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Achieving Public Long-Term Care Insurance Through Social Security Wealth: Microsimulation for the US Case

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Abstract

The risk of needing long-term care (LTC) at some point in one's life is non-negligible, and the cost of care–whether in formal or informal settings– can be prohibitive for many seniors. In fact LTC is sometimes labeled the last major uninsured expense for seniors in the United States. The majority of LTC costs are currently borne by Medicaid and out-of-pocket spending, while private insurance coverage remains minimal. The take-up of private insurance among American seniors has remained low, in part because of the large (and growing) cost of premiums, as well as the presence of Medicaid. As the payer of last resort, Medicaid forces seniors with LTC needs to liquidate their assets to bare minimums, and then use most of their retirement income as co-payment, leaving no possibility for bequests. Because there is no middle ground between costly private insurance and Medicaid, many middle-income seniors end up on Medicaid, sometimes after having sheltered assets away, thus burdening taxpayers with the cost of their care. Expanding on policy proposals by Chen (1993, 1994, 2003, 2007), and Murtaugh, Spillman & Warshawsky (2001, 2003), I propose an intermediate approach to LTC insurance, where universally-accessible, non-compulsory LTC insurance could be bought off Social Security wealth at age 65. Buyers with enough accumulated Social Security wealth at 65 would agree to receive lower Social Security retirement benefits for the remainder of their life, in exchange for a supplemental annuity in the event of LTC needs. Through a microsimulation of costs and benefits, I locate the area on the income/wealth distribution where taking up this LTC insurance would make economic sense for seniors. A secondary goal of the microsimulation will be to assess potential savings in Medicaid spending on LTC care.

**Achieving Public Long-Term Care Insurance Through Social Security Wealth:
Microsimulation for the US Case.**

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Introduction

The focus of this dissertation is long-term care for American seniors, and more specifically, how to pay for it. The individual risk of needing long-term care (abbreviated "LTC" throughout the document) at some point in one's life is substantial, and there is ample evidence that shouldering the cost of LTC services can be prohibitive for many seniors and their families (Murtaugh et al, 2001; Brown & Finkelstein, 2004a; Burns, 2006; Feder et al, 2007; Munnell & Hurwitz, 2011, Kaiser Commission on Medicaid and the Uninsured, 2011). With Medicare covering acute-care health risks in old age and Social Security covering income risks in old age, the literature sometimes refers to LTC as the last major uninsured expense for seniors in the United States (Brown & Finkelstein, 2004a). Excluding out-of-pocket payments, there are basically three options available to seniors requiring LTC services: private insurance, Medicare and Medicaid. Private LTC insurance usually pays fixed amounts towards the cost of nursing home care and home care, and has been marketed for a number of years, but take-up has remained very low due in part to the large cost of premiums and large insurance loads (Cutler, 1996; Brown & Finkelstein, 2004b; Bryant Quinn, 2007). Medicare only covers short-term nursing home stays for rehabilitation following hospital discharge, but American seniors often incorrectly assume that the program covers LTC costs. Lastly, Medicaid coverage of LTC is available to all seniors, but the program forces them to liquidate their assets to basic minimums, and then use most of their retirement income as co-payment, leaving no possibility for bequests. Worthy of note, many middle-income seniors end up on Medicaid, sometimes after having sheltered assets away ahead of time, thus burdening taxpayers with the cost of their care (Brown & Finkelstein, 2004b; Gleckman, 2007).

The first chapter will draw a general picture of LTC in the United States, looking at the different settings for LTC delivery, whether in nursing homes or in seniors' own homes, and how the United States compares internationally in terms of LTC costs. The chapter will look at the policy problems facing caregivers and care receivers now and in the future, with a special emphasis on the interactions between Medicare, Medicaid, and the private LTC insurance market. We will then examine policy solutions from a number of countries, and contrast them with provisions of the short-lived Community Living Assistance Services and Supports Act (or CLASS Act), which was part of the 2010 Patient Protection and Affordable Care Act (PPACA).

The third chapter will look at the feasibility of developing a public LTC insurance scheme in the United States, a project which seems hampered by political obstacles as well as by the budget constraints of many households. It will look into two innovative policy proposals by Chen (1993, 1994, 2003, 2007) and Murtaugh, Spillman & Warshawsky (2001), using the accrued Social Security wealth held by American seniors to purchase LTC insurance coverage. The chapter will review the design and intellectual history behind these policy proposals, evaluate their merits, and then submit a hybrid proposal amalgamating the two.

The fourth chapter will describe and conduct a microsimulation to evaluate the feasibility of this policy proposal. In a nutshell, the proposal will offer an actuarially-neutral, non-compulsory LTC insurance, which could be bought with one's accumulated Social Security wealth. Purchasers would accept lower Social Security retirement benefits, in exchange for supplemental cash benefits when LTC needs arise. Those too poor to live on a reduced Social Security

retirement benefit would simply pass on the offer. Using data from the Health and Retirement Study (HRS), the microsimulation will model the income/wealth distribution of seniors and delineate the limits of this proposal. The chapter will conclude with an estimation of the Medicaid savings that could be expected following implementation of the proposed LTC insurance.

Chapter 1 - An Overview of the Long-Term Care Landscape

LTC is a diffuse concept, straddling the fence between health and social services. Therefore, our first task in this chapter is to define LTC, its actors, and how LTC fits into the larger picture of health care. We will follow up with a broad-brush picture of LTC arrangements for current seniors in the United States, looking both at formal and informal care.

Our concern in this dissertation being mainly with LTC financing, we will follow with a portrayal of the various payers (Medicaid, Medicare, private insurers, caregivers), and how they each share the cost of LTC. Finally, we will compare LTC spending in the United States with other developed countries, using published data from the OECD.

1.1. What is Long-Term Care?

An oft-cited definition of what constitutes long-term care (LTC) originates from the Institute of Medicine (1986: 398), which describes it as "a variety of ongoing health and social services provided for individuals who need assistance on a continuing basis because of physical or mental disability". LTC can be distinguished from acute medical care, most notably in terms of end goals: while acute medical care helps patients recover from specific injuries or illnesses, LTC is the form of assistance provided to those with long-term chronic illnesses and degenerative conditions, to help them manage their daily lives in relative comfort and security (Gleckman, 2007). In a sense, LTC is more heterogeneous than acute medical care, since LTC covers a continuous spectrum from institutional care in a nursing home, to sporadic care in an assisted

living community, to informal care provided by a relative, neighbor or friend in the house of the recipient (Norton, 2000). Whereas acute medical care can be circumscribed as health techniques informed by science and experience, LTC can loosely be described as whatever someone does to assist a care recipient with activities of daily living (ADLs)[1], or instrumental activities of daily living (IADLs)[2]. As commented by Berry (2011), meeting a LTC need is not about delivering a certain service, but producing a certain outcome by various means.

The need for LTC can arise at any age, for example children with developmental disabilities and adults with spinal cord injuries may require a lifetime of care. But among the senior population, usual catalysts of LTC need are mobility problems, cognitive functioning, and chronic diseases like diabetes and pulmonary disease (Kaiser Commission on Medicaid and the Uninsured, 2011). The need for LTC is greatest at ages 85 and above (Harris-Kojetin et al. 2013).

1.2. Current Picture of LTC for Seniors in the United States

Public policy questions surrounding LTC are not likely to vanish, since it is forecasted that nearly 70 percent of seniors will require some form of long-term care before they die (Kemper, Komisar & Alecxih, 2005). It is estimated that seniors will need LTC for three years on average, and one in five may require assistance for five years or more (Gleckman, 2007). According to the 2010 National Health Interview Survey (Ward et al. 2011), close to 2.8 million American

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[1] Activities of Daily Living refer to a set of self-care and mobility activities such as: eating, bathing, toileting, transferring into and out of bed, dressing and continence [Katz et al. 1963].

[2] Instrumental Activities of Daily Living are often described as a more complex set of activities characteristic of independent living: handling personal finances, shopping, phone use, meal preparation, using transportation, taking medication, and housekeeping [Lawton & Brody, 1969].

seniors –about 7 percent– needed help with activities of daily living (ADLs)[3]. Persons aged 85

and over are more than five times more likely to need help with ADLs than persons aged 65 to

65-74. Women are more likely than men to need help with ADLs at any age above 65.

Nursing homes, hospitals, assisted living communities, continuing care retirement communities,

and private homes are the five most common settings for the delivery of LTC for seniors. People

unfamiliar with LTC will often assume that a nursing home is the most common locus for care

delivery, but only 22 percent of American seniors with LTC needs live and receive their care in a

nursing home. The majority of admissions to nursing homes happen after age 75[4]. Some stays

are relatively short, especially in the case of patients recovering from an episode of acute medical

care in a hospital (and for whom a nursing home stay is a stop-over before returning home for

convalescence), while other patients will have multiple stays over their lifetime. Brown &

Finkelstein (2004b) have estimated that 22 percent of women and 12 percent of men who enter a

nursing home will spend more than three years there. These authors have further estimated the

probability of ever entering a nursing home after age 65 to be 27 percent for men and 44 percent

for women (Brown and Finkelstein, 2004b). In 2015, the Genworth insurance company

estimated the average costs for nursing home at $91,250/year for a private room, and

$80,300/year for a semi-private room. The 5-year annual growth rate for nursing home care

costs was 4%.

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[3] This proportion seems somewhat low when compared to statistics cited in a 2003 factsheet by the Georgetown University Long-Term Care Project using data from the 2000 National Health Interview Survey, which put the number of American seniors with LTC needs at about 6 million. The divergence is caused by a difference in concepts: the proportion of seniors needing help with ADLs is a more specific, narrower concept than the proportion of seniors with LTC needs. The latter can encompass activities like help with cooking, cleaning, transportation and the like.
[4] Source: National Study of Long-Term Care Providers, 2012. https://www.cdc.gov/nchs/data/databriefs/db171.htm

The bulk of non-nursing home LTC consists of community-based services, and covers programs for at-home seniors like meals-on-wheels, aid to transportation, personal care, home health care, chore services, adult day care, etc. LTC also takes place in the context of assisted living or continuing-care retirement communities, both being analogous forms of group living arrangements for seniors.

Assisted living communities are often labeled by different names, among which we find: board and care homes, residential care homes or adult foster homes. These homes are a community-based residential option for older adults with physical or cognitive impairments, and who cannot live independently as a result (Schulz et al, 2006:87). These homes range in size, from family-style residential settings, to larger, more institutional facilities, but they are usually smaller than nursing homes. Common characteristics are the provision of room and board, along with around-the-clock supervision and some services.

A small share of LTC takes place in continuing care retirement communities (CCRC), a concept combining a residential community with a form of on-site long-term care insurance. Targeted towards wealthier seniors, CCRCs offer individual apartment-like units in a community setting, with activities, food service, and assistance if needed. As their health deteriorates, seniors can transition directly into an adjoining nursing home. This business model relies on collecting a large entrance fee from senior households, in addition to monthly rents and supplemental payments for services. The downside of this model is the risk of bankruptcy by the operator, who has to ensure that pricing of services will remain both attractive to new clientele, while covering ongoing costs. Feinstein (1993) noted that CCRC residents lived longer on average,

which could be explained by selection at entry, the quality of care provided, or the higher lifetime income of residents.

Of all people with LTC needs living at home, fewer than 10 percent rely exclusively on formal (e.g. paid) care. Formal home care ranges from periodic help with house chores to full-time nursing help. According to Coughlin et al. (1992), the likelihood of receiving paid home care rises with age and degree of physical disability, but is unaffected by cognitive status. Whereas home care is sometimes touted as a cost-saving mechanism in lieu of institutionalization, a quasi-experimental study by Hughes et al. (1987) has shown that paid home care can be costlier than nursing homes, but tends to provide significant quality-of-life benefits over nursing homes. In 2015, the national average hourly rate for home health aides was 20$ per hour, and 19.50$ per hour for homemakers (Genworth Financial, 2015).

The selection of a care setting will be influenced by a range of factors, among which we find: the recipient's physical and mental health, his/her personal finances, education, living arrangements, marital status, and geographic location. According to Houser et al. (2009), the level of education is one of the strongest predictors of the likelihood of having a LTC need. As for geographic location, it is important to note that seniors living in rural or non-metropolitan areas may have a hard time arranging for care in the home, or obtaining community-based services which are otherwise easily accessible in urban settings. For these seniors, the lack of options may result in institutionalization "by default".

1.3. Picture of Caregiving in the US

Today, most people with LTC needs rely exclusively on care from family and friends (i.e. informal care). About 85 percent of total hours of care received by people living at home with LTC needs are unpaid, and even nursing home residents sometimes receive part of their care from unpaid family members (Feder et al, 2007).

According to Gibson & Houser (2007), in 2006 between 30 and 38 million adult Americans provided care to other adults with one or more ADLs or IADL. On average, caregivers provided about 21 hours of care per week, or 1,080 hours per year. The majority of caregivers in the United States (59 percent) also work full or part time in the labour force. To paraphrase Hochschild and Machung (1989), caregiving could be seen as a "second shift": a second (unpaid) job on top of regular employment.

Spouses are often the first caregivers. In fact, being married is associated with a lower likelihood of nursing home admission (Cohen, Tell, and Wallack, 1988), while living alone is associated with an increased risk of institutionalization (Kovar, 1988). Because of differential life expectancy among heterosexual couples, and because of the prevalent pattern of men marrying younger women, more married women provide informal care than married men. The other most common informal caregiver is an (adult) child, a daughter in 75 percent of cases (Norton, 2000). Among caregivers, about 11 percent of daughters and 5 percent of sons report having quit a job in order to provide care.

Quantifying the economic value of unpaid caregiving is a complicated endeavor, requiring assumptions about the cost of replacing informal caregiving hours with paid formal care, and assumptions about prevalence of caregiving and the number of hours of care provided. But given that most LTC is currently done by unpaid caregivers, even conservative assumptions will yield a very large economic value. Such a conservative estimate (by Feinberg et al. (2011)) puts the value of unpaid caregiving at around $450 billion per year, assuming 42.1 million caregivers working at a shadow hourly wage of $11.16.

Aside from the economic value of unpaid work done by caregivers, there remains the issue of employment-related costs they incur. As mentioned above, the majority of caregivers in the United States (59 percent) are employed either full or part-time. Income losses may be caused by switching from full-time to part-time work, by taking early retirement, or by a career change made necessary because of one's relocation closer to the care recipient. Benefit losses may be linked to income losses, in particular when benefits are tied to full-time status. Long-term impacts on benefits can also be felt via reduced Social Security benefits due to lower earnings, as well as limited accumulation of retirement savings. In 2004, LTC-induced productivity losses to U.S. businesses have been estimated at $33.6 billion for full-time employed caregivers, with an average per employed caregiver of $2,110 (Gibson & Houser (2007)). This figure includes costs in connection with absenteeism, work interruptions, care crises, replacing employees, supervisory time, unpaid leave, and general reductions in hours from full- to part-time. Finally, other unquantifiable costs to the caregiver are impacts of care on career paths (foregoing training, promotion or overtime) and job security.

In this section we have deliberately left aside the question of out-of-pocket spending by caregivers, but we will address it in detail in the next section. Also, a complete taxonomy of costs incurred by caregivers will be presented in Chapter 2, as part of our analysis of the supply of informal care.

1.4. Payment for LTC

According to the National Health Policy Forum (2014), a total of 219.9 billion dollars were spent on LTC by families, insurance companies, States and the Federal Government in 2012. In decreasing order of magnitude, Medicaid represented 61% of total LTC spending, followed by out-of-pocket spending (22%), private insurance and other private sources (12%), and other public sources (5%). Other miscellaneous sources cover the last 7% of spending. In the section below, I will review briefly the details of each class of payer.

1.4.1. Medicaid

Medicaid is the federal/state public program which, among other things, pays for medical care and LTC for those with limited income and assets. Medicaid pays for LTC services whether in institutional settings or in seniors' homes. Medicaid is means-tested, which implies that it has extensive rules for assessing income and financial resources before granting eligibility for benefits. According to Eiken et al. (2014), LTC amounted to 34.1% of total Medicaid spending in fiscal year (FY) 2012, or about $140 billion out of Medicaid's total spending of $410.6 billion.

LTC spending by Medicaid is picking up pace, rising by 6.5% between FY 2008 and FY 2009, compared with an average annual rate of increase of 4.4% between FY 2004 and FY 2008.

In terms of LTC spending, Medicaid is a payer of last resort, meaning that seniors must first liquidate their assets to basic minimums, and then use most of their retirement income as co-payment, essentially eliminating the possibility for bequests. It is common for middle-income seniors who exceed the asset and income limits set by Medicaid to start paying for LTC out-of-pocket, but in time, they exhaust their assets and become eligible for Medicaid. Gleckman (2007) estimates that as many as half of nursing home residents who are admitted as private pay patients run out of funds during their stay and become Medicaid beneficiaries. For an example of Medicaid asset limits, consider that in 30 States, individuals are allowed to keep $2,000 in financial assets ($3,000 for couples). If one spouse enters a nursing home, the other is entitled to half the couple's assets, as well as one vehicle, household furnishings, personal jewelry, and the home. However, as per the Deficit Reduction Act, the home value cannot exceed $500,000 (federal regulations allow States to raise that threshold to 750,000$).[5]

Subject to federal regulations and limits, States are at liberty to design and manage their own Medicaid program. For LTC, the federal requirements include nursing home care for individuals aged 21 and above (including rehabilitative services, medically-related social services, pharmaceutical services, dietary services, program of activities, emergency dental services, room and bed maintenance, and routine & hygiene items and services), which States cannot limit

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[5] A comprehensive description of Medicaid's asset limits can be found on the National Clearinghouse for Long-Term Care Information, at http://longtermcare.gov/medicare-medicaid-more/medicaid/medicaid-eligibility/financial-requirements-assets/

access to, nor make subject to waiting lists[6]. Since 1983, States have been given the option to obtain a waiver of Medicaid rules for institutional care and offer care in recipients' homes and communities, an option labeled Home and Community-Based Services (usually abbreviated as HCBS). Forty-seven States and the District of Columbia operate at least one HCBS waiver[7]. While historically the bulk of LTC spending by Medicaid has been for nursing home care, a growing proportion of the budget is now devoted to HCBS (see Figure 1.1 below). The latter is seen as a way for States to contain nursing home spending and address the preference of beneficiaries for non-institutional alternatives (Spillman & Black, 2005).

Figure 1.1 HCBS as a Percentage of Medicaid Long-Term Care Expenditures, FY 1999-2012

source: Eiken et al. (2010, 2014)

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[6] Source: http://www.medicaid.gov/Medicaid-CHIP-Program-Information/By-Topics/Delivery-Systems/Institutional-Care/Nursing-Facilities-NF.html
[7] Source: https://www.medicaid.gov/medicaid/hcbs/index.html
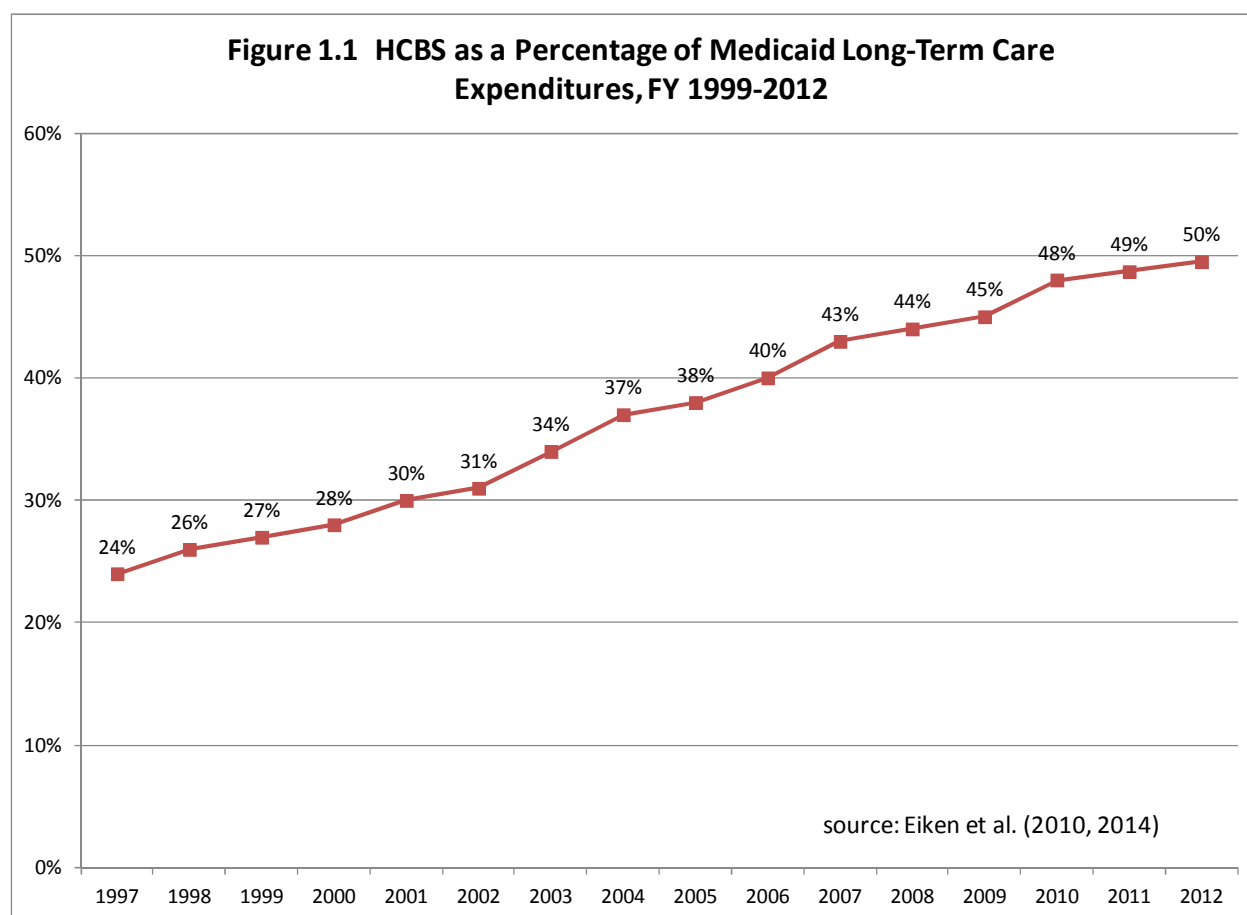
Under section 1915(c) of the Social Security Act, the Federal Government can waive certain

Medicaid statutory requirements at States' request. These waivers are used by States to offer

HCBS services to targeted populations, and allow States some flexibility in managing their

Medicaid programs. To control HCBS costs, States make use of different policy tools, like

restrictive financial and functional eligibility standards, enrolment limits, service limitations, and

waiting lists. (Kaiser Commission on Medicaid and the Uninsured, 2011). The ability of States

to ration the number of people who can receive assistance can leave many people without

service: the Kaiser Commission on Medicaid and the Uninsured (2011) estimates that more than

360,000 individuals were on a waiver waiting list in 2009, with an average waiting time of

almost 2 years.

According to Eiken et al. (2014), HCBS spending patterns differ widely by state, ranging from

27.4% of Medicaid LTC costs in New Jersey to 78.3% in Oregon. The average for all 50 States

is 49%. Per person spending on HCBS averaged $14,776 in 2007 (Kaiser Commission on

Medicaid and the Uninsured, 2011).

1.4.2. Medicare

Medicare is the federal program which provides health insurance to Americans aged 65 and up,

and to some people with disabilities before age 65. Media sources often report that seniors

mistakenly believe Medicare pays for the LTC needs of seniors[8], but in fact Medicare's coverage

of LTC services is very limited: the program pays the full cost of the first 20 days spent in a

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[8] A 2006 survey by AARP revealed that 59 percent of Americans aged 45 and over believe Medicare covers nursing home stays for three months or more for age-related or other chronic conditions. Also, 51 percent of them also believe that Medicare supplemental insurance (i.e. Medigap) covers nursing home stays.

skilled nursing home for seniors who had a hospital stay of at least 3 days. Then, Medicare will

assume some of the costs for the next 80 days of a nursing home stay, with beneficiaries making

copayments of $161 per day. Medicare also pays for some home health care for seniors needing

skilled care, conditional on being homebound, requiring intermittent skilled nursing or therapy,

and having their physician prescribe a plan of care (Georgetown University Long-Term Care

Financing Project, 2007).

Figure 1.2 Distribution of Medicare Spending, 1999 & 2014

Total spending 1999: $208B

Total spending 2014: $610B

Source: MedPac DataBook, 2010 & 2016
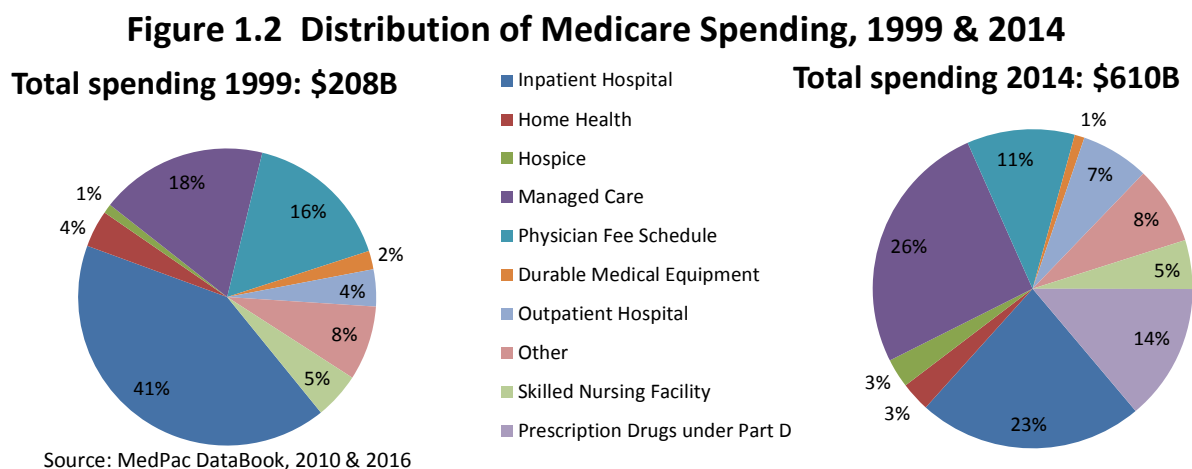
Medicare does not provide LTC coverage based on income and asset tests the way Medicaid

does. In contrast to Medicaid, the Medicare program acts as a primary payer. LTC has never

been a large activity for Medicare, as can be seen in the pie charts above (see Hospice, Home

Health and Skilled Nursing Facilities). And despite some important shifts in global cost

structure between 1999 and 2014, there has been virtually no change in the proportions of

Medicare spending devoted to LTC: collectively, total program spending for SNF, home health

and hospice care went from 10 to 11% in the course of fifteen years. The sum of Medicare

spending, however, went from $208 billion in 1999 to $610 billion ten years later, meaning that dedicated sums for LTC in fact grew considerably in absolute numbers.

1.4.3. Private LTC Insurance

Private LTC insurance is a product designed to cover the cost of personal and custodial care, either in a home setting, a community organization or a nursing home. In exchange for an annual premium payment, LTC insurance provides a daily benefit amount for those who meet a certain level of incapacitation. In general, policies will pay benefits for a limited number of years, with the possibility of inflation protection. In 2014, only 7.2 million Americans held private LTC policies (Cohen, 2016a:7). This corresponds to roughly 10% of the population who could either afford to pay for LTC insurance or clear the underwriting requirements (Cohen, 2016b:33). The low level of private coverage occurs even though LTC insurance premiums for tax-qualified contracts can be deducted as medical expenses on their federal tax returns (see below for a definition of what constitutes a tax-qualified insurance policy). The maximum deductible amount per individual rises with the insured's age, and is indexed to inflation. Some of the reasons cited for the current low level of LTC insurance coverage include misinformation (i.e. seniors ignoring the odds of ever needing LTC for themselves or acting under the impression that Medicare covers LTC), behavioral traits (i.e. people's general tendency to ignore low-probability, high cost events that haven't touched them recently), and adverse selection (i.e. where insurance is most attractive to those with greater expectation of disability, based on their perceived future needs, which causes insurers to increase their prices). Pauly (1990) also notes that moral hazard may be behind the rational non-purchase of LTC insurance by seniors, for they

fear (perhaps correctly) that if insurance is purchased, their children might institutionalize them once their mental faculties have faded. In this perspective, rational seniors with a preference for family caregiving would refrain from buying LTC insurance.

There is much variation in what services private LTC insurance policies will cover: some may pay for personal care, for chores services, for therapy to maintain/restore functions, and even for respite care to relieve family caregivers (Feder et al. 2007). Some policies may pay for nursing home care only, but most policies now cover both nursing home care and home-based care (Cohen, 2016a:18). It is usual for policies to specify a daily (or monthly) maximum amounts payable for services, but according to Feder et al. (2007), more flexible policies may instead specify a lifetime pool of funds such as $150,000, against which policy holders will draw benefits as needed. Other policies will cap the number of years of benefits payable (between two and five). The pricing of private LTC insurance policies is quite variable, and heavily dependent on the level of benefits purchased, the age of the buyer (the younger one is at time of purchase, the lower the premiums), and personal preferences of the buyer for inflation protection (inflation-adjusted benefits, or inflation-adjusted lifetime benefit ceiling).

When policy holders need LTC, they must generally meet a specified level of significant disability before benefits are paid out. In order to be tax-qualified, the policy must pay benefits when a policyholder is unable to perform at least 2 ADLs without substantial assistance, or require supervision because of cognitive impairment (Feder et al., 2007). Often, policies will only pay benefits after an "elimination period" (e.g. 90 days), which saves them the cost of

paying benefits for temporary disabilities. A more detailed discussion of the private LTC

insurance market can be found in section 2.2.2.

1.4.4. Out-of-Pocket Expenditures

"Out-of-pocket expenditures" is a generic term to describe expenses that caregivers or care

recipients must pay for themselves, as they are not covered by any of the three previous

programs. About half of caregivers report contributing financially to help support a family

member or friend with disability, and 23 percent of caregivers declare that caregiving causes

them financial hardship (Gibson & Houser (2007)). In a 2007 survey conducted by

Evercare/National Alliance for Caregiving, the average annual out-of-pocket expense by family

caregivers was estimated at $5,531, while the median income of this group was $43,026. Most

expenditures were either for medical care (co-payments and pharmaceutical products), for

household goods and food, and travel/transportation. These three categories made for 47% of

average annual expenses. Other common expenditures are for adult day services, nursing home

stays, home maintenance, rent, utilities, respite care, care management, home modifications,

clothing, and medical equipment. Unsurprisingly, long-distance caregiving entails the highest

costs ($8,728 per year), followed by co-residence caregiving ($5,885 per year) and care to a

nearby recipient ($4,570).

According to the Evercare/National Alliance for Caregiving survey (2007), caregivers often

make certain personal choices in order to finance these out-of-pocket expenditures, like cutting

back on leisure and vacation spending, reducing one's accumulation of retirement savings, and

deferring major purchases or home improvement projects. About a third of respondents declared

using their personal savings to cover out-of-pocket expenditures, and the same proportion

mentioned cutting back on basic home maintenance; 23% declared spending less on their own

health/dental care. These items –and other costs of caregiving– will be discussed again in our

detailed analysis of the supply of informal caregiving in Chapter 2.

1.5. International Comparisons of LTC Delivery and Spending

Like the United States, most developed countries are experiencing population aging, and the

management of LTC services –and their cost– will become a pressing policy concern soon, if not

already. As we will see, there is no single model of care delivery and care financing, but only a

common vision for the promotion of care and autonomy at home when possible. An

international comparison thus allows to see how countries balance increased demand for care

with a limited amount of public resources. Despite the uniqueness of the care system in the

United States and the cultural aspects inherent to LTC, there may be lessons to be gained from an

examination of other countries' systems, notably in terms of rates of institutionalization,

availability of formal care at home, and the like.

But since LTC is at the junction between health services and social services, valid cross-country

comparisons can be arduous, as each jurisdiction can define the contours of what constitutes

LTC in a different way –thus impacting data collection and data comparability. With this limit

in mind, this section will present a broad overview of LTC delivery and spending using OECD

data.[9] A more detailed typology of countries' care systems will be developed later in chapter 2.

Figure 1.3 presents the percentage of population aged 65+ receiving formal[10] LTC in 2006 in 26

OECD countries. At 3.9%, the United States is near the middle of the distribution for the

percentage of its senior population receiving LTC in institutions (blue bars). Korea and New

Zealand are at opposite ends with respectively 0.4% and 8.2% of their senior population

receiving LTC in institutions. Formal care at home ranges from 0.6% in Italy to 17.0 % in

Norway. Unfortunately, the percentage of American seniors receiving formal LTC at home is

missing. Probable causes for inter-country variance in LTC provision are: (1) the level of

resources available in the formal care system of each country, (2) the established disability

thresholds granting admission to institutional care, (3) the presence of a universal or social

insurance system for LTC provision, (4) the cultural and societal norms regarding informal care

provision by family members, and (5) the monetary incentives (or tax breaks) offered by each

country to facilitate informal care provision.

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[9] The OECD collects data from national statistical institutes like the US Census Bureau, Statistics Canada, and others. It does not harmonize each country's data to make it adhere to a specific definition of LTC (e.g. like the Luxembourg Income Project does for international datasets on personal income). However, throughout its data dissemination, the OECD is keen to alert data users of aberrant values, non-comparability and other data peculiarities. Thus, in the following figures we chose to include only countries whose data bore no red flags or footnotes. This also explains why each figure portrays a different number of countries, as some concepts are better measured than others.

[10] Unfortunately, there are no data series available for informal care.

Figure 1.3 Percentage of population aged 65 and over receiving formal LTC in OECD countries, 2006

Adapted from *Society at a glance 2009: OECD social indicators* ISBN 9789264049383
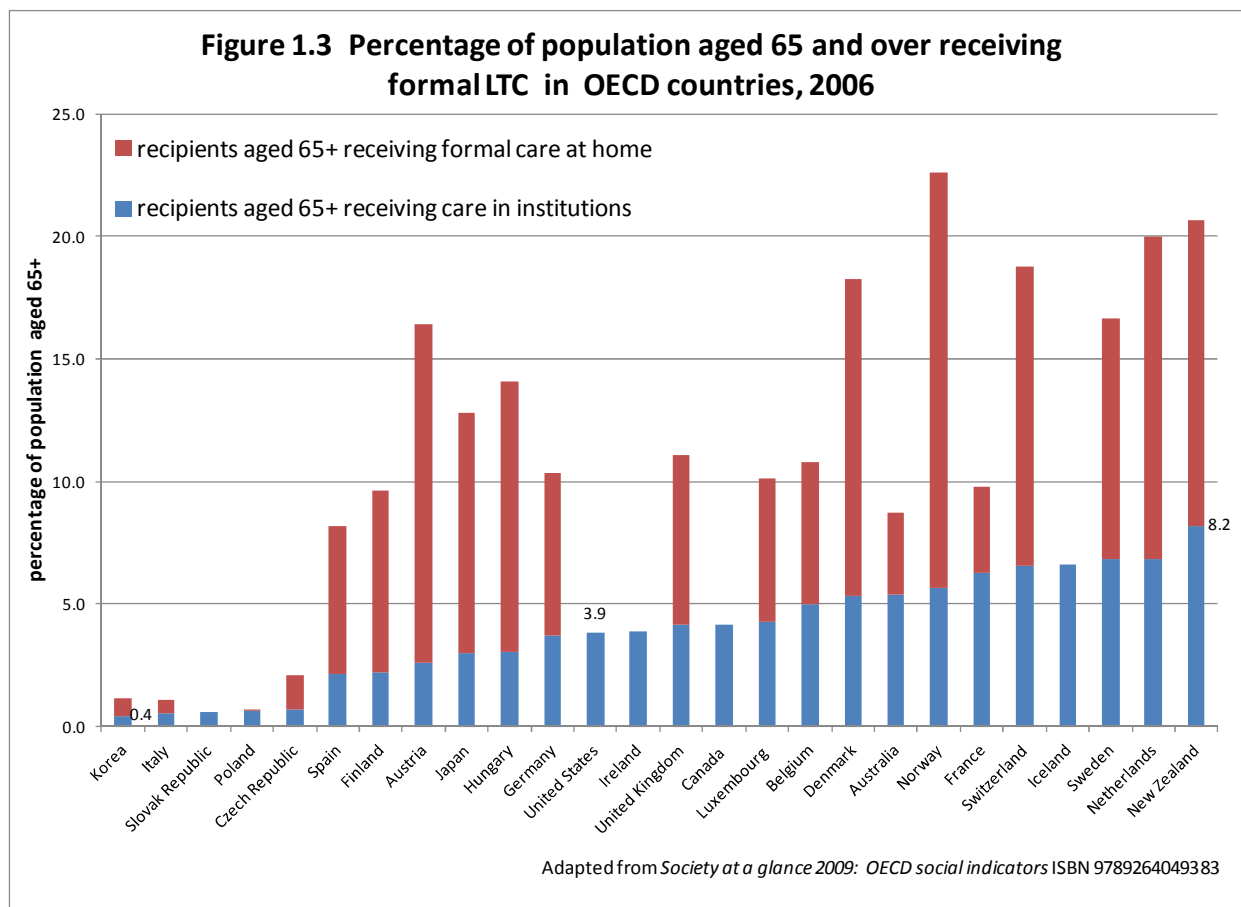
Focusing on LTC delivered in institutions, Figure 1.4 (on next page) shows the number of LTC beds available per 1,000 seniors over a 5 year span in OECD countries. The figure differentiates between beds in nursing and residential care facilities (darker bars), and beds in hospitals (lighter bars). We observe that nursing home beds tend to outnumber LTC hospital beds by a wide margin in all countries where information is available. The low proportion of LTC beds in hospitals is likely due to the costs of maintaining such resources in a hospital environment, where overhead and the cost of professional services are high. These hospital beds are useful nonetheless, for example when a patient awaits transfer to a nursing home following an acute health event.

Figure 1.4 Long-term Care Beds in Hospitals and Nursing Homes per 1000 individuals aged 65 and over in OECD countries, from 2004 to 2009

Country	2004	2009
Korea	8,0	34,7
Italy	15,1	17,5
Poland	20,7	19,8
Spain	21,3	31,1
Australia	37,9	57.7
France	38,5	56,1
Japan	41,0	37,4
Austria	43,2	40,5
United States	44,2	41,9
Germany	48,7	50.3
Hungary	51,5	56,7
Czech Republic	52,3	47,8
Denmark	54,7	52.3
United Kingdom	55,9	55.4
Slovak Republic	56,0	54,2
Ireland	59,0	
Finland	65,6	74,8
Norway	67,1	62,9
Iceland	69,1	69,3
Belgium	70,7	71,8
Switzerland	73,8	67.8
Netherlands	75,2	68.5
Sweden	92,8	81,7

Legend:
- 2004 LTC Beds in nursing homes
- 2004 LTC Beds in hospitals
- 2009 LTC Beds in nursing homes
- 2009 LTC Beds in hospitals

Source: OECD Health Data 2011, at www.oecd.org/health/healthdata

Figure 1.4 also shows that half of the countries listed have not maintained a constant supply of LTC beds in spite of their aging population. The United States, for example, had a total of 44.2 LTC beds per 1,000 seniors in 2004, but only 41.9 such beds in 2009[11]. The most radical decline happened in Sweden (from 92.8 to 81.7 beds per 1000 seniors). Among the possible explanations are health improvements in later life[12], cost-containment measures in publicly-funded LTC systems, and a progressive shift towards home care amid population aging pressures. However, Colombo et al. (2011:300) notes that a lower supply of LTC beds in

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[11] The statistic for the United States gives a very limited perspective to the true evolution of LTC beds' supply. As Dennison (2008) remarked in his analysis of the New York state nursing home market, there has been a tremendous push for hospitals to shorten their patients' length of stay. This has resulted in nursing homes welcoming a different mix of residents, who are often younger and require rehabilitation services before they can move back home.

[12] Health improvements in later life – or more precisely a delay in the calendar of disability onset- is not likely to be noticeable on such a short time span. A detailed discussion of the impacts of disability on LTC is provided in Chapter 2.

institutional settings can co-exist with higher institutionalization rates in some countries, through increased occupancy rates.

