in nominal terms.

The comprehensiveness of a policy is defined similarly as the ratio of the expected present discounted value of benefits from a policy to the ratio of the EPDV of total insurable care expenditures for which the individual is at risk. As with the formula for the load, we present the formula for comprehensiveness for a

[7] In practice, we use age- and gender-specific care utilization probabilities but for notational simplicity we have suppressed the gender subscript and use calendar time *t* to reflect the aging of the individual.

policy with no deductible and an unlimited benefit period for notational simplicity, but fully account for such features in our calculations:

$$\text{Comprehensiveness} = \frac{\displaystyle\sum_{t=0}^{T}\sum_{s=1}^{5}\left(\frac{Q_{t,s}\min\{X_{t,s},B_{t,s}\}}{\prod_{j=0}^{t}(1+i_j)}\right)}{\displaystyle\sum_{t=0}^{T}\sum_{s=1}^{5}\left(\frac{Q_{t,s}X_{t,s}}{\prod_{j=0}^{t}(1+i_j)}\right)} \qquad (2)$$

The policy comprehensiveness thus captures the expected share of long-term care expenditures that the policy will cover.

It is worth noting at this point how the public insurance programs Medicare and Medicaid affect estimates of the policy's comprehensiveness and load. Medi*caid* is the public health insurance program for the indigent and pays for 35% long-term care expenditures (CBO, 2004). However, it is a *secondary payer*; therefore, if the individual has private long-term care insurance, the private policy pays whatever benefits it owes before Medicaid makes any payments. It thus does not affect estimation of benefit comprehensiveness or load. Put differently, the load provides a measure of the net and gross expected return on the policy to the insurance company, but only the *gross* return on the policy to the individual. The *net* return to the individual will therefore be lower than the gross return to the extent that the policy premium pays for benefits that would otherwise have been covered by Medicaid.

Medi*care* is the public health insurance program for the elderly. Because it is a *primary payer*, any care that is eligible for Medicare is not reimbursed by private insurance and is not included in our estimate of per-period care expenditures $(X_{t,s})$. Medicare pays for 16% of institutional care (specifically, nursing home care) and 30% of home health care for the elderly (U.S. Congress, 2000). However, because very little of Medicare-covered nursing home expenditures would be otherwise eligible for private long-term care insurance benefits, we do not incorporate Medicare's nursing home benefits into our estimation of comprehensiveness or of loads, which are based on insurable expenses.[8] Medicare coverage for home health care, by contrast, pays for services that would otherwise be eligible for private insurance coverage. We therefore take account of Medicare in estimating policy loads and comprehensiveness; the details are discussed in Section 4.2 below.

4. Data Sources

We use the 2002 Weiss data described above for information on premiums $(P_{t,s})$ and benefits $(B_{t,s})$. This section describes the data for the remainder of the necessary inputs.

4.1 Data on care utilization $(Q_{t,s})$

One of the most important inputs for our analysis is the distribution of long-term care utilization risk. We require information not only on nursing home utilization – for which there currently exist many published studies (e.g. Dick et al., 1994; Kemper and Murtaugh, 1991; Murtaugh et al. 1997) – but also information on utilization of assisted living facilities and home health care, both of which are covered by most policies. We also need to be able to distinguish across types of individuals and types of care utilization in the same manner as private insurance companies. Individuals tend to be denied non-group long-term care insurance policies if they have any limitations to activities of daily living (ADLs) or any cognitive impairment at the time of purchase (Murtaugh et al., 1995; Finkelstein and McGarry, 2003). In addition, as noted earlier, long-term care insurance policies specify health conditions (known as "benefit triggers") that must be satisfied in order for the individual to be eligible to receive benefits for care covered by the policy. To meet all of these requirements, we makes use of a "state of the art" model of health and institutional transitions that was developed and provided to us by Jim Robinson, an actuary and former member of the Society of Actuaries' long-term care insurance valuation methods task force

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[8] Medicare will cover nursing home stays *only* if: (1) they are stays in skilled nursing home days and (2) follow within 30 days a hospital discharge. Medicare will only cover up to 100 days per spell of illness. Beyond 20 days, Medicare requires a co-payment of $97 in 2000 (U.S. Congress, 2000); this is approximately equal to the $100 benefit cap. Finally, the criteria for Medicare coverage results in Medicare covering mostly stays that are for recovery from acute illness; by contrast, as discussed earlier, long-term care insurance benefit triggers require that there be little likelihood of recovery within 90 days (U.S. Congress, 2000).

(Society of Actuaries, 1996). The model has two components.[9] The first uses data from the 1982, 1984, 1989 and 1994 National Long Term Care Surveys to estimate transition probabilities across seven different health states, defined by the number of limitations to activities of daily living (ADLs) and limitations to instrumental activities of daily living (IADLs), the presence or absence of cognitive impairment, and death. The transition model is based on a Continuous-Time Markov Chain that allows the transition rates to vary with the sex and the age of the individual. The second component uses the 1985 National Nursing Home Survey as well as the National Long Term Care Surveys to estimate the probability that individuals are in each of the five care states (no care, home care, assisted living, nursing home, or death) as a function of age, gender, current health status, and the length of time in the health status.

Together, this information can be combined to produce Markov transition probabilities across care states. The model also produces estimates of the number of hours of skilled home care and unskilled home care provided during a home care episode. Because the model provides information not only on the transitions across care states but also across the number of ADLs and IADLs and the presence or absence of cognitive impairment, we can construct transition probabilities specifically for individuals who are, at the time of purchase, healthy enough to be eligible for insurance. We can also identify which care episodes satisfy the benefit triggers built into most policies.

