The Changing Profile of the Elderly: Effects on Future Long-term Care Needs and Financing

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DESPITE BROAD SUPPORT FOR LONG-TERM CARE financing reform, it is still not clear what shape reform will take. In 1987 approximately $33 billion of the nation's health care expenses were devoted to nursing-home care for the elderly (Waldo et al. 1989, 117). The Medicaid program, designed to cover the health care of the financially destitute, paid for more than a third of these expenses ($12 billion), while private finances covered most of the rest ($19 billion). Only a fraction of nursing-home expenses was covered through an insurance mechanism (either private or social insurance). The elderly also use significant amounts of in-home long-term care services, and payment for these services is even more heavily dominated by out-of-pocket expenses. As the size of the elderly population and the number requiring long-term care services continue to increase, there is a growing consensus that we need an alternative to a system that requires the elderly to pay for long-term care expenses out of pocket until they are sufficiently impoverished to qualify for Medicaid benefits.

Various groups and studies have called for reform in long-term care financing. Most recently, the Pepper Commission proposed financing long-term care through an integrated program that would include a limited social insurance mechanism guaranteeing subsidized home-care

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benefits and three months of nursing-home care for every American, a public program for longer nursing-home stays with a floor of protection that guards against impoverishment, and measures that promote private long-term care insurance (U.S. Bipartisan Commission on Comprehensive Health Care 1990). The commission recommended that the social insurance part of the program be fully financed by the federal government, preferably through a broad-based progressive tax system. A recent study by the American Association for Retired Persons (1989) also endorsed the idea of a social insurance program to pay for long-term care expenses. One of the conclusions of a major study by Rivlin and Wiener (1988) was that a social insurance mechanism is needed along with an expansion of the private insurance market. They based this conclusion on projections indicating that only a minority of the elderly could afford private long-term care insurance.

There is obvious resistance to long-term care financing reform that would require a new social insurance program or even an expansion of Medicaid. Proposals that involve increasing payroll taxes or general income taxes in order to pay for a new benefit for the elderly do not seem feasible in a budget climate that already requires hard choices about reducing current government expenditures. This climate, coupled with some sentiment that the elderly already have more than their fair share of government benefits, is not likely to produce wide support for a new program that covers long-term care expenses. Moreover, a new universal social insurance program covering long-term care expenses would benefit middle- and upper-income elderly persons more than low-income persons because the Medicaid program already covers a large share of the nursing-home expenses of poor elderly persons.

Nevertheless, some significant change in the way that long-term care is financed may be on the horizon. This solution involves the rapidly developing private insurance market for long-term care expenses. The Health Insurance Association of America (1991a) recently reported that, as of December 1989, more than 1.5 million long-term care insurance policies had been purchased, an increase of 400,000 policies (36 percent) over 1988. The number of insurers in the market is also increasing rapidly, and the quality of the product is improving. In contrast to earlier plans, most now offer some inflation protection for rising costs of nursing-home care, cover in-home care expenses, do not require prior hospitalization, and provide coverage for at least four years in a nursing home.

It is still not clear whether private insurance coverage can solve a significant portion of the long-term care financing problem. Until recently, most of the elderly were not aware that they are not covered for long-term care services through Medicare, and we know that few of the elderly can afford today's long-term care insurance premiums (U.S. Bipartisan Commission on Comprehensive Health Care 1990). The future contribution of this financing mechanism will depend on the population's interest in long-term care insurance, as well as their ability to pay for the insurance without sacrificing other basic needs.

This study focuses on whether the profile of the elderly population is likely to change over time, so that long-term care insurance will become a more attractive and feasible option for a broader segment of the elderly population. Specifically, we examine two questions:

- What is the future need for long-term care services likely to be?
- Will long-term care insurance be affordable for a large portion of the future elderly population, or will it remain out of reach for most older Americans, suggesting that other solutions will be required?

The study uses dynamic microsimulation techniques to project the elderly population's characteristics, incomes, and long-term care needs between now and the year 2030. These techniques capture how the interactions among changing demographics, disability levels, and income will determine the future long-term care needs of the elderly. This methodology offers advantages over more traditional static aging techniques, such as those used by the Census Bureau, because a large number of variables are endogenous to the model. Projections of long-term care needs that rely primarily on Census age distributions for some future year lead to an oversimplified picture of the future because nursing-home use is also related to marital status, living arrangements, and the availability of caregivers (see, for example, Liu, McBride, and Coughlin 1990). To the extent that there are significant changes in these determinants of long-term care requirements, the more simplified models will under- (or over-) state the future need for long-term care.

A recent study by Rivlin and Wiener (1988) also used microsimulation techniques to project the future need for nursing-home care. This study differs from theirs in that the behavioral content of the underlying demographic and economic model is more complete, allowing us to

simulate the profile of the elderly population further into the future and to incorporate more completely the effects of recent behavior on the future profile of the elderly. In addition, the estimates presented here incorporate more recent changes in the still evolving long-term care insurance market.