To close this section, Figure 1.5 compares levels of LTC expenditures across countries. In 2008, total LTC spending –public and private– averaged 1.5% of GDP across OECD countries, with wide variations: public expenditures ranged between 0.1% and 3.6% of GDP, while private expenditures ranged between 0.1% and 1.3% of GDP. Public and private LTC expenditures in the United States were at 0.6% and 0.4% respectively, somewhat below the OECD average. Worthy of note, Switzerland is the only country where the majority of LTC spending comes from private sources.

Figure 1.5 Public and Private Expenditures on LTC as a percentage of GDP in OECD countries, 2008

Source: Colombo et al. 2011
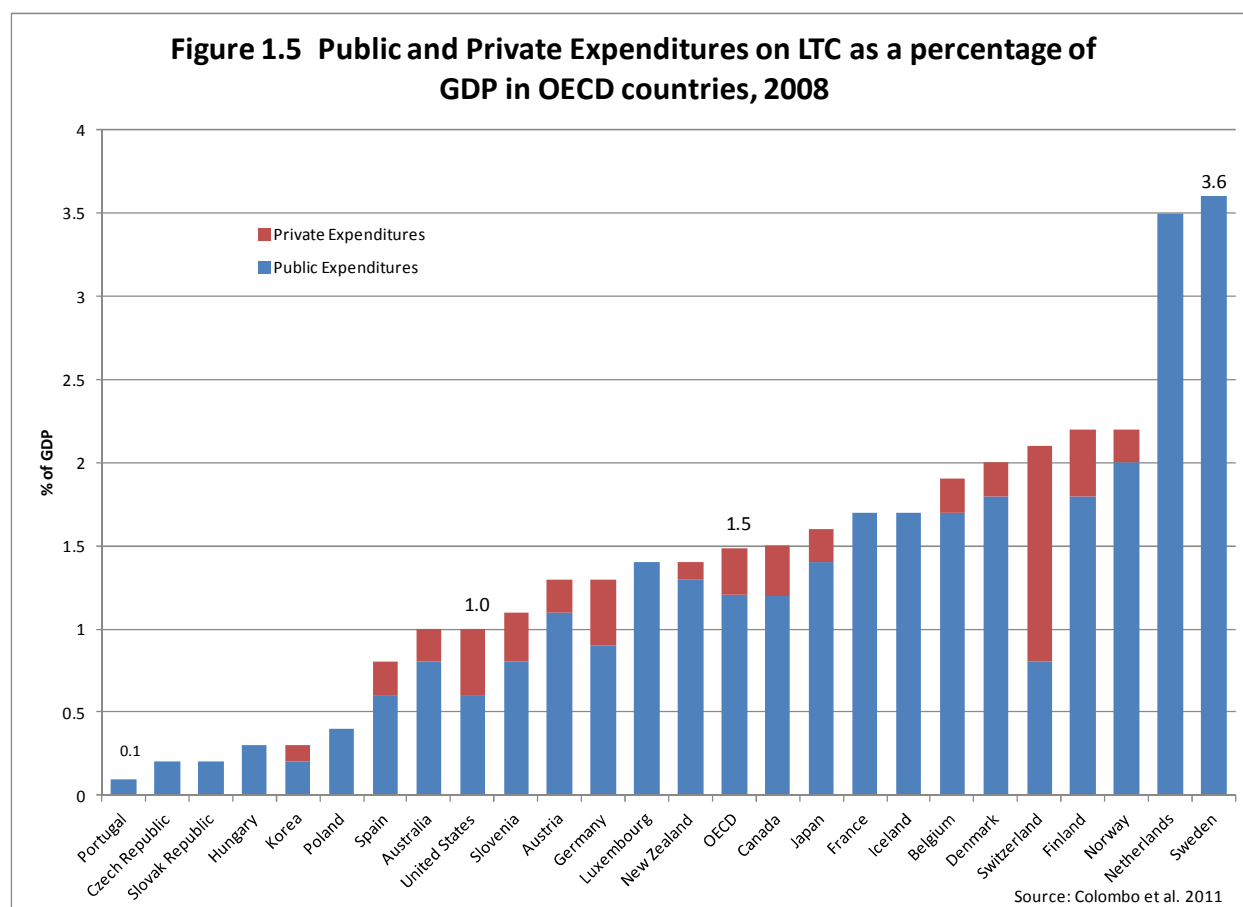
Inter-country variations in public LTC spending on Figure 1.5 could be tentatively associated with the countries' specific age structure, where one could posit that "older" countries" spend more, regardless of their choice of financing system. To test this hypothesis, we computed correlation coefficients between OECD countries' public LTC spending levels and the percentage of the population in each country aged 65 and over, and 80 and over, at two points in time (2000 and 2008). Interestingly, the correlation between public LTC spending and population aging is weakening as time goes by: for the 65 and over, the correlation coefficient fell from 0.498 to 0.216, and for the 80 and over, the correlation coefficient fell from 0.734 to 0.374. This may indicate, among other things, that as countries get "older", they begin transferring more of their LTC costs onto seniors and their families. Another possibility might be that care delivery paid by the public purse has been shifting away from costly nursing home care, and towards more home care.

1.6. Chapter's Conclusion

The aim of this chapter was to paint a general picture of LTC in the United States in recent years. Like many developed countries, the population of the United States is ageing, and a large share of current seniors may one day face LTC needs. Currently, about 7 percent of American seniors need help with activities of daily living, but prevalence rises markedly with age. While public perception of LTC is often associated with nursing homes, the majority of LTC delivery takes place elsewhere (mostly private homes, but also assisted living facilities and continuing care retirement communities), and the majority of care is delivered informally by family and friends.

Costs of LTC in 2012 amounted to a total of 219.9 billion dollars, which was carried by families, insurance companies, States and the Federal Government. Spending on LTC by Medicaid appears to be rising faster than total Medicaid spending, while Medicare spending on LTC has remained stable in proportion of total Medicare spending. Despite tax incentives, private LTC insurance has always been a marginal insurance product, with only 7.2 million Americans covered by a policy. As for out-of-pocket expenditures, the data indicates that caregivers on average incur $5,531 of care expenditures per year, an amount that may cause financial strains for many. The top out-of-pocket expenditures were for medical care, household goods, and travel/transportation. Whether the current apportionment of LTC costs between public and private sources is sustainable in the long term is open to debate. In the absence of larger risk pooling (through voluntary or compulsory insurance), the burden of paying for LTC will continue to fall mainly on taxpayers and caregivers.

Lastly, we have looked at international comparisons of LTC spending, using OECD data on the percentage of population receiving formal care, the ratio of LTC beds per thousand seniors, and the share of public and private expenditures on LTC. Despite the limits of international comparisons, we saw that the United States is in the middle of the distribution of nursing home care, and at the same time, below average in terms of total LTC spending. Despite the variations in the speed of population aging across OECD countries, it seems there is no clear link between a country's population age structure and the level of spending it will devote to LTC. If any, the correlation between population aging and LTC spending seems to weaken over time, which could mean that many countries are transferring more of their LTC costs directly to caregivers,

or that countries are spending their LTC dollars more efficiently by moving towards more home care delivery.

In chapter 2 we will examine in detail some important LTC policy questions, like the evolution of human life expectancy and disability trends, issues of supply and demand for care workers, and imperfections in the private LTC insurance market. We will also examine some policy solutions, and evaluate their success using international experience.

Chapter 2 - Policy Challenges and Potential Solutions

Access to –and affordability of– long-term care (LTC) is a policy issue in all countries experiencing population ageing. As we will see in this chapter, those countries' policy responses are quite diverse, and typically cover a wide spectrum of policy instruments, from state-run systems of nursing homes, to compulsory insurance mandates, to near-complete laissez-faire market mechanisms. Many factors come together to influence the development of the issue, among which we can mention: the demographic context of the countries in which policy is created, the market characteristics specific to LTC services, the LTC insurance products available to cover the LTC risk, and government actions to facilitate provision of care.

This chapter will be divided between LTC policy challenges and potential policy solutions. The first challenge pertains to the characteristics of care work, whether formal or informal: care work suffers from many stigmas, but we shall see that these are compounded by economic elements that further depress the supply of care services. The second challenge has to do with the multiple demographic trends about to impact the American LTC landscape now and in the years to come. In particular, the lengthening of human life, and the evolution of disability trends in old age are important aspects of the future of care. The third challenge concerns the limits of Medicare, Medicaid, and the private insurance market to address coverage of LTC risk. A sizeable academic literature has explored the reasons behind the low take-up of private LTC insurance, and the institutional roles played by Medicare and Medicaid in perpetuating this situation.

As for potential policy solutions, this chapter will examine and discuss international experiences in social insurance systems, cash-for-care systems, as well as American policy initiatives like the CLASS act, Partnership LTC insurance, and federal/state tax measures.

2.1   Policy Challenges

2.1.1   Supply of Care Services

According to Colombo et al. (2011:38), pressures on LTC are expected to increase due to four main factors : (1) population aging will translate into more seniors and old-old persons requiring care time, while a smaller share of the population may be available to cover the demand for care; (2) social changes like persistent low fertility rates, increased participation of women in the labor force, and physical distance between ageing parents and their adult children could lead to more seniors being unable to rely on informal/family care, and turning instead towards formal care systems; (3) individuals living in developed countries have come to expect a certain amount of care, with enough flexibility and coordination between actors; (4) technological progress now allows for better LTC at home, which is what is preferred by most people with LTC needs, but this presupposes a more adaptable organization for care delivery, and a more adaptable labor force. Put together, the pressures exerted by these four elements on LTC demand may require more financial and human resources than is now the case.

Meeting these potential surges in demand may prove difficult, since the supply of care services already suffers from a number of deficiencies. Therefore, our first policy challenge is the supply of **formal care**, which encompasses professions like hospital aides, nursing home workers, home

care workers, and paid homemakers. By tradition, or maybe as a result of market forces, those occupations often combine a number of unattractive characteristics: wages may be inadequate, not all workplaces are unionized, work is physically intense, and may require more emotional involvement than other kinds of service jobs. They also involve a substantial health risk: in 2015, formal care jobs ranked third for the largest incidence of occupational injuries, right after agricultural workers and bike messengers[13].

MacAdam (1990) notes that the supply of formal care is also negatively influenced by the absence of fringe benefits, part-time work schedules (especially in home care settings), insufficient training, inadequate supervision, and the lack of opportunities for career advancement. Jobs in formal care suffer from high turnover because of job hardships and the competition exerted by other occupations requiring low skills, but physically safer. And to paraphrase sociologist Everett Hugues (1958), care work is *dirty* work because it deals with notions of personal dignity, and some may consider the tasks degrading. An alternative explanation for the problems of formal care supply could be that families' aggregate supply of informal care to their parents, by its sheer size, impedes the development of a sufficient supply of formal care workers[14].

Who are the workers in formal care jobs? In the literature, the pool of likely entry-level care workers is often described as being mostly women aged 25 to 44, often immigrants, who sometimes re-enter the labor market after a spell of unemployment. Workers' education level,

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[13] Source: Bureau of Labor Statistics, Incidence rates of nonfatal occupational injuries and illnesses by case type and ownership, selected industries, 2015. Available online at http://www.bls.gov/news.release/osh.t01.htm

[14] It might be too ambitious –and beyond the scope of this analysis- for us to examine in detail the causal path as to why the supply of formal care is so low. Given that formal care is one element of a larger, complicated landscape of care options and that it is substitutable for informal care, one can surmise a degree of endogeneity.

previous work experience, family income, as well as their preference for work also play a role in explaining supply levels (Crown et al. 1995).

According to Crown et al. (1995), a form of socio-economic "sorting" seems to take place within the world of formal care, with hospital aides being more affluent, followed by nursing home care, and finally home care workers in third place. The analysis by Crown et al., confirmed by Yamada (2002), seem to indicate that home care workers are often older, less educated, as well as less likely to be married than their counterparts in nursing homes and hospital settings. Yamada (2002) also noted the higher proportion of foreign-born individuals among home care workers (22%) compared to hospitals and nursing homes (12%). One could form the hypothesis that workers in home care jobs do not positively choose to occupy these positions, but in fact have little other choices, given their level of human capital.

Another part of the policy challenge of establishing a sufficient supply of care services is the question of **informal care**, here understood to encompass care provided by relatives (spouses, children, grand-children, siblings, etc.) and friends. Establishing what creates/sustains/limits the supply of informal care is not straightforward. For one, the economic literature on this topic commonly assumes there is a necessary trade-off between time spent on care, work, and leisure, where an hour spent on informal care cannot be spent on work/leisure – although there may be joint production of care and housework (Chang & White-Means, 1995; Stern, 1995; Nocera & Zweifel, 1996; Sloan et al., 1996; Sloan et al., 1997). When viewed from the angle of family decision-making, the supply of informal care by adult children can also be seen as a bargaining exercise, where both the caregiver and the care recipient enter the negotiation with

interdependent utilities, that is, they are both concerned about family welfare, which in this case translates into the health and wellbeing of the care recipient (Pezzin & Schone, 1999). In other words, altruism shapes personal preferences about informal care provision, and this becomes a driver in the negotiation for caregiving time/financial assistance between an adult child and an elderly parent.

Trying to further comprehend how the supply of informal care takes form, we look at utility from a different angle. In their work, Brouwer et al. (2005) see utility not only in terms of <u>outcomes</u> (e.g. seeing that the needs of the care recipient are met), but as well in terms of <u>process</u> (e.g. the way the outcome is achieved). Therefore, people who choose to become informal caregivers may derive more utility from performing the tasks of caring than if they were simply arranging for care from a third party. Different individuals may derive various amounts of process utility, hence their different supply of caregiving time[15].

Could informal caregivers be motivated to supply care through a promise of delayed compensation (e.g. an inheritance)? Sloan et al. (1997), using data from the National long-term care survey, didn't find sustaining evidence that children's provision of care to their parents was motivated by bequest motives. But the money one promises may not speak as much as the money one has already given: Henretta et al (1997) looked at past parent-to-child financial transfers, and found that these financial transfers are good predictors of who, among the children in the family, will be acting as caregiver.

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[15] An analogous explanation for the supply of informal caregiving goes back to Becker's Treatise on the Family (1981), where the author posits that family members are not merely self-interested actors, but are mindful of the well-being of other family members.

Continuing our exploration of what creates or limits the supply of care, it is important to note how informal care can impede on one's work life. To examine the decision to provide informal care, economists have generally relied on the concept of a reservation wage, which is the lowest wage at which someone would be willing to take on a particular job. Econometric estimations show that people earning higher market wages have a higher reservation wage than lower-paid individuals, and therefore would not be inclined to supply informal care for free. Other factors influencing the supply decision are the constraints imposed by family situations (e.g. whether a family member is taking care of young children), the health of the family members (e.g. whether the potential caregiver himself/herself requires assistance because of health issues), and the physical distance[16] that may render caregiving impractical or onerous.

But aside from the effects of informal care on paid work and workforce attachment, it is important to recognize that the decision to supply informal care and the decision to be in the workforce are endogenous, since both activities compete for the limited time available to the caregiver (Norton, 2000). After controlling for endogeneity, studies have found that caregiving duties have a negative effect on the number of hours worked (Ettner, 1995, 1996; Stern, 1995; Wolf & Soldo, 1994; Johnson & Lo Sasso, 2000; McGarry, 2006), although the size of the effect was quite variable from study to study. In a comparison of part-time workers in 17 OECD countries, Colombo et al. (2011) have shown that non-caregivers worked on average 24,8 hours, and caregivers worked on average 21,4 hours.

In addition to the number of hours worked, providing informal care can impact many other aspects of work. In a taxonomy of costs incurred by caregivers, Fast et al. (1999) listed the

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[16] Distance is most likely an endogenous factor in the decision to supply informal care.

following additional employment-related costs: incurring a job loss or being forced into early retirement, higher absenteeism from work, lost productivity, even foregoing training, promotions or overtime. The common consequence of incurring these costs is a reduction in earnings and benefits, as well as long-term financial losses due to weaker accumulation of savings and pension credits.

Aside from the aforementioned employment-related costs, the taxonomy developed by Fast et al. (1999) contains the following categories of economic costs: **unpaid labour costs** (time spent in care management, burden of emotional support and monitoring, direct care to recipients) and **out-of-pocket expenses** (goods and services purchased by caregivers for the elders for whom they are caring, increased expenditures caused by co-residence of care recipient and caregiver, purchased household help, and purchased respite care for the caregiver him/herself.

One interesting question associated with care supply is how families decide amongst themselves who should provide care. It is not our aim to summarize here the abundant literature on the topic, but in the American family context, some basic relations tend to emerge: the person most likely to provide care is often the spouse (Dwyer and Coward, 1991), and if there is no spouse present, the primary caregiver is most likely an older daughter, often single, out of the labour force, co-residing with the care recipient, or living nearby (Spitze & Logan, 1990; Stern, 1995; Marks, 1996, Henretta et al., 1997). This is not to say that caregiving is at all times a one-person responsibility; in fact, Friedman & Seltzer (2010) found that parents will usually receive help from more than one child, and that the gender of the children involved may shape the amounts and types of care. For example, adult daughters tend to be the ones behind the maintenance of

sibling ties ("*kin keepers*"), and may prompt their brothers –usually more passive in caregiving matters- to provide more help to aging parents. Also, the division of care work between adult children seems to be driven to a degree by gender, with daughters being more involved in emotional assistance, and sons being more involved in practical chores –upkeep, repairs, etc (Kahn, McGill, Bianchi, 2011).

After having examined many of the problems plaguing the supply of formal and informal care, we can sum up the challenges in the following way: jobs in formal care suffer from attraction and retention problems, which are amplified by work conditions, health risks and low compensation. The supply of informal care, on the other hand, is problematic because it conflicts with many aspects of paid work and family life.

Demand for LTC, on the other hand, will be affected by important demographic changes, which we will examine in detail in the next section.

2.1.2   Population Ageing and Other Related Demographic Phenomena Affecting Demand for LTC

In the coming decades, four demographic phenomena (or trends) will converge to influence the demand for LTC in the United States and other industrialized countries: (1) the baby-boom generation reaching age 65, (2) gains in life expectancy, (3) lower fertility rates, and (4) the evolution of disability at older ages. As with most demographic phenomena, they were long in

the making, which is not to say that all consequences on LTC were readily apparent. Those demographic phenomena constitute the second policy challenge.

First, the baby boom generation, here defined as birth cohorts from 1946 to 1964, has begun to reach age 65 in 2011. In the United States, this generation will bring the proportion of the population aged 65 and up from 12.3% in 2010 to 19.3% in 2030, and then stabilize around 20.0% by 2040[17]. Being a larger generation than the ones preceding and following them, baby boomers have caused an oft-noted swelling of demand for services –school facilities, college education, housing, jobs and so on– at every step of their life (Foot, 1996; Huber & Skidmore, 2003). By the same arithmetic, it is common for policy analysts to view baby boomers approaching old age as a sign that absolute demand for LTC should increase, *ceteris paribus* (Norton, 2000; Fries, 2003; Brown & Finkelstein, 2004b; Hagen, 2004; Gleckman, 2007). On one hand, the reliability of such a prediction depends in part on future life expectancy gains and the evolution of disability rates at each age (which will be discussed in detail below). On the other hand, to offset the effect of the baby boom generation on LTC demand would require massive reductions in disability rates, notably in the control of degenerative diseases and dementias.

The second demographic trend impacting the demand for LTC is evolution of life expectancy. It finds its source in the sustained fall of mortality rates over many decades. At the beginning of the 20th century, gains in life expectancy were caused by mortality reductions in the first years of life, but since the 1950s, most gains in life expectancy have occurred because of reductions in

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[17] Source : official US bureau of census national population projections, available at
http://www.census.gov/population/projections/

mortality rates at older ages. And so, the general decline in mortality rates and the concomitant rise in life expectancy have increased the proportion of seniors relative to the overall population, and in a way made old age more visible in society. Hence, while a century ago the dream of old age and retirement was distant and uncertain, workers of today enjoy a sort of "democratization" of old age (Légaré, 1988). A look at the Social Security period life tables is enough to corroborate this trend: whereas in 1900, life expectancy at birth was 46.41 years for men and 48.96 years for women, by 2000 these figures had reached 74.03 and 79.39 years[18] respectively. As can be seen on Figure 2.1, according to period life tables published by the Social Security Administration, the proportion of men and women who could expect to live to age 65 in 1900 was 44.3%, and in 2000 this figure was 82.5%. Therefore, an individual today has a better 'chance' of reaching old age, but at the same time, this individual has a higher probability of needing LTC before his/her death, since the prevalence of dementias and chronic diseases intensifies with age. On the other hand, it has been observed that the gap between the life expectancy of men and women is narrowing, which may decrease the length of time spent in widowhood for married seniors, and therefore increase the level of mutual assistance between spouses to a degree (Colombo et al., 2011).

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[18] Source: Bell, F.C. & M.L. Miller (2005) "Life Tables for the United States Social Security Area 1900-2100", Social Security Administration, Actuarial study no 120.

Figure 2.1 Survival Curves for Calendar Years 1900, 1950, 2000, for the US Population

Source of data: Bell & Miller (2005)
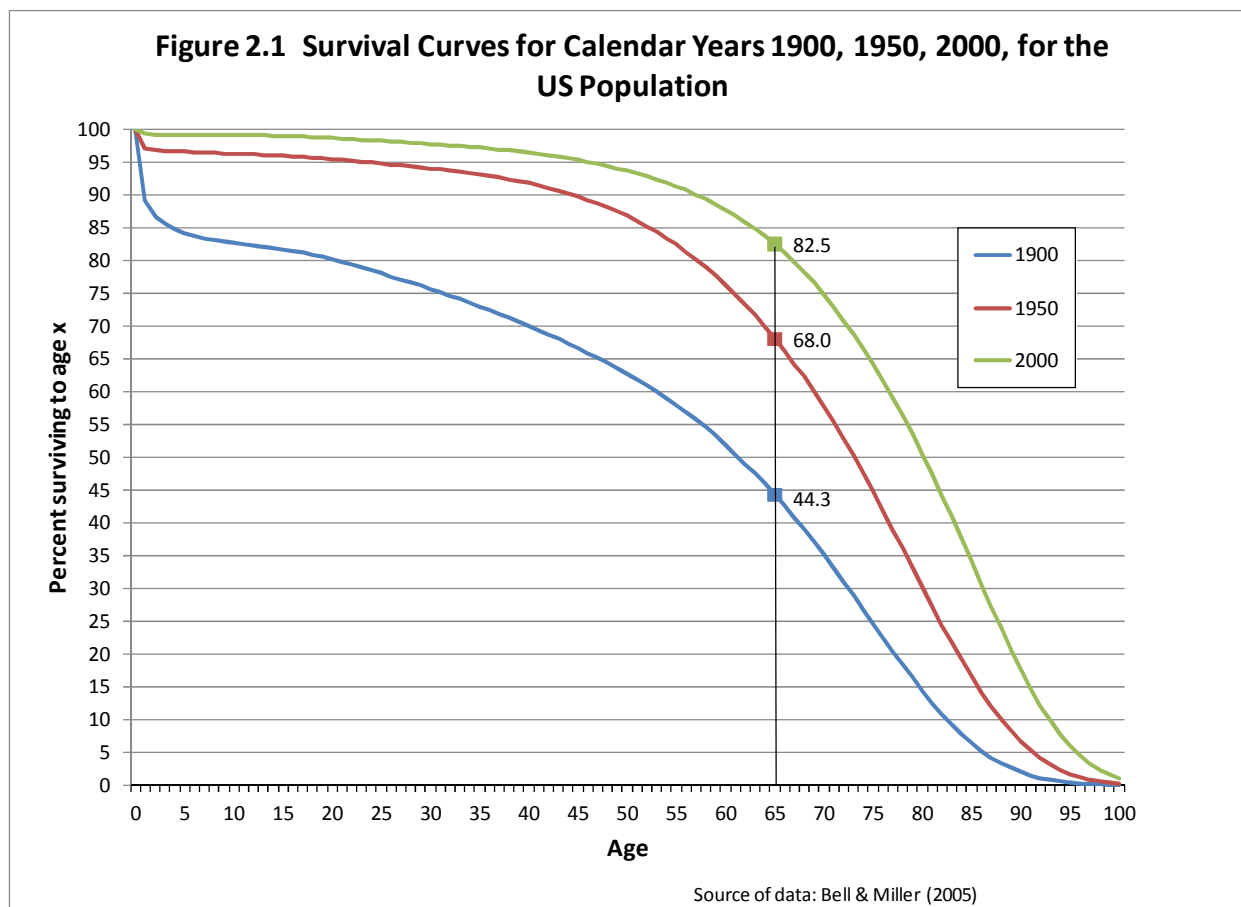
The third demographic trend to impact LTC demand is the fall of fertility rates, a phenomenon observed in all industrialized countries at various degrees. In the United States, the total fertility rate (TFR) fell from 3.7 children per woman in 1959 to 1.74 in 1976, before stabilizing at around 2.0-2.1 since 2000[19]. To explain this evolution, scholars have argued that reliable birth control methods have made the timing of childbearing and family formation less arbitrary, and offered women the chance to further their education and develop their own careers, independent of their husbands (Katz and Goldin, 2002; Goldin, 2006). The resulting lower fertility levels have long-lasting impacts on family arrangements for the provision of informal care, because falling

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[19] Source: CDC, Vital Statistics of the United States, various years. available online at http://www.cdc.gov/nchs/products/vsus.htm

fertility rates imply smaller families, and in time, fewer adult children to provide informal care to

aging Americans (which links back to questions of supply of informal care developed earlier).

Also, when viewed from the perspective of intergenerational equity, fertility levels play a role in

the sustainability of the social contract on which many public programs are built. The pay-as-

you-go financing of programs like Medicare and Social Security –that is, collecting contributions

from currently active workers to provide benefits to current seniors– is stabilized[20] when fertility

levels remain stationary over long periods of time (Keyfitz, 1980). But if fertility levels fall,

contributions must be raised (or benefits reduced) for selected generations of workers, causing

inequities and conflict. Of note, the Trustees of the Social Security Administration use TFR

assumptions ranging from 1.7 to 2.3 children per woman for forecasting purposes.

The last demographic trend to impact LTC demand is the evolution of disability levels across a

population, expressed as the number of years seniors can expect to live in good health. This

quantity is labeled disability-free life expectancy, and is most useful when compared to 'total'

life expectancy, which tracks longevity irrespective of health conditions. In many countries, the

pace of progress in total life expectancy and disability-free life expectancy has been uneven,

reflecting the separate forces that govern morbidity trends and mortality trends. As succinctly

summarized by Lafortune et al. (2007), three theories have been offered to explain patterns of

evolution for those two concepts:

- Expansion of morbidity/disability: in this scenario, increasing longevity would be

  matched by increasing periods of morbidity/disability at the end of life, resulting from

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[20] The stability of pay-as-you-go systems like Medicare and Social Security is also dependent on life expectancy gains and the growth rate of the population.

enhanced survival rates of sick persons and the increasing prevalence of aging-related

diseases like dementia (Gruenberg, 1977; Kramer, 1980);

- Compression of morbidity/disability: in this scenario, increasing longevity would be

    matched by shorter periods of morbidity/disability at the end of life, and where major

    health problems would be caused by senescence and the aging process (Fries 1980, 2003,

    2005);

- Dynamic equilibrium: in this scenario, increasing longevity would be matched by (1) an

    expansion of light morbidity/disability, and (2) a reduction of severe morbidity/disability,

    owing to improvements in health care, prevention, and the greater use of assistive devices

    (Manton, 1982).

In the past decades, disability-free life expectancy has been rising at a rate that exceeded total

life expectancy (Cai & Lubitz, 2007), which may be interpreted as validation for the theory of

compression of morbidity proposed by Fries. Looking to the future, additional improvements in

disability-free life expectancy for successive generations of seniors could help mitigate the

demand for LTC, but it might be too soon for definitive conclusions. On one hand, scholars like

Lakdawalla et al. (2004), Olshansky et al. (2005), and Reynolds et al. (2005) have outlined the

perils of an obesity pandemic and the possibility that obesity-related morbidity might reverse the

current trend of life extension. On the other hand, Manton et al. (2006) noted that the literature

on the effects of obesity on disability is mixed: in particular, questions remain as to whether

current methodologies overestimates the effect of obesity on disability (Flegal et al. 2004), and

whether obesity at older ages is a determinant factor of hospitalization (Luchsinger et al. 2003).

International research has shown that gains in disability-free life expectancy vary by gender, by cohort, and by education level. Gains in education, it seems, have the strongest effect on disability (Lafortune et al. 2007). While trends in disability reduction are not uniform across countries, there is clear evidence of a decline in disability among elderly people in the United States (Manton & Gu, 2005, Manton et al. 2006). Using data from the National Long Term Care Survey (NLTCS), Manton & Gu (2005) have shown that the age-specific rates of decline in chronic disability in the United States was about 1.5% between 1982 and 1994, and 2.6% between 1994 and 1999. Reflecting on this trend, Fries (2003) noted that this decrease in disability prevalence is substantially greater than the decrease in mortality rates over the same period, which declined at about 1% per year.

To sum up this policy challenge, the impact of demographic trends on the future LTC landscape could be condensed in the following way: first, keeping disability and other factors constant, it is expected that aggregate demand for LTC will increase due to the large cohort of the baby-boomers entering old age now and in the next two decades. Second, observed gains in life expectancy mean that a larger proportion of current and future seniors can expect to reach age 80, at which point the likelihood of needing LTC before one's death intensifies. Third, lower levels of fertility observed since the 1970s will impact the provision of informal LTC in decades to come, as fewer adult children will be available to provide informal care to their aging parents. Fourth, ongoing changes in patterns of disability at older ages, and whether they keep up (or outpace) gains in life expectancy, may affect aggregate demand for LTC.

With problems on the demand and supply side, individuals could be tempted to purchase insurance to cover their LTC risk in old age, but as we will see in the next section, there are market imperfections preventing this insurance product from fulfilling its promises. This will be our next policy challenge.

2.1.3 Private LTC Insurance Market, and its Interactions with Medicaid & Medicare.

As shown in Chapter 1, the greatest part of LTC in the United States is done through informal arrangements. But in formal settings, the largest share of LTC spending is currently shouldered by Medicaid (43% of total spending), followed by Medicare (24%), out-of-pocket spending by care recipients and their families (19%), and private insurance (7%). A substantial economic literature has emerged to address the fact that private insurance spending remains so low – compared to the magnitude of the risk to cover– and whether aspects of Medicare and Medicaid hinder the purchase of insurance coverage. We will look at the aspects of this policy challenge in sequence.

- Private insurance

It is a fair assessment that the popularity of private LTC insurance has never really taken off: various studies have estimated the coverage rate to be between 5 and 10 percent of elderly Americans (Coronel, 1998; American Academy of Actuaries, 1999; Murtaugh et al., 2001;

Brown & Finkelstein, 2004b; Finkelstein & McGarry, 2006)[21]. Reasons behind this low take-up

rate are multiple, but first on the list is a question of <u>affordability</u>, the cost of premiums being

simply too high for some households. To illustrate this, a 2016 price chart by Genworth

indicated that annual premiums for a 65-year old female New Yorker looking for 3 years of

coverage were in the range of $2,550 to $5,101 (for daily maximum benefits of $150 and $300

respectively)[22]. If one assumes that premium levels are 'manageable' when they represent less

than 5-10 percent of income or assets, then, between 20 and 50 percent of people at or near

retirement age could afford LTC insurance (Rivlin and Wiener, 1988; Friedland, 1990; Alecxih

et al., 1995). In a more recent assessment, Consumers Report (2008) concluded that given the

structure of Medicaid LTC benefits, people with personal net worth below $200,000-$300,000

and those with personal net worth above $2 million (excluding the home) should self-insure.

A second issue is <u>commitment</u>: private LTC insurance is usually bought before or around age 65,

covering for a risk that may be decades away. Thus, for insurance to remain in force, payment of

premiums must continue uninterrupted. This may become a financial drain over time for retirees

with less than fully indexed sources of income, a problem compounded by *ad hoc* premium

increases[23]. As noted by Kassner (2009), the stability of premiums depends on the accuracy of

insurers' predictions with regards to the cost and number of future claims, the return on

investment income, and the number of people who will lapse their policies. Industry figures on

lapse rates following premium increases are around 1.6% (United States Government

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[21] Elderly Americans are here understood to refer to the population aged 65 and over. If one includes those aged 60 to 64, the rate of insurance coverage reaches 14 percent, according to 2008 HRS figures (Brown & Finkelstein, 2011).

[22] https://www.genworth.com/long-term-care-insurance/ny/make-a-plan/ltc-insurance-cost.html

[23] Insurance companies wishing to increase their premiums must apply to the States' insurance commissioners, a procedure that may limit somewhat the amount and frequency of these *ad hoc* increases, without preventing them entirely.

Accountability Office, 2011). And so, to let one's insurance coverage lapse –even momentarily–
is problematic as the cost of premiums is 'locked-in' at the time of first purchase, meaning that
an ex-client wanting to opt-in again would likely be considered a new client, and be charged
higher premiums in line with his/her age at re-entry. According to Cutler (1996), this
mechanism is used by insurance companies to ensure that people who are good risks are not
leaving the pool over time, only to re-enter after a while (this being a form of moral hazard).

A third aspect of the problem is <u>adverse selection</u>, where insurance is most attractive to those
with greater expectation of disability, based on their perceived future needs. Because of
asymmetry of information between the insurer and the insured, adverse selection increases the
cost of insurance for everyone, and companies tend to protect themselves against poor risks by
requiring a form of medical underwriting (screening) before accepting someone as a client.
Norton (2000) estimated that through this technique, insurers deny between 10 and 20 percent of
elderly applicants. Murtaugh et al. (1995) estimated that between 12 and 23 percent of 65-year
olds are rejected for private insurance due to health problems, and that 20 to 31 percent of 75-
year olds are rejected for the same reason.

In line with adverse selection is the <u>perception of non-eligibility</u> among seniors. Because of the
widespread usage of medical screening and the consequent rejection rate, many seniors may
think that they would not qualify for a LTC insurance policy because of their health status, and
therefore simply choose not to apply, even though the cost of such a policy might be within their
means (Cutler, 1996).

A fifth factor limiting the popularity of private LTC insurance is the issue of <u>moral hazard</u>, which usually refers to the reckless behaviour of the insured in regard of the risk for which insurance was bought. In his 1990 seminal work, Pauly outlined a novel form of moral hazard that may apply to private LTC insurance. In his view, the elderly fear (perhaps correctly) that if insurance is purchased, their children might institutionalize them once their mental faculties have faded. As noted by Sloan & Norton (1997), private LTC insurance reduces the relative price of institutionalization versus the price of family caregiving. Thus, rational seniors with a preference for family caregiving would refrain from buying LTC insurance for themselves.

Finally, there is evidence that the private LTC insurance market is <u>not efficient</u>. For one, imperfect competition from a limited number of insurance providers mean that prices for coverage are set well above expected claims, with a load of 18 cents on the dollar for typical policies (Brown & Finkelstein, 2004b). Also, asymmetric information about applicants' medical risk and the uncertainty of future LTC costs usually leads insurers to limit their exposure, often by applying daily maximum payout caps. And even with these protections, major insurance firms find it difficult to maintain LTC insurance as a profitable business line, going so far as to stop selling new individual contracts[24].

Aside from these issues, insurers have found challenging to accurately price their product because of intertemporal uncertainties, most notably the gains in life expectancy, the evolution of disability profiles, and the evolution of care standards over time (Atkinson, 1995). Since the future evolution of these parameters is not directly measurable, it is very difficult for the private

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[24] MetLife announced it would stop selling new LTC insurance policies at the beginning of 2011, citing financial challenges, while Prudential announced it would stop sales in August 2012, due to poor interest rates.

market to value them properly (Barr, 2010). This is made evident by the recurring requests of private LTC insurers to state insurance commissioners for permission to raise the premiums across-the-board for current policyholders, due to, among other things, "unexpected gains in life expectancy" and "policyholders generating higher claims" (Tergesen & Scism, 2010).

- Medicare

Medicare offers much less in the way of LTC coverage than most Americans seem to imagine. As mentioned in Chapter 1, a 2006 survey by AARP found that 59 percent of Americans aged 45 and over believe Medicare covers nursing home stays for three months or more. In reality, Medicare only covers short-term nursing home stays (100 days) for rehabilitation following a hospital stay of at least 3 days. Only the first 20 days are paid in full, the remaining 80 days incur a $161 per day copayment by the care recipient.

This falsely held belief in Medicare coverage may cause many Americans to see the purchase of private LTC insurance as an unnecessary expense. Simply put, Medicare may be crowding out private LTC insurance through lack of information.

- Medicaid

For those too poor to afford LTC, Medicaid acts as a payer of last resort. But as previously described, conditions for eligibility to Medicaid are such that seniors must first spend-down their assets to minimal levels ($2,000 for an individual and $3,000 for a couple, in most states, excluding principal residence) and then devote most of their income as co-payment. For seniors with low levels of income and wealth, Medicaid acts as a comprehensive insurance policy, which

provides a close substitute for private LTC insurance coverage –in effect crowding out purchases of private LTC insurance for this segment of the population (Pauly, 1990, Sloan & Norton, 1997).

For seniors with larger amounts of wealth, eligibility to Medicaid LTC benefits is akin to an insurance policy where the deductible is roughly equal to one's assets, something that should, in theory, encourage private LTC insurance sales. But in fact, it seems to foster the practice of asset sheltering, where seniors transfer assets to relatives in order to qualify for Medicaid LTC benefits and preserve their estate. According to a study by the United States Government Accountability Office (2007), the practice of asset sheltering is not very prevalent (10 percent of Medicaid recipients, with a *median* sheltered amount of $15,000). An earlier study by Lee et al. (2006) found that between 9 and 15 percent of new Medicaid-eligible nursing home residents had transferred assets, but with a *mean* transfer amount of $4,000. Due to the questionable moral nature of asset sheltering, the above figures might suffer from a degree of undercounting, and may be best viewed as a lower-bound estimate. On the other hand, the legal costs of setting up a trust for the purpose of sheltering assets can be as low as $5,000, making the operation worthwhile for seniors with large amounts of assets to protect.[25]

2.2   Policy Solutions

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[25] It should be mentioned that federal law contains provisions aimed at discouraging artificial impoverishment for the purpose of establishing financial eligibility to Medicaid. According to the United States Government Accountability Office (2007:2), "those who transfer assets for less than fair market value during a specified "look-back" period–a period of time before application to Medicaid in which a individual's or couple's assets are reviewed–may be deemed ineligible for Medicaid coverage (…) for a period of time, called the penalty period". On average, these penalty periods lasted 6 months.

In a 1994 essay on LTC, Wiener et al. have outlined five goals that any attempt at LTC reform in America should reach ideally: (i) recognizing that LTC is a normal life risk, that is, making people aware of the costs of disability in old age, and making them aware of financing mechanisms available; (ii) offering protection against the catastrophic out-of-pocket costs of LTC, namely, avert the common scenario where seniors must devote all of their income and assets to cover the costs associated with LTC; (iii) preventing dependence on welfare systems like Medicaid, the payer of last resort when one has exhausted all assets; (iv) promoting home care, the care setting that is most favored by seniors, but where few resources are directed; and (v) making the system affordable overall to users and to governments. We consider these five goals to be still relevant in today's policy environment, and thus, we will use them as a scorecard for assessing policy options currently in operation abroad (social insurance schemes, cash-for-care benefits) as well as policies developed in the United States (the CLASS act, Partnership insurance policies, tax measures).

2.2.1   Social Insurance

A LTC social insurance system is a compulsory government program, into which workers (and sometimes employers) contribute, for the purpose of insuring against the risk of needing LTC. Benefits are paid either in kind, through vouchers, or in cash. Governed by actuarial principles of long-term solvency, these programs are a generalization of private LTC insurance, spreading the risk across as large a pool as possible through compulsion. LTC social insurance is universal insurance, of the same family as Medicare (universal insurance for health care provision) and

Social Security (universal insurance against exhausting one's wealth)[26]. In terms of the policy challenges developed in section 2.1, one could say that a LTC social insurance system is mainly an answer to the problems of the private insurance market, and ever-growing spending on Medicaid by Federal and State Governments. LTC social insurance could also be seen as a partial solution to the risks posed by population ageing (gains in life expectancy and the evolution of disability at older ages).