The estimates produced by the model are designed to be representative of the entire population. We do not make any adjustments to reflect the possibility that moral hazard or adverse selection may result in an insured population with different rates of care utilization than non-insured individuals. This is because the utilization experience of insured individuals is quite similar to that of the population as a whole (Society of Actuaries, 2002; Finkelstein and McGarry, 2003). Thus, these estimates are representative of the insured population as well.

The estimates do not incorporate any projected changes in morbidity or care utilization. This is standard practice for the industry (see e.g. Tillinghast-Towers Perrin, 2002, and conversations with

[9] Readers interested in a more detailed description of the model are encouraged to consult Robinson (1996).

several actuaries) as well as for academic research (e.g. Wiener et al., 1994). This practice may reflect the substantial disagreement in the literature over the *sign* of projected changes in morbidity (compare e.g. Manton et al., 1997 and Manton and Gu, 2001 to Lakdawalla et al., 2001) or in care utilization conditional on morbidity (compare e.g. Lakdawalla and Philipson, 2002 to CBO, 1999).

The model has a very strong pedigree. Versions of the model have been used by insurance regulators, private insurance companies, state agencies administering public long-term care benefit programs, and the Society of Actuaries LTC Valuation Methods Task Force (Robinson, 2002). We spoke with numerous actuaries in consulting firms, insurance companies, and the Society of Actuaries who confirmed that the model is widely used to price long-term care insurance policies and that it is very highly regarded. We also independently verified that the model produces estimates that are broadly consistent with published estimates, where comparable; Appendix Table A summarizes the results of this validation exercise.

Table 5 presents some summary statistics on care utilization in the Robinson model for 65-year old men and women. To make the statistics relevant for someone's long-term care insurance policy, the statistics assume the individual is medically eligible for insurance at age 65 and counts care utilization only if benefit triggers are satisfied. A 65-year old man has a 27 percent chance of ever using nursing home care; a 65 year old woman has a 44 percent chance of ever using nursing home care. Among those who use care, the amount of care used is also higher for women. For example, women who enter a nursing home spend on average 2 years there and have a 12 percent chance of spending more than 5 years there; for men who enter a nursing home, the average amount of time spent there is 1.3 years, and they have only a 5 percent chance of spending more than 5 years there. These gender differences in utilization are only partially explained by longevity differences.[10] They likely also reflect the fact that elderly men are more likely than elderly women to receive unpaid care from their spouses in lieu of formal, paid care (Lakdawalla and Philipson, 2002) as well as underlying health differences between men and women.

[10] For example, among individuals who survive until age 80, women have a 10 percent change of having used nursing home care before age 80, compared to only 7 percent for men (results not shown).

There is substantial churning across types of care as well as exit from care for reasons other than death. For example, a man who uses a nursing home has a 55% chance of also using home health care (results not shown). In addition, almost two-thirds of individuals who use a nursing home will at some point leave the nursing home alive; this is consistent with other studies (e.g. Dick et al., 1994) that indicate a substantial amount of recovery from nursing home care. On the other hand, we find that about half of individuals who use a nursing home will ultimately die in a nursing home (results not shown).

4.2 Other inputs

Data on average national daily care costs for nursing homes, assisted living facilities, and home health care $(X_{t,s})$ are taken from Metlife Market Survey data (MetLife, 2002a; MetLife, 2002b). These data were collected in order to determine pricing for the new federal long-term care insurance program. The survey covers all 50 states and the District of Columbia. We use the national average costs because insurance companies do not vary premiums with location. In addition, using a restricted access version of the 2000 Health and Retirement Survey (HRS) that includes each individual's state of residence, we found no evidence of a statistically or substantively significant correlation between the average daily nursing home cost in the state and the probability of holding long-term care insurance.

The national average daily cost of nursing home care in 2002 is $143 per day for a semi-private room (private rooms are more expensive). Care costs for an assisted living facility are on average about half that, at $72 per day. Home health care is by far the least expensive type of care, and accounts for only one-quarter of total long-term care expenditures (U.S. Congress, 2000). Using the data on hours of home health care use described above, we estimate that even a current 90 year old male (female) in home health care would only incur, on average, $30 ($45) per day of insurable home health care costs. Moreover, we adjust home health care expenditures downward in estimating equations (1) and (2) to account for the fact that Medicare pays an estimated 35% of home health care costs.[11]

[11] Our estimate of 35% is based on the fact that Medicare covers 30% of home health care expenditures (U.S. Congress, 2000), and our estimate from the Robinson data that 85% of total home health care expenditures meet the private benefit trigger. Since the health-related criteria for Medicare eligibility are more stringent than those for

We project forward these estimates of 2002 long-term care costs using the general consensus that, since the primary cost for all of these types of care is the labor input, they will grow at the rate of real wage growth (Wiener et al., 1994, and conversations with industry officials).[12] We use the Wiener et al. (1994) and Abt (2001) assumption of 1.5 percentage point annual real growth in care costs, although we also examine the sensitivity of our findings to both lower and higher assumptions about real cost growth.

To put cost growth into nominal terms, we apply expected rates of inflation as of March 2002, the date of the survey. The expected inflation rate is determined using the yield differential between nominal U.S. Treasury securities and TIPS. For our nominal interest rates (i_t), we use the term structure on yields of U.S. Treasury strips from this same date. In the analysis below we examine the sensitivity of our findings to using the corporate term structure instead of the Treasury term structure for discounting.

5. Estimates of Loads and Benefit Comprehensiveness of Typical Purchased Policies

5.1 Basic results

Table 6 reports the estimated load and comprehensiveness of the typical policy purchased by a 65 year old. Relating back to Table 3, this is a "scenario 2" policy with $100 constant nominal daily benefits, covering all three types of long-term care with a 60 day deductible and a 4 year maximum benefit period. The results are shown using a unisex actuarial table because policies are sold on a unisex basis.