Data and Methods

The Urban Institute's Dynamic Simulation of Income Model (DYNASIM) was used to project the characteristics of the elderly population to the year 2030. DYNASIM is a microsimulation model that incorporates behavioral research on all of the major demographic and economic events that will affect the future profile of the elderly. DYNASIM has its origins in the work of Orcutt and others (1961) and has been under continuous development at The Urban Institute for more than 20 years (Lewis and Michel 1990).

The dynamic projection methodology differs from the static aging techniques used by the Census Bureau and the Social Security Administration in that it stimulates behavior at the personal and family levels. The model starts with a representative sample of the population. It "ages" the population in annual intervals through a series of probabilistic models of the major demographic and economic events that affect the status of the family unit. The microsimulation methodology provides a powerful projection tool because births, deaths, labor force participation, and other economic and social events interact to shape the profile of the population.

The DYNASIM model is fully described elsewhere (see, for example, Orcutt, Caldwell, and Wertheimer 1976; Johnson, Wertheimer, and Zedlewski 1983, 1989; Congressional Budget Office 1986; Hacker and McBride 1989; and Zedlewski et al. 1990). Below we highlight the model's input data and the behavioral functions used to develop a profile of the future elderly population. We also define the aggregate projection assumptions used in this analysis.

Input Data

The starting data set used for this analysis is the "1973 Exact Match File," which includes the March 1973 Current Population Survey (CPS),

actual social security earnings records for each individual with work experience, and 1972 Internal Revenue Service tax return information. We begin the simulation process with this data set because it is the *latest* available public use file that includes a representative sample of the population and their earnings history back to 1951. Historical information is critical for simulating retirement incomes for persons with work experience prior to the date of the input file, because many retirement income sources (e.g., social security and pensions) are based on earnings histories. The DYNASIM model continues to build upon this historical data with each year of simulation. For example, a DYNASIM-aged file representative of 1990 includes an earnings history for each individual from 1951 through 1990, where earnings for 1951–1973 are directly observed from social security records, and earnings for 1974–1990 are simulated.

More recent historical data are also built into the simulation process. Historical trends for each event simulated are used to guide the model's projections and to validate its predictions during the 1974–1988 period. These data include vital statistics on births, deaths, marriages, and divorces, and data from the Bureau of Labor Statistics on labor force participation, hours worked, and real earnings growth.

The drawback of using the 1973 Exact Match File is that we must rely on simulated data for a larger part of the projection period. However, we rely on the DYNASIM model to capture the interactions among these events over the 1973–1990 period. In addition, we use historic aggregate data to benchmark simulation results for the 1974–1990 period. These steps ensure accuracy of aggregate events, while also capturing some expected disaggregated effects.

Behavioral Models

Dynamic aging relies on a set of behavioral functions used to update microunit characteristics year by year. These functions attempt to capture important and stable real world relationships so that the model will generate realistic samples representative of some future date. Thus, the model must capture movements of demographic or economic aggregates (such as fertility, divorce, or female labor force participation) over time, as well as the important cross-sectional features of behavior so that distributional outcomes can be examined. For example, it is not sufficient to simulate secular trends in the probability of divorce over time. The

model must also capture important variations in the incidence of divorce such as higher divorce rates experienced by couples in which the wife's earnings are relatively high compared with the husband's, and by couples in which the wife first married at an early age (Cherlin 1977). Similarly, it is not sufficient to capture increasing female labor force participation over time; the model must also capture differences in participation by marital status, the number and timing of children ever born, and the relative economic returns to work.

Development of realistic behavioral functions has been a major feature of DYNASIM (Wertheimer et al. 1986). DYNASIM's aging process consists of a set of simulations of birth, death, divorce, marriage, educational attainment, labor force status, job change, wage rates, and unemployment. Table 1 lists the essential operating characteristics of DYNASIM along with the variables that are endogenous to each of the outcomes. As shown, the extent of the interactions among social and economic variables that DYNASIM captures is fairly extensive.

As indicated in table 1, to project future retirement incomes, the model applies detailed sets of social security and private pension benefit rules to the simulated earnings and family histories. The sets of rules replicate benefit formulas in use today. In the case of social security they incorporate scheduled future changes. Other pension parameters are indexed with real wages or prices as specified in different plan formulas. Projected marital histories are important to the retirement income simulation because former or deceased spouses' retirement credits and benefits are used to calculate surviving spouses' benefits.

DYNASIM also includes a number of health-related modules. Specifically, the model predicts the number of limitations in activities of daily living (ADLs) that elderly persons "have difficulty performing" as a function of a person's age, sex, current and previous marital status, race, and location, based on data representative of the entire elderly population in 1984 (McBride 1989). In addition, the DYNASIM model predicts nursing-home entry as a function of the elderly's health and demographic characteristics.