Social insurance for LTC surpasses private LTC insurance by enhancing economic efficiency in many different ways. As discussed in section 2.1.3, issues of adverse selection, medical underwriting and imperfect competition among insurance carriers create an undersupply (or overpricing) of private LTC insurance, resulting in sub-optimal risk coverage. In contrast, the compulsory nature of social insurance creates a balanced pool of contributors, not just those with greater expectations of disability (i.e. adverse selection). This device also removes the need for medical underwriting to identify candidates with poorer health prospects (Murtaugh et al, 2001; Spillman et al. 2003), and removes the need to inflate premiums to cover bad risks. Thus, social insurance systems can provide LTC coverage to the average-risk individual at a unit cost lower than any commercial insurer could offer. Other sources of economic efficiency stem from the absence of profit motives, as well as savings from the elimination of marketing budgets and unnecessary sales personnel. In the American context where many middle-class seniors end up relying on Medicaid for their LTC needs, implementing a LTC social insurance program would curtail state and federal spending on Medicaid by shifting costs from tax-based social assistance to contributions-based social insurance.

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[26] There are however some limits to the "universality" of Medicare and Social Security, since both require a minimum of 10 years of contributions.

As Barr (2010) points out, a key difference between private LTC insurance and LTC social insurance is the financial commitment required of citizens: with the former, policyholders see the level of their premiums locked-in at time of purchase, but any failure to pay premiums voids the policy; thus, re-entering into an insurance contract would entail higher premiums, to reflect the buyer's age and what the insurer has learned in the meantime about the evolution of disability and mortality profiles in its pool. In contrast, social insurance carries only an implicit contract between citizens-policyholders and the government administration, and contributions are paid whenever one is gainfully employed. Contribution levels are also set equal across all ages.

On that last point, this "divorce" between contribution levels and individual LTC risk levels allows plan sponsors to keep premium levels constant year-in and year-out, while the risk of LTC may evolve with gains in life expectancy and changing profiles of disability over time (Barr, 2010). This feature comes at a cost, though: to maintain long-term solvency in the face of potential shocks, social insurance systems are sometimes financed at a rate slightly higher than what is considered an actuarial steady-state rate.

LTC social insurance can coexist alongside private LTC insurance, usually with the former offering a form of basic coverage, which individuals can top-up by buying the latter, according to their personal preferences. But once a LTC social insurance scheme is established, changing the initial level of benefits can have adverse consequences for individuals: if the social insurance scheme becomes more generous over time, those who bought complementary private LTC insurance in the past may end up with an inefficient (i.e. excessive) amount of coverage.

Inversely, if the social insurance scheme becomes less generous over time, individuals trying to compensate with private coverage may be unable to afford it if they are already old (since the level of premiums escalates with age) or unable to access it altogether (if they cannot get through the medical screening). This is why great care must be taken in establishing the initial level of coverage in a public plan.

In designing a LTC social insurance system, governments can basically select between an *ex ante* or an *ex post* model of financing (Barr, 2010). In an *ex ante* model, the contribution rate is set low, and contributions are paid throughout one's working life. Thus, reaching a level where one is entitled to full benefits requires an entire career, which may necessitate special arrangements for those who are already in mid- or late-career when the program is launched, so that their benefits will be meaningful despite their shorter contribution period.[27] *Ex post* social insurance is a partial remedy to this problem, either by requesting payment of contributions as a lump sum at age 65 (or some other meaningful age), or out of someone's estate at the time of death (Lloyd, 2008). While these options would re-establish a certain dimension of intergenerational equity, they would also create new problems : if requesting payment in full at age 65, the accumulated premiums could not be set very high, because of wealth inequalities in the general population, and benefit levels would be commensurately small. Instead, if requesting payment of premiums out of one's estate, then the system would be vulnerable to free-rider problems, as well as encourage asset sheltering for the preservation of one's estate. As remarked

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[27] Those who benefit from these special arrangements may receive a disproportionate amount of benefits in comparison to their record of contributions, which may irritate younger contributors, who may feel they are being overcharged. The best example of this situation is the case of Ida May Fuller, the very first recipient of a Social Security check in 1940, who, after paying $24,75 for 3 years, collected retirement benefits until she turned 100 in 1975, for a total of $22,888.92 (http://www.ssa.gov/history/idapayroll.html)

by Barr (2010), the general principle of insurance is that one must pre-commit to insurance before the risk can be realized.

In closing, here is an evaluation of LTC social insurance systems against the five goals of LTC reform in the United States, as established by Wiener et al. (1994). We find that goals 1,2,3, and 5 below are achieved by the proposal.

1. Recognizing that LTC is a normal life risk: starting a LTC social insurance system (in an *ex ante* financing approach) would require the imposition of payroll deductions analogous to Social Security taxes. This would put the risk of LTC on equal standing with the risk of longevity covered by SSA's retirement benefits, and the risk of ill health covered by Medicare.

2. Offering protection against the catastrophic out-of-pocket costs of LTC: a social insurance system, like a private LTC insurance policy, is a third-party payer whose function is to preserve income and assets of care recipients (or a portion thereof). While the level of benefits chosen by policymakers may not protect everyone against impoverishment, care recipients and their spouses would still retain more of their assets under a social insurance system than under the current spend-down policy imposed by Medicaid.

3. Preventing dependence on welfare systems: as discussed above, the Medicaid spend-down policy is forcing American seniors to liquidate their assets to basic minimums, and then use most of their retirement income as co-payment. The program also deters the

purchase of private LTC insurance and entices a certain proportion of middle- and high-

income seniors to shelter assets through *inter vivos* gifts, in order to fall under the

eligibility thresholds of Medicaid, and thus burdening taxpayers with the cost of their

care (Brown & Finkelstein, 2004b; Gleckman, 2007). In contrast, a social insurance

system covers all seniors who have paid contributions during their working lives,

regardless of their current levels of wealth/income. If the level of social insurance

benefits is set very low, some care recipients may still need to spend down their assets to

the thresholds of Medicaid, but in doing so they would become "dual eligibles[28]" (the

social insurance program and the Medicaid program complementing each other to cover

the cost of LTC).

5. Making the system affordable overall: as previously mentioned, making all American

workers contribute to a LTC social insurance system would eliminate the problem of

asymmetry of information between the insured and the insurer. This inclusivity would

reduce the unit cost of premiums, as well as eliminate the need for medical underwriting.

The only goal not attained by a LTC social insurance system is the promotion of home care. In

itself, social insurance is blind as to where a recipient receives care, whether it is at home or

within a nursing home. Perhaps specific benefits could be targeted to home care, but this would

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[28] In health care parlance, the term "dual eligibles" usually refers to the seniors qualifying to both Medicare and Medicaid. In the case at hand, the introduction of LTC social insurance may introduce new meaning to the term.

be secondary to the prime objective of covering the risk of LTC for as wide a population as possible.[29]

LTC social insurance schemes have been developed and implemented in six countries so far: Germany, Japan, the Netherlands, Luxembourg, Israel, and South Korea. Appendix 1 lists the characteristics of each of them in succinct form.

2.2.2 Cash-for-Care

Cash-for-care is a policy option which consists of a government agency giving periodic cash amounts to people with LTC needs (or to the person responsible for organizing care) to purchase their own care, whether at home, in intermediate settings or in nursing homes. Such systems offer great design flexibility to policy makers, whether for payment levels (modulated on disability levels/scales), conditions of eligibility (specific tests for income levels, wealth, disability), or financing mechanisms (e.g. relying on revenues from general taxation, contributions to a social insurance system, or a hybrid of the two). Going back to the policy challenges developed in section 2.1, a cash-for-care system can be seen as a partial answer to the challenges of supply of informal care (in terms of reducing the opportunity cost for informal caregivers) as well as stimulating the development of formal care supply (offering stable sources of revenue for home care workers, and attracting more providers to this field).

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[29] One of the potential drawbacks of implementing a social insurance scheme is the effect on demand for formal care: if upon implementation there is a massive shift from "free" informal care provided by families/friends towards paid formal care, this could lead to sudden shortages in labour and commensurate price increases for services.

The first advantage of cash-for-care systems is freedom of choice: autonomy and control over care arrangements being longstanding claims of disabled people's advocates (Glendinning, 2008), cash-for-care lets the care recipient select both the type of providers and the care settings. Cash-for-care also enhances the purchasing power of care recipients with limited economic resources. Lastly, any unspent benefits in a given period can be saved up for future care needs.

Programs like cash-for-care improve the economic efficiency of LTC delivery in many ways. For one, by opening care options and taking advantage of care recipients' marked preference for home care services, governments can allow care recipients to hire relatives, which in a way provides recognition of formerly unpaid caregiving (Ungerson, 1997). As mentioned in section 2.1.1, becoming an informal caregiver comes with many potential economic costs like income losses due to working fewer hours, early retirement, or even job loss. Cash-for-care benefits may not compensate for all of the economic consequences of caring, but can alleviate some of the shocks. They are also efficient because they do not promote overuse of services (the amount of benefits paid out not being tied to the amount of services received) (Murtaugh et al, 2001). Of note, German and Dutch caregivers who are employed by their relatives accrue social security pension credits for their care work, thus reducing the negative impacts on their own retirement, and lowering the opportunity cost of leaving one's job to care for a parent. In this way, cash-for-care supports the supply of informal care.

In countries with comprehensive LTC policies, cash-for-care benefits provide a counterweight to costly, supply-oriented, and often unresponsive state programs (Da Roit & Le Bihan, 2010). Cash-for-care systems foster the creation/expansion of markets for formal care services, in which

for-profit and non-profit agencies representing professional care workers can flourish. Competition among providers can also enhance the quality and efficiency of care (Kremer, 2006).

One last dimension of economic efficiency is the apparent willingness of persons with LTC needs to accept lower cash payments in exchange for receiving care at home instead of a nursing home. Governments managing cash-for-care schemes have decided to take advantage of this price gap to control their costs[30]. The smaller cash benefits for home care also reflect the fact that individuals do not carry the kind of overhead common to the administration of nursing homes (Pijl & Ramakers, 2007).

On the downside, it should be mentioned that cash-for-care systems can transform an informal caregiving experience between a care recipient and a relative into a commodified relationship (Ungerson and Yeandle, 2007), where what was previously an unwritten family contract now becomes a client/provider relationship of sorts, with rules sometimes imposed from outside the household. Also, whereas plan sponsors may initially expect that cash benefits will serve as salary for the caregiver (e.g. routed wages), a portion may be diverted to home remodeling, vehicle modifications or buying daily supplies. Regulations around hiring and wage disbursement may prevent some of this, notably in the Dutch system, where control of cash-for-care is retained by a government agency who acts as *de facto* employer and "pay office" for caregivers, setting wages and deducting taxes.

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[30] Cash-for-care systems in Germany, Japan and the Netherlands are prime examples of this price gap. In the latter case, cash benefits are set at 75% of the cost of benefits delivered in kind.

Cash-for-care systems, like in-kind benefits, can lead to a form of moral hazard where recipients and their medical providers make use of the disability assessment process to obtain more benefits. When disability assessments are conducted via an ADL scale, this moral hazard carries the name of "ADL creep" (Murtaugh et al., 2001). It can be conjectured that such a behavior would be more prevalent in cash-for-care systems because of the flexibility brought by cash payments.

Also, cash-for-care systems do not solve all problems of availability, qualifications and working conditions of formal care workers. For care recipients living in rural areas where population density is low, it may be inefficient to organize formal home care services due to the long traveling distance between clients of a same care worker, and introducing cash-for-care may not be enough of a monetary incentive to increase formal care supply. In this respect, external factors like unemployment rate fluctuations may have more influence on supply. Thus there may be situations where persons with LTC needs receiving cash-for-care benefits do not have more purchasing power after all, and must still rely on nursing homes.

It has also been noted that cash-for-care systems can contribute to the development or sustainment of a 'grey market' in LTC (e.g. illegal aliens or legal aliens occupying undeclared jobs). In Austria, where there is no government agency monitoring how cash stipends are spent by care recipients, many care workers are recent immigrants from central or Eastern Europe. As Österle and Hammer (2007) noted, workers in these grey markets are willing to work long hours for below-minimum wages, and without social protections, which often is a good match for care recipients (or close relatives acting as care managers), who are financially unable to hire on the

legal market, where services and prices are regulated. For persons with LTC needs, but without a family member willing to commit to caregiving, opting for the grey market means forfeiting quality controls and the possibility of legal protections in cases of wrongdoing; however this may be their only option if they want to avoid institutionalization. By opposition, the existence of a 'grey market' is much harder to ascertain in a country like the Netherlands where cash-for-care benefits are disbursed by a government agency whose job it is to manage hiring and paying duties.

Finally, here is an evaluation of cash-for-care against the five goals of LTC reform in the United States, as established by Wiener et al. (1994). We find that goals 2,3,4 and 5 would be achieve by this policy option.

2. Offering protection against the catastrophic out-of-pocket costs of LTC: from the point of view of informal caregivers, cash-for-care benefits help defuse some of the economic shocks they incur when providing care for an extended period of time, like wage losses and loss of fringe benefits. From the perspective of care recipients, this policy may signify not having to liquidate assets in a fire sale just to raise cash to pay for care.

3. Preventing dependence on welfare systems: while the level of cash-for-care benefits selected by policymakers may not always be sufficient for every care recipient in every situations, such a benefit would delay one's depletion of assets, and postpone one's reliance on Medicaid for LTC.

4. Promoting home care: as mentioned above, persons with LTC needs generally have a strong preference for receiving care at home, and cash-for-care benefits allow this to happen.

5. <u>Making the system affordable overall</u>: as discussed, cash-for-care benefits generally

   increase the supply of informal and formal care. This should theoretically decrease

   demand for nursing home care, an option that is costlier both for individual clients and

   for governments.

The only goal not attained by a cash-for-care system was about recognizing that LTC is a normal

life risk: to speak in terms of risk presupposes an insurance framework, but international

experience shows that cash-for-care systems are delivery mechanisms first and foremost, and do

not require financing through insurance principles in order to work well.

In the end, about 20 OECD countries currently offer a cash-for-care scheme, in one form or

another (Colombo et al. 2011). International experience seems to indicate that cash-for-care

schemes can readily be inserted into a social insurance scheme, thus combining the strengths of

both policy options[31].

2.2.3 The CLASS Act

The most recent domestic policy effort regarding LTC has been the launch –and subsequent

abandonment– of a government initiative called the Community Living Assistance Services and

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[31] In 1981, the Federal government established a provision inside the Medicaid program, which in effect waived certain statutory limitations and allowed states to cover individuals' needs for care through home and community based services (HCBS). Since that time, a growing number of states have begun allowing Medicaid recipients with chronic conditions to receive benefits in a manner akin to a cash-for-care system. Referred to as "consumer-directed care" or "self-directed services", this Medicaid option promotes personal choice and control over services that would otherwise be delivered in a top-down manner through a state agency. Medicaid clients approved for consumer-directed care must go through a planning process to establish the services and supports they require, as well as design a budget which will be under the care recipient's control and direction. Care recipients also have 'employer authority', meaning that they are empowered to hire, train, and manage employees providing care.

Supports (or CLASS) act. Originally enacted in March 2010 as Title VIII of the Patient

Protection and Affordable Care Act, the CLASS act would have created a voluntary government

LTC insurance program to provide cash benefits to enrollees who require help with activities of

daily living (ADLs) or because of cognitive impairment, irrespective of age (Gleckman, 2009,

2012; Meyer, 2010; Munnell & Hurwitz, 2011). The insurance program, whose design would

have included an initial five-year capitalization period, would have been administered by the US

Department of Health and Human Services (HHS). CLASS was set to collect its first premiums

in 2012, but in October 2011, the Obama administration announced it would not implement the

program, citing the lack of a 'viable path' for implementation (Wayne & Armstrong, 2011).

The goals of the program were threefold: to help Americans of all ages remain financially

independent while living in the community, to relieve some of the burden carried by families,

and to tackle the bias towards institutionalization by offering cash benefits, thus enabling

recipients to purchase care according to their preferences (Kaplan, 2010; Munnell & Hurwitz,

2011). Given the projected low value of benefits, CLASS was meant more as a basic protection

against LTC needs, on top of which people could have purchased more protection through

private LTC insurance, if they wanted.

Many of the details regarding premiums and benefit levels were left to the Secretary of HHS to

establish through regulations, but some minimal parameters were nonetheless spelled out in the

law. For example, CLASS was to be entirely financed by participant premiums, with no

financial assistance from the Federal Government (Kaplan, 2010; Munnell & Hurwitz, 2011;

Gleckman, 2012). Thus, premium levels were required to be set at a level sufficient to make

CLASS solvent for 75 years, a common actuarial benchmark for evaluating long-term sustainability of social insurance schemes. Coverage would have been available to all working individuals aged 18 and over, with only a minimal work requirement, i.e. earning enough to pay Social Security taxes for one quarter, which represents about $1,120 per annum (Kaplan, 2010). In contrast with private LTC insurance practice, CLASS would have prohibited the use of tests to screen out people with medical conditions, and established the same level of premiums for men and women (Gleckman, 2012).

The level of CLASS premiums would have varied by age at entry, with the young paying less, to account for the longer contribution period. Premium levels would have remained constant year-over-year, unless adjusted to keep the program financially viable, or in cases where enrollees interrupted their payments for three month and then re-enlisted (Meyer, 2010; Munnell & Hurwitz, 2011). Also, a contribution floor of 5$ was included for low-income workers and working students.

Eligibility for CLASS benefits would have been achieved after paying premiums for five years, while meeting the minimum work requirement for at least three years (Kaplan, 2010; Munnell & Hurwitz, 2011; Gleckman, 2012). All benefits would have been paid out in cash, and triggered by demonstrating the need for help with at least two ADLs, or similar assistance due to cognitive impairment, for at least 90 days. The CLASS act left to the secretary of the HHS the task of devising a scale for benefit amounts, provided that the average minimum benefit be at least $50. Those cash benefits could then have been used in a myriad of ways to purchase formal care in the home, to make house adaptations, to pay for nursing home services, or to provide

compensation to informal caregivers, etc. This last usage of CLASS benefits would have been a clear departure from traditional private LTC insurance policies, where payments to family caregivers, if allowed, are often restricted to situations of co-residency with the care recipient, or require specific professional licensure (Kaplan, 2010).

CLASS would have improved on private LTC insurance in many ways, most notably by forbidding underwriting practices which are commonly used by private insurers to reject those with health problems. Second, while a large part of private LTC insurance contracts are service-based, all CLASS benefits would have been paid in cash, thus expanding recipients' freedom to arrange for care in different ways, as well as use the benefits for home modifications that would have facilitated home care. Third, CLASS claimants would not have been subject to a lifetime limit for cash benefits, nor to a benefits ceiling –a feature common to many private LTC insurance contracts (Kaplan, 2010; Munnell & Hurwitz, 2011). However, some aspects of CLASS were inferior to private LTC insurance, like the five-year vesting period which would have delayed claimants' access to benefits (private insurance contracts carry elimination periods too, but never as extended as CLASS would have created).

Early on, discussions about the CLASS act were mired by solvency issues. To be successful, the new insurance plan had to attract a diverse population of adherents, young and old, healthy or not. Attracting a substantial share of young and healthy participants in the plan was important because of the ban on underwriting for previous health conditions, a feature that was made explicit in the statute. But the absence of underwriting opened the door to adverse selection problems, where insurance is most valuable to those who expect to need it the most. Without the

'backstop' of underwriting, the unbalanced pool of adherents would have threatened the long-term solvency of the plan, whose finances were supposed to be entirely self-sustaining, with no taxpayer funds to shore up deficits (Congressional Budget Office, 2009).

Trying to create a broad appeal for an insurance product like CLASS was ambitious, knowing that people generally tend to postpone hard choices and unpleasant future thoughts like their own ageing and mortality. As Gleckman (2009) wrote, the question at the heart of CLASS enrollment was why would people purchase from the government a product they won't buy from a private insurer, even if insuring against the risk of LTC makes economic sense. To generate the required level of take-up, CLASS was designed to make use of a passive enlistment device, which allowed employers to enroll their employees automatically (leaving the possibility for individual workers to opt-out), and deduct premiums through payroll deduction. The jury is still out as to whether this device would have generated the numbers of adherents required to maintain long-term solvency[32]. In the end, the problem of generating a broad appeal, and the risk of creating an unbalanced pool of adherents with higher-than-expected likelihood of claims, may have been the main reasons behind the decision of the Obama administration to stop implementation of CLASS.

Going back to the policy challenges developed in section 2.1, it becomes clear that CLASS would have responded to the challenges of supply of care services through the flexibility of the cash payment. Also, CLASS would have addressed the risks associated with population ageing –

[32] Gleckman (2009) suggested that participation could be encouraged by allowing employees to pay CLASS premiums with pre-tax dollars and giving employers tax credits for paying the premiums on behalf of their employees. He also suggested the payment of penalties for those who delay enrollment, as is currently the case with Medicare Part D.

notably the longevity risk and the risk associated with disability trends–through the insurance

element (i.e. large-scale pooling). Lastly, the problems of the <u>private LTC insurance market</u>

(affordability, commitment, adverse selection) and the associated interactions with Medicaid

would have been partially tackled by CLASS, although the anticipated low level of benefits

would have prompted many to purchase additional private LTC insurance.

In terms of the five goals of LTC reform defined by Wiener et al. (1994), the CLASS act would

have touched upon goals 1, 2, 3, and 4:

1. <u>Recognizing that LTC is a normal life risk</u>: the CLASS act would have provided a basic

   form of LTC insurance coverage available to all adults, while its large scale of operation

   would have created a form of program recognition among the public, thus bringing more

   attention to the economic stresses experienced by those with LTC needs today (and the

   need to insure adequately against the risk of LTC).

2. <u>Offering protection against the catastrophic out-of-pocket costs of LTC</u>: while CLASS'

   benefit schedule never came about, the idea of a health-blind, unconditional LTC

   insurance coverage would have provided an initial degree of asset protection for

   subscribers.

3. <u>Preventing dependence on welfare systems</u>: As Gleckman (2009, 2012) put it, Medicaid

   may provide a critical safety net for LTC, but it often forces people into a kind of care

   they don't necessarily want (e.g. nursing homes), and leaves recipients with only minimal

   assets and personal income. In contrast, the basic LTC insurance coverage offered by

   CLASS would have provided hard-pressed families with a flexible cash benefit, which

   would have given them more choice in care arrangements. Also, turning people away

from Medicaid would have lifted some of the fiscal pressures on Federal and State Governments, who share Medicaid costs.

4. <u>Promoting home care</u>: as mentioned previously in the description of CLASS benefits, there were to be no restrictions on the uses one could make of the cash payments, whether for formal or informal care, or even for home adaptations. Interestingly, the third stated goal of CLASS was to tackle the bias towards institutionalization.

The only goal from Wiener's et al. list which CLASS didn't attain was about making the system affordable overall. In a 2009 analysis of CLASS, the Congressional Budget Office estimated an average monthly premium of $123, but that estimate proved very sensitive to the age and health composition of the pool of participants. Using a simple simulation model, Munnell & Hurwitz (2011) have shown that failing to attract young and healthy workers to CLASS would create such an imbalance in the insurance pool that premiums would have to be adjusted to an average of $312/month to maintain solvency, which would no doubt further deter participation by young and healthy workers. This cycle -i.e. high premiums deterring enrollment of healthy workers, which in turn requires even higher premiums to cover insured workers with high risk- was referred to as a "death spiral" by a joint panel of the Society of Actuaries and the American Academy of Actuaries (2009). Mandating CLASS coverage for all workers would defeat adverse selection effects, as well as stabilize premiums at a low initial level, but implementing a new mandatory social insurance program might prove politically difficult in the American context.

2.2.4   Partnership Long-Term Care Insurance

In 2005, Federal and State Governments tried to limit the appeal of asset sheltering and stimulate the purchase of private LTC insurance policies through a program called Partnership Long-Term Care Insurance. The main goal was to decrease the pressure on States' Medicaid budgets, by allowing individuals who had purchased qualified LTC insurance policies –and exhausted the benefits of the policy– to qualify for Medicaid while protecting some of their assets from the Medicaid spend-down rules[33]. The level of asset protection offered is a dollar-for-dollar offset (for example, a $300,000 LTC insurance policy entitles the policy holder to the same amount of asset protection upon eligibility to Medicaid), but some States offered the possibility of unlimited asset shielding (Nixon, 2006; Kassner, 2009). The whole policy approach was initially developed in the 1990s as a pilot project authorized by the Department of Health and Human Services in four States –New York, California, Indiana and Connecticut–, and financed in part by the Robert Wood Johnson Foundation. The Deficit Reduction Act of 2005 expanded the policy to all 50 states.

To qualify as a Partnership LTC insurance policy, insurers must offer a product which meets a number of minimum standards: minimum daily benefit amount, minimum benefit duration, compound annual inflation protection, meeting standards for favorable tax treatment, offering reciprocity between states, and other various consumer protections. States also prohibit insurers to price their Partnership LTC insurance policies differently than a similar policy offering the same level of benefit, thus preventing insurers from extracting a rent from the added asset

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[33] Before they become eligible to Medicaid, Partnership policy holders who exhausted their benefits are still required to use most of their retirement income as co-payment for services.

protection feature. On the other hand, potential buyers of Partnership policies must still submit to medical screening, like regular LTC insurance policies. According to the United States Government Accountability Office (2005), when looking at purchases of LTC insurance between 2002 and 2005, approximately 2 percent of all policyholders had a Partnership policy. In terms of the policy challenges developed in section 2.1, Partnership LTC insurance clearly addresses the problems of private LTC insurance and its interactions with Medicaid, hoping to bolster coverage in the former and lessen the costs incurred by Federal and State Governments in the latter.

On the positive side, Partnership policies simplify the process of shopping for LTC insurance, since the minimum standards to which Partnership insurance products must conform means the buyer has fewer options to select, and more comparable products between insurers. Second, the Medicaid asset protection embedded in partnership policies enables buyers to obtain more benefits than from a standard policy, at the same premium level. This was touted as a way to broaden the market for LTC insurance, and reduce dependence on Medicaid from people who had sufficient means to purchase private LTC insurance coverage but didn't (Feder et al., 2007). Also, the Medicaid asset protection available in a Partnership policy lessens (eliminates?) the need for buyers to resort to asset sheltering and other estate planning tricks.

One of the limitations of this approach is that Partnership policies do not reduce the overall cost of LTC insurance, and therefore do not attract more middle-income citizens to the product itself. Partnership policies still attract buyers from the upper-middle class and above: in a GAO analysis of policyholders from the original four Partnership states, more than half of

policyholders had incomes above $5,000/month, and more than half had reported assets in excess

of $350,000 (GAO, 2005). A second criticism is the limited behavioral response induced by the

creation of Partnership policies: in a regression analysis of sales of LTC insurance, Nixon (2006)

concluded that the level of sales in the four states originally included in the Partnership pilot

(NY, CA, IN, and CT) did not significantly differ from the rest of the country. Corroborating

this finding with survey data, the GAO estimated that about 80 percent of Partnership

policyholders would still have purchased LTC insurance in the absence of the Partnership

incentive (GAO, 2007: 2). This lack of behavioral response puts Medicaid at a financial

disadvantage, since Partnership policy holders are now susceptible of receiving Medicaid

benefits much sooner after the exhaustion of their insurance benefits.

In closing, here is an evaluation of Partnership LTC insurance policies against the five goals of

LTC reform in the United States, as established by Wiener et al. (1994). We find that goals 1

and 2 below are achieved by the proposal:

1. <u>Recognizing that LTC is a normal life risk</u>: The appeal of LTC insurance products is

   broadened, since the Partnership policies are regulated by states, individually, and

   authorized by the federal legislation. This functions as a *de facto* seal of approval for a

   standardized insurance product.

2. <u>Offering protection against the catastrophic out-of-pocket costs of LTC</u>: By design,

   Partnership policies (and LTC insurance policies in general) offer protection against the

   catastrophic out-of-pocket costs of LTC. They are a third-party payer whose function is

   to preserve income and assets of care recipients.

The third goal (preventing dependence on welfare systems) should in theory be met by Partnership policies, but in practice this is not the case. If the creation of Partnership LTC insurance policies had elicited a strong behavioral response from middle-income Americans, then the policy would have reached the goal. But as discussed previously, the vast majority of Partnership purchases were made by people who would have bought insurance anyway.

The fourth goal (promotion of home care) is not met by the Partnership LTC insurance policies. Some Partnership policyholders may receive home care because they purchased a policy covering the cost of home care, but there is no explicit federal requirement for Partnership policies to include such a benefit. Still, states have some leeway in defining the minimum requirements for an insurance product to qualify as a Partnership policy, and some states (notably New York, during the pilot phase) do require policies to offer comprehensive care options, that is, both nursing facility care and home care.

Finally, the fifth goal (making the system affordable overall) is not met by the Partnership LTC insurance policies, because their introduction did not alter the price structure of private LTC insurance products. As remarked by Gleckman (2007), the low demand for private LTC insurance is directly linked to its cost.

2.2.5   Tax deductions for LTC insurance premiums

One approach to bolster private LTC insurance coverage is to reduce the cost of premiums through a tax deduction (or even a complete tax exemption). Since the lack of insurance

coverage usually translates into higher Medicaid costs for the Federal and State Governments, both of them could in theory benefit from better insurance coverage rates, provided that tax revenues lost by exempting premiums are smaller than the amount saved in Medicaid expenditures. Let's examine the situation for each level of government.

At the federal level, the Health Insurance Portability and Accountability Act (HIPAA) of 1996 ensured that expenses and premiums from qualified LTC insurance policies are on the same footing as general health insurance, tax-wise (Cramer & Jensen, 2006). Hence, tax filers itemizing their deductions can include LTC insurance premiums in the medical expense deduction (provided their medical expenses exceed 7.5% of gross income – a high threshold for many tax filers). If LTC insurance is offered by the employer, the sponsoring firm can deduct its share of premiums, and the insurance is not considered a taxable advantage for the employee. As for self-employed taxpayers, they can deduct the full cost of LTC insurance premiums regardless of whether they itemize or not.

Various efforts to generalize the tax deductibility of LTC insurance premiums to all tax filers were put before the US Congress in the past, in an attempt to promote private insurance coverage. One recent proposal (during the 109th Congress of 2006) recommended deducting LTC insurance premiums from the taxable income of itemizers and non-itemizers alike, before the calculation of income tax. Such a tax break would, no doubt, reduce the global cost of purchasing this insurance product, but the price reduction would be linked to one's marginal tax rate, and therefore this would have a regressive effect, with people in the highest tax bracket more likely to respond to such a policy (Feder et al, 2007). Would that be enough to generate

more demand? Cramer & Jensen (2006) have shown that demand for LTC insurance is price inelastic, and therefore unlikely to respond noticeably to tax measures. Hence, those who would be most likely to benefit from such a proposal are those who already carry LTC insurance.

The same can be said of the various tax deductions put forward to encourage LTC insurance purchase at the state level. In his review of tax incentives, Nixon (2006) found that 16 states had such provisions in force, with effects varying between $30 and $250 per slice of $1,000 of premiums. But through a regression analysis, he found that state tax incentives do not, in and of themselves, induce more sales of LTC insurance, in accord with the aforementioned finding that demand for LTC insurance is price inelastic.

In terms of the goals of LTC reform, expanding the tax deductibility of LTC insurance premiums only touches upon goal 2 (Offering protection against the catastrophic out-of-pocket costs of LTC), albeit in an indirect way: while the tax incentives offered by the Federal and State Governments for the purchase of LTC insurance do not in and of themselves offer the protection against catastrophic out-of-pocket costs, they reduce the price of purchasing private insurance coverage, and thus indirectly participate in reducing out-of-pocket costs of LTC.

The first goal (recognizing that LTC is a normal life risk) is not met by the policy, because extending a tax incentive to a wider population still requires contributors to actively purchase LTC insurance, unlike other risks of old age where basic coverage is automatic (like health and Medicare, or income and Social Security)

The third goal (preventing dependence on welfare systems) should in theory be met by the policy, but in practice does not. As we saw in our evaluation of the previous policy option, demand for LTC insurance is price inelastic, and therefore tax incentives have very little attraction power for new buyers. If the demand had been more elastic, then the policy would have played a larger share in the prevention of dependence on welfare systems.

The fourth goal (making the system affordable overall) is not met by the policy. The discount on insurance premiums that is provided by federal and state tax deductions is not enough to entice people of limited financial means to purchase insurance. In fact, because there is no demonstrated behavioral response to the tax measures, only people currently holding LTC insurance policies benefit from the tax breaks.

Lastly, the fifth goal (promotion of home care) is not met by the policy. As was the case with the previous policy option, buyers are at liberty to select different levels of coverage according to their preferences or budget, and this may or may not include home care. The tax deductibility of LTC premiums applies indistinctly of whether the insurance policy favors home care over nursing home care.

2.3   Chapter's Conclusion

The first part of this chapter described a set of three not entirely independent policy challenges facing LTC, that is, 1) the various problems affecting formal and informal care supply, 2) the demographic trends that may increase care demand in the very near term, and 3) the low level of private LTC insurance coverage and the problems tarnishing that insurance product, notably its

interactions with established public plans like Medicare and Medicaid. The second part of this chapter, while not a strict counterpoint to the first, described five policy solutions, gathered from international and American experience: 1) social insurance systems, 2) cash-for-care systems, 3) the CLASS act, 4) Partnership LTC insurance, and 5) tax deductions for LTC insurance premiums. In addition, each policy solution was evaluated according to the five goals of LTC reform established by Wiener et al. (1994).

Table 2.1   Summary of Policy Solutions and their Score on the Wiener et al. (1994) List of LTC Reform Goals

Policy	Goal #1 (recognizing LTC as a normal life risk)	Goal #2 (offering protection against catastrophic out-of-pocket costs)	Goal #3 (preventing dependence on welfare systems)	Goal #4 (Promoting home care)	Goal #5 (Making the system affordable overall)
Social insurance systems	✔	✔	✔		✔
Cash for care systems		✔	✔	✔	✔
CLASS act	✔	✔	✔	✔	
Partnership LTC insurance	✔	✔			
Tax deductions for LTC insurance premiums		✔			

In the end, both social insurance and cash-for-care scored highest on the aforementioned scale (four out of five goals attained). Combining both policy options has been achieved in Germany, in the Netherlands, Luxembourg and South Korea, and in a way this is what the CLASS act

seemed poised to accomplish in the United States while it was being developed by the Obama administration. CLASS also scored high on the scale, but was not a social insurance program *stricto sensu*, because it lacked a coercive mechanism to make coverage universal. This non-coercive aspect of CLASS proved to be its actuarial Achilles' heel: without credible tools to maintain premiums to a workable level and no real means of drawing healthy and young participants, the program stood to be a victim of adverse selection. But given the current state of Social Security and Medicare, coercing Americans into another social insurance plan seems anathema to the current American political climate.

In the next chapter we will set the stage for a policy simulation combining both social insurance and cash-for-care benefits, by linking elements from the annuity market and the LTC insurance market.

Chapter 3 - Going Towards a Social Insurance Scheme Combining Retirement Income and LTC

The CLASS act was the latest and most transforming policy initiative on LTC in a long time, but as we saw in Chapter 2, its non-coercive nature put it at risk of never attaining actuarial solvency. The negative political climate around the sustainability of social insurance programs like Social Security and Medicare seemed to prevent the creation of another plan requiring mandatory contributions, especially at a time when the Obama administration was trying to implement a larger policy program on health care which itself requires every American to acquire health care coverage.

In this chapter we will explore a solution to this problem, that is, offering an LTC insurance benefit through the accrued wealth held by American workers in the Social Security trust fund. This idea was originally developed by Yung-Ping Chen, (1993, 1994, 2003 and 2007), who envisioned that paying for LTC in America actually relies too much on out-of-pocket spending and Medicaid, and not enough on insurance. His solution was to propose trading Social Security cash benefits for a basic level of LTC protection. This idea later received added validation from the work of Christopher M. Murtaugh, Brenda C. Spillman & Mark J. Warshawski (2001, 2003) who realized that private insurers willing to offer products combining the risk of long life (annuities) and the risk of needing care at the end of one's life (LTC insurance) would attract complementary clienteles and generate cost savings, provided that pooling was more or less complete across the population at risk.

This chapter will examine the design and intellectual history behind the development of these policy proposals, evaluate their merits, and then submit a hybrid proposal amalgamating the two.

3.1   Carving LTC Benefits out of Social Security Retirement Benefits

In a 1993 essay (and 1994, 2003 & 2007 follow-ups), Professor Yung-Ping Chen of the University of Massachusetts-Boston contrasted the fields of retirement income and LTC, and remarked that while the former rested on three sources of funding (personal savings, pension, social insurance) plus a safety net (SSI), the latter was overly reliant on one source (personal savings) and a safety net (Medicaid). This being inefficient and overly costly on Medicaid, Chen proposed the creation of a social insurance scheme for LTC. But being aware that 1) new public funds would not be available for this purpose, and 2) individuals may already be budget-constrained, he instead suggested carving out a portion of Social Security retirement benefits to finance the LTC benefits.

Chen's approach was to turn Social Security's prescribed retirement benefits into tradable benefits, an approach that is also known in the private sector as cafeteria plans, where plan members choose the type of benefit they value most within a select number of options. Chen suggested that a small percentage of Social Security retirement benefits (which are akin to a publicly-provided life annuity) be set aside to provide basic compulsory LTC insurance coverage[34][35]. This protection floor would be purchased with a 5% trade-off in retirement

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[34] A close relative of Chen's proposal was developed by Norton & Newhouse (1994), where the authors proposed taxing Social Security benefits for long-term care.

[35] Chen also noted that the trade-off approach could be expanded to occupational pension plans offered by employers, including state and local government employee retirement plans.

benefits, with an exemption for low-income seniors who would get free coverage. The author

conceded that this carve-out would not be enough to cover all LTC costs, but would become a

foundation upon which individuals could build by going into the private insurance market if

desired:

> "The suggested method to pay for LTC does *not* imply that the trade-off will cover *all*
>
> LTC needs (…). It follows, then, that the implementation of the trade-off principle
>
> would still leave much room for private insurance business. For, with their basic
>
> coverage financed, individuals may elect to have a greater protection for additional LTC
>
> insurance, in a manner similar to the expansion of private pensions following Social
>
> Security."   (Chen, 1993:57)

To situate the magnitude of the proposed carve-out, Chen estimated that a 5% transfer of Social

Security cash benefits in 1991 was equivalent to $15 billion, which was then sufficient to cover

25% of all formal LTC costs reported in that year[36]. However, the author conceded that this

share would contract over time if the cost of formal LTC kept increasing more rapidly than the

rate of growth for average earnings.

To get a rough idea of the kind of individual coverage one could expect from a 5% carve-out, the

author estimated that the aforementioned $15 billion of revenue, once spread across all

Americans aged 65 and over, would have allowed for the purchase of a LTC insurance policy

with an annual premium of $500. When compared to existing commercial LTC policies of the

time, such a premium could have offered a $50/day nursing home benefit (after a 90 day

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[36] This estimation was made assuming negligible administrative costs and no induced demand, i.e. no increase in demand for LTC stemming from the creation of this benefit.

elimination period), with benefits indexed at 5%, for a maximum lifetime coverage of 1.5 years[37]. Yet, Chen was quick to point out that his comparison was awkward, since commercial LTC policies can be priced lower than their true cost due to lapse rates among initial purchasers. Such price differences would presumably have been equalized in part by the lower administrative costs entailed by his proposed benefit (due to the magnitude of the insurance pool) as well as the fact that complete coverage would *de facto* eliminate the need to cover for adverse selection.

As a measure of actuarial prudence, Chen suggests that his proposal be phased-in over five years, so as to establish a contingency reserve, to be invested in the same manner as the current OASDI surplus (i.e. in special Treasury bills). Such a reserve would serve to cover unexpected high expenses in the first years of operation, and give enough time to adapt the plan if needed.

This approach to LTC insurance has many positive aspects. For one, public opinion of cafeteria plans and trade-offs is positive: Chen indicated that according to opinion polls, a majority of non-retired Americans are already willing to accept lower Social Security retirement benefits in exchange of higher Medicare benefits, and a majority of Americans would trade some of their Social Security retirement benefits for LTC benefits (Illston and Wiener, 1997). Another positive aspect has to do with universality: spreading the LTC risk on a wider population would also ensure equality of access to insurance (good and bad risks being equally welcomed, thus eliminating the problems of adverse selection, medical underwriting, and fears of being ineligible for coverage). The plan would not require new taxes on workers, which alleviates concerns about intergenerational equity (Illston and Wiener, 1997).

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[37] The premium itself would be indexed at 4%.