The first row shows the results using the "base case" assumptions discussed above. Under these assumptions, the typical policy purchased by a 65 year old has a load of 0.18. This indicates that a 65 year old who purchases this policy receives, in expectation, only 82 cents in expected present discounted benefits for every dollar he pays in expected present discounted value premiums.

"tax qualified" private insurance (see e.g. Bishop and Skwara, 1993; GAO, 1996; U.S. Congress 2000), we assume that all Medicare home health care payments are for home health care that meets the private policy benefit triggers.

[12] The image of an individual in a nursing home hooked up to many machines is in fact a tiny share of the nursing home population. As Wiener et al. (1994) note, "long-term care is extremely labor intensive, and much of it involves hands-on, personal services, where opportunities for substantial gains in productivity are few."

It is surprisingly difficult to find estimates of loads in other insurance markets. However we were able to compare our 18 percent load estimate for long-term care insurance policies to estimates of loads on life annuities and on acute health insurance. The load for long-term care insurance is roughly comparable to that found for life annuities which, for 65 year olds are in the range of 13 to 15 percent (Brown, Mitchell and Poterba, 2002). Like long-term care insurance, life annuities are also sold by life insurance companies to elderly consumers and are a relatively small market. The long-term care insurance load is higher than the typical loads on acute health insurance, which is a much more substantial market; these are on the order of 6 to 10 percent (Newhouse, 2002).[13]

The second column of Table 6 indicates that the typical policy purchased by a 65 year old will cover only about one-third (34 percent) of the individual's expected present discounted value of long-term care expenditures. The limited coverage is due primarily to the presence of the $100 constant nominal daily benefit cap rather than to the 60-day deductible or 4-year maximum benefit period. For example, if we re-estimate the comprehensiveness eliminating the deductible and maximum benefit period, the comprehensiveness increases by only 44 percent (to 49 percent, results not shown). By contrast, if we keep the deductible and maximum benefit period but remove the daily benefit cap so that all insurable expenditures are reimbursed, the comprehensiveness increases by 100 percent (to 68 percent, results not shown). This is because, at $143 per day for a semi-private room, current nursing home costs already exceed the $100 daily benefit cap. Moreover, a 65 year old who purchases a policy now and eventually enters a nursing home will not, on average, enter that nursing home for 18.5 years (see Table 5); by that time, the $100 daily benefit cap will cover only one-third of his daily nursing home costs.

5.2 Results under alternative assumptions

The remaining rows of Table 6 show the estimates for the load and comprehensiveness under alternative assumptions. The first alternative shows the effect of using the higher term structure for BAA corporate bonds instead of U.S. Treasury strips. Not surprisingly, this increases the load (from 0.18 to

[13] This is the estimate of the load on group health insurance. Loads on non-group health insurance can be as high as 25 to 40 percent, but the vast majority of acute health insurance policies sold are group policies (Newhouse, 2002).

0.27) because premium payments begin almost immediately while benefits do not begin, on average, for another 15 to 20 years. Comprehensiveness also increases (but only slightly from 0.34 to 0.36); the ratio of insured to total expenditures is higher in more heavily weighted earlier years, reflecting both the limited benefit period and the fact that the fixed nominal daily benefit cap covers a declining fraction of expenditures over time. The next two rows vary the real cost growth rate from the base case of 1.5 percent to 3 percent (the assumption used by Mulvey and Li, 2002 and CBO, 1999) and 0.75 percent (the "lower bound" assumption used by Abt, 2001). As expected, higher real cost growth results in lower loads but also lower comprehensiveness while lower real cost growth results in higher loads and higher comprehensiveness. The effect on loads is tempered however, by the presence of the $100 constant nominal benefit cap since cost growth above the cap does not affect the load estimates.

Given the large documented price dispersion in other insurance markets, we also estimated loads based on the median premium for the policy offered by the top five sellers of long-term care insurance. Table 6 shows that the load is essentially the same for this more limited sample.

The next two rows consider the effect of a "spousal discount" on loads. Insurance companies do not offer long-term care insurance policies that jointly cover a husband and wife. However, many companies provide discounts on the premium if both members of the couple purchase a policy. Spousal discounts of 10 percent are common in the Weiss data. We estimate in the 2000 Health and Retirement Survey (HRS) that about two-fifths of policies are held in households where both spouses are covered.[14] Under the generous assumption that all of these policies receive a spousal discount, the 10 percent spousal discount reduces the average load to 0.14.

The loads presented thus far are calculated from the perspective of an individual who buys a policy and pays premiums until death. In practice, however, about 7 percent of policies each year lapse due to failure to pay the regularly scheduled premiums within the time required; lapse rates are similar for both genders (Society of Actuaries, 2002). This lapse rate will have a substantial impact on the estimated load

[14] This number is not artificially low due to possibility that there was a two-owner married couple in which one spouse has died. In the 2000 HRS, we estimate that of currently married households in which at least one spouse has insurance, 60 percent of these households have only one spouse holding insurance.

because in the early years of the policy expected premium payments are substantially higher than expected benefits; on average, it is only after 15 to 20 years that individuals begin receiving benefits. Moreover, lapse activity usually results in the forfeiture of any future benefits; fewer than 3 percent of the policies in the Weiss data provide any benefits after a policy lapses. In the last row of table 6, therefore, we estimate the load assuming that the individual faces the insured-population average probability of lapsing each year.[15] Accounting for this lapse activity raises the estimate of the load to 0.51, almost a 3-fold increase over the base case.

The reasons for these policy lapses are not well understood. An industry survey of individuals who had lapsed from their existing long-term care insurance policies found that the most common explanation given for this lapsation was an "affordability problem"; most individuals who let their policy lapse do not subsequently buy a new policy (HIAA, 1993). Dynamic selection – as insured individuals learn more about their expected care utilization – may also be part of the explanation for lapsation. There is evidence that individuals who let their long-term care insurance contract lapse have, ex-post, a lower risk if nursing home use than individuals who were otherwise-equivalent at the time of purchase who do not drop out of their contracts (Finkelstein et al., 2004).

5.3 Where does the load come from?

As noted earlier, loads on private insurance products may be produced by administrative costs, imperfect competition, asymmetric information and aggregate risk. If the estimated long-term care insurance load was due primarily to the aggregate risk of medical cost inflation or increased care utilization, we should expect to see loads decreasing with age. This is because at older ages, the remaining time horizon for care – and hence the risk of an aggregate shock – is smaller. Figure 1 however indicates that loads rise with age, suggesting that the explanation for high loads lies elsewhere. While inconsistent with aggregate risk, this age-load pattern is consistent with individuals having private information about risk type that increases with age. Indeed, recent empirical evidence indicates that

[15] Data on lapse rates for non-group policies come from the Society of Actuaries (2002). It is possible that these data may overstate lapse rates as terminations for unknown reasons (which may include death) are counted as a lapse. However, a survey on this issue indicates that less than 10% of recorded lapses may in fact be deaths (HIAA, 1993).

asymmetric information exists in the private long-term care insurance market. However, asymmetric information is unlikely to contribute to the baseline loads, as the average utilization of insured individuals is similar to the utilization of the population as a whole (Finkelstein and McGarry, 2003).[16]

By contrast, administrative costs are likely to contribute to the loads. Indeed, it is unrealistic to presume that an insurance company will be able to price insurance in an actuarially fair manner, as they must cover their expenses (including commissions for agents and brokers) and earn a normal profit in order to stay in business over the long run. Estimates of administrative costs in the health insurance industry as a whole vary from as low as 15 percent (Cutler and Zeckhauser, 2004), to as high as 40 percent for individual / small group policies (Council of Economic Advisers, 1994), and vary widely by lines of insurance and by company (Mulligan and Philipson, 2003). Unfortunately, we have been unable to find reliable estimates of administrative costs for long-term care insurance.

Imperfect competition is also a likely contributor to the estimated loads. While markets for financial products such as insurance are generally thought to be fairly competitive, analysis of the U.S. life insurance industry suggests that it may be less efficient than other financial services industries such as property-liability insurance and banking, and that price competition is relatively low (Cummins, 1999). Moreover, the market for long-term care insurance is fairly concentrated. The top company (G.E.) accounts for one-quarter of market sales and the top five companies account for two-thirds of the market (LIMRA, 2002). On net, therefore, the evidence suggests that the existing loads arise from a combination of administrative costs and imperfect competition, although it is not possible to distinguish the relative contribution of the two using currently available data.

6. Can Supply Side Problems Explain the Limited Private Market?

The preceding results indicate that most policies purchased in the private market are priced well in excess of actuarially fair levels and they provide only very limited coverage. In this section, we

[16] Although individuals who have private information that they are higher risk are more likely to purchase insurance, another group of individuals that tends to purchase insurance are unobservably more "cautious" about their health and are lower risk than the insurance company would estimate. These two factors cancel each other out and produce an insured population that, on average, has a similar risk profile to the population as a whole (Finkelstein and McGarry, 2003).

investigate whether the high loads and limited benefits – and implicitly, the private market problems that may be behind them – appear to be important factors in explaining the limited proportion of people who buy private policies and the limited amount of insurance bought by those who do buy these policies. We provide several pieces of complementary evidence that suggests that this is not the case.

6.1 Is pricing to blame?

The results in Table 7 show a striking disparity in the loads by gender. This arises from the fact that premiums are offered on a unisex basis (see Table 4) whereas utilization rates are much higher for women (see Table 5). As a result, the base case estimates indicate that typical load for a 65 year-old male is 44 cents on the dollar, which means that the typical male who purchases a long-term care insurance policy can expect to receive only 56 cents in benefits for every dollar spent in premiums. By contrast, the premiums are actually *better* than actuarially fair for the typical woman, with loads of -0.04.[17] In other words, a 65 year-old woman would receive $1.04 in EPDV benefits for every dollar paid in EPDV premiums.

There are two related implications of these loads by gender, both of which suggest a limited role of pricing. First, standard expected utility theory indicates that a risk averse individual will want to buy insurance (in fact, full insurance) if the premium is actuarially fair. The fact that only 10 percent of elderly women own long-term care insurance policies despite facing prices that are better than actuarially fair suggests that something other than pricing is constraining demand for private long-term are insurance.

Second, coverage rates are similar for men and for women despite markedly different loads. Despite the enormous differences in loads by gender estimated in Table 7, the probability of having insurance is approximately the same for men and for women (see Table 1). In addition, policies purchased by women tend to be very similar to those purchased by men. If anything, most differences tend to be in the direction of women purchasing slightly less comprehensive policies (shorter duration, lower daily benefit, etc), although these differences are not significant (see Table 2). Clearly, there must be some other demand

[17] Note that the average load using unisex pricing is not simply the equally weighted average of the load on a man's and woman's policies separately, because the unisex pricing approach implicitly places more weight on the woman, due to her higher rates of utilization and survival.

side factor that is altering the *effective load* for men and for women, or else one would expect the difference between a 44 percent load for men and a negative load for women would lead to differences in purchase propensities. Even if one took the view that one must consider the probability of allowing a policy to lapse, in which case the load for women is now positive (see Table 7) and suggests actuarially unfair pricing, it is still the case that dramatically different load factors for men and women remain, but do not lead to different utilization probabilities.