In terms of costs, if the proposed LTC benefits were to be administered federally (as is currently the case with other Social Security benefits), delivery costs would be minimal, on account of mandatory participation into Social Security, and its existing system infrastructure. Also, with a larger share of total LTC spending assumed by social insurance, the plan would reduce the role of Medicaid in LTC provision and payment, thus restoring the program "to its original purpose of helping the poor" (Chen, 1993:58). It would also alleviate pressures on federal and state budgets.

However, there are several negative aspects as well. For one, Chen's estimation of benefit levels was done through a macro approach, that is, using the total amounts spent in Social Security benefits and aggregate LTC costs. Such an approach does not lend itself to sensitivity analyses or dispersion measures around the mean benefit. Also, if implemented, this proposal could raise demand for care overall and formal care in particular. This may prove difficult to achieve given the limits of formal care supply discussed in section 2.1.1. and may cause an upward adjustment in labour prices.

Some could view the 5% trade-off proposed by Chen as a cut in benefits or a tax, although the author insists the total amount of benefits awarded would remain the same for all recipients. Also, the compulsory nature of the trade-off could be problematic for a subset of retirees with limited financial assets and whose retirement income rests mostly on the Social Security retirement benefit. For this group with non-diversified retirement cash flows, the compulsory carve-out could bring economic hardship. In the same vein, the cost of the redistributive aspect

of the proposal (i.e. offering LTC coverage to low-income seniors while exempting them from the carve-out) was not measured or estimated by Chen, nor did he draw the line delimiting the 'low-income senior' threshold.

Lastly, Social Security retirement benefits are taxable, while private LTC insurance benefits are not. If one assumes that a carve-out from Social Security would be treated in the same manner as a private LTC insurance policy, there is a potential loss of federal tax revenues, which may or may not be entirely offset by savings in Medicaid spending for LTC.

In closing, here is an evaluation of Chen's proposal against the five goals of LTC reform in the United States, as established by Wiener et al. (1994). We find that goals 1, 2, 3, and 5 below are achieved by the proposal.

1. Recognizing that LTC is a normal life risk:

If put in motion, the mutualization of LTC risk through Social Security would provide a basic form of LTC insurance for all seniors. In the event of their disability, American seniors would be aware of the LTC benefit stemming from their Social Security wealth, and so the cost of LTC would not come as a complete surprise to them.

2. Offering protection against the catastrophic out-of-pocket costs of LTC:

As seen in chapters 1 and 2, people do not tend to purchase LTC insurance in the private market, even if the length of disability in old age and the cost of care could lead to financial hardship. Even if it covers only parts of the total cost of care, the LTC benefit imagined by Chen would

work against the rapid impoverishment of elderly disabled Americans, who must otherwise draw down their assets to bare minimums before becoming eligible to LTC benefits by Medicaid, the federal payer-of-last-resort.

3. <u>Preventing dependence on welfare systems</u>:

Social assistance programs represent a large portion of federal and state public budgets in the United States, and may seem like the easiest target in times of financial constraints. Therefore, a program that purports to shift some portion of LTC costs out of the social assistance realm and over to the social insurance area may be seen like a welcome relief to policymakers. It is not clear from Chen's proposal how the LTC benefit would interact with Medicaid if implemented, but one can imagine that if seniors have no supplementary private LTC insurance to rely on, those needing LTC may need to spend down their assets (albeit at a slower pace than what is currently observed), and then apply to Medicaid for the uninsured portion of the costs. While this scenario does not eliminate Medicaid from the LTC equation, Chen's proposal would nevertheless generate interesting savings for Federal and State Governments.

5. <u>Making the system affordable overall</u>:

Chen's proposal calls for a 5% carve out from Social Security wealth, a trade-off that could be envisioned by most middle-income Americans, but may be considered too onerous for people living on very little retirement income. Aware of this limitation, Chen proposed that low-income individuals have their premium waived.

The only goal not attained by Chen's proposal is goal #4: promoting home care. The proposal, as stated, does not address the issue of how care is delivered, nor does it talk about care settings.

3.2   A Related Idea: Joint Annuity/LTC Benefits in the Private Insurance Market

In a 2001 article, Christopher Murtaugh, Brenda Spillman and Mark Warshawsky examined the markets for immediate income annuities and for LTC insurance, and drew parallels between them: both products insure against running out of money, either because of exceptional longevity or because of prolonged and costly LTC needs, and neither product seem to attract substantial clienteles in the US market. The authors asserted that adverse selection was one of the key factors explaining the small, incomplete nature of these two insurance markets. Specifically, since income annuities are more valuable to persons with above average expected longevity, insurers tend to raise their price to cover that hazard. And in a similar manner, LTC insurance is more valuable to persons with greater expectation of disability, which prompts insurers to use medical underwriting to "identify and exclude purchasers with pre-existing disabilities or other health conditions that are believed to result in higher near-term claims costs." (Murtaugh et al., 2001: 227). The authors estimated that if applying for LTC insurance coverage at age 65, between 12 and 23 percent of the population would be rejected, while between 20 and 31 percent would be rejected if applying at age 75.

Because of the inverse correlation between disability and life expectancy, Murtaugh et al. hypothesized that combining those two risks in a single insurance product with minimal medical

underwriting could eliminate adverse selection issues, reduce the cost of both coverages (that is, increase their value for the purchaser), and expand the pool of interested customers. This result could be achieved because anyone labeled a bad risk for income annuities is a good risk for the LTC insurance market, and inversely. Using a microsimulation approach, the authors estimated that with minimal underwriting (e.g. only excluding those who would be eligible to the LTC benefit at the time of purchase), 98 percent of 65 year-olds could be insured under a combined annuity-LTC policy, while paying lower premiums than observed market rates. Such a benefit could be bought with a lump-sum payment at the time of retirement.

The combined policy designed by Murtaugh et al. is a cash benefit paid out as an immediate fixed income annuity of $1,000 per month for life, with a guaranteed ten-year payout; if the insured senior becomes chronically disabled with two ADLs or cognitively impaired, a disability annuity begins, paying out an additional $2,000 per month. If the insured becomes chronically disabled with four ADLs, the disability annuity is increased by a further $1,000. The benefit amounts chosen by Murtaugh et al. for their microsimulation were so that if combined with Social Security benefits, they would cover the average cost of nursing home care and basic consumption needs in most US regional markets at the time of publication (i.e circa 2001).

This approach to LTC insurance has many positive aspects. As mentioned above, pooling the disability and mortality risks reduces the need for medical underwriting. The proportion of Americans who are getting turned down when applying for stand-alone LTC insurance each year is non-negligible, and these are willing clients that insurers are deliberately turning down. Previous research by Murtaugh et al. (1995) indicates that the medical filtering mechanism

currently in use by insurers misses the mark: those excluded by underwriting in fact have lower expected nursing home use than those who are accepted. Also, by combining a cash annuity with LTC insurance, adverse selection is defeated in both products (it mutually cancels out): people with high risk of disability in old age cost less on the annuity side, and people with high longevity cost less on the LTC insurance side.

One hypothesis for the low take-up of annuities is the reluctance of seniors to tie up their resources in a product where they cannot access the capital, making it hard to cover for a health emergency like LTC. Combining a cash annuity with an LTC benefit addresses this liquidity concern. In the same fashion, it is sometimes argued that the low take-up of LTC insurance is due to the extended time horizon over which premiums must be paid and the small and distant nature of the risk covered. Again, combining a cash annuity at retirement with a LTC benefit could give buyers the impression they are getting more immediate utility out of this insurance product.

Another positive aspect of the model developed by Murtaugh et al. is that it delivers its benefits in the form of unconditional cash payments. As previously shown in section 2.2.2, the theoretical argument for unconditional LTC cash payments is the freedom it confers on seniors to choose their own care setting, choose their provider, and in turn increase the proportion of home care arrangements over institutionalization (Stone, 2001; Glendinning, 2008). Also, the model developed by Murtaugh et al. adheres to minimal medical underwriting, which implies that only those already disabled at age 65 would not qualify for benefits. The model could be easily converted into a social insurance program if all medical underwriting was eliminated. Indeed, as

the authors point out, removing all medical underwriting at age 65 would have little impact on premiums, since there are so few of these "extremely high-cost cases", and because annuity benefits for them would be small, due to shorter life expectancy.

However, the proposal by Murtaugh et al. carries some negative aspects as well. As can be observed in Table 3.1 in the next section, the price of premiums for the proposed annuity/LTC insurance product is only marginally lower than when both products are purchased separately. Therefore, it is hard to believe the reduction for the combined benefit would be enough to generate a spontaneous movement by consumers to buy combined insurance coverage. Said differently, the price elasticity of demand for this product might be low, and the proposal may require a larger price drop before it could be considered a commercial success.

And as remarked by Murtaugh et al., cash benefits are of value to the nondisabled as well as the disabled, and this can lead to a behavioral response –or moral hazard– where disabled individuals and their medical providers tend to inflate the medical assessment in order to qualify for higher benefits. When ADLs are used to determine eligibility for benefits, this phenomenon is labelled "ADL creep"[38], and this moral hazard could affect the viability of the proposal since the benefit structure is linked to an ADL scale.[39]

In closing, here is an evaluation of Murtaugh et al.'s proposal against the five goals of LTC reform in the United States, as established by Wiener et al. (1994). We find that goals 1, 2, 3,

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[38] Murtaugh et al. (2001:246)
[39] See also section 2.2.2 for a general discussion of ADL creep in cash-for-care schemes.

and 4 below are achieved by the proposal, provided that this is still a private, voluntary solution, not a public mandatory one.

1. Recognizing that LTC is a normal life risk:

One of the benefits of purchasing the combined annuity/LTC insurance product described by Murtaugh et al. is that buyers will have certainty as to who will pay for their LTC needs, should they ever become disabled in old age, and those costs will not cause immediate financial distress for them or their immediate family.

2. Offering protection against the catastrophic out-of-pocket costs of LTC:

As remarked by Wiener et al. (1994:11), very few seniors can afford to pay out-of-pocket for even one year of nursing home care. The advantage of the combined annuity/LTC insurance product designed by Murtaugh et al. is that a cash benefit (an extra annuity) is paid out upon determination of LTC needs, thus responding to this increased demand for cash, and preserving other assets at the same time.

3. Preventing dependence on welfare systems:

Potential buyers of the combined annuity/LTC insurance product could well be motivated by a desire to avoid falling on Medicaid due to prolonged LTC need, a situation that carries some stigma for many. If buyers have substantial assets to protect, such an insurance product would make sense. The value of the LTC benefit may not be sufficient to cover the complete cost of care, but this would certainly delay one's depletion of personal assets, and in turn postpone one's reliance on Medicaid.

4. <u>Promoting home care</u>:

As mentioned previously in section 2.2.2, persons with LTC needs generally have a strong preference for LTC care in the home. The proposal, as stated, does not address the issue of how care is delivered, nor does it talk about care settings. But the flexibility of a cash benefit would allow for more home care provision.

The only goal not attained by the joint annuity/LTC benefit proposal is goal #5: making the system affordable overall. As it stands, the proposal by Murtaugh et al. is still a private insurance policy requiring that individuals make a voluntary decision to purchase the product. Since publication of the Murtaugh et al. study, the insurance industry in the United States has begun selling combined annuity/LTC insurance products similar in design to what the authors had envisioned, to moderate success (Cohen, 2016a), but those are still very costly products, and haven't led to a drop in overall LTC costs.

In the next section, we will review the microsimulation and empirical tests used by Murtaugh et al. to assess the financial viability of their proposal.

3.3   Microsimulation and Empirical Tests for the Murtaugh et al. Proposal

Whereas Chen favored a macro approach to evaluate his proposed carve-out, Murtaugh et al. relied on microdata to test the price of their proposed annuity/LTC benefit. The authors' microsimulation was estimated using cases from the 1986 National Mortality Follow-back

Survey (NMFS), where the health history of each decedent was gathered from a next of kin[40].

Using survey information on ADL limitations and cognitive impairment, Murtaugh et al.

reconstructed the calendar of disability onset of those who were aged 65 and over at the time of

their death. After data adjustments and reweighting, the authors ended up with two sub-samples:

Prospective purchasers (77.1% of the sample), who exhibit none of the underwriting

characteristics currently in use in the LTC insurance industry, and *non-purchasers* (22.9% of the

sample), who have one or more of those characteristics[41]. Because of these characteristics, non–

purchasers is the group of seniors aged 65 and older to which no LTC insurance could be sold,

but for which Murtaugh et al. nonetheless computed annuity amounts and LTC insurance

amounts for comparison purposes.

As specified by Murtaugh et al., the goal of the microsimulation was to compare the price of

coverage for "separate income annuities and long-term care policies under current long-term care

insurance underwriting practice and (…) a combined income and disability annuity under a

scheme of minimal underwriting". (Murtaugh et al., 2001:231) The minimal underwriting

criterion is here defined as denying coverage only to those who would qualify for LTC benefits

at the time of purchase. As can be seen in Table 3.1 below, moving from current underwriting to

minimal underwriting dramatically changes the sub-sample proportions (98% of prospective

purchasers and 2% of non-purchasers) as well as the mean number of years lived beyond age 65

for each group.

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[40] As summarized by Murtaugh et al., the 1986 National Mortality Followback Survey is "a nationally representative sample of adults who died in 1986 (...), conducted by the National Center for Health Statistics to study causes of death and disease, demographic trends in mortality, and other healthcare issues." (p. 230).
[41] Of note, previous research by Murtaugh, Kemper and Spillman (1995) seems to indicate that current underwriting procedures used by insurers do not achieve the goal of correctly excluding those with higher LTC risks and costs: indeed, they found that expected nursing home use among prospective purchasers at age 65 is higher than for most non-purchasers.

For prospective purchasers under current LTC underwriting, the estimated premium for a combined benefit was $230,151, while prospective purchasers under minimal underwriting had their premium set at $218,768, a difference of 5.2%. Murtaugh et al. explained this difference by the lower cost of providing income annuities to people in the expanded pool (due to their lower probabilities of survival), which more than compensates for the higher cost of providing disability benefits.

For non-purchasers under current LTC underwriting, the estimated premium for a combined benefit was $188,018. This is the lowest estimated premium of all groups, and again the difference is explained by the low cost of providing income annuities to this group, whose members can only expect to live 11.7 years on average after age 65. When moving to minimal underwriting, the estimated premium for a combined benefit was $304,427: this time, the higher LTC benefit costs incurred by this subgroup could not be offset by their shorter life expectancy.

Table 3.1 Premiums at Age 65 for Income Annuities with Disability Benefits, under Current LTC Underwriting Policies and Minimal Underwriting Policies.

	% of sample	Mean survival (years) after age 65	$1,000 monthly life annuity only	$2,000 monthly 2+ADL disability benefit	$1,000 monthly 4+ ADL disability benefit	Lump-sum premium for a combined benefit
All persons	100.0	17.8	$177,238	$35,649	$7,630	$220,517
Prospective purchasers						
• Current LTC underwriting	77.1	19.5	$187,102	$35,258	$7,791	$230,151
• Minimal underwriting	98.0	18.0	$178,426	$33,122	$7,220	$218,768
Non-purchasers						
• Current LTC underwriting	22.9	11.7	$143,963	$36,969	$7,086	$188,018
• Minimal underwriting	2.0	5.9	$120,268	$156,864	$27,295	$304,427

Source: Murtaugh et al, 2001 (tables 2 & 3) and author's calculations.

Notes: Income annuities are purchased at age 65 on a unisex basis, and payments are guaranteed for a minimum of 10 years. All benefits are protected against inflation: income annuities are indexed at 3% per year, compounded, and disability benefits are indexed at 5% per year, compounded. All premium amounts include expense loadings of 3.5% for the income annuity part, and 18% for the LTC benefit, for a combined expense loading of 5% on the combined product. Expense loading levels were set by Murtaugh et al. to mirror insurers' current practice.

Looking at the top line of Table 3.1, which encompasses the entire cohort of persons turning 65 years old, the combined lump-sum premium would only be slightly higher than for prospective purchasers under minimal underwriting ($220,517 in lieu of $218,768). Thus, complete risk pooling for longevity and LTC risks is only 0.8% higher than with minimal underwriting, but still 4.2% lower than with current LTC underwriting. On this matter, Murtaugh et al. wrote:

"While a private insurer might not be willing to immediately cover persons already in claim, the implication is that the small group excluded by minimal underwriting would have little impact on costs for a mandatory public program, in which there is pooling over all risks." (p. 237)

Other empirical tests by Murtaugh et al. seem to indicate the value of a combined annuity/LTC benefit. For example, the authors estimate that only 72.7% of men and 81.0% of women aged 65 years old can buy a LTC insurance policy under current LTC underwriting practices, because of mens' earlier onset of disability. Moving to minimal underwriting would more or less equalize access for men (97.6%) and women (98.3%) at age 65. But where women are less prone to early disability onset, they compensate with greater longevity, higher LTC costs, higher rates of chronic disability, and longer probabilities of survival with disability. All these contribute to higher premiums for women (14.5%) than for men in the microsimulation.

Another aspect is the impact of minimal underwriting for persons who postpone purchase of LTC insurance until later in their senior years. Here, the authors estimate that only 69% of seniors aged 75 years old can buy a LTC insurance policy under current LTC underwriting practices, a proportion that could increase to 94.5% under minimal underwriting. In this case, purchasing a combined annuity/LTC benefit would generate savings of 3.1% over the separate purchase of the said policies. Buying a combined annuity/LTC benefit at age 75 would be 13% lower than a same product bought at age 65.

A third empirical test has to do with the possibility that benefits are underestimated by the microsimulation. On one hand, expanding access to the cash benefits of LTC insurance could promote a form of moral hazard where people covered by LTC insurance –and their medical providers– tend to overstate disability levels in order to reach the next level of disability benefits sooner. This response, labelled ADL creep, was discussed earlier in section 3.2. On the other hand, actual disability levels in the population could be higher than reported in survey data, for a myriad of reasons not related to individual behavior. Both situations could lead to higher direct benefits than estimated by Murtaugh et al. To find out the magnitude of this effect, the authors simulated a simplified case where persons with one ADL limitation were to receive the benefit for two ADLs, and persons with three ADL limitations were to receive the benefit for four ADLs. This caused an increase of 41%-56% in payouts for disability; yet, this increase only had a modest effect on combined annuity/LTC premiums (i.e. 4%-6%), since the LTC part represents no more than 10% of the total premium.

3.4 Proposal for a Microsimulation Building Upon the Models of Chen and Murtaugh et al.

Chen's proposal first introduced the principle of trading off some of SS retirement wealth to create a social insurance LTC benefit. As mentioned, the author devised such an approach because he thought it unlikely that new public funds for a social insurance LTC benefit would materialize, as well as his belief that many American households may not have the available resources to start contributing to such a plan. Unfortunately, Chen estimated his proposal using a

macro approach, and did not touch upon parameters such as benefit levels, or the redistribution feature of his proposal by which low-income seniors would get free LTC benefits.

Through their proposal, Murtaugh et al. wanted to solve the problem of small markets for annuities and LTC insurance, two products designed to prevent against the possibility of exhausting one's financial resources. Murtaugh et al. consider that adverse selection is a key factor explaining why annuities and LTC insurance policies do not reach wider clienteles. Through a microsimulation, the authors find that combining the two insurance products together and applying minimal medical underwriting brings down the aggregate cost of coverage –more, it makes LTC insurance available to almost all 65 year olds. But one critique of the proposal by Murtaugh et al. has to do with the affordability of such a combined benefit for those turning 65. Specifically, it is unclear *how many* seniors would be able to shoulder such premiums. From the microsimulation analysis, it also becomes clear that an overwhelming share of the combined premium is destined to service the annuity, not the LTC benefit.[42]

In this context, we suggest creating a hybrid of the proposals by Chen and Murtaugh et al., that is, a system in which Americans applying for Social Security (SS) retirement benefits at age 65[43,44] could divert some of their benefits to buy LTC insurance coverage, on a voluntary basis,

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[42] As mentioned by Professor John Moran (Penn State) in an email to Professor Douglas Wolf, the applicability of the Murtaugh et al. proposal to Social Security breaks down on the matter of adverse selection on health and longevity matters. Specifically, the Murtaugh et al. proposal of a combined annuity and LTC benefit would be beneficial to a clientele whose health (either good or bad) isn't in the tails of the distribution (e.g. people who have a more or less equal interest in being covered for risk of LTC as well as for income stability). The problem is that Social Security does not suffer from adverse selection as an annuity provider, because coverage is made compulsory by the law.

[43] We acknowledge the fact that full retirement age for SS retirement benefits has been in increasing since 2003 for cohorts of Americans born in 1938 and later, but for simplicity – and since the full retirement age is not yet stabilized – we continue to refer to age 65 as the milestone for full retirement age. This hypothesis will be carried forward into our microsimulation.

without medical underwriting. The LTC benefits thus purchased would replicate the proposed

schedule of benefits of Murtaugh et al. (i.e. $2,000 per month if one becomes chronically

disabled with two ADLs or cognitively impaired, and an additional $1,000 per month if one

becomes chronically disabled with four ADLs). Benefits would be put into payment following a

medical assessment of limitations, and only after a six-month elimination period[45]. The benefits

would be delivered as unconditional cash payments to the recipient, or to the person responsible

for organizing care (cash-for-care).

The feasibility of this carve-out rests for the most part on the <u>magnitude of the LTC insurance

premium</u>, and the <u>theoretical value of accumulated SS wealth</u> amassed by individuals over their

working life. The former could be estimated based on the recent disability experience of senior

Americans, either from retrospective sources (e.g. the 1986 National Mortality Follow-back

Survey used by Murtaugh et al.), or from prospective sources (for example, panel surveys like

the Health and Retirement Study). The latter could be estimated as the net present value (NPV)

of a stream of SS retirement benefits for a given individual at a precise claim date, using an

individual's primary insurance amount, SS mortality tables, and assumptions for interest and

inflation rates from the SS Trustees' reports. For those electing to purchase the LTC insurance

coverage upon application for a SS retirement benefit, the Social Security Administration (SSA)

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[44] Following on the contents of footnote 43, we must also acknowledge that it is possible to collect SS retirement benefits as early as age 62 (or as late as age 70), with an downwards (upwards) actuarial adjustment to account for the longer (shorter) period during which retirees will be collecting SS benefits.   The monthly rate of reduction from the full retirement benefit is 5/9 of 1 percent a month for the first 36 months preceding the full retirement age, and 5/12 of 1 percent for any additional month. For workers who reach age 62 in 2005 through 2016, the maximum overall reduction for early retirement is 25 percent. Seventy-two percent of retired beneficiaries receive reduced benefits because of entitlement prior to full retirement age. (source: Annual Statistical Supplement to the Social Security Bulletin, 2015).

[45] At present, recipients of a SS disability pension who qualified before the age of 65 see their disability benefit converted to a retirement benefit at 65. Since their likelihood of needing LTC is higher than non-disabled workers and retirees, the six month elimination period for LTC benefits would be waived for them.

would deduct a one-time LTC insurance premium out of their predicted NPV[46]. A reduced

retirement benefit based on the remaining NPV would then be put into payment. Both the

retirement benefit and the LTC benefit would be subject to the same cost-of-living adjustments.[47]

In designing this carve-out, care would be exercised to make sure that all benefits are actuarially

neutral on the individual[48], so as to avoid creating new liabilities on the Social Security trust

fund. Unlike Chen's proposal, there would be no redistributive aspect to our proposal: LTC

insurance premiums would be the same for everyone, and the carve-out would be offered only to

those whose accumulated SS wealth is greater than the one-time premium costs of LTC

insurance. Lastly, the administrative cost of running a 'single-payer' LTC insurance scheme

would be proportionately lower than what is currently seen in the private LTC insurance market,

due to the absence of profit motives (expense loadings) in social insurance schemes[49].

Through a microsimulation exercise, our goal will be to evaluate how many American seniors

could afford to convert their SS retirement benefits into a joint retirement and LTC benefit, given

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[46] As mentioned previously, 72 percent of currently retired beneficiaries have applied for their retirement benefits before reaching full retirement age, and thus receive actuarially reduced benefits until death. Given that our proposal entails lower retirement benefits in exchange for LTC insurance coverage, it is to be expected that the younger one is when applying for retirement benefits, the less likely one is to purchase LTC insurance from SS wealth.
[47] Worthy of note, the average cost of LTC in recent years has been rising at a faster rate than the Consumer price index, a situation that is in part driven by the labor-intensive nature of care work, whether in institutional or home settings. This cost increase means that ceteris paribus, the purchasing power of the proposed LTC benefits would decline over time. To preserve intergenerational equity (in the form of a purchasing power parity), a solution might be to apply an indexation rate specific to the LTC benefits, although this would have negative repercussions on the initial LTC insurance premium.
[48] In essence, actuarial neutrality on the individual means that if someone's predicted present value of retirement benefits is estimated at $300,000, his/her combined value of retirement benefits plus LTC insurance benefits should also be $300,000. This is done so that the progressivity of the benefit structure is left unchanged. Variations in longevity and disability experience across individuals means that gains and losses to the Social Security trust fund would even out at the cohort level.
[49] Due to a lack of information, we have deliberately stayed away from quantifying the cost of providing the LTC benefit on a national scale. But just like the cost of providing the current suite of SS benefits to all Americans is factored in the legislated contribution rate, the cost of administering the new LTC benefit would have to be factored in the LTC premium.

the global value of all their income sources and assets in retirement. The microsimulation will also look at alternative LTC benefit levels, in order to establish a distribution of affordability across income and wealth levels.

Who would be the most likely clientele for this proposal? Since one of the main functions of LTC insurance is to protect assets, the likely clientele for the proposal is middle-income retirees, who may have one or two sources of retirement income in addition to SS retirement benefits, as well as some accumulated wealth to pass on to their heirs. At present, should uninsured middle-income retirees need LTC, their deductible for Medicaid would be very high (i.e. almost all of their non-housing assets), and so would be their copayment (a large portion of their income stream). Thus it is presumed that middle-income seniors would be willing to accept a 'pay cut' in their SS retirement benefit, to avoid the inferior Medicaid option, and retain as much of their assets as possible. In today's LTC market, these benefit levels may not be sufficient to cover the entire cost of nursing home care, but the idea here is to provide a foundation upon which seniors could build by going to the private insurance market if they so choose. Also, the level of benefits could serve as price signals, leading people into less intensive care settings (e.g. at home, with relatives, in senior day-care).

Low-income retirees (and workers entering retirement with a limited/fragmented record of SS contributions) would likely pass on the LTC benefit offer, either because of low accumulated SS wealth, or for want of other sources of retirement income to live on in retirement. This segment of the retired population might have fewer assets to protect as well, making the Medicaid option more palatable to them. On the other hand, it is possible that low-income seniors in poor health

at age 65 would choose to obtain LTC coverage from SS if they believed their onset of disability

to be imminent, and their expected duration of disability to be longer than average.

As for high-income retirees, a first hypothesis is that they might decline the LTC benefit offer, as

their situation makes them able to self-insure against LTC risk, or buy coverage on the private

insurance market[50]. A second hypothesis is that they might use the proposed carve-out to lower

their SS retirement benefits, and in turn reduce their yearly tax bill. This presupposes that the

proposed LTC benefits would be exempted from federal taxes, mirroring the tax treatment of

current benefits from private LTC insurance policies.

Outside of tax considerations, the degree of benefit take-up may also fluctuate with seniors'

degrees of risk-aversion, precautionary saving and wealth accumulation. Simulation studies

have suggested that precautionary saving is an important determinant of individual wealth

accumulation (Engen and Gruber, 2001). Precautionary saving is usually linked to the

uncertainty of life duration and the fact that people wish to avoid low levels of consumption in

the event that they live longer than expected (Abel, 1985). But with the explosion of health care

costs, precautionary saving can also be invoked for the contingency of needing costly LTC care.

In this situation, risk-averse individuals have to decide which of these two scenarios causes them

less financial harm: 1) not buying private LTC insurance and then being hit with severe

disability, or 2) buying private LTC insurance and not needing it. Thus, the purchase of LTC

insurance can be likened to a bet, but according to the theory of risk aversion developed by

Arrow (1971), the decision to engage in bets depends on one's own degree of risk aversion and

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[50] Consumers Report (2008) has determined that people with personal net worth above $200,000 should be able to shoulder the cost of premiums, while those with personal net worth above $1.5 million should self-insure.

one's marginal utility of wealth. If we posit that marginal utility of wealth is strictly decreasing as wealth increases, then Arrow argues that the willingness of a risk-averse individual to engage in bets of a fixed size should increase as his wealth increases, since the odds demanded diminish in proportion of his wealth. Arrow labels this phenomenon the decreasing absolute risk aversion. In other words, given that the premium of the proposed LTC benefit is fixed, the willingness of seniors to take up the benefit should increase in proportion of their wealth.

This approach to LTC insurance has many positive aspects, many of which are directly derived from our previous analysis of social insurance and cash-for-care schemes:

- Management and delivery of LTC benefits by the Social Security Administration (SSA) would likely be more economical than provision by a private entity, because of the existing SSA infrastructure, and the absence of profit motive. Said differently, those who would trade some of their retirement benefit would be able to purchase more LTC insurance coverage than an equivalent product in the private market, due to the absence of expense loadings –which, according to Murtaugh et al., average 18% for this particular insurance product. Seniors would remain free to increase their LTC insurance coverage by going on the private market.

- Spreading the LTC risk across a cohort of American seniors would ensure equality of access to insurance, eliminating the problems of adverse selection, medical underwriting, and fears of being ineligible for coverage.

- In response to the previous point, critics may counter that the proposed benefit will not spread LTC risk on the entire population of seniors, because take-up would be voluntary and may prove overly popular with seniors who anticipate early onset of disability, thus

increasing SS cash outlays. But since disability and life expectancy are inversely correlated (as shown by Murtaugh et al.), seniors who would rapidly qualify for a LTC disability benefit after age 65 would not receive as much in terms of SS retirement benefits.

- A one-time premium carve-out for payment of the LTC insurance benefit takes care of the issue of commitment: private LTC insurance is usually bought before or at age 65, paid for in regular instalments, and covering a risk that may be 20 or more years away (Cutler, 1996). For private LTC insurance to remain in force, the payment of premiums must continue uninterrupted. This may become a financial drain over time for retirees with less than fully indexed sources of income, a problem compounded by ad hoc premium increases imposed by insurers.

- The proposal would not affect intergenerational equity, since it does not require new Social Security taxes being imposed on current workers.

- The theoretical argument for an unconditional LTC cash payment is the freedom it confers on seniors to choose their own LTC arrangement, choose their provider, and in turn increases the proportion of home care arrangements over institutionalization (Stone, 2001).

- Expanding LTC insurance coverage would be beneficial to the public purse since many uninsured middle-class seniors currently end up relying on Medicaid for their LTC needs after exhaustion of their assets. The proposal would reduce state and federal spending on Medicaid by shifting costs from a tax-based social assistance program to a contributions-based social insurance program.

- Depending on the degree of LTC insurance take-up, the proposal could also curtail the practice of asset sheltering, i.e. a procedure by which people with substantial wealth will transfer their assets to others, in order to ensure their eligibility to Medicaid. (see section 2.1.3)

- Voluntary take-up of the LTC insurance would ensure that people who currently carry private LTC insurance policies are not forced to over-insure for the LTC risk.

- At the individual level, SS retirement benefits could be regarded as annuitized wealth, an illiquid asset which seniors cannot bequeath to the next generation. LTC insurance is fundamentally a device for the preservation of one's assets in the face of a random and costly risk. Therefore, by taking some SS annuitized wealth (in reality a public life annuity) to purchase a LTC insurance benefit, this proposal lets people use their non-annuitized wealth at their discretion in the event that emergency liquidities are needed.[51]

- As mentioned by Chen (1993), there seems to be popular buy-in to the idea of a trade-off, as earlier surveys pointed to a majority of non-retired Americans being willing to trade some portion of their SS retirement benefits in exchange of LTC benefits.[52]

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[51] Levin (1995) offers an interesting variation on this argument: "Social Security wealth is not traded for a variety of reasons. First, a contract to sell future Social Security benefits is not legally enforceable. Second, even if it were, adverse selection would be a severe problem; a person who knows that her mortality probability is higher than average will be the individual most likely to try to sell the rights to her Social Security benefits. In addition, the high correlation between sickness and death causes an ill individual's Social Security benefits to be valued at a lower rate than they would be for a healthy person. As a result, upon finding herself ill, an individual would be forced to sell these rights at a significant discount."

[52] In fairness, these measures of popular sentiment date back to more than a decade. It would be most interesting see whether this opinion has persisted in recent cohorts of workers, given recent economic and financial events. There is also the possibility that surveyed individuals have no indication of their Social Security wealth, and cannot predict with accuracy the level of retirement benefits they stand to receive.

Negative aspects

- As noted for Chen's proposal, extending LTC insurance coverage may raise demand for care overall, something the care market may have difficulty adjusting to. As well, expanding LTC benefits may cause an upward adjustment in labour prices.

- Carving out a LTC insurance benefit from SS wealth may reduce the amount of federal tax revenues, since retirement benefits are taxable and LTC insurance benefits are not. It is unclear at this stage whether this tax loss would be offset by savings in Medicaid spending for LTC.

- Depending on how the life expectancy and disability-free life expectancy of seniors evolve over time, the solvency position of the Social Security trust fund may require that LTC premiums be increased, and this is a political risk.

- The solvency of the Social Security trust fund could also be affected by the fact that not every eligible senior will apply for the LTC insurance benefit. Murtaugh et al.'s original finding is that creating a joint LTC-annuity benefit cancels out two kinds of adverse selection: customers with bad health versus customers with superior longevity. This constitutes a novel approach to an old insurance problem which was usually fixed through compulsory coverage (i.e. social insurance). The problem with converting retirement social security benefits into a joint LTC-annuity benefit is that only the annuity part is compulsory coverage. Choosing LTC coverage is voluntary, and therefore opens the door to adverse selection, with people in poor health rushing to get the LTC benefit as a way of getting more from their accumulated Social Security wealth. A partial solution would be to get more people who aren't in the tails of the health distribution to choose the joint LTC-annuity through a premium discount. The logic behind it is that

people who are not in the tails of the health distribution might be indifferent between LTC benefits and the retirement benefits, yet be sensitive to prices. The premium discount might be financed through Medicaid savings on LTC provision (see section 4.5.3 for a discussion).

- As remarked by Murtaugh et al., cash benefits are of value to the nondisabled as well as the disabled, and this can lead to a behavioral response –or moral hazard– where the disabled and their medical providers inflate the medical assessment of their patient in order to qualify them for higher benefits. When ADLs are used to determine eligibility for benefits, this phenomenon is labelled "ADL creep", and this moral hazard could materialize since the benefit structure is linked to an ADL scale. (See also sections 2.2.2 and 3.2)

- Cash benefits could also become an open door to financial abuse of care recipients, in situations of guardianship where oversight might be weak. This is amplified by the fact that most perpetrators of financial abuse are family members, who may double as caregivers. Financial abuse of the elderly is hard to detect, in part because people tend to manage their affairs in an intimate fashion that is not always conducive to outside 'auditing'. Given these hurdles, monitoring how cash-for-care benefits are spent may require a system of random home inspections to verify if care is provided.

- At the macro level, it is legitimate to ask whether carving out a LTC benefit out of SS wealth would have general appeal, since many indicators point to an erosion of the overall economic position of seniors (carrying higher debt loads, carrying mortgages into their retirement years, having less access to private pensions, facing higher out-of-pocket medical expenditures, earning lower interest on investments, etc.). Seniors may need all

the disposable income they can draw from SS retirement benefits, and not be able to afford the carve-out.

- Since there are large differences in costs for LTC services from state to state (and even within states), it might be necessary to adjust the level of the LTC annuity on location, otherwise seniors in low-cost states would receive more than they need, and seniors in high-cost states would be short-changed. Furthermore, failing to adjust for differences in cost of service provision by locale would introduce a distortion where benefit take-up would be large in 'cheaper' states, and lower in 'expensive' states.

In closing, here is an evaluation of our hybrid proposal against the five goals of LTC reform in the United States, as established by Wiener et al. (1994). We find that goals 1 to 4 are achieved by this proposal.

1. Recognizing that LTC is a normal life risk:

The proposed benefit would trade some of the accumulated wealth held in SS retirement benefits, to create a new, voluntary LTC insurance benefit of equal actuarial value. This in effect puts the risk of LTC on equal standing with the risk of longevity covered by the retirement benefits. For many seniors, it would become the first line of defense against the rising costs of LTC, and would bring more attention to the economic stresses experienced by those with LTC needs.

2. Offering protection against the catastrophic out-of-pocket costs of LTC:

For seniors opting to take the trade-off, the LTC benefit becomes a third-party payer whose function is to preserve a portion of income and assets. The level of benefits in itself may not

entirely prevent from falling into poverty in old age, but the current alternative of Medicaid, with its high deductible and income requirements, is undoubtedly worse.

3. <u>Preventing dependence on welfare systems:</u>

The proposed LTC benefit could decrease reliance on Medicaid in two ways: First, if seniors view Medicaid as an inferior option, seniors may be willing to trade-off some of their SS retirement wealth to buy an actuarially fair LTC insurance.

Second, seniors who do not view Medicaid as an inferior option and who actively prepare by resorting to the practice of asset sheltering, may change their behavior due to the fact that the proposed LTC benefit would originate from an otherwise illiquid form of wealth; thus seniors choosing the SS carve-out would preserve the usufruct of all their other non-annuitized assets, without resorting to complicated and costly asset sheltering techniques.

As mentioned above, the value of the proposed LTC benefit may not be sufficient to cover the complete cost of one's care: depending on their initial wealth levels, some seniors receiving the new LTC benefits may still end up on Medicaid after a while, but in doing so they would become "dual eligibles" (i.e. the Medicaid program and the ongoing LTC benefit together covering the cost of care). Even accounting for those situations, we can assume the impact of the proposal on the level of Medicaid LTC spending would remain positive.

4. <u>Promoting home care:</u>

As mentioned previously in Chapter 2, persons with LTC needs generally have a strong preference for LTC care in the home. So far, this proposal for unconditional cash payments to recipients with demonstrated LTC needs did not address care delivery, nor did it touch upon the question of care settings, but the flexibility of a cash benefit invites for more home care provision. And as pointed out earlier, the relatively low value of the proposed cash benefit could also be seen as price signals, leading people into less intensive care settings (e.g. at home, with relatives, in senior day-care, etc.).

The only goal not attained by the proposal is goal #5: making the system affordable overall. By design, this proposal requires that seniors applying for SS retirement benefits make an informed decision whether to take a full retirement benefit or to purchase the LTC benefit out of their accumulated SS wealth (here defined as the net present value (NPV) of one's stream of Social Security retirement benefits). This trade-off is also conditional on having accrued enough of that form of wealth through lifetime employment/contributions, and having alternate sources of income at older ages (private pensions, investments, continued paid employment, etc.) to offset the carve-out. One indirect way to make the system more affordable would be to commingle all Medicaid savings generated from the proposal in a year, and then reinvest these monies so as to reduce LTC insurance premiums to be carved out of SS wealth. Said differently, Medicaid cost reductions would be reinvested to offer better-than-actuarially fair LTC benefits. In theory, this positive feedback effect could expand the base of seniors for whom the proposal would be financially attractive. The politics of implementing this Medicaid feedback loop would be a different matter, given the entrenched ideological positions regarding Medicaid spending as a whole, but the actuarial aspects may be worth considering anyway.

3.5   Chapter's Conclusion

The design of a workable LTC policy proposal for the United States must respond to the peculiar way in which costs are borne by individuals, insurers and the State. As described in chapter 1, there is currently little reliance on private LTC insurance, and an over-reliance on out-of-pocket spending (i.e. self-insurance) and welfare programs (Medicaid). As we reviewed in chapter 2, attempts to stimulate the purchase of private LTC insurance policies have generally failed at increasing coverage levels. In addition, recent attempts to create a national social insurance plan (the CLASS act) failed because adhesion to the proposed plan would have been voluntary: said differently, the lack of compulsion meant there was no guarantee that CLASS would have attracted a sufficient number of young and healthy workers to balance the insurance pool.