One alternative explanation for the similarity in coverage rates for men and women that is not related to price directly is that there may be high within-household correlation in coverage decisions. This does not, however, appear to be the case. In the 2000 HRS, for example, we found that in married households in which one spouse has purchased insurance, the probability that the other spouse purchases insurance is only 40 percent.[18] While this is considerably higher than the probability for any married individual (which is about 12 percent), it also indicates that many married individuals make different purchase decisions than their spouse. Since only about three-quarters of policies are held by married (as opposed to single) individuals, overall only about two-fifths of policies are held in households in which both spouses are covered.

6.2 Are quantities rationed?

We found that the typical policy *purchased* contains very limited coverage. Various supply-side market failures could result in more comprehensive policies not being offered, even if individuals were willing to purchase them. Asymmetric information may produce such quantity-rationing as it may result in their being no equilibrium price for a particular policy (see e.g. Akerlof, 1970 or Stiglitz and Weiss, 1981). Similarly, aggregate risk could lead to quantity rationing as a way of limiting the insurer's exposure to the "right tail" of the expenditure distribution.

In fact, we find no evidence of quantity rationing. While typically *purchased* policies provide limited benefits, the market currently *offers* substantially more comprehensive policies that are widely

[18] Married households in which only one spouse has insurance are split basically 50-50 in terms of whether it is the husband or the wife that has insurance.

available at loads similar to those on less comprehensive policies. Table 8 shows the estimated comprehensiveness and loads for a typical 65 year old for 8 different policies that, according to the Weiss data, are widely available. Moving down the rows, the policies are increasing in comprehensiveness. To conserve space, we report results under the base case assumptions only; in results not reported, we find that all of the patterns discussed below remain present under the various alternative assumptions from Table 6.

The comprehensiveness estimates in Table 8 indicate that policies covering over 90 percent of the expected present value of long-term care expenditures are available in the market. The key to getting such a policy is to increase the daily benefit cap. Policies paying constant nominal benefits cover only between one-quarter and one-half of the expected present value of insurable long-term care expenditures for a 65-year-old male or female. By contrast, these same policies cover substantially more (between one-half and almost all) of expenditures if they escalate at 5% per year in nominal terms. The fact that such comprehensive policies are available indicates that supply-side market failures such as asymmetric information do not appear to prevent the offering of comprehensive insurance policies.[19]

A second key result in Table 8 is that the loads do not rise systematically with the comprehensiveness of the policy. For example, for women, loads for a given policy scenario are lower on the larger policy (i.e. escalating vs. constant nominal benefits); however, for a given benefit time-profile, loads tend to be higher on policy scenarios with more comprehensiveness benefits.[20] This lack of a clear pricing pattern by comprehensiveness is consistent with the utilization-based evidence in Finkelstein and McGarry (2003) that there are not systematic risk differences across individuals who purchase more or less comprehensive policies.

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[19] Of course, as noted by Cutler (1996), as a result of their daily benefit caps, none of these policies covers the aggregate risk of dramatically increased nursing home costs. It is unlikely, however, that daily benefit caps primarily represent a means of rationing insurance coverage against such aggregate risk. The data indicate that older buyers who – due to the greater proximity of purchase age with expected care use face less aggregate risk than younger buyers – not only purchase binding daily benefit caps but in fact purchase lower daily benefit amounts and are less likely to purchase policies with benefit escalation (HIAA 2000a).

[20] The sole exception is Scenario 4, which is likely an artifact of the much more limited set of companies in the data providing premium information on this policy. When we limit the sample to the companies who offer Scenario 4 and other scenarios, scenario 4 always has a higher load than the other scenarios.

The availability of more comprehensive policies at similar loads suggests that, while typically purchased policies are of limited comprehensiveness, it is not the case that supply side imperfections have led to quantity rationing and thus rendered comprehensive policies unavailable. Rather, consumers are choosing not to buy more comprehensive policies, even though they are available at comparable loads to less comprehensive ones. Nor is it the case that high loads simply limit demand more for more comprehensive policies. Were this true, we should see women purchasing more comprehensive policies than men. The data in Table 2 however suggest that, if anything, women purchase less comprehensive policies than men. Again, this points to the existence of demand-side factors that in some sense raise the effective load above that calculated here.

There is, of course, a different form of quantity rationing that does exist in this market, namely, that individuals in observably poor health are often denied insurance coverage, at least by the large long-term care insurance companies (Murtaugh et al., 1995; Weiss, 2002). The practice of denying individuals rather than offering them higher prices is interesting given the absence of pricing regulation preventing the offering of high prices. It may reflect issues of reputation or brand name, or it may reflect private market failures such as asymmetric information which may be more of a problem for people in worse health. However, this limited type of quantity rationing is unlikely to be a major factor in explaining the small size of the private long-term care insurance market. An examination of applications from the major long-term care insurance companies – as well as several of their underwriting guides – indicates that they deny coverage to individuals who have limitations with respect to activities of daily livings (bathing, eating, dressing, toileting, walking, and maintaining continence), use of mechanical devices (wheelchair, walker, crutches, quad cane, oxygen) or suffer from cognitive impairment. We estimate in the 2000 HRS that about 85 percent of individuals aged 60 to 70 would meet these eligibility requirements.[21]

In total, the evidence on pricing and benefit comprehensiveness leads to two findings. First, that commonly purchased policies tend to be expensive and cover only a small fraction of overall long-term

[21] Our estimate is comparable to that found by other investigators using different data and methods. For example, Murtaugh et al. (1995) estimate that 12 to 23 percent of 65 year olds would be ineligible for insurance.

care expenditures. Second, the existence of these high prices and limited benefit is insufficient to explain the small size of this market. The evidence from prices and benefit availability relative to purchase behavior suggests that demand side factors are important in understanding the limited size of the market.