Despite writing his own proposal two decades before the advent (and failure) of the CLASS act, Chen had already surmised the difficulties of creating new social insurance schemes in the American political landscape: 1) a popular aversion for creating new compulsory insurance programs, and 2) a large portion of Americans who may be budget-constrained. These facts led Chen to suggest the conversion of existing SS retirement benefits into a joint annuity and LTC benefit, to be financed through a 5% carve-out of accumulated SS wealth. A redistributive mechanism would have ensured that those with little SS wealth would receive LTC benefits nonetheless. In our view, Chen's proposal was incomplete because its estimation rested for the most part on a macro analysis, which didn't allow for an in-depth appreciation of how the benefit

worked at the individual level, nor did it allow for sensitivity analyses. Also, the redistributive aspect of the proposal was not quantified.

On the other hand, Murtaugh et al.'s study aimed to examine why and how adverse selection by insurers led to incomplete coverage and high prices in both the annuity and the LTC insurance market. Since someone who is a bad risk for a LTC insurance policy is a good risk for an annuity (and vice versa), the authors conjectured that combining these two risks in a single insurance product with minimal underwriting could defeat adverse selection, and result in a cheaper product than purchasing the two separately. One important critique of the proposal by Murtaugh et al. is that even if it aims to develop the LTC insurance market, the level of the combined premium may well be out of reach for many, because the annuity part is driving most of the premium cost.

This affordability problem led us to consider a LTC policy proposal combining the insurance principles of Murtaugh et al. with Chen's idea for a SS carve-out. SS is basically an illiquid source of wealth amassed through forced savings, which delivers a public annuity. To convert the retirement annuity into a joint annuity/LTC benefit –provided they are actuarially neutral and accessible regardless of previous health conditions– could instill more social insurance in the financing mix we described earlier.

As we wrote previously, the feasibility of this carve-out rests for the most part on the <u>magnitude of the LTC insurance premium</u>, and the <u>theoretical value of accumulated SS wealth</u> amassed by individuals over their working life. In the next chapter, we will describe a microsimulation

which will test for the viability of this policy proposal. A first step will be to establish a calendar of disability for a cohort of Americans on the eve of their retirement, using data from the Health and Retirement Study (HRS). This will allow us to compute the insurance premium to be carved out of SS wealth. A second step will be to measure the value of accumulated SS wealth for this sample of HRS respondents. After deducting the insurance premium from an individual's accumulated SS wealth, we will work our way backwards to compute their new, reduced SS retirement benefit. A third step will be to look at the broader picture of retirement income, by expanding our analysis to other sources of income and financial assets. By combining the value of pensions and financial assets with the now-reduced SS retirement benefits, we will be in a better position to measure who can (and who cannot) afford to purchase LTC insurance coverage from SS wealth. Different levels of LTC benefits will also be tested for sensitivity.

Chapter 4 - Evaluating our Policy Proposal

The core aim of this chapter is to answer our main research question: for how many American seniors would it make economic sense to get a joint income and LTC annuity bought from one's Social Security (SS) wealth at age 65. This will require performing a number of statistical tasks, the first of which will be to estimate via microsimulation the size of the insurance premium required to offer the proposed LTC benefits. Second, the affordability of such an insurance premium will be measured relative to the estimated Social Security (SS) wealth of a sample of seniors, and also in relation to other sources of income and financial wealth they may have. Third, a cost-benefit analysis will determine where, along the income and wealth distribution, the purchase of the proposed LTC insurance does make economic sense for American seniors. And fourth, the potential effects on Medicaid spending will be estimated.

4.1 Description of a Cost-Benefit Analysis Measuring the Lifetime Utility of a Joint LTC-Retirement Benefit

We begin by restating and expanding the framework for the cost-benefit analysis needed to measure the lifetime utility of a joint annuity and LTC benefit bought from Social Security (SS) wealth.

As described in Chapter 3, the proposed benefit is a hybrid of a policy proposal by Chen (1993, 1994, 2003, 2007) and Murtaugh et al. (2001, 2003). The idea for the proposed benefit is as follows: at the time of their application for Social Security (SS) retirement benefits, applicants

would be offered the possibility to trade a portion of their retirement benefit in order to buy LTC

insurance coverage, without regard for their health condition[53]. For each person turning 65, the

Social Security Administration would compute the predicted net present value (NPV) of all SS

retirement benefits to be paid over the life of the applicant and subtract a fixed amount to pay the

one-time LTC insurance premium. Working in reverse, the remaining NPV of SS benefits would

serve to pay reduced retirement benefits to the applicant. Care would be exercised to make sure

that all benefits are actuarially neutral on the individual [54, 55]. So far, the proposed benefit is

nothing more than a voluntary carve-out from one's SS retirement benefit, transforming a life

annuity into a ***combined*** life and LTC annuity.

Mirroring the benefit model developed by Murtaugh et al. (2001), the LTC annuity takes the

following form: if an independent medical assessment finds that one is affected by a disability

level of two or three ADLs[56] or is cognitively impaired, the Social Security Administration

would pay out a monthly cash benefit of $2,000. An increment of $1,000 per month would be

added after reaching a disability level of four or more ADLs. Payment of the annuity would be

made irrespective of care arrangement (whether in nursing home, home care, senior day-care,

etc.). In the context of home care, this LTC cash benefit would serve to pay for the unskilled,

custodial care of the beneficiary, while in the context of a nursing home, the LTC cash benefit

would serve to pay for nursing home costs (e.g. room and board, medication management,

personal care, and social activities). The cash benefit is not meant to cover all costs associated

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[53]This offer would be a one-time enrolment opportunity at the time of benefit application, not an annual open-enrolment event.

[54]See footnote 48 in Chapter 3 for a description of the actuarial neutrality concept.

[55]Actuarial neutrality also implies that premiums and benefits be actuarially adjusted for seniors electing to start their SS retirement benefit before or after the full retirement age. For the sake of microsimulation simplicity, we assume that everybody retires at 65, which was the full retirement age for the cohort of HRS respondents we selected. (see footnote 43 in Chapter 3 for more details)

[56]ADL: activities of daily living.

with LTC, but is designed as a base upon which individuals can either buy supplemental private LTC insurance, or proceed with a careful depletion of their personal assets.

Given the characteristics of the proposed benefit, the main research question is: for how many seniors would it make economic sense to get a joint income and LTC annuity, and where would be the cut-off along the income/wealth distribution. The joint income and LTC annuity being a wealth-preserving mechanism, the aforementioned cut-off could be understood as an area in the distribution where it is less onerous for seniors to purchase the joint annuity than to rely on Medicaid for their LTC needs (that is, an area of the distribution where wealth is not entirely depleted). Now, it is likely that the level of benefits originally envisioned by Murtaugh et al. (2001) might be hard to shoulder for a large proportion of retirees. Therefore, a subsidiary research question is: how can the level of insurance premiums and benefits be modified so as to widen the pool of potential "clients".

Since the proposed LTC benefit would originate from a social insurance scheme, its pricing should be devoid of profit. In other words, the LTC insurance premium should closely correspond to the actual disability experience of American seniors. Thus, our first step is to establish a calendar of disability onset and recovery, to be estimated using the Health and Retirement Study (HRS) and the Asset and Health Dynamics among the Oldest Old (AHEAD) datasets over multiple years. Estimating this calendar of disability onset and recovery will be achieved with the help of a technique developed by Laditka & Wolf (1998) for analysing active life expectancy. Establishing the LTC premium is then a matter of multiplying the number of months individuals spend in disability by the dollar amount of LTC benefits paid by the

insurance, discounted to today's dollars. The methodology is described in greater details in section 4.3 below.

Once the LTC premium is established, its affordability will be evaluated through a cost-benefit analysis using households from the 1992 HRS dataset (couples, single women and single men). This cost-benefit analysis will start from the perspective that individuals' and households' decision to buy the proposed LTC insurance would be made simultaneously with their application for the Social Security retirement benefit (which, for simplification purposes, is assumed to be made at age 65 for everyone[57]). The proposed LTC insurance benefit is basically a wealth-preservation mechanism, whose utility will differ depending on the economic situation of each household. To make a reasoned decision about it, men and women arriving at age 65 would need several pieces of information, like an estimation of life expectancy at that age, the probability of ever needing LTC, their anticipated annual income in retirement, and the value of their financial assets at the time. It is important to state that our analysis is conducted from the

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[57] The decision to force couples to subsidize each other to buy LTC insurance coverage rests on the following logic:
1: There is a large literature in family economics dedicated to the analysis of whether (and how) couples pool their resources, and the degree to which resource pooling influences household spending. For the purpose of our microsimulation, we assume that resource pooling among spouses extends to the realm of health care and health insurance.
2: Because of historical benefit rules, couples are endowed with a larger Social Security wealth than single individuals, due to auxiliary spouse benefits and survivor benefits (the calculation of which is based on both spouses' contribution histories to Social Security). We assume that the extra Social Security wealth available to couples, when considering assumption #1, would make it highly likely that seniors 'subsidize' one another in buying the proposed LTC insurance coverage through their joint pool of Social Security wealth.
As a result, our model assumes that when presented with the opportunity to buy LTC insurance coverage at age 65, both spouses will buy the coverage (2x the premium) using their joint pool of SS wealth, so that both can obtain their individual LTC insurance coverage. Thereafter, each spouse would go on incurring their gender-specific risks of disability and death every year, as individuals.
On a related note, the joint probability of two spouses needing LTC is probably not the same as the probability of two single individuals of similar characteristics. The theory that marriage has protective effects for survival might extend to LTC, and should our proposal ever be implemented in the real world, such a phenomenon could be used in correctly pricing the insurance premium.

viewpoint of prospective purchasers entering retirement at age 65 in 1992[58] who, when faced

with the choice to buy or not the proposed LTC insurance, can only assess their health and

financial situation with the information available to them at that moment[59]. In other words,

prospective purchasers are assumed to be rational, but not omniscient decision-makers.

With these elements in mind, here are the main initial parameters of the model: it is assumed that

that all men and women in the sample[60] reach age 65 in January 1992, and are bestowed a life

expectancy based on SSA life tables (e_{men}^{65}=16 years and e_{women}^{65}=19 years, respectively)[61].

Individuals' anticipated income level in retirement is assumed to be equal to the person's

reported income at age 65, indexed annually to inflation. The treatment of financial assets at age

65 is trickier, because the HRS does not report the composition of each individual's asset

portfolio, and the dataset is not rich enough to determine patterns of asset depletion or re-

investment from wave to wave. To palliate this data limitation, we use the following strong

assumptions with regards to financial assets: all individuals are presumed satisfied with their

retirement income at age 65 and will not need to sell assets to finance their consumption in any

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[58] The choice of 1992 as a base year aligns with the HRS' first wave of data collection, allowing us to follow a cohort of near-seniors until near extinction. By choosing the earliest HRS data point we can conduct a form of historical analysis, assessing how well the Chen/Murtaugh insurance plan would have performed had it been offered then.

[59] While subsequent HRS waves could easily provide the "true" fluctuations of income, financial assets and health status for every senior in the sample, we deliberately chose not to use this information because prospective purchasers in our model do not know their future at the time of purchase. To use this information would create a situation of perfect adverse selection, where only those who know they will need the LTC insurance would purchase it, therefore obliterating the insurance pool from the start.

[60] To create a substantial sample of single men, single women and couples, we couldn't rely solely on people aged 65 in the 1992 HRS because there are just not enough of them. To palliate this limitation, we have decided instead to start with all individuals aged 60 to 65 in the 1992 HRS. The incomes and assets of those aged 60 to 64 were adjusted mathematically using later waves of the HRS, so as to make them comparable. In the case of couples, both spouses had to be within the 60-65 age range to be included in the sample.

[61] We recognize that everyone in the HRS sample will have a unique path to disability and death, which means that probably no one will conform to the SSA-computed life expectancy figures. Likewise, many will never experience the need for LTC before they die. But it is important to view the decision to purchase the LTC insurance in the same way people buy life annuities on the private insurance market: they buy annuities because they *assume* they will outlive their savings, when in fact not everybody in the pool does. And in evaluating the value of the insurance for themselves, they have to rely on heuristics like life expectancy figures and other assumptions.

subsequent year, until disability strikes at the end of their life; income streams derived from invested assets are counted as part of annual revenue; individuals create no new savings after 1992 and the value of one's financial assets grows at par with inflation, which according to the hypotheses of the 1992 SSA Trustees report, is assumed constant at 3% for all years after 1992[62]. These assumptions in effect create a sort of financial "steady-state" from age 65 onwards.

It is assumed that every person in the sample will experience a "disability event" that is severe enough to require LTC in a nursing facility, with disability onset varying between one and three years prior to death. These men and women remain in their disabled condition until death, and the nursing home charges each of them the national average for a semi-private room[63]. Table 4.1 below indicates the national average annual cost for a semi-private room in a nursing home, from 2006 to 2011.

Table 4.1   National Average Annual Cost for a Semi-Private Room in a Nursing Home, 2006-2011 (source: MetLife Market survey of Long-Term Care Costs)

Year	Annual cost
2006	$66,975
2007	$68,985
2008	$69,715
2009	$72,270
2010	$74,825
2011	$81,030

(source: MetLife Market survey of Long-Term Care Costs)

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[62] As specified under SSA's alternative 1. See table II.D.1 of the 1992 Annual Report of the Social Security and Medicare trust funds.

[63] As measured annually by the MetLife Market survey of Long-Term Care Costs.

It is assumed that when the need for LTC arises, individuals are made aware of Medicaid rules

and start paying the cost of their LTC in a manner that preserves their financial wealth: for

example, in the base case scenario (without LTC insurance), it is assumed that seniors will pay

their nursing home stay first with their disposable income, and then deplete their financial assets

down to the Medicaid deductible levels. In the alternate scenario, it is assumed that seniors will

pay for their nursing home stay first with their LTC insurance benefit, followed by their

disposable income, and then deplete their financial assets down to the Medicaid deductible levels

to cover any remaining balance owed. At the time of death, the difference between the balance

of financial assets remaining in the base case scenario (without LTC insurance) and in the

alternate scenario (with LTC insurance) will determine whether purchasing the LTC insurance

was profitable for the person/couple in question[64].

Next, section 4.3 will detail the methodology for establishing the level of the LTC insurance

premium, through an examination of mortality and disability patterns. Then, section 4.4 will

describe the methodology for estimating the total value of Social Security wealth from HRS data.

4.2   Modeling Mortality and Disability Patterns Using HRS Data

It might seem commonplace to state that the prevalence of disability increases with age, but

tracking the evolution of disability over time is a complicated dynamic process: aside from

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[64] As will be seen later, couples are endowed with a larger Social Security wealth than single individuals, due to auxiliary spouse benefits and survivor benefits (the calculation of which is based on both spouses' contribution histories to Social Security). Assuming that in general spouses pool their resources to pay for household expenditures, it makes sense to assume that they would also 'subsidize' one another in buying the proposed LTC insurance coverage through their joint pool of Social Security wealth (see footnote 57 for a related discussion).

measurement challenges, one cannot envision disability in older persons as being strictly

progressive or permanent, because many will move in and out of disability repeatedly as they age

(Hardy and Gill, 2004). The proposed LTC benefit described in section 4.2 above was originally

designed by Murtaugh et al. (2001) as being triggered by ADLs, in a manner that assumed full

linearity (e.g. progression from healthy status to light disability, followed by serious disability

and death). This implied that once benefits were put into payment, they were to continue until a

more serious disability condition –or death– occurred, but they never reversed back to good

health. In order to match the original design of the proposed benefit, we will replicate this

condition (hereafter referred to as *continuous benefits*), but since disability levels is the most

important element of the LTC insurance premium, we feel compelled to compare this benefit

design with a benefit that allows for returns to good health (hereafter referred to as *discontinuous*

benefits).

4.2.1   Description of the Stochastic Modeling Methodology and its Limits

To model the evolution of mortality and disability patterns, one has to rely on transition

probabilities estimated from panel survey data, where the functional status of sampled

respondents–and their eventual death–is being recorded over time. A common problem with

panel surveys is that if respondents are reached at intervals of one or two years, short periods of

disability and recovery might go unrecorded, creating biased estimates of disability transition

probabilities (Wolf & Laditka, 1997; Laditka & Wolf, 1998; Wolf & Gill, 2009). Another

problem of panel surveys is that time between two interviews can fluctuate across respondents

and from wave to wave, often substantially. To remedy these problems, an approach based on

embedded Markov chains and the increment-decrement life table was developed by Douglas A. Wolf and Sarah B. Laditka (Wolf & Laditka, 1997, Laditka & Wolf, 1998, hereafter referred to as W&L). This method allows to artificially "fill in" for the missing information between survey waves. A Markov model is an iterative process where surveyed individuals are assumed to stay in a defined health state for a given unit of time, followed by another unit of time where they may make a transition to another health state. Markov models are devoid of memory, in the sense that the sequence of previous states does not predict or influence future states. As noted by Gandjour and Weyler (2006:361), Markov models are useful in situations where risk is continuous over time, when the timing of observed events is important, and where those events may happen repeatedly[65].

The first step of the method developed by W&L is to use maximum likelihood estimation of transition probabilities between health states. From observations collected every two years, the method can derive transition probabilities for periods as short as one month, but for the case at hand, six-month transition probabilities–matching the length between two health assessments in our proposed benefit–will be sufficient. As described by W&L, these transition probabilities represent the chances that a person of a given age and functional status will, by the next time period, see an improvement or a decline in functional status, remain in the same functional status, or die. The transitions can occur between the following four discrete states: unimpaired (0-1 ADLs), moderately impaired (2-3 ADLs), severely impaired (4 and more ADLs), and death. In matrix (2) below, these states are abbreviated as U, M, S, D for short.

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[65] Research by Hardy & Gill (2004) and Hardy et al (2005) using panel data with 1- month time intervals has shown that the Markovian assumption for month-to-month disability may not hold true. In fact, prior disability is a predictor of disability onset and recovery. But as observed by Wolf & Gill (2009), the Markovian assumption remains unavoidable given the existing analytical techniques, and given that most panel surveys are plagued with large, time-inconsistent intervals between interviews.

Following W&L, the transition probabilities are computed in the form

$$p_{ij}(age,\ t) = pr(STATUS_{t+6} = j \mid STATUS_t = I; age_t) \tag{1}$$

where the probability of an individual being in status j in t+ 6 month is dependent on what status the individual occupies at time t and the individual's age at time t. Given the multiple possible transitions between states, the probabilities are arranged in matrix form:

$$P(age,t) = \begin{bmatrix} p_{UU}(age,t) & p_{UM}(age,t) & p_{US}(age,t) & p_{UD}(age,t) \\ p_{MU}(age,t) & p_{MM}(age,t) & p_{MS}(age,t) & p_{MD}(age,t) \\ p_{SU}(age,t) & p_{SM}(age,t) & p_{SS}(age,t) & p_{SD}(age,t) \\ 0 & 0 & 0 & 1 \end{bmatrix} \tag{2}$$

Because death is an absorbing state, $p_{DU}(age,t) = p_{DM}(age,t) = p_{DS}(age,t) = 0$ and $p_{DD}(age,t) = 1$ on the last row of the above matrix.

Following W&L, the estimation of transition probabilities includes three covariates: age of respondent (continuous), education level (dichotomized for those with less/more than 12 years of schooling), and race (dichotomized as being white/non-white). The ML estimation strategy is to isolate the embedded Markov chain that corresponds to the best estimation of the observed data. The assumption, as previously stated, is that panel data is represented by a first-order Markov

chain[66]. Thus, the multinomial logistic regression equation for the top three rows of (2) is written as follows:

$$\ln\left[\frac{p_{ij}(age,t)}{p_{iU}(age,t)}\right] = \beta_{ij0} + \beta_{ij1}age_1 + \beta_{ij2}Nonwhite + \beta_{ij3}Low\ education \qquad (3)$$

where $i = U$, M or S, and $j=U, M, S$ or D. The IMaCh computer program is then brought in to estimate the transition probabilities for given time intervals. IMaCh (which stands for **I**nterpolation of **Ma**rkov **Ch**ains) is specially designed to incorporate multiple waves of data from panel surveys with different interval lengths between waves. Created in 2003 by A. Lièvre, N. Brouard and C. Heathcote, the IMaCh program is a direct extension of the work of W&L, and uses the same ML estimation strategy. The program outputs the matrix of transition probabilities as in equation (2) as well as confidence intervals.

4.2.2   Description of the HRS Dataset; Description of the Disability Thresholds.

The data used by IMaCh for the estimation of transition parameters is from the Health and Retirement study (HRS), a longitudinal panel study that surveys a representative sample of more

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[66] The performance of W&L's method for estimating disability dynamics was put to the test by Wolf & Gill (2009). The authors were fortunate to have access to a dataset containing regular 1-month measures of disability, which allowed them to estimate a complete Markov-chain model. Then, they discarded monthly information from the full dataset to mimic the interval sequences of a survey like the HRS (which interviews its subjects every 24 months), and tried to estimate the same Markov-chain model again. Their conclusion is that the ability of W&L's method to reproduce the parameters of a complete data model is low, producing downward biases in the probabilities of disability onset and recoveries (e.g. fewer disability/recovery events than would be observed in continuous observation). Wolf & Gill also remark that W&L's method underplays the risk of becoming severely disabled immediately prior to death. Given that there are currently no solutions to these methodological issues, the best we can do is limit our analysis to population averages generated by the IMaCh estimation software. Another point which is likely to attenuate biases is that the proposed benefit for which this microsimulation is being written requires a 6-month elimination period, which is likely to discard many episodes of short-term disability.

than 26,000 Americans every two years since 1992. As stated in the survey documentation[67], the

HRS target population includes all adults in the contiguous United States born during the years

1931-1941, who reside in households. Since institutionalization is a key aspect of LTC, it is

interesting to note that while institutionalized populations were initially excluded at entry in

1992, sampled individuals are retained in the survey's following waves if they transition from a

household to an institution. The HRS oversamples for key subgroups of interest: Blacks,

Hispanics, and Florida residents.

To better cover the evolution of disability among older households, the 1993 and 1995 waves of

the Asset and Health Dynamics Among the Oldest Old (AHEAD) survey are included in the

sample. This survey was initiated by the HRS, using the same probability sampling frame, but

with a target population of US household residents who were born before 1924 –i.e. people aged

70 and over in 1993. The AHEAD sample was merged with the HRS sample in each survey

wave in 1998. For the purpose of this study, the 1993 AHEAD wave is assumed to be a

continuation of the 1992 HRS wave, and the 1995 AHEAD wave is assumed to be a continuation

of the 1994 HRS wave (see table 4.2 on next page). Notice that the AHEAD sample was not

interviewed in 1996[68]. These minor adjustments are fully accommodated by the IMaCh

program.

The specific operations required to prepare HRS/AHEAD data into a flat file, ready for

submission into the IMaCh program are detailed in Appendix 2 at the end of the chapter.

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[67] http://hrsonline.isr.umich.edu/sitedocs/surveydesign.pdf

[68] The original HRS sample was augmented with new cohorts in 1998 and 2004, but these were deliberately left out for this study, because they were present in the sample for fewer waves, and therefore lacked information about early transitions (i.e. they were left-truncated as compared to the 1992 HRS and 1993 AHEAD original cohorts).

Table 4.2   HRS Summary Statistics

Survey and year	Wave #	N	Age ranges
Hrs 1992	1	2,617	60 – 92
Ahead 1993	1	7,417	70 - 103
Hrs 1994	2	2,186	62-93
Ahead 1995	2	6,193	72-105
Hrs 1996	3	2,018	64-95
Hrs 1998 (merging with AHEAD)	4	6,950	66-105
Hrs 2000	5	5,875	68-107
Hrs 2002	6	4,956	70-109
Hrs 2004	7	4,129	72-107
Hrs 2006	8	3,399	74-105
Hrs 2008	9	2,776	76-107
Hrs 2010	10	2,125	78-109
Number of **Men** Retained in All Waves		3,563	
Number of **Women** Retained in All Waves		5,232	

4.2.3   Modeling Results

After all data preparation operations are completed, the flat file is submitted into the IMaCh

software for estimation of transition probabilities[69]. Tables 4.3 and 4.4 present the regression

coefficients estimated values from the IMaCh software for men and women, for various origin-

destination pairings. The omitted transitions are the status quo pairings (e.g. UU, MM, SS). As

can be attested by the standard errors and T-values, the estimated coefficients are very precise,

with 35 out of 36 being significantly different from zero for men, and 36 out of 36 for women.

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[69]The software finds convergence of the Maximum Likelihood (ML) estimator quicker if the user writes a set of "guess values" for the parameters to be estimated. Thus, in order to speed up convergence of the estimator, one can run IMaCh multiple times, starting with parameter guess values set to zero and a large time interval for the transition probabilities (e.g. in our case, 24 months). The parameter estimates obtained after a first run can then be used as guess values for a second IMaCh run where the time interval for transition probabilities is reduced to 12 months. Parameter estimates from the second run can then be used as guess values for a third run where the time interval is further reduced to 6 month (our target). Consequently, the results estimated in each IMaCh run become the starting point of the subsequent, more refined ML estimation.

Table 4.3   Estimated Transition Parameters (and Standard Errors) for Men

Origin	Destination	Variables			
		Constant	β1 Age	β2 Non-white	β3 education
U	M	-10.155 (0.012)*	0.077 (0.000)*	0.346 (0.003)*	-0.047 (0.002)*
U	S	-9.100 (0.008)*	0.073 (0.000)*	0.675 (0.002)*	-0.826 (0.001)*
U	D	-8.558 (0.007)*	0.062 (0.000)*	0.134 (0.002)*	-0.259 (0.001)*
M	U	1.094 (0.015)*	-0.033 (0.000)*	-0.050 (0.005)*	-0.039 (0.003)*
M	S	-1.104 (0.012)*	-0.003 (0.000)*	-0.343 (0.006)*	-0.633 (0.003)*
M	D	-1.576 (0.012)*	-0.008 (0.000)*	-0.055 (0.006)*	-0.119 (0.004)*
S	U	0.083 (0.012)*	-0.040 (0.000)*	0.180 (0.003)*	-0.030 (0.002)*
S	M	0.189 (0.027)*	-0.058 (0.000)*	-0.003 (0.007)	0.351 (0.005)*
S	D	-8.245 (0.008)*	0.071 (0.000)*	-0.135 (0.002)*	0.242 (0.001)*

Legend: U = unimpaired; M = Moderately impaired; S = severely impaired; D = dead.

*Value of the t-statistic is greater than 2.0.

number of cases=3563

Table 4.4   Estimated Transition Parameters (and Standard Errors) for Women

Origin	Destination	Variables			
		Constant	β1 Age	β2 Non-white	β3 education
U	M	-9.171 (0.007)*	0.072 (0.000)*	0.110 (0.002)*	-0.407 (0.001100)*
U	S	-11.639 (0.007)*	0.101 (0.000)*	0.537 (0.002)*	-0.465 (0.001)*
U	D	-10.070 (0.007)*	0.074 (0.000)*	0.335 (0.002)*	-0.320 (0.001)*
M	U	-0.373 (0.008)*	-0.015 (0.000)*	-0.058 (0.002)*	-0.067 (0.002)*
M	S	-3.959 (0.010)*	0.029 (0.000)*	0.222 (0.002)*	-0.276 (0.002)*
M	D	-5.933 (0.015)*	0.038 (0.000)*	-0.590 (0.006)*	-0.049 (0.002)*
S	U	2.449 (0.012)*	-0.074 (0.000)*	-0.011 (0.003)*	0.037 (0.002)*
S	M	2.230 (0.013)*	-0.070 (0.000)*	-0.195 (0.003)*	0.290 (0.002)*
S	D	-3.658 (0.003)*	0.016 (0.000)*	-0.455 (0.001)*	0.074 (0.001)*

Legend: U = unimpaired; M = Moderately impaired; S = severely impaired; D = dead.

*Value of the t-statistic is greater than 2.0.

number of cases=5232

Before moving ahead with the microsimulation of disability transitions, it is important at this point to check the validity of the mortality profile generated by the IMaCh program using HRS

data. In other words, the estimated mortality profile must be compared to a reference mortality scenario (or benchmark). This step is important given the aim to estimate a fair-value LTC insurance premium to be carved out of seniors' Social Security (SS) wealth: consequently, the IMaCh mortality profile should closely align with SS life expectancy projections. Detailed steps on the transformation of IMaCh results into mortality profiles are outlined in Appendix 3.

Figure 4.1   Survival Curves (l_x) for Men

Figure 4.2   Survival Curves (l_x) for Women
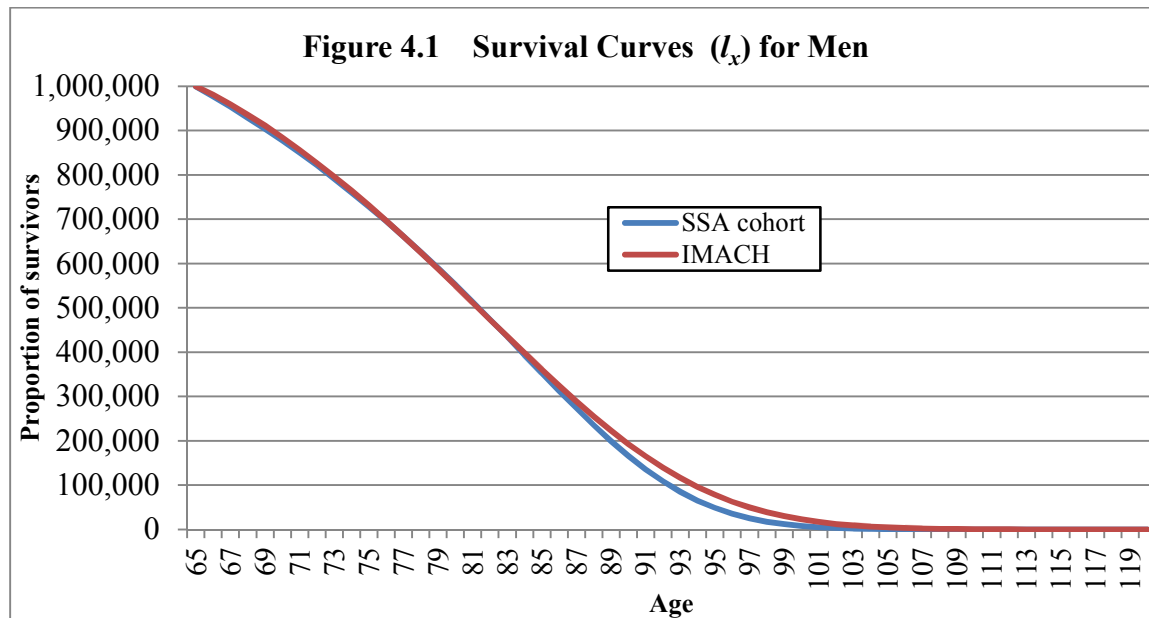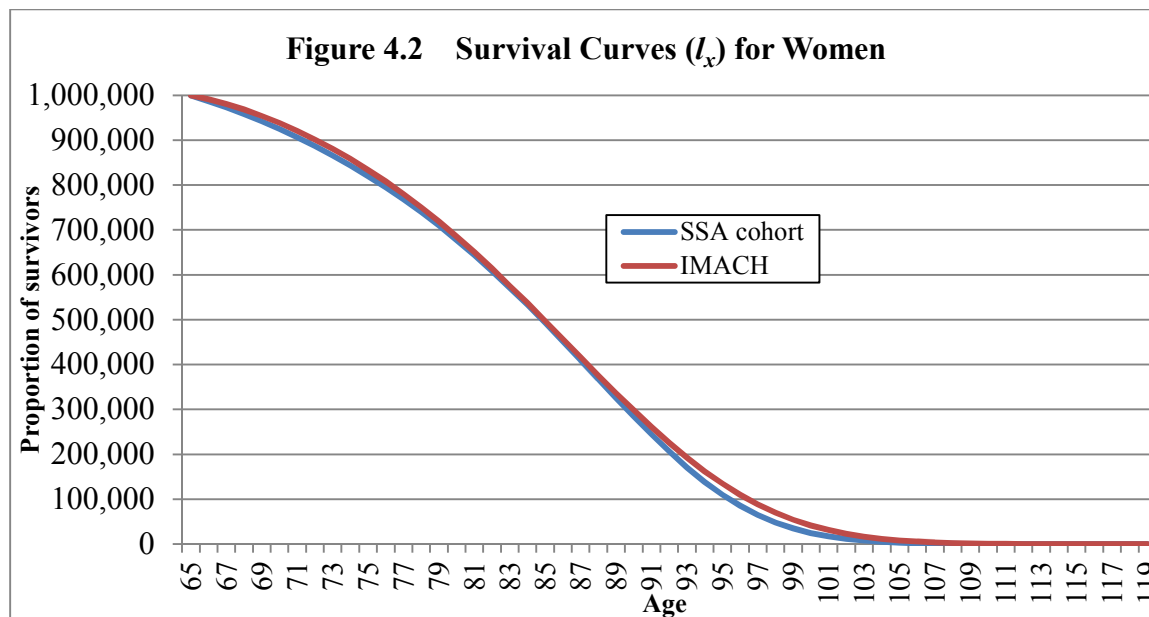
The mortality table selected as benchmark in this case is taken from the Life Tables of the United

States Social Security Area 1900-2100, a report prepared by actuaries at the Social Security

Administration (Bell and Miller, 2005). Specifically, the mortality profile of the 1930 cohort life

table is used, for it approximates the entry cohort of HRS respondents in 1992, whose ages at

entry are between 51 and 61. The near-superimposition of red and blue lines on Figures 4.1 and

4.2 (above) seem to indicate a close adherence to the benchmark, but it is safer to test it

mathematically. To perform this, a standardization equation commonly found in actuarial

mathematics and demography is used. Equation (5) below indicates the number of deaths

expected (E) from the life table generated by the IMaCh software, and compared to the number

of deaths in a reference life table (R). Results from equation (5) are multiplied by 100, where

E/R=100 indicates that aggregate mortality is exactly the same in both life tables. Values below

100 indicate that the mortality profile in the life table under study is lower (that is, people tend to

live longer) than in the reference table (Mitchell & McCarthy, 2002).

$$E/R = \frac{\sum_x l_x q_x^*}{\sum_x l_x q_x} \times 100 \qquad\qquad (5)$$

In equation (5) above, q_x^* is the death probability at each age in the mortality table under study, and q_x is the death probability in the reference mortality table. The l_x is the weighing element, initially set at 100,000, but decreasing so that $l_x = l_{x-1} (1-q_x)$. l_x is therefore the number of people who survive at age x in the reference table. Table 4.5 shows how the mortality profile generated by the IMaCh software (and based on HRS data) compares to the SSA benchmark, for a set of age ranges.

Table 4.5   E/R ratio

Age Range	Ages 65-85	Ages 85-119	Ages 65-119
Men	98.04	79.93	92.03
Women	95.14	73.05	84.56

As observed, the estimated mortality profile seems to closely follow the benchmark between ages 65 and 85, but tends to decline in later years. One hypothesis is that low sample numbers at higher ages in the HRS might cause the IMaCh estimation to be less precise. Whereas it would be ideal for the mortality profile generated by IMaCh to match the benchmark perfectly from beginning to end, there is room for accommodation: for one, the LTC insurance premium to be estimated later in this chapter will represent the discounted value of cash benefits to be provided in a distant future, and discrepancies between the estimated mortality profile and the reference mortality profile **at extreme ages** will have a negligible effect on the final dollar value of today's premium, because of the heavy discounting involved.

Also, the fact that our estimated mortality profile tends to <u>underestimate</u> the force of mortality

after age 85 (or overestimate the likelihood of survival after age 85) could be seen as a measure

of prudence against future developments in human life expectancy. The example of the private

LTC insurance market does, in fact, point in that direction: for the past few years, many of the

largest private LTC insurance providers have begun exiting the LTC market due in part to their

underestimation of clients' survival rates. Thus, basing the computation of a premium for a fair-

value LTC insurance benefit on a slightly overestimated likelihood of survival at extreme ages is

similar to adding an actuarial "buffer" for future gains in life expectancy: seniors will be

modeled as living somewhat longer lives, and will face the risk of LTC for longer, which means

that if such a longevity scenario is realized, the added costs should not disrupt the balance sheet.

On a different level, instead of seeing our estimated mortality profile as diverging from the

benchmark, one could criticize the longevity benchmark itself, since according to Lee & Miller

(2001), mortality projections by the Social Security Administration have systematically under-

predicted gains in life expectancy (at birth) since 1950.

4.2.4   Estimation of LTC Insurance Premium Based on Disability and Mortality Patterns

To estimate the LTC insurance premium, the estimated transition probabilities between health

states (unimpaired, moderately impaired, severely impaired and dead) from the previous section

are applied to a large simulated population of seniors aged 65-year old in 1992, which will age

and experience transitions into and out of disability at intervals of 6 months, until cohort

extinction. In this microsimulation, entering the states of being moderately impaired and severely impaired will trigger payment of LTC insurance cash benefits. The microsimulation will track these amounts for each individual over time, and then discount them back to 1992 dollars, using the forward-looking discount rates agreed upon by the SSA Trustees in their 1992 report. The mean value of those discounted benefits would then become the LTC insurance premium the government would need to charge seniors if this policy proposal were to be enacted. As already mentioned previously in this chapter, such a premium would be carved out of Social Security wealth in a one-time payment at age 65, with the remaining Social Security wealth serving to pay retirement benefits.

Four types of insurance premiums can be estimated from the transition probabilities listed in Tables 4.3 and 4.4: one for continuous benefits, one for discontinuous benefits, for each gender. The continuous benefit corresponds to the benefit proposed by Murtaugh et al. (2001), where any senior assessed at two ADLs receives an inflation-adjusted annuity of $2,000/month to pay for LTC, and a further $1,000/month if assessed at four ADLs, even if those disability levels prove to be non-permanent. On the other hand, the discontinuous benefit follows more closely the evolution of disability over time, meaning that the LTC benefit can be raised and lowered depending on the evolution of disability, at 6-month intervals. Intuitively, the discontinuous benefit would require a lower premium, although if implemented, this type of benefit presupposes a system where disability status is tracked over time, not just at the time of initial determination. Our microsimulations apply the transition probabilities on a starting population of 100,000 senior men and 100,000 senior women aged 65 in 1992. As can be seen on Table 4.6 below, the premium for a continuous benefit for men is estimated at $92,773, whereas the

premium for a discontinuous benefit is 33% less, at $62,598. For women, the premium for a

continuous benefit is $118,443, whereas the premium for a discontinuous benefit is 30% less, at

$83,002.

The value of premiums listed in Table 4.6 is obtained after 40 replications of the

microsimulation, so as to measure the variance generated by the estimated parameters in the

transition equations. This portion of the variance, the "between microsimulations" variance, is

very small. The variance generated by the 100,000 computer-generated individuals, which is a

result of the random transitions assignations, must be added to the "between microsimulation".

This "within microsimulation" variance is much larger, given the multiple possibilities of

individual trajectories of disability and death from age 65 until age 120. Equation 6 below is the

formula that combines the "within microsimulation" variance and the "between

microsimulations" variance in a single figure. However, since the interpretation of a variance is

not intuitive when it relates to a mean, Table 4.6 instead shows the standard deviations for each

premium[70].

$$\text{VAR}(\overline{P^*}) = \frac{1}{40}\sum_1^k \sigma_{\bar{P}}^2 + \frac{41}{40}\left(\frac{\Sigma\left(\bar{P}^{(k)} - \bar{P}^*\right)^2}{39}\right) \qquad (6)$$

---

[70]The average for both sexes (Table 4.6, last column) is un-weighted: it assumes that an equal proportion of men and women reach age 65, in each cohort, which is not the case in real life. For example, only 66% of the men from the 1930 cohort were alive at age 65, whereas 78% of women from that cohort were alive at the same age. In the event that the proposed LTC insurance scheme would be implemented, it is presumed that SSA would make use of the average premium for both sexes: for comparison's sake, the FICA tax rate for OASDI, which is akin to an insurance premium, is not differentiated by gender. In similar fashion, since Arizona v. Norris (1983), employers providing retirement benefits (in the form of annuities) have been required to use gender-neutral life tables to establish premium levels for their employees.

Table 4.6   Average Estimated LTC Insurance Premiums for Different Kinds of Benefits, by Gender (1992 dollars)

	Men	Women	Average for both sexes
Premium for a continuous benefit	$92,773 (SD=$137,595)	$118,443 (SD=$145,773)	$105,608
Premium for a discontinuous benefit	$62,598 (SD=$84,961)	$83,002 (SD=$92,150)	$72,800

It is also interesting to look beyond the mean and examine the distribution of simulated

individuals and the value of their discounted LTC benefits. In Figure 4.3, where benefits are

ordered by individuals' total receipt over a lifetime, about 42% of men aged 65 in 1992 would

not receive any LTC benefits before they die, whereas for women of the same age and cohort,

29% would not receive any LTC benefits before death. This is in accordance with the oft-noted

higher prevalence of disability among senior women.