7. Conclusion

The limited size of the market for private long-term care insurance in the U.S. has spawned a number of theoretical papers exploring a variety of both demand- and supply-side explanations for the lack of widespread private long-term care insurance. Yet very little evidence exists with which to answer even the most basic empirical questions about the nature of this market. This paper brings to bear new evidence on the existing market for long term care insurance policies, and in so doing argues that supply side market limitations are not the primary reason for the small size of the market.

The four major supply side hypotheses – administrative costs, imperfect competition, asymmetric information, and aggregate risk – all have at least one of two empirical implications. First, prices should be higher than actuarially fair. Second, available policies should be limited in their benefit comprehensiveness ("quantity rationing"). We begin by showing that, based on the characteristics of commonly *purchased* policies, both of these empirical predictions appear to hold. The typical policy purchased by a 65 year old has a load of 18 percent and covers only about one-third of expected long-term care expenditures.

However, we also provide evidence that neither of these factors appear capable of explaining the limited size of the market. We find enormous differences in loads between men and women – our central estimates suggest the load on the typical policy purchased by a 65 year old man is 0.44, compared to -0.04 for the typical 65 year old woman – yet virtually no difference in insurance coverage. We also find that more comprehensive policies are widely available at comparable loads to the more limited, purchased policies. This suggests that quantity rationing is not a primary factor in this market.

The results of this paper therefore imply that the limited size of the market is not driven by supply side imperfections, but rather demand side factors. Possible demand-side factors that have been suggested by the theoretical literature include limited consumer rationality and the existence of substitutes for private insurance, such as informal care provided by family members or the public Medicaid program. Our results indicate that, to explain existing empirical patterns, a demand-side story must not simply reduce the desirability of insurance for everyone, but also be able to explain why men and women insure at a comparable rate, despite the very different load factors that they face in the private market.

In this regard, one particularly promising demand-side explanation is the role of Medicaid. In separate work (Brown and Finkelstein, 2004) we have estimated that a large part of the premium for private insurance policies goes to pay for benefits that simply replace benefits that would otherwise have been provided by Medicaid. Because women's expected lifetime utilization of long-term care is much greater than men, women are even more likely than men to end up on Medicaid, with or without private insurance. As a result, the "implicit tax" that Medicaid imposes on private insurance policies is substantially larger for women than for men. We consider further explorations of Medicaid's role in this market a very important avenue for additional research.

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Table 1: 2000 Private long-term care insurance coverage rate among the elderly in the HRS

	Whole Sample	Men	Women	Married	Single	Wealth Quartile 1	2	3	4
Long-term care insurance coverage rate	10.5	10.7	10.1	11.8	8.4	2.8	5.9	11.5	19.4

Note: Sample consists of individuals in 2000 HRS aged 60 and over. Average age is 74. Sample size is 14,937. All means are weighted using household weights.

Table 2: Characteristics of Individual Long-Term Care Insurance Policies Purchased in 2000

Attributes of Policies	Percent of Entire Sample	Percent of Men	Percent of Women
TYPES OF POLICIES SOLD			
Nursing Home Only	14%	12%	16%
Nursing Home and Home Health Care	77	80	74
Home Health Care Only	9	8	10
DEDUCTIBLE			
0 days	23%	22%	24%
15-20 days	3	2	3
30-60 days	16	16	19
90-100 days	55	59	51
> 100 days	3	4	3
NURSING HOME BENEFIT PERIOD			
1-2 years	17%	16%	19%
3 years	23	23	22
4 years	14	12	15
5 years	11	12	10
6 years	5	4	2
Lifetime Benefit	30	34	32
Average duration among Non-Lifetime Policies	5.5 years	5.6 years	5.3 years
PERCENT CHOOSING INFLATION PROTECTION	41%	42%	41%
NURSING HOME DAILY BENEFIT			
up to $30	1%	1%	1%
$31-$59	5	5	6
$60-$89	17	16	18
$90-$119	43	42	44
$120 and Over	34	36	31

Source: LifePlans, Inc. survey of 5,407 policies purchased in 2000 based on a random sample of policies purchased by 12 companies representing more than 80 percent of sales in 1999. Average age of the buyers is 67. First column is taken directly from HIAA (2000a). Estimates by gender are based on a custom tabulation done by LifePlans, Inc. at the request of the authors.

Table 3: Description of common policy scenarios for which prices are listed in Weiss data

	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Covers Nursing Home	YES	YES	YES	YES
Covers Assisted Living Facility	YES	YES	YES	YES
Covers Home and Community-Based Care	NO	YES	YES	YES
Deductible	90 Day	60 day	30 days	0 days
Benefit Period	2 Year	4 year	Unlimited	Unlimited
Daily Benefit	$100	$100	$100	$100

Note: Deductible specifies the number of days in otherwise-covered care during which no benefits are paid toward the policyholder's expenses. Benefit period gives the maximum length of time for which the policy will pay the daily benefit. The daily benefit gives the maximum amount paid by the company per day toward covered care. In all of the policies studied, the daily benefit is the same across covered care states.

Table 4: Descriptive statistics on annual median premiums in 2002

	Age 50	Age 55	Age 60	Age 65	Age 70	Age 75	Age 80	Age 85
Scenario 1:								
- Covers Facility Care only								
- 90 day deductible								
- 2 year benefit period								
Constant Benefit	210	270	360	530	843	1,410	2,470	3,986
Escalating (5%)	447	558	752	1,016	1,470	2,218	3,320	4,846
Scenario 2:								
- All care covered								
- 60 day deductible								
- 4 year benefit period								
Constant Benefit	459	597	821	1,192	1,907	3,232	5,156	7,707
Escalating (5%)	1,032	1,271	1,572	2,140	3,268	5,038	7,565	10,189
Scenario 3:								
- All care covered								
- 30 day deductible								
- Unlimited benefit period								
Constant Benefit	751	912	1,280	1,872	3003	5,004	7,875	10,411
Escalating (5%)	1,630	1,910	2,490	3,450	5,112	7,843	11,930	13,857
Scenario 4:								
- All care covered;								
- 0 day deductible;								
- Unlimited benefit period								
Constant Benefit	602	843	1,147	1,698	2,616	4,345	8,290	10,071
Escalating (5%)	1,565	2,007	2,496	3,326	4,509	6,613	11,150	12,327

Note: "Premium" refers to median premium. All policies have $100 maximum daily benefit for any covered care. "Facility care" refers to nursing home and assisted living facilities. "All care" also includes home health care. All companies quote unisex prices. Weiss requests information on three policy scenarios, with the third defined as either Scenario 3 or Scenario 4 (the company selects). The somewhat anomalous result that median premiums are lower for (more generous) Scenario 4 policies than (less generous) Scenario 3 policies arises from heterogeneity in the set of companies offering these different policies because of whether they chose to report Scenario 3 or Scenario 4. Comparisons of premiums across ages between 50 and 75 or between men and women are not subject to this difficulty since companies that offer a given policy will tend to offer it for all of the ages reported and at a unisex price

Table 5: Descriptive Statistics of Care Utilization for 65 year old, from Robinson Model

		Probability of Use			Avg Age of First Use (among users)	Duration of Use (Among Users)			Exit and reentry (among users)	
		Prob. Ever Use	Prob. ever use, cond'l on living to 75	Prob. ever use, cond'l on living to 90		Avg Years Spent in Care	Prob use more than 1 year	Prob use more than 5 years	Prob ever exit to non-death state	Avg # of spells
Nursing Home (NH)	Men	0.27	0.33	0.46	83	1.3	0.33	0.05	0.65	1.28
	Women	0.44	0.49	0.59	84	2.0	0.42	0.12	0.66	1.39
Assisted Living Facility (ALF)	Men	0.12	0.14	0.18	82	0.58	0.16	0.01	0.90	1.18
	Women	0.20	0.22	0.26	85	0.48	0.13	0.01	0.93	1.26
Facility Care (NH or ALF)	Men	0.28	0.34	0.47	83	1.5	0.38	0.07	0.60	1.27
	Women	0.46	0.51	0.61	84	2.3	0.48	0.15	0.62	1.37
Home Care (HC)	Men	0.29	0.31	0.34	79	1.9	0.52	0.09	0.67	1.45
	Women	0.35	0.37	0.39	81	2.3	0.52	0.15	0.77	1.68
Any Care (NH or ALF or HC)	Men	0.40	0.46	0.55	80	2.9	0.77	0.17	0.33	1.20
	Women	0.54	0.59	0.68	82	4.2	0.85	0.31	0.35	1.27

Note: All statistics are reported for the version of the model used for all of the analysis in the paper. Specifically, all individuals are assumed to be healthy enough to be eligible for private insurance at the time of purchase (here, age 65) and care utilization is measured as care utilization by individuals whose health characteristics simultaneously satisfy the benefit triggers required for care costs to be reimbursable by insurance contracts. See text for further details.

Table 6: Comprehensiveness and Loads on Typical Policy Purchased by a 65 Year Old

	Comprehensiveness	Load
Base Case	0.34	.18
Alternative assumptions		
Corporate interest rate	0.36	.27
Real cost growth 3% / year	0.28	.11
Real cost growth 0.75% / year	0.38	.21
Top five companies	----	.19
Spousal Discount (10%)	----	.14
Assuming random lapsation	----	0.51

Note: Policy covers all three types of care (home health care, assisted living facility and nursing home), has a 60 days deductible, 4 year benefit period, and pays a $100 constant nominal daily benefit; this is Scenario 2 from the Weiss data. All estimates are done using unisex transition probabilities. Load is calculated using median premiums. "Base case" uses the Treasury term structure for the nominal interest rate, real cost growth of 1.5% per year, and all companies in the Weiss data. The remaining rows show the estimates when various assumptions in the "base case" are altered.

Table 7: Loads of Typical Policy Purchased for 65 Year Old, By Gender

	Male	Female
Base Case	0.44	-0.04
Alternative assumptions		
Corporate interest rate	0.50	0.07
Real cost growth 3% / year	0.40	-0.12
Real cost growth 0.75% / year	0.46	-0.004
Top five companies	0.45	-0.03
Spousal Discount 10%		
Spousal Discount 25%		
Assuming random lapsation	0.65	0.38