Figure 4.3   Distribution of Lifetime LTC (continuous) Benefits for a Population of 100,000 Men and 100,000 Women Aged 65 in 1992

$\text{Max}_{\text{women}} = \$940{,}214$

$\text{Max}_{\text{men}} = \$862{,}767$
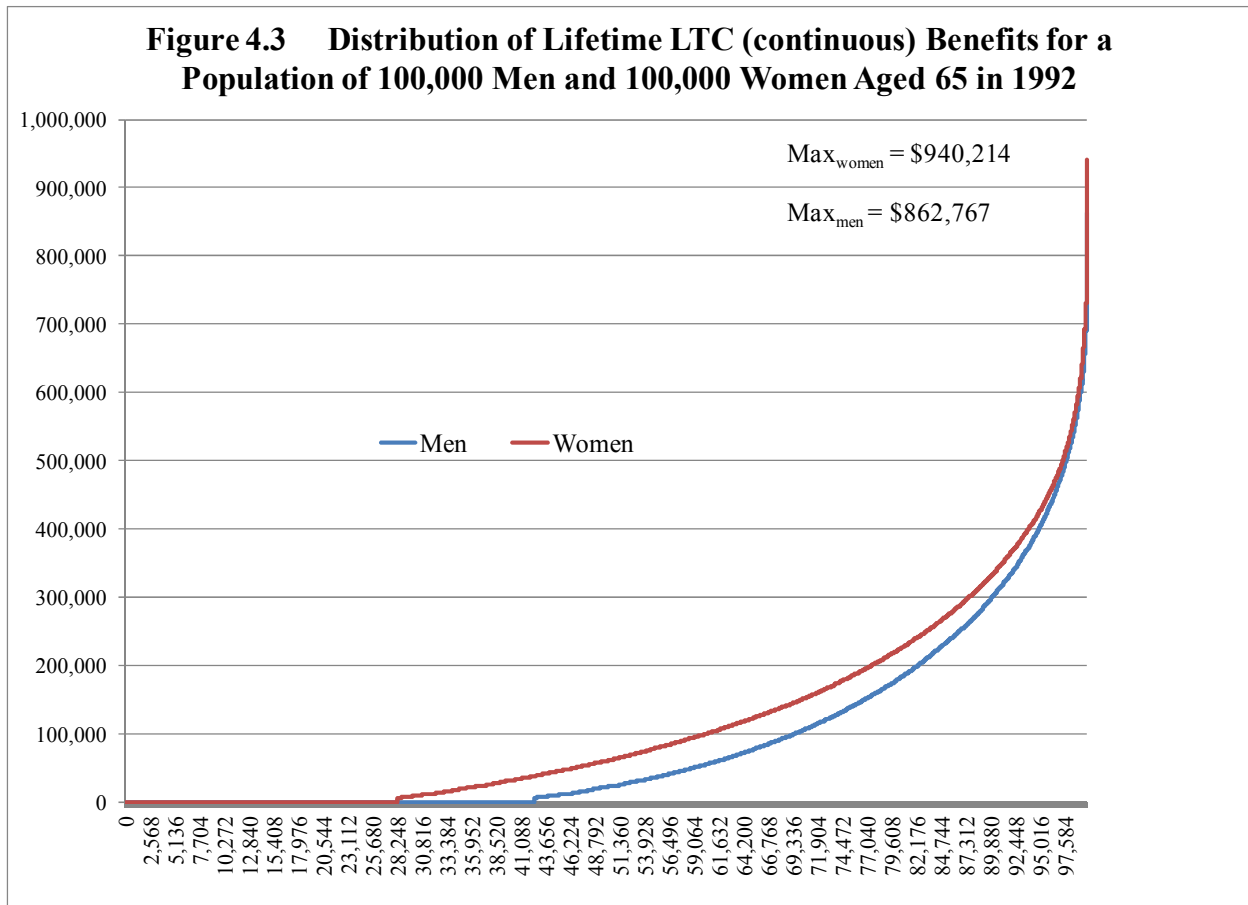
At this stage, it can already be conjectured that the high LTC insurance premiums of Table 4.6 will be hard to shoulder for a majority of persons reaching age 65, whether the LTC benefit is continuous or not. It is therefore more prudent to re-run the microsimulations with partial benefit values. Table 4.7 shows the distribution of premiums for a continuous benefit, while Table 4.8 shows the distribution of premiums for a discontinuous benefit, by 10% decrements. The lowest benefit is arbitrarily set at 30%, since in our opinion, anything lower could be seen as not worth the policy effort.

Irrespective of benefit size, the premiums for the discontinuous benefit are essentially equal to 67% of the premiums for the continuous benefit, which implies a large degree of linearity.

Table 4.7   **Average Estimated LTC Insurance Premiums for a Continuous Benefit,**

Modulated by Benefit Size (1992 dollars)

Amount of benefit	Men	Women	Average for both sexes
100% benefit (2 ADLs=$2,000/month) (4 ADLs=$3,000/month)	$92,773	$118,443	$105,608
90% benefit (2 ADLs=$1,800/month) (4 ADLs=$2,700/month)	$84,006	$110,041	$97,024
80% benefit (2 ADLs=$1,600/month) (4 ADLs=$2,400/month)	$73,518	$97,172	$85,345
70% benefit (2 ADLs=$1,400/month) (4 ADLs=$2,100/month)	$64,556	$85,217	$74,887
60% benefit (2 ADLs=$1,200/month) (4 ADLs=$1,800/month)	$56,072	$73,170	$64,621
50% benefit (2 ADLs=$1,000/month) (4 ADLs=$1,500/month)	$46,232	$61,226	$53,729
40% benefit (2 ADLs=$800/month) (4 ADLs=$1,200/month)	$37,085	$48,662	$42,874
30% benefit (2 ADLs=$600/month) (4 ADLs=$900/month)	$28,018	$36,576	$32,297

Table 4.8   **Average Estimated LTC Insurance Premiums for a <u>Discontinuous</u> Benefit,**

Modulated by Benefit Size (1992 dollars)

Amount of benefit	Men	Women	Average for both sexes
100% benefit (2 ADLs=$2,000/month) (4 ADLs=$3,000/month)	$62,598	$83,002	$72,800
90% benefit (2 ADLs=$1,800/month) (4 ADLs=$2,700/month)	$55,985	$74,814	$65,400
80% benefit (2 ADLs=$1,600/month) (4 ADLs=$2,400/month)	$50,163	$66,040	$58,102
70% benefit (2 ADLs=$1,400/month) (4 ADLs=$2,100/month)	$44,209	$59,129	$51,669
60% benefit (2 ADLs=$1,200/month) (4 ADLs=$1,800/month)	$37,502	$50,168	$43,835
50% benefit (2 ADLs=$1,000/month) (4 ADLs=$1,500/month)	$31,586	$41,725	$36,656
40% benefit (2 ADLs=$800/month) (4 ADLs=$1,200/month)	$24,971	$33,265	$29,118
30% benefit (2 ADLs=$600/month) (4 ADLs=$900/month)	$18,745	$24,989	$21,867

4.3   Modeling Methodology for Estimating the Total Value of Social Security

Wealth from HRS Data

Now that we have measured the magnitude of LTC insurance premiums for full benefits and

partial benefits, we are one step closer to answering our research question: for how many

American seniors would it make economic sense to get a joint income and LTC annuity,

purchased from Social Security (SS) wealth. This section and the next ones will focus on the

income and wealth dimensions of retirement.

Purchasing a joint income and LTC annuity from SS wealth requires individuals' Primary

Insurance Amount (or PIA), and their present value of "accrued" SS wealth[71], which is derived

from the former. The PIA is the monthly amount which is payable to covered workers when

they reach the normal age of retirement. As can be expected, taking out a LTC insurance

premium from one's accrued SS wealth results in a lower PIA and a lower lifetime retirement

benefit.

Without getting into the specific details of its determination, the PIA is computed on the basis of

an individual's monthly earnings history, adjusted for growth in earnings (otherwise known as

Average Indexed Monthly Earnings, or AIME). By design, SS will replace a higher percentage

of earnings for workers at the bottom of the economic ladder, and therefore the PIA breaks the

AIME into three "bend points": for example, in 1992, the PIA formula was equal to 90% of

AIME up to 387$, plus 32% between 388$ and $2,333, plus 15% above that line.

An HRS public dataset, called "Prospective Social Security Wealth Measures of Pre-retirees",

provides estimates of the present value of SS wealth, based on the employment section of the

1992 HRS interview and the restricted SSA benefits file (Kapinos et al. 2010). The dataset

contains detailed estimates of the present value (PV) of SS wealth at the individual and

household levels, but stops short of providing individual PIAs, which we can nonetheless

approximate since the two concepts are mathematically related. Equation 7a below illustrates

---

[71] We must remind readers that in reality, there is no such thing as an accrued Social Security wealth value for covered workers, since the Social Security scheme is established as a "pay-as-you-go" plan, not as a pre-funded plan with individual accounts. But for the sake of this exercise, it helps to view all future discounted benefits as being a stock of illiquid wealth one is entitled to access for specific purposes.

how the present value of SS wealth arises from the PIA in the most basic case (e.g. for an

unmarried individual who is not yet retired).

$$PV_c = PIA_c \sum_{t=0}^{T} P_t * (1 + r)^{-t} \qquad (7a)$$

where PVc = the expected present value of total SS retirement benefits, in claim year dollars,

PIAc = the annual SS Primary Insurance Amount at the projected claim date (c = age 65

in 1992),

Pt   = the probability of being alive at time t conditional on having survived through the

wave date, estimated from SS cohort life tables,

r   = real interest rate = (1 + nominal inflation rate) / (1+inflation rate) − 1.

By solving equation 7a for the PIA instead, we get equation 7b, a simple transformation which

yields the missing PIA.

$$PIA_C = \frac{PV_c}{\sum_{t=0}^{T} P_t * (1+r)^{-t}} \qquad (7b)$$

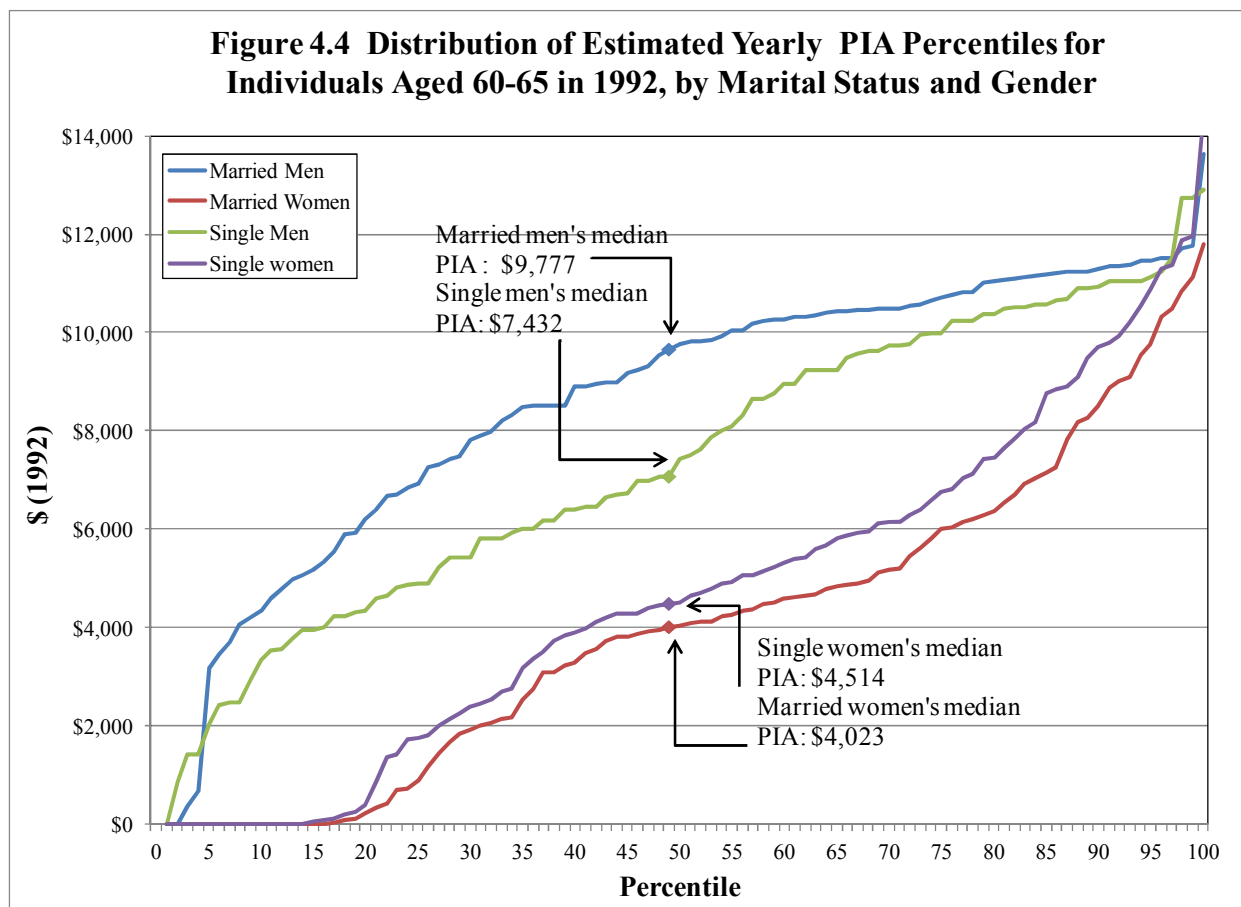The survival probabilities (Pt) we apply to equations 7a and 7b are taken from the publicly

available SS life tables by Bell & Miller (2005). Instead of narrowly defining our sample to

those aged 65 in 1992, we instead look at those who are aged 60-65 at that time: the reason being

that when treating married couples, the likelihood of two spouses being exactly the same age is

small and would unduly reduce our sample size.

Figure 4.4 below shows the distribution of estimated PIAs for unattached and married individuals, by gender. Notice the wide gap between the estimated PIAs for married men and married women: at the median, married men's estimated PIA is more than twice what it is for married women. Regardless of marital status, Figure 4.4 shows that women's PIAs are lower than men's, a fact explained by women's lower lifetime earnings. This, in turn can be explained by three factors:

- Women in the workforce are more likely than men to be working part-time. Using historical data from the Current Population Survey (CPS), we found that from 1980 to 2010, the proportion of female workers working part time was between 33%−37%, compared with 15%−19% for male workers. Over the decades, women represented between 61% and 66% of all part-time workers[72].

- Women working full-time earn less than men working full-time. In 2012, women's median weekly earnings were $691, while men's median weekly earnings were $854. The women-to-men wage ratio thus was 0,81.

- Women tend to have a more elastic labour supply, in part because of a higher prevalence of caregiving (to their children and/or their parents and relatives) (Soldo, Wolf & Agree, 1990; Wolf & Soldo, 1994).

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[72] Miriam King, Steven Ruggles, J. Trent Alexander, Sarah Flood, Katie Genadek, Matthew B. Schroeder, Brandon Trampe, and Rebecca Vick. Integrated Public Use Microdata Series, Current Population Survey: Version 3.0. [Machine-readable database]. Minneapolis: University of Minnesota, 2010.

Figure 4.4 Distribution of Estimated Yearly PIA Percentiles for Individuals Aged 60-65 in 1992, by Marital Status and Gender

Having completed the estimation of the PIA, we now turn our attention to the total expected present value of Social Security wealth for HRS respondents. Compiling these values is a different process whether one is looking at singles or married couples. Indeed, couples can accumulate a higher expected present value because of two extra benefits:

1) the spouse with the lowest PIA might be eligible for a top-up benefit (the auxiliary spouse benefit), if his/her initial retirement benefit is less than half of the spouse with the higher PIA[73]; and

---

[73] Divorced individuals who have not yet applied for their Social Security 's retirement benefits are counted as single individuals for the purposes of the cost-benefit analysis. As a matter of fact, it is possible for divorced individuals to derive some SS benefits from their previous relationship under certain strict conditions: if the duration of the union was at least 10 years and if divorced individuals have not remarried, they can qualify for a retirement benefit equal to half of their former spouse's benefit (but only if it is greater than the retirement benefit they would get from their

2) the spouse who outlives his/her partner is entitled to survivor benefits[74].

Equation 8 (reproduced from Kapinos et al., 2010) details the computation of SS wealth for all benefits spouse i might be entitled to, through his/her marriage to spouse j. The first line represents the present value of SS retirement benefits, as described earlier in equation 7a. The second line is the mathematical expression of the auxiliary spouse benefit, adjusted for the likelihood that both spouses are alive at each period. The third line represents the survivor benefit, which too is adjusted for likelihood of survival at every period. Adding the SS wealth of spouses i and j together thus yields the total expected SS household wealth.
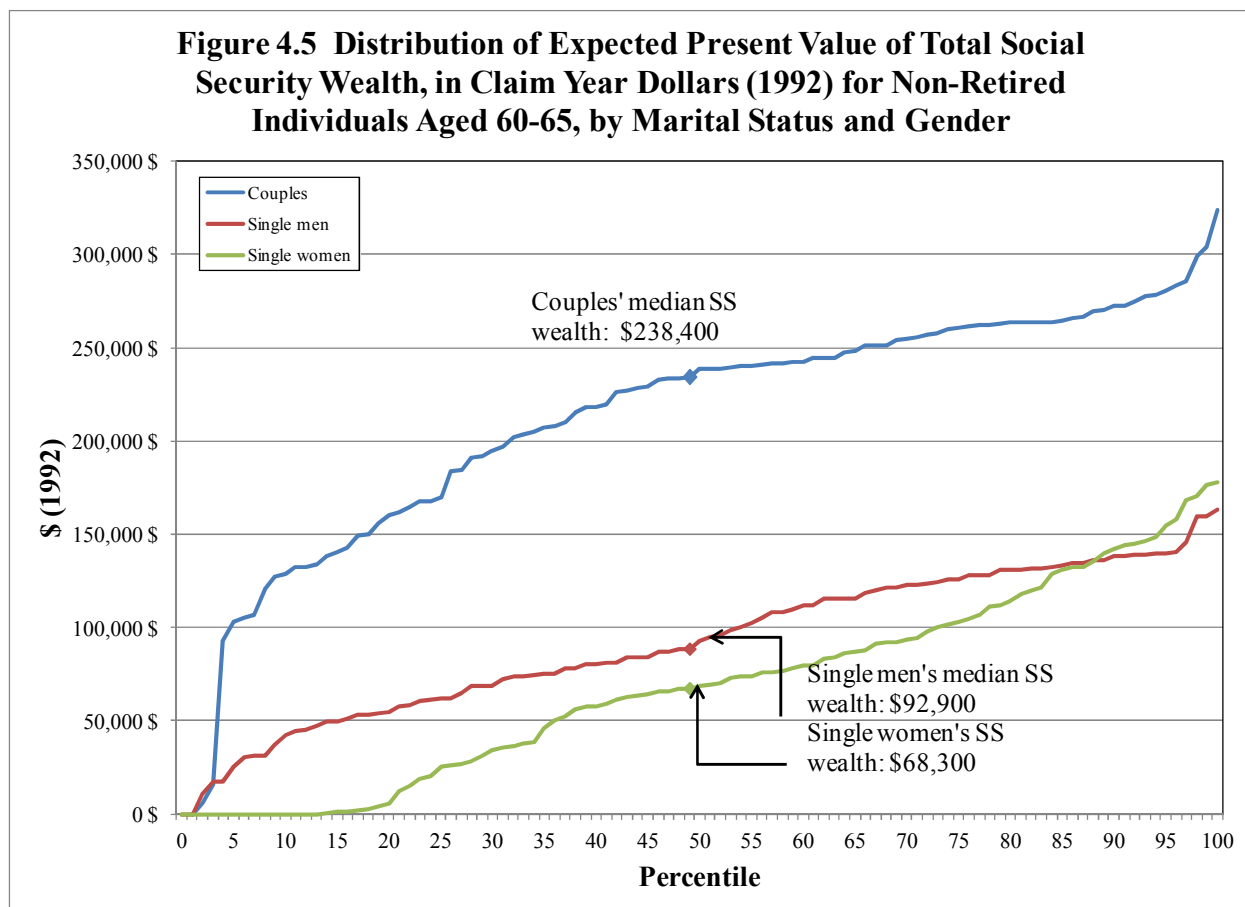
$$\text{SS Wealth}_i = \text{PIA}_i \sum_{t=0}^{T} P_{it}(1+r)^{-t} +$$

$$max\left(0.5PIA_j - PIA_i, 0\right) \sum_{t=0}^{T} P_{it}P_{jt}(1+r)^{-t} + \qquad (8)$$

$$max\left(PIA_j - PIA_i, 0\right) \sum_{t=0}^{T} P_{it}\left(1 - P_{jt}\right)(1+r)^{-t}$$

Figure 4.5, below, illustrates the distribution of total expected present value of SS wealth for non-retired individuals aged 60-65, by marital status and by gender. The figure clearly illustrates the higher SS wealth of married couples, brought about by the auxiliary spouse benefit and the survivor benefit.

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own record of contributions). However, the Social Security wealth of divorcees may diminish over time, because there is a general tendency for unions to terminate sooner, which means fewer divorcees will pass the 10-year test for spousal benefits (Harrington. Meyer, Wolf & Himes 2006), This in turn, means that fewer divorcees could have enough SS wealth to pay the LTC premium should they wish to purchase the coverage.
[74] In certain circumstances, common-law relationships can be eligible for survivor benefits as well, provided the relationship is recognized at the state level.

Figure 4.5 Distribution of Expected Present Value of Total Social Security Wealth, in Claim Year Dollars (1992) for Non-Retired Individuals Aged 60-65, by Marital Status and Gender

At this point, it is important to establish two assumptions to prevent the total expected present value of SS wealth from changing down the road: we must assume that once individuals attain age 65, all marital statuses are immutable over time (except for the possibility of widowhood, which is exogenously imposed by our model), and that no disability claims are made between the ages of 60 and 65. As per our cost-benefit analysis design, the LTC insurance premium will be carved out of SS wealth, and the remaining SS wealth will in turn generate a new, lower PIA[75].

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[75] For single seniors, this operation is straightforward because one's PIA is in direct relation to the amount of one's SS wealth. For couples, this is somewhat more challenging, because as equation (8) illustrates, couples' PIAs include the possibility of an auxiliary spouse benefit and a survivor benefit. It is highly likely that two persons forming a couple will have different PIAs when reaching age 65 due to their different career paths, yet a plausible hypothesis is that the spouse with the highest accumulated SS wealth will subsidize the spouse with the lowest SS wealth, so that both could purchase individual LTC insurance coverage from their commingled SS wealth. Once the

Having established the distribution of SS wealth and the value of the LTC insurance premiums, we can estimate an affordability ratio, defined as the proportion of individuals and couples who have enough SS wealth to cover the LTC insurance premium.[76] Tables 4.9 and 4.10 below display the different levels of LTC insurance benefits, the amounts of insurance premiums required, and the proportion of seniors who have enough SS wealth to cover it.

---

two LTC insurance premiums are carved out from the unique pot of household SS wealth, how can one go about attributing the new, lower PIAs to each spouse? Assuming that household SS wealth is a function of each spouse's PIA, we decided to fit those variables in an OLS regression. The regression equation is as follows:

$$\text{SS } Wealth_{i+j} = \beta_1 PIA_i + \beta_2 PIA_j + \varepsilon \qquad (9)$$

where β_1 and β_2 can be likened to annuity conversion factors. Then, after subtracting the value of two insurance premiums out of SS Wealth$_{i+j}$, we can work our way backwards to the new values of PIA$_i$ and PIA$_j$. Notice that the regression equation is written (and estimated) without an intercept, because the relationship between SS wealth and the PIAs must pass through the origin (i.e. if PIA$_i$=0 and PIA$_j$=0, SS wealth$_{i+j}$ must equal 0 as well.)

[76] This definition of an affordability ratio is rather selective and narrow, because we are only looking at whether people in the sample have enough SS wealth to cover the LTC insurance premium carve-out. True affordability would be to look at the percentage of total income remaining after purchasing LTC insurance, a concept which will be explored later in tables 4.11 and 4.12.

Table 4.9   **Percentage of Non-Retired Individuals Aged 60-65 in 1992 Who Could Afford to Pay Different Levels of LTC Insurance Premiums (for a Continuous Benefit)**

Level of LTC benefit	LTC insurance premium for a continuous benefit	Single men	Single women	Couples
100%	**$105,608**	**43,9%**	**23,6%**	**62,7%**
90%	$97,024	47,2%	28,3%	70,7%
80%	$85,345	55,0%	36,8%	74,9%
70%	$74,887	65,7%	44,8%	82,6%
60%	$64,621	73,2%	54,3%	89,5%
50%	$53,729	81,3%	62,8%	92,9%
40%	$42,874	89,8%	65,2%	96,2%
30%	$32,297	91,5%	70,7%	96,2%

Table 4.10   **Percentage of Non-Retired Individuals Aged 60-65 in 1992 Who Could Afford to Pay Different Levels of LTC Insurance Premiums (for a Discontinuous Benefit)**

Level of LTC benefit	LTC insurance premium for a discontinuous benefit	Single men	Single women	Couples
100%	**$72,800**	**68,3%**	**43,9%**	**83,0%**
90%	$65,400	72,4%	53,4%	89,5%
80%	$58,102	78,7%	59,6%	92,6%
70%	$51,669	83,9%	63,1%	94,8%
60%	$43,835	89,8%	65,2%	96,2%
50%	$36,656	91,5%	67,8%	96,2%
40%	$29,118	94,1%	71,9%	96,2%
30%	$21,867	95,6%	75,8%	96,8%

Interesting comparisons can be made within and between tables 4.9 and 4.10. First, as expected, larger proportions of seniors would be able to afford the premiums for LTC insurance if the benefits were to follow actual variations in health status (i.e. discontinuous benefits in table 4.10)

than if they were to be paid continuously after a single disability event (table 4.9), as initially

proposed by Murtaugh et al. (2001). Second, regardless of the level and type of LTC benefits

chosen, the group which can least afford the coverage is always single women, followed by

single men and couples. This is in line with the distribution of SS wealth previously shown in

Figure 4.5. Also, it is worth noting that even when LTC benefits are trimmed to 30% of their full

value--an admittedly subjective lower bound--there remains a small proportion of seniors (in

every type of household) with not enough SS wealth to afford the premiums. In light of these

results, one must not forget that Medicaid does act as payer of last resort for those with levels of

assets and income too low to afford LTC costs on their own. And so, those who cannot afford to

purchase LTC insurance with their accumulated SS wealth would instead use Medicaid as a

safety net. For policymakers, the choice of an optimal level of LTC insurance benefit/premium

must therefore be informed by the potential clientele, and its ability to pay.

In the next section, we will determine the respondents' other sources of income and wealth in

retirement. This will allow us to examine how much retirement income would be waived if

retirees were allowed to purchase a LTC benefit from their accumulated SS wealth at age 65.

4.4   Estimating Total Annual Income and the Value of Financial Assets from HRS Data

As stated earlier, individuals wishing to purchase a joint income-and-LTC annuity through their

SS wealth would need several pieces of information in order to make an educated choice, like an

estimation of their own life expectancy, their anticipated annual income in retirement, the value

of their financial assets (when they retire and later when they expect disability to strike), and whether or not they want to leave some bequests. It is assumed that seniors who are about to apply for Social Security benefits as they turn 65 have a good sense of their income mix for their first year in retirement. As specified in section 4.1, our model assumes that the annual income level declared at age 65 is stable, with annual adjustments for inflation, and that seniors do not deplete their financial assets until disability requires it.
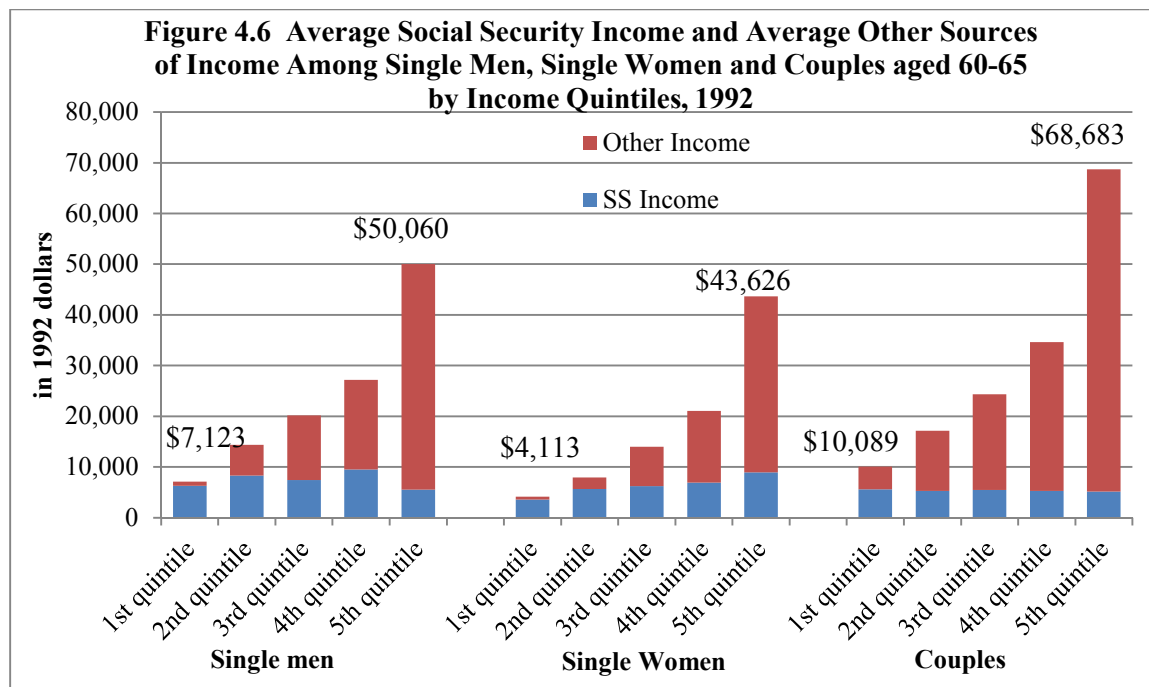
To assess the value of income and financial assets, we turn to the <u>RAND HRS Income and Wealth Imputation</u> dataset, which provides "cleaned, processed, streamlined, and where necessary imputed, collection of income and wealth variables derived from the [HRS]."(Moldoff et al. 2013:6) For the purpose of our cost-benefit analysis, total income is estimated via the vector of variables "HxITOT"[77], which compiles income from all sources (earnings, pensions, annuities, SSI and Social Security disability benefits, Social Security retirement benefits, unemployment and workers compensation, other government transfers, household capital income and other miscellaneous income). Figure 4.6 below shows the income distribution of seniors[78] by quintiles, in a split between Social Security and other sources of income at age 65[79].

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[77] The 'x' in the variable's name actually stands in for the HRS wave year.

[78] Couples' incomes are adjusted to reflect economies of scale enjoyed by both members of the household through an adjustment factor commonly found in the economic literature, i.e. dividing household income by the square root of 2.

[79] Averaging income from Social security for the 60-65 age range might actually be a biased measure, as the generation of workers shown in Figure 4.6 had the opportunity to collect actuarially reduced Social Security retirement benefits as early as age 60. While the decision to retire and collect Social Security retirement benefit is multifaceted, one could presume that the higher prevalence of manual labour among workers of the first and second income quintiles would translate into a higher proportion of them taking early retirement benefits. In the same vein, professionals, academics and others who entered the labour force at a later age because of the requirements of their formal education might go on to work past age 65 and accrue delayed retirement credits. This behaviour would create a downward bias on average social security income at age 65.

Figure 4.6 Average Social Security Income and Average Other Sources of Income Among Single Men, Single Women and Couples aged 60-65 by Income Quintiles, 1992

As expected, seniors in the third, fourth and fifth income quintiles draw a larger proportion of their income from sources *other* than Social Security benefits. Those seniors are therefore more likely to be the natural clientele for the proposed LTC insurance, since they already have complementary sources of income to rely upon in retirement (which is not to say that every senior in those higher income quintiles has reached a sufficient income replacement rate). As stated earlier, our analysis is conducted from the perspective of prospective purchasers entering retirement at age 65 in 1992 who, when faced with the choice to buy or not the proposed LTC insurance, can only assess their health and financial situation with the information available to them at that moment. Therefore, our model assumes that the annual income level declared at age 65 remains constant, with inflation protection, and that seniors do not deplete their financial assets until disability requires it.

At this point, we can try to establish how much retirement income would be foregone *on average* if retirees had the possibility of purchasing LTC insurance coverage from their accumulated SS

wealth at age 65. Tables 4.11 and 4.12 display the ratios of reduced retirement income to full

retirement income, for different levels of LTC insurance benefits. For brevity, only seniors from

the third, fourth and fifth income quintiles who had enough accumulated SS wealth to afford the

LTC premiums were included and results are limited to three representative levels of LTC

insurance premiums.

Table 4.11   Percentage of Total Income Remaining for Retired Individuals Aged 65 in

1992 After Purchasing LTC Insurance out of their SS Wealth, According to

Different Benefit Levels and Insurance Premiums (for a Continuous Benefit).

Level of LTC benefit	LTC premium for a continuous benefit	Single men's income ratio			Single women's income ratio			Couples' income ratio		
		3rd quintile	4th quintile	5th quintile	3rd quintile	4th quintile	5th quintile	3rd quintile	4th quintile	5th quintile
100%	**$105,608**	**54.8%**	**65.7%**	**81.4%**	**67.4%**	**76.6%**	**85.5%**	**71.0%**	**77.5%**	**89.9%**
50%	$53,729	73.3%	80.5%	90.5%	77.6%	84.1%	91.5%	83.9%	86.3%	93.8%
30%	$32,297	85.2%	88.5%	94.3%	85.8%	89.9%	94.8%	89.8%	90.6%	95.7%

Table 4.12   **Percentage of Total Income Remaining for Retired Individuals Aged 65 in 1992 After Purchasing LTC Insurance out of their SS Wealth, According to Different Benefit Levels and Insurance Premiums (for a Discontinuous Benefit)**

Level of LTC benefit	LTC premium for a discontinuous benefit	Single men's income ratio			Single women's income ratio			Couples' income ratio		
		3rd quintile	4th quintile	5th quintile	3rd quintile	4th quintile	5th quintile	3rd quintile	4th quintile	5th quintile
100%	**$72,800**	**67.1%**	**75.1%**	**87.8%**	**73.3%**	**81.9%**	**88.6%**	**78.0%**	**83.3%**	**92.5%**
50%	$36,656	83.2%	87.0%	93.5%	83.8%	88.6%	94.1%	88.8%	89.7%	95.7%
30%	$21,867	90.3%	92.7%	93.5%	90.1%	93.0%	96.4%	98.0%	96.4%	98.1%

As expected, when reading Tables 4.11 and 4.12 vertically, lower LTC insurance premiums lead to smaller reductions in retirement income. But from a methodology standpoint, it must be mentioned that individual lines in the Tables are not entirely comparable: when the premium (and the corresponding level of LTC benefits) is lowered below 100%, the population of seniors having enough SS wealth to purchase the insurance in each quintile expands, and the computation of average income ratios is therefore done on a different (i.e. larger) group. The difference between Tables 4.11 and 4.12 is most striking for income ratios related to the full (100%) LTC benefit.

We now move to the estimation of seniors' financial wealth. In the context of our analysis, our estimation of financial wealth must align with the Medicaid deductible, which is defined as all sources of financial wealth which must be spent down before someone with LTC needs can rely on Medicaid, namely:

- Checking and savings accounts

- Certificates of deposits, government savings bonds, treasury bills

- Net value of stocks, mutual funds, and investment trusts

- Net value of real estate other than the principal residence

- Net value of business interests

- Net value of IRA, Keogh accounts

- Net value of all other savings

- Minus the value of debts other than mortgages/loans on the principal residence.

Figure 4.7 below shows the distribution of average financial wealth by income quintiles for seniors in 1992, as they were about to begin their retirement[80]. We chose to divide the distribution of average financial wealth by income quintiles to facilitate comparisons between the earlier Figure 4.6 and the figure below. But since income and financial wealth are not perfectly correlated[81], the distribution in Figure 4.7 appears non-monotonic across quintiles. This might also be exacerbated by the fact that many seniors hold a large proportion of their wealth in their

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[80] Couples' wealth is adjusted to reflect economies of scale enjoyed by both members of the household through an adjustment factor commonly found in the economic literature, i.e. dividing by the square root of 2.
[81] Correlation between income at age 65 and financial assets at age 65 is 0.37 for single men, 0.72 for single women, and 0.71 for couples.

principal residence, an asset class that is deliberately left out of the calculation because it is

(mostly) irrelevant to the Medicaid spend-down rules[82].

Figure 4.7 Average Financial Assets among Single Men, Single Women and Couples aged 60-65 by Income Quintiles, 1992
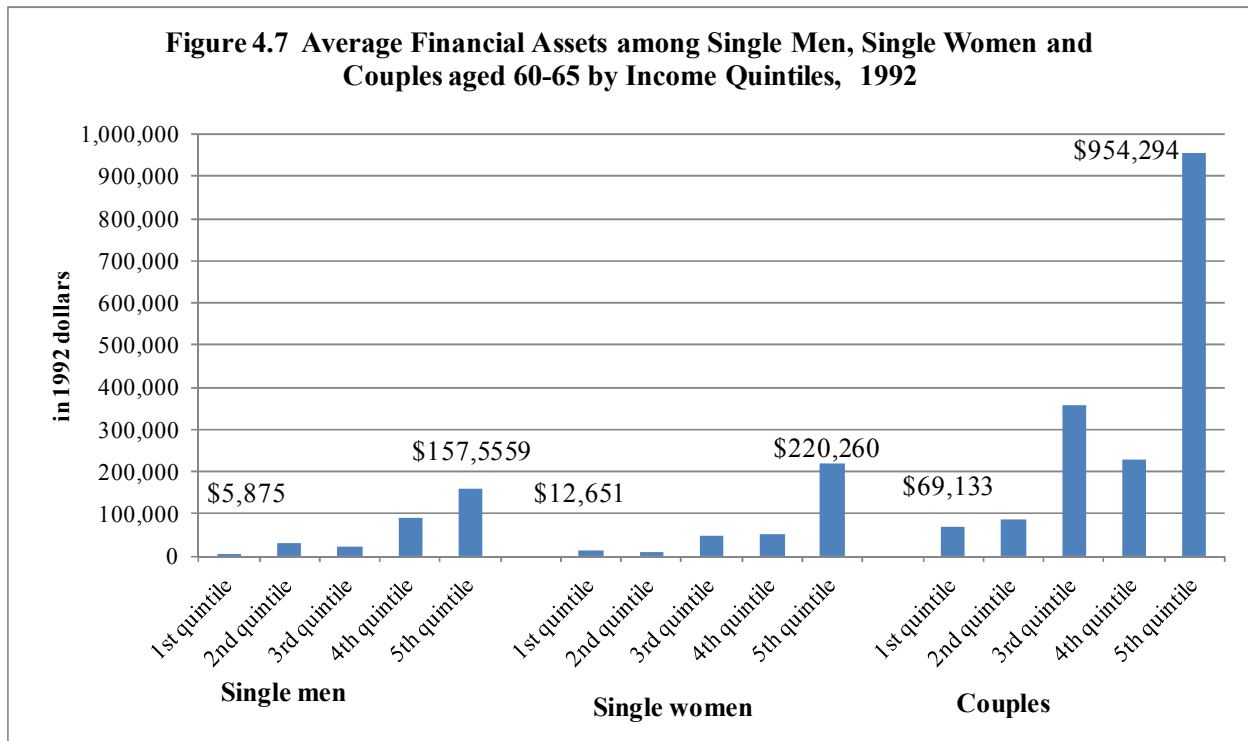
4.5   Results

4.5.1   Cost-Benefit Analysis

As mentioned earlier, the cost-benefit analysis starts from a perspective where the decision of

seniors (singles and couples) to buy the proposed LTC insurance would be made simultaneously

with their application for the Social Security retirement benefit, which is exogenously imposed at

age 65 for everyone. The analysis is conducted from the viewpoint of potential buyers who,

when faced with the choice to purchase the proposed LTC insurance, can only assess their health

prospects and financial situation with the information available to them as they enter retirement.