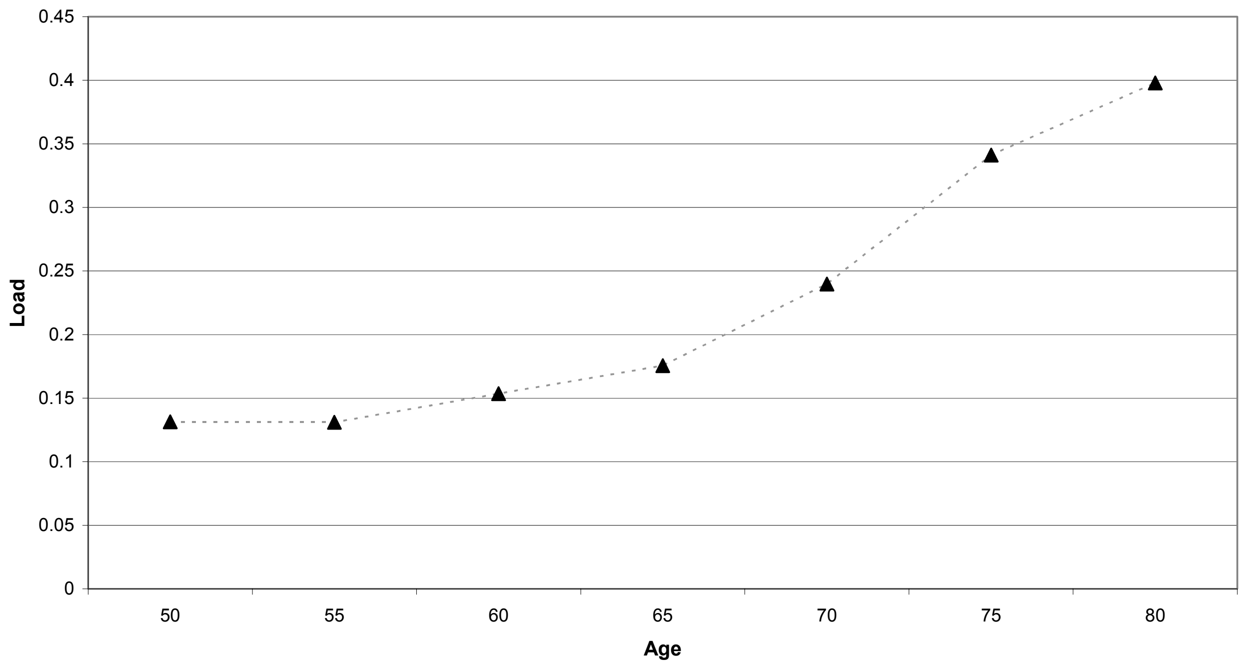
Note: Policy covers all three types of care (home health care, assisted living facility and nursing home), has a 60 days deductible, 4 year benefit period, and pays a $100 constant nominal daily benefit; this is Scenario 2 from the Weiss data. All estimates are done using gender-specific transition probabilities. Load is calculated using median premiums. All estimates use the Treasury term structure for the nominal interest rate, real cost growth of 1.5% per year, and all companies in the Weiss data.

Table 8: Comprehensiveness and loads of available policies; estimates are all for 65 year olds.

		Male		Female	
		Comp	Load	Comp	Load
Constant Nominal Benefits					
Scenario 1: Facility only,	90 day deductible, two year benefit period	0.27	0.28	0.21	-0.22
Scenario 2: All 3 types of care,	60 day deductible, four year benefit period	0.38	0.44	0.32	-0.04
Scenario 3: All 3 types of care,	30 day deductible, unlimited benefit period	0.49	0.55	0.47	0.03
Scenario 4: All 3 types of care,	no deductible, unlimited benefit period	0.51	0.48	0.48	-0.10
Benefits Escalate at 5% per year					
Scenario 1: Facility only,	90 day deductible, two year benefit period	0.58	0.20	0.49	-0.47
Scenario 2: All 3 types of care,	60 day deductible, four year benefit period	0.68	0.45	0.59	-0.08
Scenario 3: All 3 types of care,	30 day deductible, unlimited benefit period	0.88	0.56	0.91	-0.03
Scenario 4: All 3 types of care,	no deductible, unlimited benefit period	0.92	0.52	0.94	-0.09

Note: Policy covers all three types of care (home health care, assisted living facility and nursing home), has a 60 days deductible, 4 year benefit period, and pays a $100 constant nominal daily benefit; this is Scenario 2 from the Weiss data. All estimates are done using gender-specific transition probabilities. Load is calculated using median premiums. All estimates use the Treasury term structure for the nominal interest rate, real cost growth of 1.5% per year, and all companies in the Weiss data.

Figure 1: Loads By Age



Note: Policy covers all three types of care with 60 day deductible, 4 year benefit period, $100 constant nominal daily benefit . Loads calculated using median premiums, unisex transition probabilities, and base case assumptions.

Appendix Table A1: Comparison of nursing home (NH) utilization estimates: Robinson model and other published studies (65 year old).

Model	Data Sources	Probability of ever entering a nursing home			Average age of first entry into nursing home (conditional on entry)			Expected time in nursing home (conditional on entry)	% of those who enter nursing home who spend more than	
		Male	Female	Unisex	Male	Female	Unisex	Unisex	1 year (Unisex)	5 years (unisex)
Robinson Model	NLTCS (1982, 1984, 1989 and 1994) and NNHS (1985)	0.30	0.48	0.39	83 (median)	84 (median)	83 (mean)	1.8 years	40%	11%
Dick et al (1994)	NLTCS (1982, and 1984) and NNHS (1985)			0.35	81 (median)	84 (median)		1.8 years	40%	12%
Kemper and Murtaugh (1991)	1986 National Mortality Followback Survey	0.33	0.52	0.43			83 (mean)		55%	21%
Murtaugh et al. (1997)	1985 NNHS			0.39				2.7 years	51%	20%
Wiener at al.	NLTCS (1982, 1984) and NNHS (1985)			0.49				2.2 years	45%	14%

Note: All estimates for Robinson model are based on a version that estimates care utilization without regard to whether the care satisfies policy benefit triggers and without regard to the health condition of the individual at age 65. This is done to make the Robinson estimates comparable to published estimates that do not make these restrictions. The Robinson estimates used in the analysis in the paper, however, do incorporate these important restrictions.