[82] When determining eligibility for Medicaid, the home is exempt from calculation as long as it serves as a principal place of residence. But the value of the home can affect whether Medicaid will pay for LTC if the equity interest held by someone exceeds a certain level ($552,000 in 2015). States where the price of real-estate is higher can set a higher Medicaid limit (up to $828,000).

As previously stated in section 4.2, it is assumed that every person in the sample experiences a "disability event" that is severe enough to require LTC in a nursing home setting (e.g. at least 2 ADLs), with disability onset varying between one and three years prior to death. These men and women remain in their disabled condition until death, and the nursing home charges each of them the national average for a semi-private room. None of them carry private LTC insurance, and they start paying the cost of their LTC in a manner that preserves their financial wealth, which is to say that in the base case scenario (without LTC insurance), seniors pay their nursing home costs with their disposable income before depleting their financial assets down to the Medicaid deductible levels. In the alternate scenario, seniors pay for their nursing home costs first with their LTC insurance benefit, then use their disposable income, and then deplete their financial assets down to the Medicaid deductible levels to cover any remaining balance owed[83]. At the time of death, the difference between the balance of financial assets remaining in the base case scenario (without LTC insurance) and in the alternate scenario (with LTC insurance) determines whether purchasing the LTC insurance is profitable for the person/couple in question. The three sections of Figure 4.8 below show the income and asset levels of single men, single women and couples at age 65 in 1992, and whether a LTC insurance policy providing continuous benefits is advantageous for them, given that they will all face disability in the **12** months prior to their death. Continuous benefits, as previously described, is the benefit proposed by Murtaugh et al. (2001), where any senior assessed at two ADLs receives an inflation-adjusted annuity even if disability is non-permanent.

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[83] Because of their differing life expectancy, men and women living as couples must manage the LTC costs (use of disposable income and depletion of financial assets) in a way that protects the surviving spouse. As a reminder, our model treats all men in our sample as if they are endowed with a life expectancy of $e^{65}=16$ years (all men die at age 81), while all women have a life expectancy of $e^{65}=19$ (all women die at age 84).

Figure 4.8a   Distribution of Income and Asset Levels of Single Men aged 65 in 1992, Who Would Eventually Require LTC for 12 Months Prior to Their Death, by Insurance Coverage
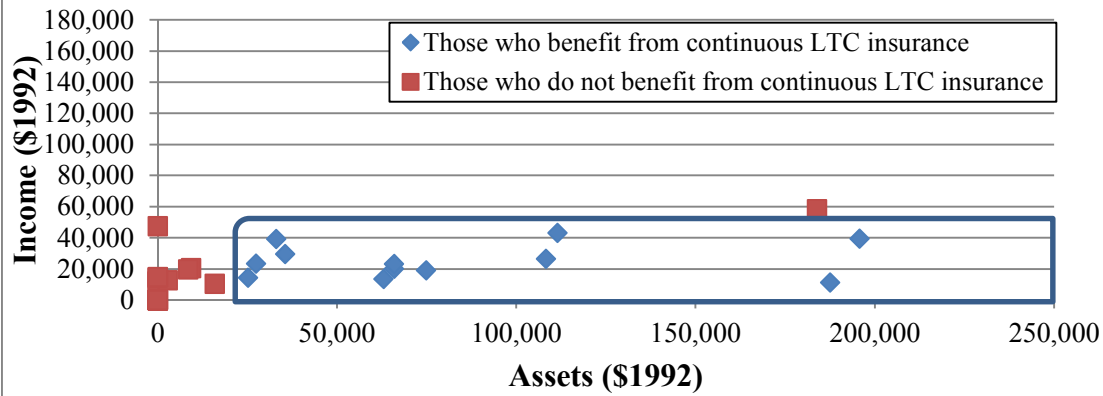
Figure 4.8b   Distribution of Income and Asset Levels of Single Women aged 65 in 1992, Who Would Eventually Require LTC for 12 Months Prior to Their Death, by Insurance Coverage
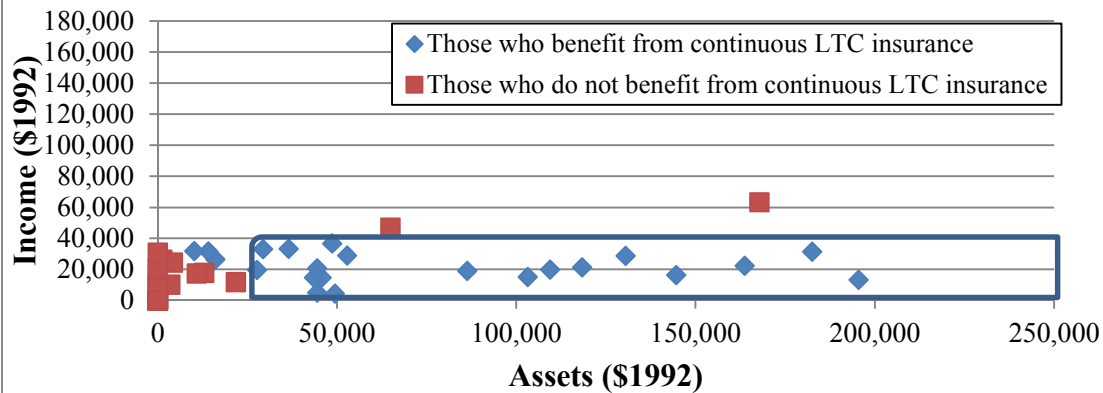
Figure 4.8c   Distribution of Income and Asset Levels of Couples Who Would Eventually Require LTC for 12 Months Prior to Their Death, by Insurance Coverage
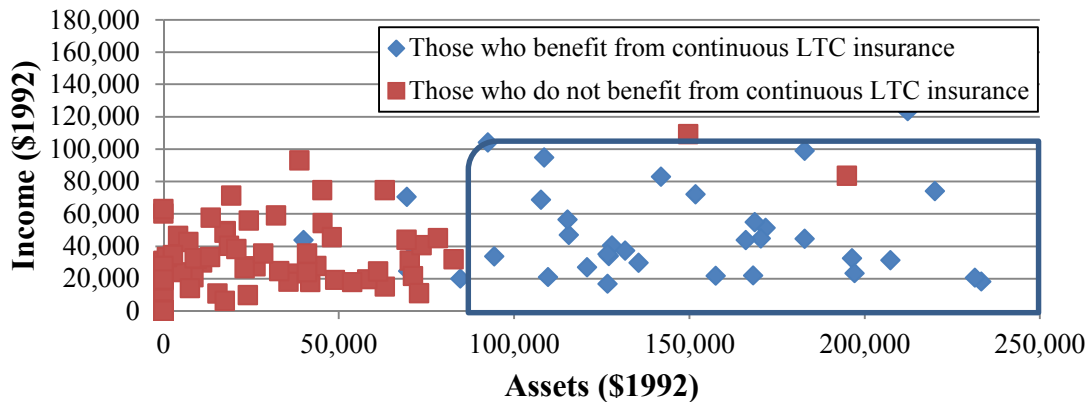
Blue dots in each panel of Figure 4.8 indicate individuals and couples who would be able to retain more of their financial wealth because of the continuous LTC insurance, following a disability event lasting 12 months before death. Blue "boxes" superimposed on the graphs are approximate markers of the zone in which the combination of income and assets warrants the purchase of LTC insurance[84]. Each panel of Figure 4.8 shows that regardless of matrimonial status, lower levels of financial assets translate into less desirability for the proposed LTC insurance. For single men, the area where continuous LTC insurance protection is beneficial starts when assets are over $20,000 (approximately) and income is close to $50,000. For single women, the area where continuous LTC insurance protection is beneficial starts when assets are over $25,000 (approximately) and income is more or less $40,000. For couples, LTC insurance protection is beneficial when household assets are above $90,000 and household income is above $105,000.

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[84] Single men, women and couples have very different asset distributions, which means that in order to make the three panels of Figure 4.8 comparable, we had to truncate the x-axis (right censoring). Thus, the right end of the superimposed blue boxes on every graph should be open-ended.

Figure 4.9a   Distribution of Income and Asset Levels of Single Men aged 65 in 1992, Who Would Eventually require LTC for 36 Months Prior to Their Death, by Insurance Coverage
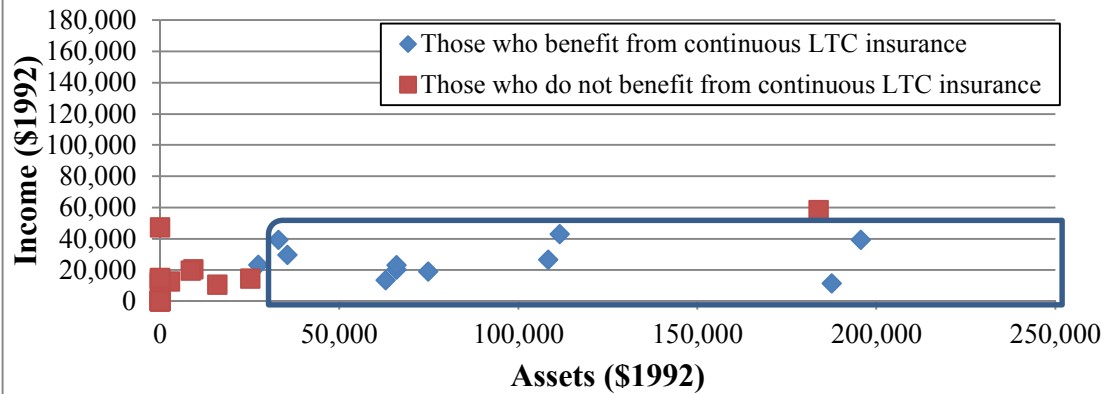
Figure 4.9b   Distribution of Income and Asset Levels of Single Women aged 65 in 1992, Who Would Eventually Require LTC for 36 Months Prior to Their Death, by Insurance Coverage
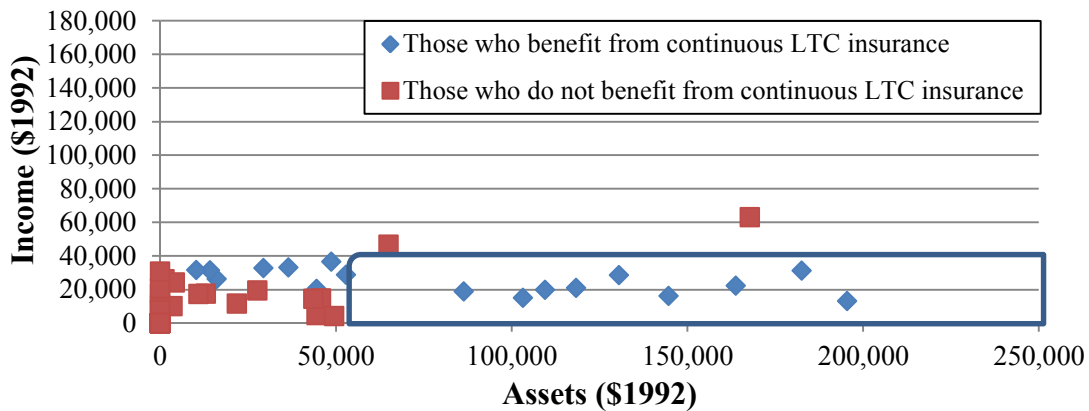
Figure 4.9c   Distribution of Income and Asset Levels of Couples, Who Would Eventually Require LTCfor 36 Months Prior to their Death, by Insurance Coverage
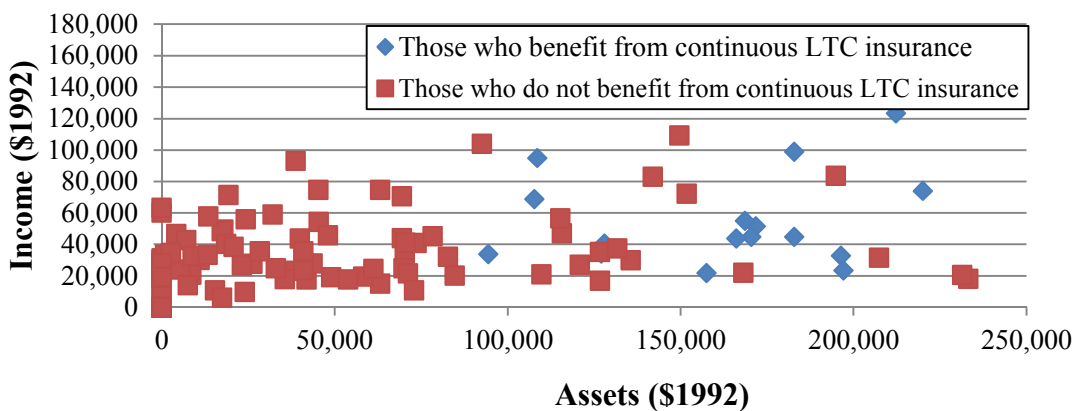
The three panels of Figure 4.9 above show whether an LTC insurance policy providing

continuous benefits is advantageous when one expects a longer disability period (here set at **36**

months of LTC prior to death). Since HRS individuals and couples shown in Figure 4.9 are the

same as in Figure 4.8, with identical distribution of income and assets at age 65, the layout of the

scatterplot is similar, but the results of the cost-benefit analysis have made some dots change

from blue to red. At first glance, it seems that increasing the disability period to 36 months

changes very little in terms of who should purchase the proposed LTC policies. For single men,

the area where continuous LTC insurance coverage is beneficial starts when assets are over

$25,000 (approximately) and income is higher than $50,000.

For single women, the area where continuous LTC insurance protection is beneficial is smaller,

starting when assets are over $60,000 and income is more or less $40,000. For couples in Figure

4.9c, where each spouse is modeled as if facing 36 month of LTC before death, there does not

seem to be a clear zone in which the combination of income and assets warrants the purchase of

LTC insurance. After combing through the results of the cost-benefit analysis, it appears that

only high net-worth couples emerge as gainers, but they do not appear on Figure 4.9c because

the x-axis is right-censored to maintain comparability with panels 4.9a and 4.9b. For couples

with fewer financial assets, the sheer length of the disability period (36 months for each spouse)

exhausts their financial assets, even with a generous LTC insurance acting as first payer.

We've now looked at the effects of continuous LTC insurance benefits on the wealth of

American seniors, for two disability lengths: 12 months and 36 months. It's now time to

examine the effects of discontinuous LTC insurance benefits under the same set of assumptions.

"Discontinuous" benefits is where any senior assessed at two ADLs or more receives an

inflation-adjusted annuity which can be suspended and reinstated when the level of disability is reassessed at prescribed time intervals[85].

The three sections of Figure 4.10 below show the income and asset levels of single men, single women and couples at age 65 in 1992, and whether a LTC insurance policy providing discontinuous benefits is advantageous for them, given that they will all face disability in the 12 months prior to their death. Figure 4.11 seeks to answer the same question, but for 36 months of disability prior to death. As in the two previous figures, blue dots indicate individuals and couples who were able to retain more of their financial wealth because of LTC insurance, and blue boxes are approximate markers of the zone in which the combination of income and assets warrants the purchase of LTC insurance. The main conclusion to be drawn from comparing continuous benefits (Figures 4.8 and 4.9) and discontinuous benefits (Figures 4.10 and 4.11) is that the zones marked by the blue boxes are similar. This is an important result from a policy perspective:

1) it is already established that setting up a LTC insurance scheme with discontinuous benefits carries a lower premium than the same insurance scheme with continuous benefits;

2) if benefits were discontinuous, a larger proportion of Americans turning 65 would be able to pay the LTC insurance premium through their Social Security wealth;

3) it is now proven that the zone (assets x income) in which LTC insurance with discontinuous benefits is beneficial is nearly as extensive as the zone for continuous benefits. Therefore, LTC insurance policies with discontinuous benefits should be favored for their affordability.
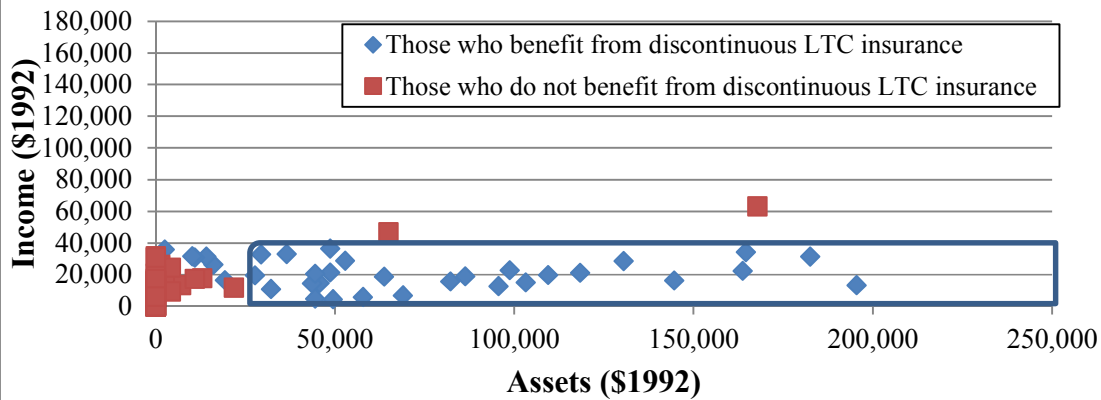
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[85] See section 4.2.4 for details.

Figure 4.10a   Distribution of Income and Asset Levels of Single Men aged 65 in 1992, Who Would Eventually Require LTC for 12 Months Prior to Their Death, by Insurance Coverage
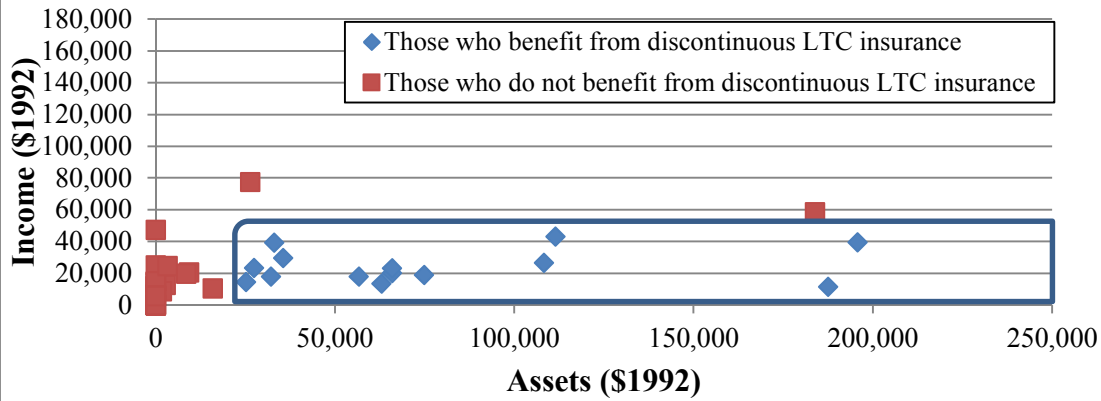
Figure 4.10b   Distribution of Income and Asset Levels of Single Women aged 65 in 1992, Who Would Eventually Require LTC for 12 Months Prior to Their Death, by Insurance Coverage

Figure 4.10c   Distribution of Income and Asset Levels of Couples Who Would Eventually Require LTC for 12 Months Prior to Their Death, by Insurance Coverage
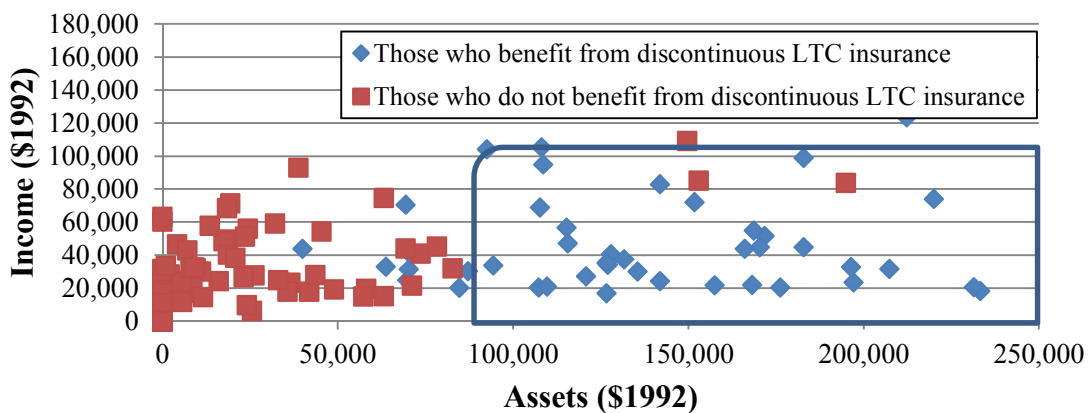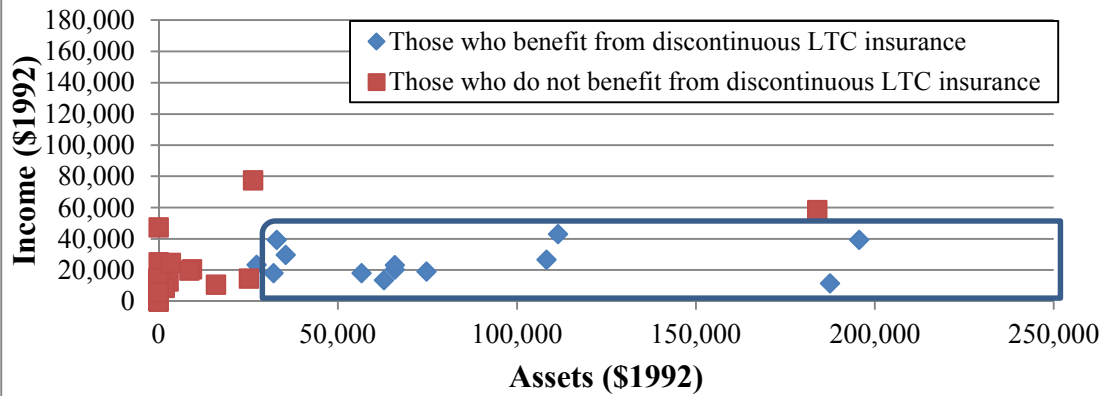
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Figure 4.11a   Distribution of Income and Asset Levels of Single Men aged 65 in 1992, Who Would Eventually require LTC for 36 Months Prior to Their Death, by Insurance Coverage

Figure 4.11b   Distribution of Income and Asset Levels of Single Women Who Would Eventually Require LTC for 36 Months Prior to Their Death, by Insurance Coverage
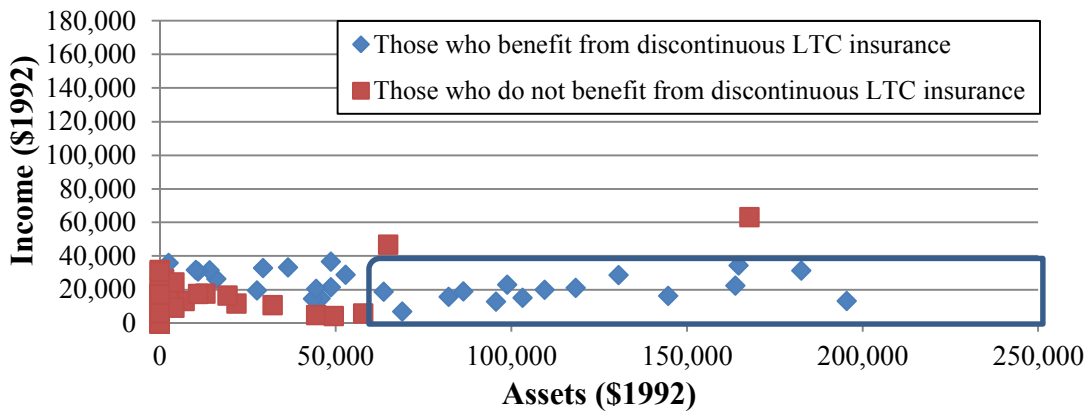

Figure 4.11c   Distribution of Income and Asset Levels of Couples, Who Would Eventually Require LTCfor 36 Months Prior to their Death, by Insurance Coverage
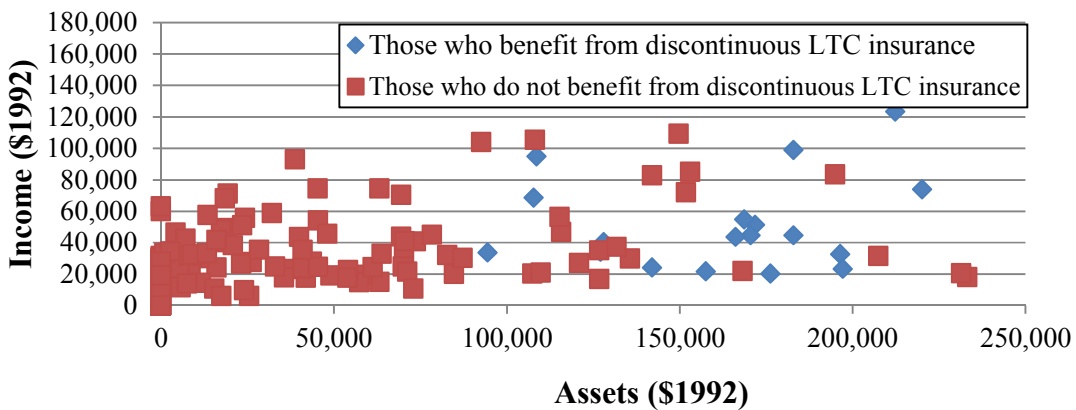
4.5.2   Sensitivity Analysis Using Lower LTC Benefits.

In an effort to make the purchase of LTC insurance from SS wealth accessible to a wider group of seniors, the cost-benefit analysis model was modified to allow for lower insurance benefits which, as shown earlier in this chapter[86], carry proportionately lower premiums. In turn, these lower premiums could allow seniors with lower levels of accumulated SS wealth to cover their risk of LTC. Starting with the original benefit levels set by Murtaugh et al. ($2,000/month for 2+ ADLs, $3,000/month for 4+ ADL), we estimated insurance premiums for progressively smaller benefits, until we reached a floor representing 30% of the original benefit levels.

For efficiency purposes, we will look only at the cost-benefit analysis results for discontinuous LTC benefits that are 30%, 50% and 70% of the full benefits for periods of disability of 12 months at the end of one's life. First, the three panels of Figure 4.12 below show whether a discontinuous benefit that is only 30% of the original benefit is sufficient to preserve one's assets when faced with 12 months of LTC prior to death. For all single men in the HRS sample, and nearly all single women, the answer is no: those minimal LTC insurance benefits are too low to avert the complete depletion of one's assets when LTC strikes. For couples, this lower LTC insurance protection is beneficial when household assets are above $75,000 and household income is above $100,000.

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[86] see tables 4.7 and 4.8.

Figure 4.12a   Distribution of Income and Asset Levels of Single <u>Men</u> aged 65 in 1992, Who Would Eventually Require LTC for <u>12 Months</u> Prior to Their Death, with LTC Insurance at <u>30%</u> of Full Benefits
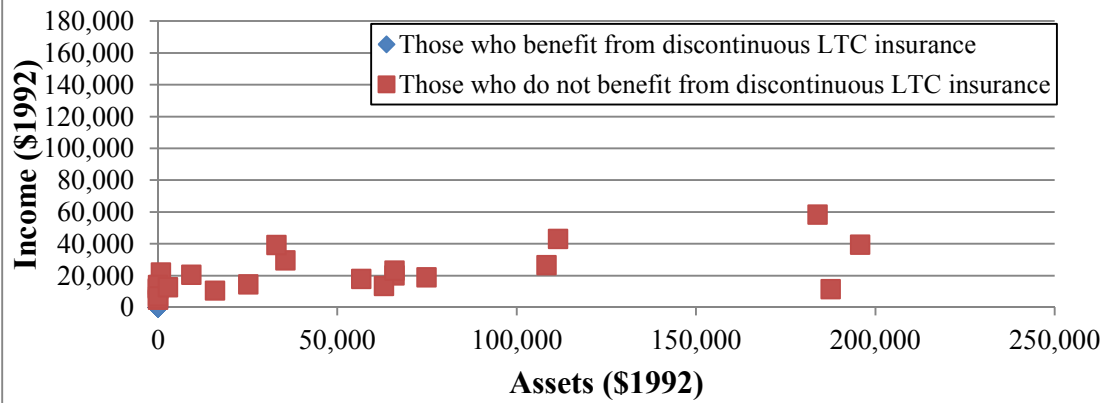
Figure 4.12b   Distribution of Income and Asset Levels of Single <u>Women</u> aged 65 in 1992, Who Would Eventually Require LTC for <u>12 Months</u> Prior to Their Death, with LTC Insurance at <u>30%</u> of Full Benefits
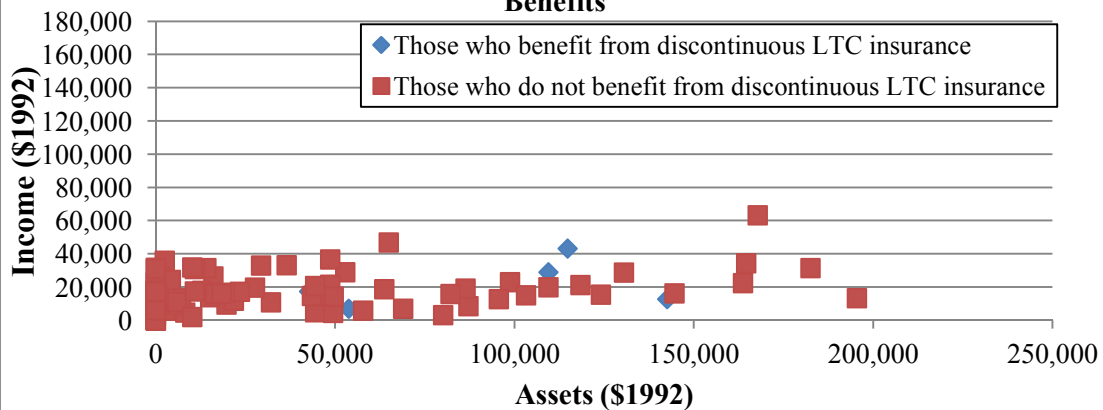
Figure 4.12c   Distribution of Income and Asset Levels of <u>Couples</u> Who Would Eventually Require LTC for <u>12 Months</u> Prior to Their Death, with LTC Insurance at <u>30%</u> of Full Benefits
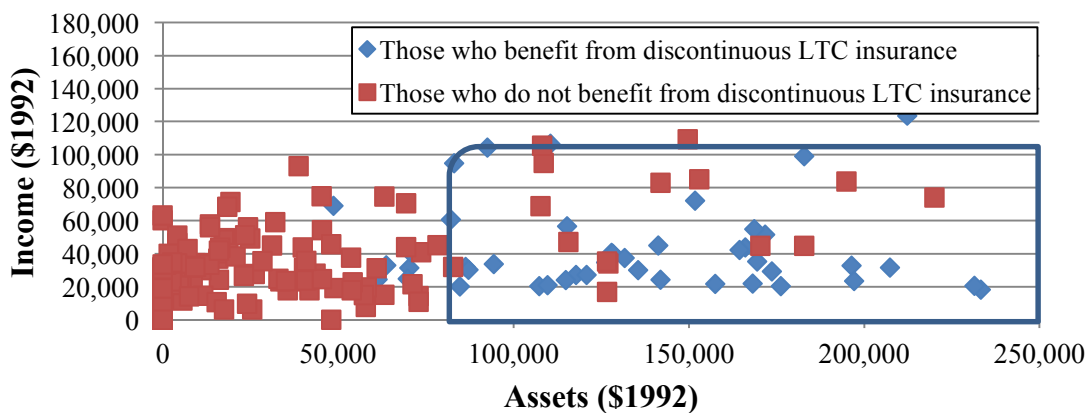
Next, the three panels of Figure 4.13 show the impact of a LTC insurance benefit set at 50% of the original insurance value. The top two panels indicate that for single men and women, the preservation of assets following 12 months of LTC is not a success, save for sporadic cases in the asset/income distribution. The benefits are too low to avert the complete depletion of one's assets when LTC strikes. For couples, LTC insurance protection is beneficial when household assets are above $75,000 and household income is above $100,000.

Finally, the three panels of Figure 4.14 show the impact of a LTC insurance benefit set at 70% of the original insurance value. For single men, this LTC insurance protection is beneficial for some, but there is not enough of a pattern or uniform zone in which the combination of income and assets warrants the purchase of LTC insurance. For single women, LTC insurance protection is beneficial when assets are above $50,000 and income is near $40,000. For couples, LTC insurance protection is beneficial when household assets are above $75,000 and household income is above $100,000. To sum up, trying to broaden the accessibility of the proposed LTC insurance with lower premiums/benefits could be problematic if policymakers were to apply a severe discount, because then the much lower benefits would be too low to cover LTC costs, and seniors would still need to deplete their financial assets to cover the balance, and possibly rely on Medicaid. A sensible approach would be for LTC premiums/benefits to remain in the 70%-100% range.
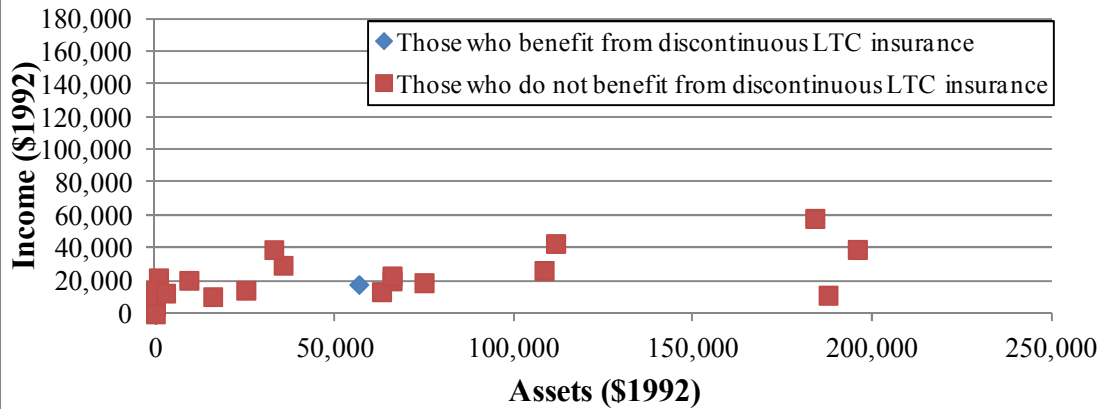
Figure 4.13a   Distribution of Income and Asset Levels of Single <u>Men</u> aged 65 in 1992, Who Would Eventually Require LTC for 12 Months Prior to Their Death, with LTC Insurance at <u>50%</u> of Full Benefits

Figure 4.13b   Distribution of Income and Asset Levels of Single <u>Women</u> aged 65 in 1992, Who Would Eventually Require LTC for 12 Months Prior to Their Death, with LTC Insurance at <u>50%</u> of Full Benefits

Figure 4.13c   Distribution of Income and Asset Levels of <u>Couples</u> Who Would Eventually Require LTC for 12 Months Prior to Their Death, with LTC Insurance at 50% of Full Benefits
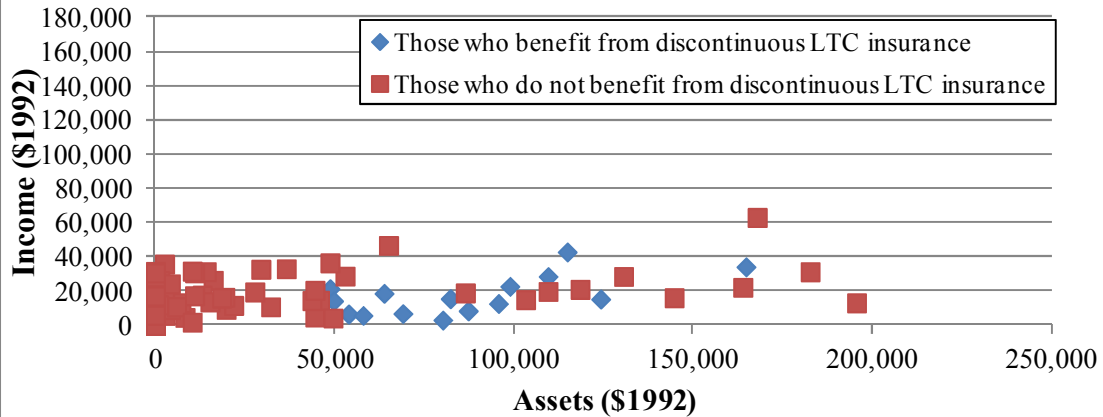
Figure 4.14a   Distribution of Income and Asset Levels of Single <u>Men</u> aged 65 in 1992, Who Would Eventually Require LTC for 12 Months Prior to Their Death, with LTC Insurance at <u>70%</u> of Full Benefits

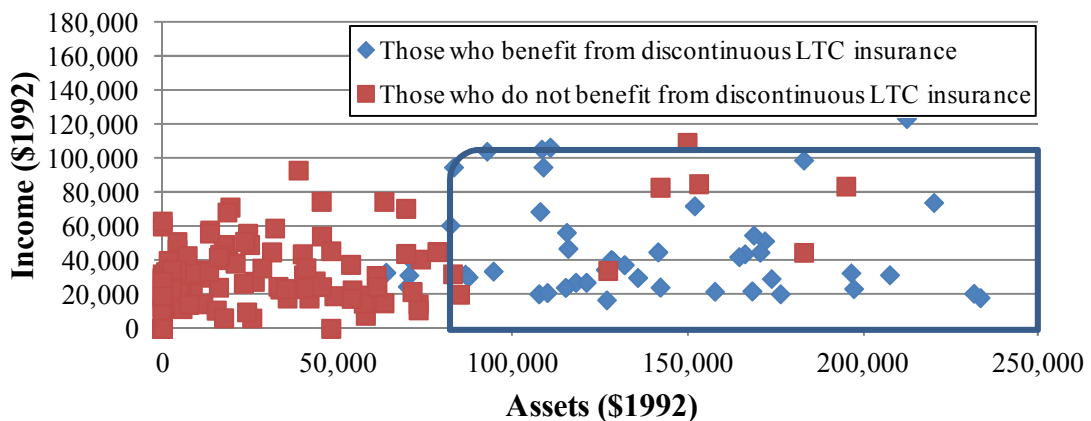**Figure 4.14b   Distribution of Income and Asset Levels of Single <u>Women</u> aged 65 in 1992, Who Would Eventually Require LTC for 12 Months Prior to Their Death, with LTC Insurance at <u>70%</u> of Full Benefits**
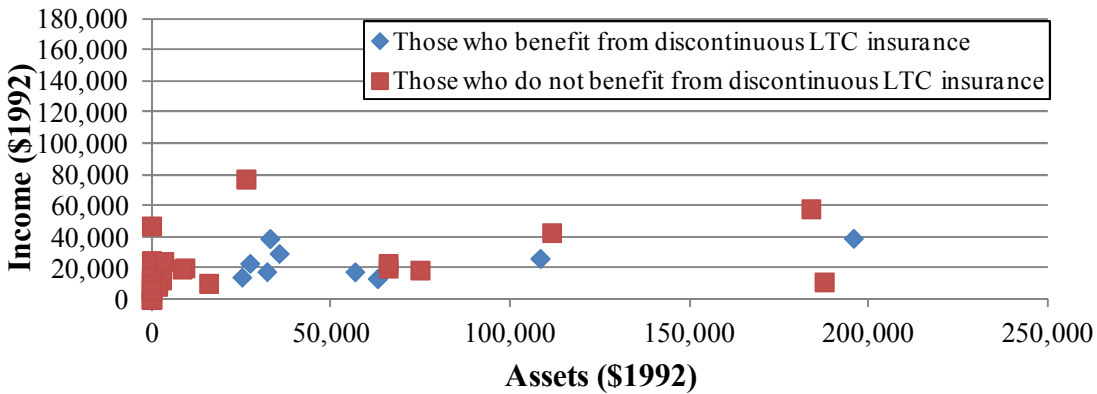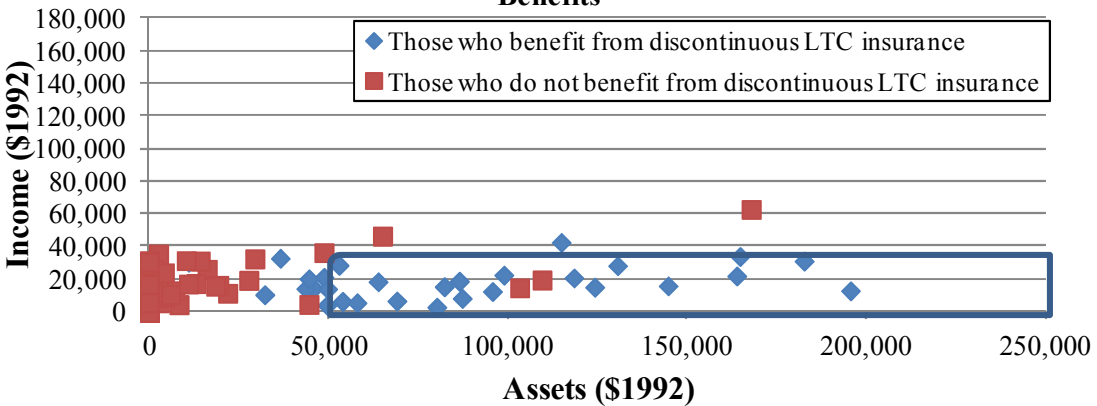

Figure 4.14c   Distribution of Income and Asset Levels of <u>Couples</u> Who Would Eventually Require LTC for 12 Months Prior to Their Death, with LTC Insurance at <u>70%</u> of Full Benefits
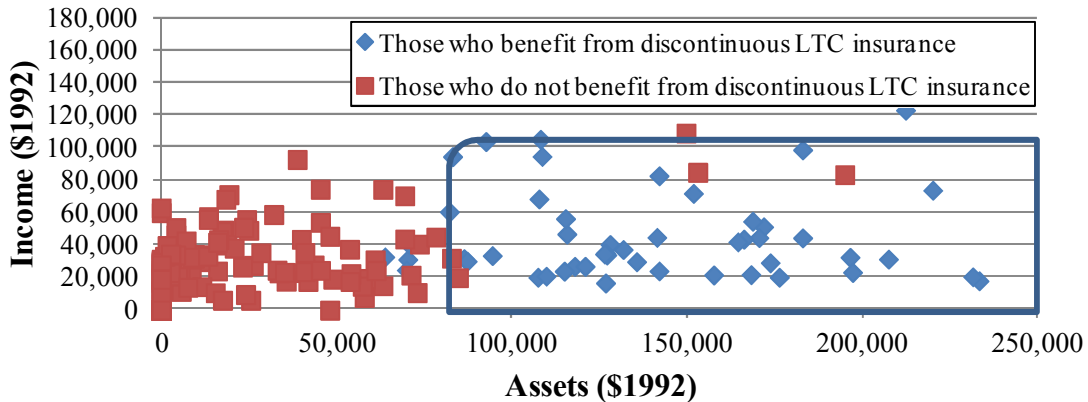
Oftentimes, the graphical representation of those who do and do not benefit from the LTC insurance in Figures 4.12, 4.13 and 4.14 seems to suffer from a number of outliers, i.e. data points which are very close in terms of income and asset levels yet end up being of different colors on the graph. The explanation for those outliers appears to resides in small differences in the income mix behind each datapoint (i.e. the proportion of income that each individual or couple initially derives from Social Security). Those small differences in the proportion of Social Security income will cause differing rates of asset depletion when LTC strikes at the end of life.

4.5.3   Estimation of Potential Savings for Medicaid

The driving force for implementing a social insurance scheme combining retirement income and LTC benefits is to increase older Americans' own financial preparedness with regards to LTC and decrease reliance on Medicaid. But as established earlier in our cost-benefit analysis, the value of the insurance premium might be seen as out of reach by many, and the benefits may not appeal to those who enter retirement with relative low wealth and/or low-income. Yet, part of the appeal of establishing LTC insurance paid through Social Security wealth is that it will relieve current and future pressures on Medicaid budgets, and some of these savings may be passed on in the form of lower LTC insurance premiums. This would create an opportunity to broaden the potential clientele and enhance the feasibility of the policy proposal[87].

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[87] Passing on the Medicaid savings could be done instantly among members of the same generation, but this would require a very precise estimation of how much will be saved in Medicaid costs, many years ahead of time. Another approach could be to wait until the extinction of one generation to realize the total Medicaid savings and then pass them on to the new generation of seniors reaching age 65, thus creating a virtuous circle of lower premiums, albeit in a form that would defy principles of intergenerational equity. A final use of the Medicaid savings could be to equalize access to LTC insurance between couples and single seniors: as illustrated previously in tables 4.9 and 4.10, single women and single men are not as likely as couples to have amassed enough SS wealth to afford the LTC

Estimating how much Medicaid funds could be saved initially is delicate because of data

limitations, such as the initial take-up for the proposed LTC insurance benefit and the lack of

official statistics for Medicaid nursing home per diems. Medicaid reimbursements to nursing

homes are jointly funded by the Federal and State Governments and since the repeal of the Boren

amendment in 1997, the latter enjoy a certain amount of leeway in designing their

reimbursement formulas, with the result that in some States, each nursing home receives a

"tailor-made" per diem for their Medicaid patients, based on factors like fixed capital costs,

administrative costs, dietary costs, direct care staff costs, insurance liability, etc. Statistics on

those per diem rates are not systematically aggregated by the *Centers for Medicare and*

Medicaid. For the purpose of this exercise, we rely instead on the national Medicaid per diem

average computed by the consulting firm Eljay, LLC (2014) via a survey of nursing home

costs[88]. Figure 4.15 shows the evolution of the national per diem average for years 1999-2013.

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insurance premium. This is in part caused by the existence of auxiliary spouse benefits and survivor benefits for couples.

[88] Notice that this report was commissioned and paid for by the American Health Care Association. To compute the national Medicaid per diem average, Eljay LLC combined cost reports from 36 state affiliates of the American Health Care Association representing close to "80 percent of the Medicaid patient days in the country including the nine states that represent more than half of all days covered under the Medicaid program: California, Florida, Illinois, Massachusetts, New Jersey, New York, Ohio, Pennsylvania, and Texas." (p.6)

Figure 4.15 Evolution of the National Medicaid Per Diem Average, 1999-2013

Source: Eljay LLC, 2014
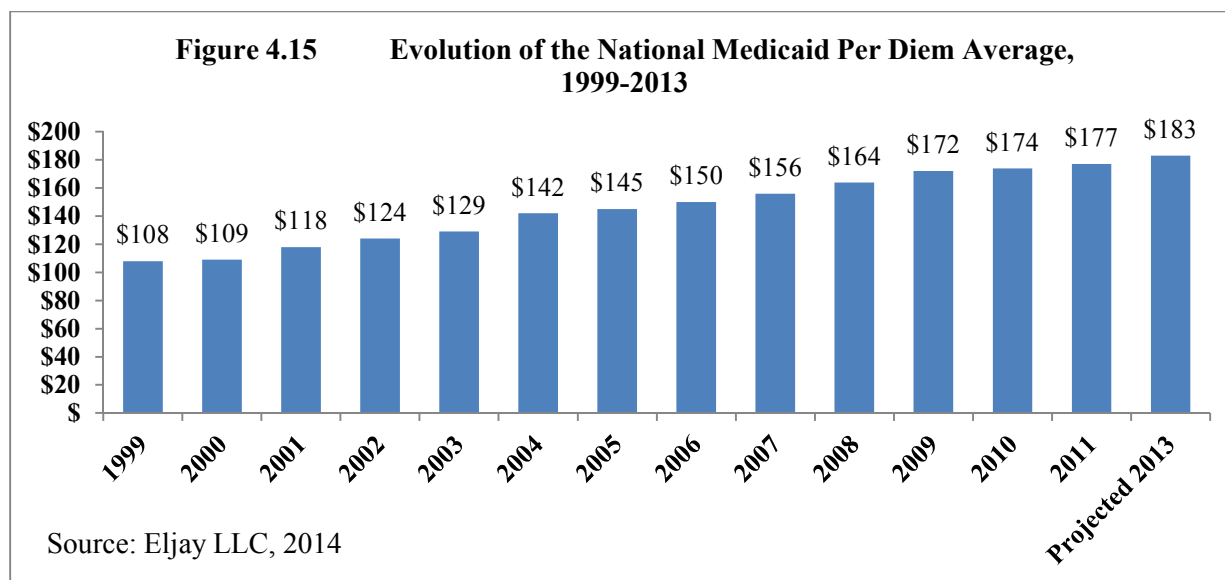
Estimating the initial Medicaid savings requires a few simplifying assumptions, mostly similar to those set out at the beginning of the cost-benefit analysis: all men in the HRS sample die at age 81 in 2008, all women die at age 84 in 2011, everyone will require 12 months of LTC prior to their death, and the take-up rate of the LTC insurance benefit is 100%. We then retain only individuals who end up on Medicaid after exhausting all their financial wealth and compare their Medicaid costs with and without the LTC insurance. This result is then multiplied by the HRS weights and the national Medicaid per diem average. This back-of-the-envelope approach yields the following figures (in 2011 dollars):

Celibate men: $504,365,389 or $12,995 per person.

Celibate women: $1,366,839,690 or $16,344 per person.

Couples : $13,178,166,224 or $56,901 per couple.

These numbers sum up to $15.049 billion, to be allocated between the Federal Government and the States, or funneled back to seniors in the form of lower LTC insurance premiums. These amounts represent an upper-bound estimate, because we assumed 100% take-up and full LTC

insurance benefits. In comparison, total Medicaid spending on LTC in fiscal year (FY) 2012 was $140 billion, out of Medicaid's total spending of $410.6 billion. (Eiken et al. 2014)

4.6   Chapter's Conclusion

This chapter, indubitably the most technical of this dissertation, has covered a lot of ground in terms of findings. At the onset, our main research question was: for how many American seniors would it make economic sense to get a joint income and LTC annuity bought from one's Social Security (SS) wealth. Answering this question necessitated numerous intermediate steps, which we had to approach in a (hopefully) intuitive order. The first step was to develop a microsimulation to estimate the size of the LTC insurance premium required to offer the LTC benefits described originally by Murtaugh et al. (2001). This insurance premium would be carved out from one's Social Security wealth, with the goal of creating a combined life and LTC annuity. To build the microsimulation, we had to model the mortality and disability patterns of a generation of Americans about to enter retirement. This was achieved by following a panel of Health and Retirement Study (HRS) respondents over ten interview waves (1992-2010), and estimating their probability of transitioning between four states: unimpaired (0-1 ADLs), moderately impaired (2-3 ADLs), severely impaired (4 and more ADLs) and death. We employed a Maximum Likelihood estimation methodology developed by Wolf and Laditka (Wolf & Laditka 1997, Laditka & Wolf, 1998) to obtain transition probability estimates and variances.

Having established a calendar of disability onset and recovery for the population of interest, we moved to estimate the value of the LTC insurance premium. To do so, the estimated transition probabilities were applied to a large simulated population of seniors aged 65-year old in 1992, with transitions happening every six months until full cohort extinction. Movements of the cohort members through the disability states translated into different LTC insurance cash benefits. The sum of those LTC benefits, once averaged and discounted to the moment when the insurance is purchased, equals the insurance premium. The original benefit model developed by Murtaugh et al. (2001) called for LTC benefits to be paid continuously once the insured person had reached a certain level of disability, even if the person had returned to good health. Obviously, this caused the LTC insurance premium to swell. An alternative model—where LTC benefits are rescinded/reinstated according to one's health variations—commanded insurance premiums that were 30% to 33% cheaper, depending on gender (Table 4.6, page 129). Seeing that a LTC insurance policy providing discontinuous benefits still carried a relatively high price and fearing that many individuals and couples would probably be left out of this market because of insufficient Social Security wealth, we conducted a sensitivity analysis by re-running the microsimulations with a number of partial benefit values (Tables 4.7 and 4.8, page 131). This exercise yielded a more affordable set of insurance premiums, although as we later discovered, moving towards very low premiums defeats the purpose of the policy intervention: the correspondingly low LTC insurance benefits are in most cases not substantial enough to cover nursing home costs, which leads to one's complete asset depletion and reliance on Medicaid.

After establishing the LTC insurance premiums, our next step was to determine HRS respondents' Social Security (SS) wealth at age 65, from which the LTC insurance premiums

could be deducted. These SS wealth values were conveniently obtained from an HRS public

dataset called "Prospective Social Security Wealth Measures of Pre-retirees", and once the

insurance premium was deducted for every person in the sample, we worked in reverse to

establish the new annuity value to which they would be entitled. Interestingly, when tabulating

the percentage of seniors who could afford the proposed LTC insurance, affordability never

reached 100%, even when LTC insurance premiums were radically lowered (Table 4.9, page

139), or when the benefits were converted from continuous to discontinuous (Table 4.10, page

139). Among the different household types, single women were the least likely to afford

coverage.

The next step in our analysis of LTC insurance was to look into the distribution of total annual

income to estimate whether those about to enter retirement had enough resources (other than

from SS) to shoulder a reduction in their SS retirement benefits. An analysis of income

distribution (Figure 4.6, page 142) showed that the importance of Social Security benefits in the

total income mix declines as we move up the income distribution, a result indicating that the

prevalence of workplace pensions and other savings mechanisms is higher for middle-class

seniors and those in the higher quintiles. Another piece of information we gathered in

anticipation of the microsimulation is the level of financial assets, which we graphed by income

quintile (Figure 4.7, page 146). This led to the realization that income levels and financial

wealth are not perfectly correlated.

Having gathered all the elements needed to conduct the cost-benefit analysis (CBA) per se, we

moved forward in section 4.5.1 with the construction of a base case and alternate scenarios in

which our sample of seniors were to experience LTC for variable durations, and receive either continuous insurance benefits, discontinuous insurance benefits, or no benefits at all. Admittedly, the test underlining our CBA (i.e. spending either 12 or 36 months in a nursing home) is rather static, in that it does not reflect changes in disability status. But for the sake of brevity and ease of modeling, we chose what seemed like an upper and lower bound.

It might be said that when initially designing our CBA, we were a bit naive in thinking that the decision to buy LTC insurance from one's Social Security wealth would translate as a clean line on a graph. As we have discovered, there is no unique income-and-assets figure on which we could recommend Americans to purchase LTC insurance through SS wealth. A short recapitulation of the CBA results in Figures 4.8 to 4.11 indicates that for each household type, there seems to be a "zone" (a more or less defined range) of assets and income levels for which purchasing the LTC insurance from SS wealth makes economic sense. Seniors who find themselves outside of this zone are either in a situation of low income and low financial assets (in which reliance on Medicaid is a safer choice) or in a situation of high income and high financial assets (with enough disposable income to pay for their own care while suffering little asset depletion along the way).

Since the affordability of the proposed LTC insurance is an important aspect of the policy proposal, one key question is whether moving from a model of continuous benefits to a model of discontinuous benefits would attract the same clientele. To this end, a visual assessment of continuous benefits (Figures 4.8 and 4.9) and discontinuous benefits (Figures 4.10 and 4.11) showed that the zones where income and asset levels warrant the purchase of LTC insurance are

indeed similar. Thus, based strictly on clientele and premium levels, discontinuous benefits should be the preferred model. However, one should note that this type of benefit presupposes a system where seniors' disability statuses are tracked over time, not just at the time of initial benefit determination. But given the current need for Medicaid beneficiaries to obtain recertification at regular intervals, such a system might not be too difficult to expand and adapt. Another unmeasured issue that is likely to hamper the 'discontinuous benefits model' has to do with the moral hazard of individuals and their medical providers trying to inflate their periodical medical assessments in order to prevent lapses in benefit (this phenomenon is commonly referred to as "ADL creep", because eligibility for benefits is determined through an ADL scale[89]). If widespread, this form of system gaming could endanger the actuarial soundness of the proposed LTC insurance scheme, or require higher premiums.

It was also important to conduct a sensitivity analysis to see whether lower premiums and benefits could make the purchase of LTC insurance from SS wealth accessible to a wider group of seniors. This hypothesis was tested by modifying the CBA to allow for benefits set at 30%, 50% and 70% of the original benefits (Figures 4.12, 4.13 and 4.14). The results showed that trying to broaden accessibility by applying deep discounts was causing LTC benefits to be much too low vis-à-vis LTC costs, which implied that seniors would still need to deplete their financial assets to cover the balance of costs. The most prudent course of action would be to set the premium/benefit levels at 70%-100% of their original range.

Finally, we wanted to test for the magnitude of Medicaid savings that could be expected from the proposed LTC insurance. Medicaid spending is always a contentious part of States' budgets, and

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[89] Murtaugh et al. (2001:246)

part of the appeal of establishing a LTC insurance scheme paid through Social Security wealth is

that it could relieve future Medicaid cost pressures. As well, some of these savings may be

passed on in the form of lower LTC insurance premiums, thus broadening the potential clientele

for the policy proposal. Using national Medicaid per diem averages and assuming full take-up,

we estimated that the maximum value of Medicaid savings in 2011 would be $15.049 billion.

At the end of this lengthy process, it is important to look back and ask ourselves whether the

policy proposal meets its target. The feasibility of using a fraction of accumulated SS wealth to

provide LTC insurance rests on three key elements: the magnitude of the LTC insurance

premium, the theoretical value of SS wealth accumulated by individuals over their working life,

and the stock of wealth they have amassed along the years. The second and third elements are

probably the Achilles' heel of the policy proposal: the distribution of SS wealth suffers from a

very unequal distribution, which is heightened by the ancillary benefits available to couples only.

Single individuals are therefore at a disadvantage when it comes to purchasing the insurance

coverage. The accumulation of wealth is the other side of the coin: carving out a portion of one's

SS wealth to acquire LTC insurance coverage implies lower SS retirement benefits in perpetuity.

Plugging this "hole" in one's expected retirement income requires either a consequential level of

financial assets and/or membership in a solid pension plan, a workplace advantage that is

increasingly hard to find in today's work environment. In any event, building up one's retirement

nest egg is an endeavor which requires years of foresight and financial discipline, and as

statistics on 401(k) plan balances tend to attest, American workers may have to prepare

themselves for a lower level of consumption when reaching retirement. This is why we believe

that if our policy proposal becomes reality, it is unlikely that it will be hugely popular among those approaching retirement.

Instead of retrofitting LTC insurance benefits into the long-established Social Security program, it might be simpler to develop a stand-alone, fully funded, universal LTC social insurance scheme with dedicated premiums, as international experience has shown. But as surmised by Chen (1993) in his original proposal, what is simpler in administrative terms can be very difficult to develop politically, especially since a stand-alone LTC social insurance scheme would require raising new dedicated taxes.

Conclusion

The focus of this dissertation has been about how to meet the cost of long-term care (LTC) for American seniors. As was shown in Chapter 1, the risk of needing LTC at some point in one's life is non-negligible, and LTC is sometimes considered the last major uninsured expense for seniors in the United States (Brown & Finkelstein, 2004a). Indeed, in the current landscape of LTC spending, private insurance coverage remains minimal, while the majority of costs are borne by Medicaid and out-of-pocket spending. As the payer of last-resort, Medicaid forces seniors with LTC needs to liquidate their assets to basic minimums, and then use most of their retirement income as co-payment, leaving no possibility for bequests.

Chapter 2 has showed that the provision of LTC suffers from many policy challenges. The first challenge pertains to the characteristics of both formal and informal care work: jobs in formal care generally suffer from attraction and retention problems, which are amplified by poor work conditions, health risks and low compensation. The supply of informal care, on the other hand, is challenging because it conflicts with many aspects of paid work and family life, and can carry many hidden costs to the caregiver. The second policy challenge affecting LTC has to do with the multiple demographic trends about to impact the American LTC landscape now and in the years to come. In particular, the aging of the baby-boom generation, the lengthening of human life, the persistent low fertility rates and the evolution of disability trends in old age will be important drivers of the future demand for care.

The third challenge concerns the limits of Medicare, Medicaid, and the private insurance market to address coverage of LTC risk. As mentioned repeatedly, American seniors tend to shun LTC private insurance, a perplexing behaviour when compared to the magnitude of the risk, and its potential for rapid impoverishment. This lack of coverage might be explained by a number of 'market' problems (affordability of premiums, need for long-term commitment on the part of the buyers, adverse selection, moral hazard, lack of competition among insurers), and compounded by the wrongly held belief among Americans that Medicare covers all LTC expenditures (which it does not). The existence of Medicaid, a last-resort program with high deductible and coinsurance levels, should in theory encourage more private LTC insurance purchase. Yet, the program's characteristics might in fact foster the practice of asset sheltering, by which seniors transfer assets to relatives in order to qualify for Medicaid LTC benefits and preserve their estate.

The second part of Chapter 2 described five policy solutions gathered from international and American experience (social insurance, cash-for-care, the CLASS act, Partnership LTC insurance, tax deductions for LTC insurance premiums) and drew an assessment of each according to the five goals of LTC reform, as established by Wiener et al. (1994): recognizing LTC as a normal life risk, offering protection against catastrophic out-of-pocket costs, preventing dependence on welfare systems, promoting home care, and making the system affordable overall. Originally enacted in March 2010 as Title VIII of the Patient Protection and Affordable Care Act, the CLASS act would have created a voluntary government LTC insurance program providing cash benefits to enrollees who require help with activities of daily living (ADLs) or because of cognitive impairment. The proposal met four of the five goals of LTC reform, but was non-coercive in nature, which proved to be its actuarial Achilles' heel: without credible tools

to maintain premiums to a workable level and no real means of drawing healthy and young

participants, the program stood to be a victim of adverse selection and was taken off the table by

the Obama administration in October 2011, prior to implementation. The negative political

climate around the sustainability of social insurance programs like Social Security and Medicare

seemed to prevent the creation of another plan requiring mandatory contributions, especially at a

time when the Obama administration was attempting the launch of a large health care reform

which would eventually require every American to acquire health care coverage.

Chapter 3 sought to answer the limitations of the CLASS act and the private LTC insurance

market by designing a social insurance plan which didn't require additional contributions. The

solution, as originally put forward by Chen (1993, 1994, 2003, 2007) was to convert a portion of

existing Social Security (SS) retirement benefits to provide LTC benefits. According to Chen, a

5% transfer of SS cash benefits in 1991 would have generated $15 billion, which was then

sufficient to cover 25% of all formal LTC costs reported in that year. However, the author

conceded that this share would contract over time if the cost of formal LTC kept increasing more

rapidly than the rate of growth for average earnings. In our view, the costing of Chen's proposal

was also lacking because its estimation rested for the most part on a macro analysis, which didn't

allow for an in-depth appreciation of how the benefits would work at the individual level, nor did

it allow for sensitivity analyses.

Next in chapter 3, we explored the idea of joint annuity/LTC benefits in the private insurance

market. This proposal was initially put forward by Murtaugh et al. (2001, 2003), who

determined that combining the risk of long life (annuities) and the risk of needing care at the end

of one's life (LTC insurance) generated complementary clienteles and cost-saving opportunities. Indeed, since someone who is a bad risk for a LTC insurance policy is a good risk for an annuity (and vice versa), the authors inferred that combining both risks in a single insurance product with minimal underwriting could defeat adverse selection, and result in a cheaper product than purchasing the two separately. One important critique of the proposal is that even if it aims to develop the LTC insurance market, the combined premium may well be out of reach for many, because the annuity part would be driving most of the premium cost.

This affordability problem led us to consider a LTC policy proposal combining the insurance principles of Murtaugh et al. with Chen's idea for tapping into accumulated SS wealth. SS is basically an illiquid source of wealth amassed through forced savings, which converts to an annuity at the time of retirement. The hope behind transforming the SS retirement annuity into a joint annuity/LTC benefit is that it would bring in the social insurance vehicle that is currently missing in the mix of LTC financing, and would not necessitate new contributions on the part of seniors. Universality was a concern because there is much variation in the income and asset profiles of American seniors. Some seniors could be left out because of insufficient SS wealth, while others may have enough SS wealth to afford the insurance premium but the remaining SS wealth might not generate an annuity that is sufficient enough to avoid poverty in old age. Lastly, some seniors may purchase the LTC insurance when in fact relying on Medicaid could have been a better deal for them given their income and asset levels.

With these concerns in mind, in chapter 4 we proceeded to test the feasibility of the joint annuity/LTC benefit. Our main research question was: for how many American seniors would it

make economic sense to get a joint income and LTC annuity bought from one's Social Security (SS) wealth. After developing the intermediate methodological steps needed for our cost-benefit analysis, we established a base case and alternate scenarios in which our sample of seniors from the HRS were to experience LTC for variable durations, and receive either continuous insurance benefits or discontinuous insurance benefits. The results of the CBA are quite heterogeneous according to household composition, income and asset levels. Indeed, for each household type, there seems to be a limited zone of assets and income levels for which purchasing LTC insurance from SS wealth makes economic sense. Seniors who find themselves outside of this zone are either in a situation of low income and low financial assets (in which reliance on Medicaid is a safer choice) or in a situation of high income and high financial assets (with enough disposable income to pay for their own care while suffering very little asset depletion along the way).

What the CBA results tend to show is that reverse-engineering an existing social insurance scheme to diversify the kinds of cash benefits it offers does not generate a limited set of intuitive answers. When faced with the decision to obtain this new LTC coverage, there is no quick-and-simple guidance one can look for: individual situations are varied and decisions about LTC insurance will depend on variables characteristics (e.g. marital status, asset levels, expected income from all sources) as well as a few unknown parameters (e.g. life expectancy and onset of disability) and the continued existence of a social assistance program (Medicaid) which acts as a backstop for everyone. This is probably why countries that created social insurance schemes for the LTC risk have chosen to create stand-alone plans dedicated to this risk only, and not tie them to the realm of retirement income.

Another point has to do with one of the principles underpinning the Murtaugh et al. model: from the point of view of a private insurer, the benefit of combining longevity annuities with LTC insurance rests on the premise that both products are affected by adverse selection, and by combining a cash annuity with LTC insurance, adverse selection is defeated in both products (people with high risk of disability in old age cost less on the annuity side, and people with high longevity cost less on the LTC insurance side). But Social Security does not suffer from adverse selection as an annuity provider, because coverage is made compulsory by the law. Is it therefore appropriate to import a private insurance solution into a social insurance scheme?

One of our assumptions in conducting the CBA was full take-up of the proposed LTC benefit for everyone with enough SS wealth to afford the premium. But as seen in tables 4.11 and 4.12 from chapter 4, paying the LTC insurance premium out of one's SS wealth can create serious dents in one's expected retirement income. Through a behavioural approach, future research could explore the tolerance of near retirees to such "haircuts". For this purpose, one could develop the concept of "reservation income", which could be defined as the lowest retirement income level one is willing to accept in exchange for a given amount of LTC insurance protection.

Appendix 1   LTC Social Insurance Schemes in Selected Countries

LTC social insurance schemes have been developed and implemented in six countries so far.

Below is a very short description of the policy history, and details about contributions and

benefits in each jurisdiction.

- **Germany**: prior to the 1994 reforms, German citizens with LTC needs had to pay for

  their care using all their financial resources, until becoming eligible to a welfare program

  which paid for all costs of care (Rothgang, 2010). Thus, the goal of the 1994 reform was

  to alleviate the fiscal pressures on the public purse, while fostering greater supply of

  home care, which costs less to administer (Cuellar & Wiener, 2000). The German system

  (*Pflegeversicherung)*, is financed through a 1.95% contribution paid in equal parts by

  employees and employers, in a pay-as-you-go arrangement. High earners are given the

  choice to either register in the public system, or contract an equivalent private insurance

  policy. When a person develops a disability, he/she can elect to go to a nursing home, or

  receive care at home. Home care services can either be delivered in kind, or recipients

  can receive a cash benefit which can be used to pay a relative for care provision. Access

  to all benefits is conditional on a medical evaluation of ADLs and IADLs, and for

  disabilities expected to last at least six months. Following this medical evaluation, the

  applicant is assigned to one of the three levels of benefits offered, which correspond to

  the estimated number of hours of care required.

- **Japan**: often recognized by demographers as being the country with the oldest age

  structure, Japan experiences a strong demand for LTC. Before 2000, a public LTC

system offered institutional care, but the amount of co-insurance billed to families was so high that many families sidestepped the public LTC system altogether by leaving seniors in the care of hospitals, where the costs were borne by the State (Matsuda & Yamamoto, 2001). The LTC social insurance system (*Kaigo Hoken*) supersedes the previous arrangement, with the goals of promoting independent living in the community, sharing costs between a large base of workers, and alleviating care burdens for informal caregivers (Olivares-Tirado et al, 2011). The system is financed in equal parts by general taxation revenues and compulsory insurance premiums paid by workers aged 40 and over and retirees. For those aged 65 and over, access to benefits is established using a standardized tool of evaluation of physical and mental state, which is then counter-verified by a panel of health professionals (Matsuda & Yamamoto, 2001). For those aged 40 to 64, access to benefits is conditional on the disability being linked to causes like strokes or Alzheimer's disease. Following the medical assessment, applicants are classified according to one of seven levels of needs, which corresponds to a level of care, with 6-month reviews. Care can be delivered either in institutions or in the home.

- **The Netherlands**: introduction of a LTC social insurance system in the Netherlands goes back to the end of the 1960s. The system (*Algemene We Bijzondere Ziektekosten*) was created to cover the cost of institutional care for people of all ages, and later expanded to cover home care (Da Roit & Le Bihan, 2010). Two thirds of the system's budget comes from a dedicated 13.55% tax on workers' annual income, and the remaining third is provided by the consolidated fund of the Dutch government. Access to benefits is established through a standardized procedure managed by a government agency, which

determines for each applicant the number of hours of care needed. Care can be delivered in kind, or as a cash allowance –called a personal budget– to purchase formal caregiving services or to compensate an informal caregiver. The cash value of benefits paid through personal budgets is set at about 75% of the cost of benefits paid in kind, which is no deterrent to their popularity (Pijl & Ramakers, 2007).

- **Luxembourg**: when created in 1998, Luxembourg's LTC social insurance system was heavily influenced by the German system launched in 1994. The Luxemburgish system gets 65% of its financing from a dedicated income tax of 1.4%, while the balance comes from consolidated government funds and state electricity sales. The system offers either in-kind benefits or cash benefits, and those are accessible to any applicant requiring at least 3.5 hours of care per week to perform ADLs, provided the medical condition is deemed to last at least six months. One of the main differences from the German system is the absence of levels of benefits: instead, the Luxemburgish system uses a continuous benefits scale.

- **Israel**: faced with an inadequate system of LTC and an ageing population, the Israeli parliament voted in 1980 to create a system of LTC social insurance. The system began amassing contributions in 1982, through a dedicated 0.2% tax on wages, paid in equal parts by employers and employees. Since benefits were to begin only in 1988, the system therefore had time to build up a small reserve, which was rapidly depleted; the system is now overly dependent on subsidies from the Israeli government. (Borowski & Schmid, 2000). The goals of the system are to increase the supply of formal care delivered at

home, and to give respite to informal caregivers. Women can apply for benefits starting

at age 60, and men can apply starting at age 65. Benefits are subject to an earnings test

which is particularly lax (3 times the average wage). Access to benefits is established

through a medical evaluation centered on ADLs. There are two levels of benefits offered

–ten or fifteen hours of care- and all benefits are in-kind (personal care, monitoring,

transport, adult day care, laundry). Payment for benefits is channeled directly to formal

care providers (Borowski & Schmid, 2000).

- **South Korea**: the LTC social insurance system in South Korea

  (*Noinjanggiyoyangboheum)* is the most recent of the list, having been activated in 2008.

  Among the factors leading to its creation are the rapid ageing of the Korean population,

  the rising profile of women in the paid labour force, the low level of financial resources

  of seniors, as well as the financial stress of providing LTC in a hospital context (Kwon et

  al., 2009). The new LTC social insurance system is financed by a mix of dedicated

  income taxes (52%), consolidated government funds (37%), and copayment charges to

  service users (11%). Like in the Japanese LTC insurance system, access to benefits is

  established through a standardized procedure which is then counter-verified by a panel of

  health professionals (Colombo et al. 2011). If deemed eligible, applicants are classified

  according to one of three levels of needs, which is associated with a specific level of

  benefits. Those benefits are for the most part delivered in kind by private contractors

  (who are refunded by the social insurance scheme), but can be paid in cash to the care

  recipient if there are no private contractors offering services in their region.

Appendix 2   Preparation of the HRS/AHEAD Dataset

Our goal is to seek information on the timing of disability onset, remissions and death for a panel of HRS respondents over ten interview waves (1992-2010). Running the IMaCh software requires the submission of a flat file where each line represents the record of events for one individual, over time, with additional information such as the value of covariates, a weight value, and birth/death information. The following is an abridged layout of the flat file in question:

- Record number: positive number from 1 to x.

- First covariate: education (1 or 0)

- Second covariate: race (1 or 0)

- Weight: positive number

- Date of birth: coded as mm/yyyy

- Date of death: coded as mm/yyyy (if death has occurred, otherwise coded as 99/9999)

- Date of first interview: coded as mm/yyyy.

- Disability status at first interview. (1 = no disability; 2 = one or two ADLs, 3 = three or more ADLs, 4 = dead, -1 = missing value).

- Date of second interview: coded as mm/yyyy.

- Disability status at second interview.

- Date of third interview: coded as mm/yyyy.

- Disability status at third interview.

- Date of fourth interview: coded as mm/yyyy.

- Disability status at fourth interview.

- etc

Disability in the HRS and AHEAD surveys can either be physical or cognitive. Physical disability is easily reported through a set of questions about respondents' ability to perform activities of daily living (ADLs), a widely accepted measure of self-care and mobility[90]. But reporting cognitive disability is more challenging. As observed by Lachman and Spiro (2002), cognitive measures are often left out of survey designs because reliable tests are too difficult and time-consuming to administer, especially when lay interviewers are working via telephone. Yet, the HRS includes a recurring measure, the TICS (Telephone Interview of Cognitive Status), whose aim is to capture the intactness of mental status (McArdle et al. 2009:6). The TICS is modeled after an anterior measure, the MMSE (Mini-Mental State Examination). According to Brandt et al. (1988) and Freedman et al (2001), the TICS measure displays high reliability and excellent predictive validity in terms of identifying persons with clinically diagnosed dementia. The following questions make up the TICS measure:

What is today's date (in full)

What day of the week is today?

What do people usually use to cut paper?

What do you call the kind of prickly plant that grows in the desert?

Name the President of the United States

Name the Vice President of the United States

Count backwards from 20 to 1.

Immediate recall of a list of ten words mentioned by the interviewer.

Delayed recall of same list of ten words

---

[90]See section 1.1 for more details on the use of ADLs.

Subtract 7 from 100 (and repeating this operation four times).

The maximum number of points one can obtain on the TICS is 35. Following work by Herzog and Wallace (1997), we set the cutoff for cognitive impairment at 8, because the proportion of respondents scoring at this level corresponds to estimates of population affected by severe cognitive impairment. HRS respondents who fall below the cutoff are deemed severely disabled and are coded as "3" in the flat file (e.g. the equivalent of having three or more ADLs).

For HRS survey respondents whose condition required the use of a proxy informant, we chose to mirror the threshold used by Freedman et al. (2001), who defined severe cognitive impairment as those cases where the proxy informant declared the person under his/her care as having poor memory and poor judgment (from a question scored on a five-point scale including excellent, very good, good, fair, or poor). Again, respondents with poor memory and poor judgment are coded in the flat file as "3" in the flat file.

Appendix 3: Validity of the Mortality Profile Generated by the IMaCh Program

To obtain the estimated mortality profile generated by the IMaCh software, we first substitute the estimated coefficients from Tables 4.3 and 4.4 into equation (4), which is a transformation of equation (3) by exponentiation of both sides. This step yields the transition probabilities between the four states at every age between 65 and 120, by gender. These transition probabilities are then applied to two "virtual" populations, one representing 1,000,000 men aged 65 and the other representing 1,000,000 women aged 65, with representative proportions of whites and non-whites, as well as proportions of people with and without a high-school diploma. The transition probabilities are computed in periods of 6 months, until cohort extinction at age 120. Table A1 presents an abridged view of men's estimated transitions starting at age 65, in half-years, for illustration purposes[91].

$$\ln\left[\frac{p_{ij}(age,t)}{p_{iU}(age,t)}\right] = \beta_{ij0} + \beta_{ij1}age_1 + \beta_{ij2}Nonwhite + \beta_{ij3}Low\ education \qquad (3)$$

$$p_{ij}(age,t) = \frac{e^{\left(\beta_{ijn}X_n\right)}}{1+\sum_{n=1}^{n-1}e^{\left(\beta_{ijn}X_n\right)}} \qquad (4)$$

---

[91] To keep with the design of the benefit, where people would be assessed every six month once they are initially evaluated for the disability benefit, Table A1 produces transition numbers in half-years.

Table A1   Six-Month Estimated Transitions Between 4 Health States, for a Cohort of

1,000,000 Men Aged 65 (abridged)

Age x	Age x+0,5	U-U	U-M	U-S	U-D	M-U	M-M	M-S	M-D	S-U	S-M	S-S	S-D
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
65	65.5	974,309	5,826	10,609	9,256	0	0	0	0	0	0	0	0
65.5	66	948,478	5,887	10,662	9,282	1,195	3,548	686	397	782	284	9,279	266
66	66.5	924,449	5,957	10,731	9,320	1,969	5,945	1,141	662	1,488	535	18,065	538
66.5	67	901,699	6,032	10,811	9,364	2,489	7,640	1,460	848	2,119	757	26,251	810
67	67.5	879,886	6,111	10,898	9,413	2,852	8,901	1,695	983	2,673	948	33,819	1,082
67.5	68	858,764	6,192	10,989	9,466	3,116	9,885	1,874	1,086	3,157	1,112	40,790	1,353
68	68.5	838,162	6,275	11,082	9,519	3,312	10,688	2,019	1,169	3,580	1,250	47,199	1,625
68.5	69	817,950	6,357	11,175	9,570	3,466	11,367	2,142	1,237	3,945	1,366	53,095	1,896

Legend: U= unimpaired; M = Moderately impaired; S = severely impaired; D = dead.

From the numbers generated in Table A1, the transitions to dead states (e.g. columns 4-8-12) are aggregated for each age to form a single vector of information representing overall mortality experience. This vector serves as the basis for building a life table, the demographic tool which presents for each age the probability of survival and death, as well as life expectancy values. Tables A2 and A3 show abridged versions of men's and women's life tables, as estimated from the IMaCh software.

Table A2   Men's' Life Table, from an Estimated IMaCh Model, Abridged

Age x	l_x	d_x	q_x	L_x	T_x	E_x
65	1,000,000	19,201	0.01920	990,400	16,630,147	16.63
66-70	980,799	124,466	0.12690	4,592,830	15,639,748	15.95
71-75	856,333	159,676	0.18646	3,882,475	11,046,918	12.90
76-80	696,657	184,547	0.26490	3,021,918	7,164,443	10.28
81-85	512,110	188,225	0.36755	2,089,988	4,142,525	8.09
86-90	323,885	158,871	0.49052	1,222,248	2,052,538	6.34
91-95	165,014	102,106	0.61877	569,805	830,290	5.03
96-100	62,908	45,974	0.73081	199,605	260,485	4.14
101-105	16,934	13,722	0.81032	50,365	60,880	3.60
106-110	3,212	2,760	0.85928	9,160	10,515	3.27
111-115	452	407	0.90044	1,243	1,355	3.00
116-120	45	45	1,0	113	113	2.50

Table A3   **Women's Life Table, from an Estimated IMaCh Model, Abridged**

Age x	l_x	d_x	q_x	L_x	T_x	E_x
65	1,000,000	9,274	0.00927	995,363	20,328,056	20.33
66-70	990,726	73,623	0.07431	4,769,573	19,332,693	19.51
71-75	917,103	113,751	0.12403	4,301,138	14,563,120	15.88
76-80	803,352	152,095	0.18933	3,636,523	10,261,983	12.77
81-85	651,257	179,583	0.27575	2,807,328	6,625,460	10.17
86-90	471,674	179,487	0.38053	1,909,653	3,818,133	8.09
91-95	292,187	143,963	0.49271	1,101,028	1,908,480	6.53
96-100	148,224	88,229	0.59524	520,548	807,453	5.45
101-105	59,995	40,309	0.67187	199,203	286,905	4.78
106-110	19,686	14,129	0.71772	63,108	87,703	4.46
111-115	5,557	4,115	0.74051	17,498	24,595	4.43
116-120	1,442	45	0.03121	7,098	7,098	4.92

The proportion of survivors at every age (l_x) estimated via IMaCh can now be plotted against a reference mortality scenario (or benchmark) to test its validity. Refer to Figures 4.1 and 4.2 from Chapter 4, where we compared the proportion of survivors at every age (l_x), by gender, from ages 65 to 120.

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