Projection Assumptions

The DYNASIM model can also capture the consequences of alternative long-range aggregate assumptions about demographic and economic

TABLE 1
Main Events Simulated by the Dynamic Simulation of Income Model

Event or characteristic	Principal determinants
Demographic	
Birth	Marital status, age, race, education, number of previous live births
Death	Age, race, sex, education, marital status, parity of women, current year
First marriage	Age, race, sex, education, hours worked, wage rate, transfer income, current year, year of birth
Remarriage	Age, sex, marital status (widowed or divorced), current year, year last marriage ended
Divorce	Age, race, disability status, unemployment status of husband, earnings of wife, length of marriage, year of marriage, current simulation year
Education (probability of advancing a grade)	Age, race, sex, education of head of family, number of grades completed
Geographic location (region and size of standard metropolitan statistical area [SMSA])	Age, sex, education, and marital status of family head or single individual, duration of marriage, region and current SMSA size
Labor	
Labor force participation	Age, race, sex, presence of disability, whether participated in previous year, marital status, number and age of children, spouse's earnings, history of participation
Hours of labor supplied	Age, race, sex, education, marital status, age and number of children, expected wage, labor supply in previous year
Hours of unemployment	Age, race, sex, education, marital status, unemployment in previous year, aggregate unemployment rate
Wage	Education, region, marital status, age race, sex

continued

TABLE 1 continued

Event or characteristic	Principal determinants
Retirement income	
Social security	Earnings and marital history (and current statuses); age; actual program rules
Private and government pensions	Earnings and marital history (and current statuses); age, job history (tenure, industry); representations of actual program rules
Financial assets	Earnings, other retirement income, race, health, location, age, sex, marital status
Health and related variables	
Limitations in Activities of Daily Living (ADLs)	Age, sex, ever married, current marital status, race, location
Nursing-home use	ADLs, age, marital status, sex

events. Aggregate outcomes can be constrained to match "consensus" views regarding the future paths of key demographic or economic events. For these projections we followed the Social Security Administration's 1986 assumptions regarding future births, unemployment, and average real wage growth (see table 2). In the case of mortality, however, we provide an alternative assumption. One mortality path follows Social Security's baseline assumption and the other follows their more optimistic projection. In the optimistic projection, mortality rates decline at historical rates; in the middle-of-the-road projection, mortality rates decline at half this rate.

It must be noted, however, that even though some of DYNASIM's *aggregate* results may be constrained to match key assumptions regarding future events or sectoral change, the model's internal behavioral functions distribute the incidence of events at the microlevel. For example, we track particular mortality rates (for different sexes), but an individual's *relative* probability of death will vary according to factors included in the model (e.g., education, marital status, age, sex, race).

TABLE 2
Key Projection Assumptions: Baseline and Optimistic Mortality

Projection year	Baseline mortality		Optimistic mortality		Completed fertility[b]	Real wage growth[c]	Unemployment rate	Interest rate
	Men[a]	Women[a]	Men[a]	Women[a]				
1990	15.1	19.9	15.2	19.8	1.90	1.6	6.5	6.2
1991	15.1	20.0	15.4	20.0	1.90	1.7	6.2	6.1[e]
1992	15.2	20.2	15.5	20.3	1.91	1.6	5.8	6.1
1993	15.3	20.3	15.6	20.5	1.92	1.5[e]	5.7	6.1
1994	15.4	20.4	15.8	20.6	1.92	1.5	5.6	6.1
1995	15.5	20.5	15.9	20.7	1.93	1.5	5.5[e]	6.1
2000	15.7[d]	20.8[d]	16.4	21.3	1.96	1.5	5.5	6.1
2010	16.1	21.3	17.2	22.3	2.00[e]	1.5	5.5	6.1
2020	16.4	21.7	18.0	23.2	2.00	1.5	5.5	6.1
2030	16.8	22.2	18.9	24.2	2.00	1.5	5.5	6.1

Source: U.S. Social Security Administration. 1986.
[a] Years remaining at age 65.
[b] Completed fertility, number of children per woman.
[c] Average growth in real (after inflation) wages.
[d] Declines are extrapolated between years shown.
[e] Ultimate rates.

What Factors Will Affect the Future Demand for Nursing-home Care?

A variety of changes in the demographic profile of the future elderly population will affect their need for formal, long-term care services in nursing homes (or significant levels of in-home services provided by professionals). Obviously, the life span of the elderly and the proportion who have health limitations will be important because the need for long-term care, in general, increases with age and disabling health conditions. Their living arrangements will also be important, however. If more elderly persons live alone in the future, the demand for formal in-home and nursing-home services will increase (holding constant health and other characteristics) because fewer elderly will be living with family caregivers providing significant levels of informal long-term care services.

Changing Demographic Risk Factors

Table 3 highlights expected changes in several key demographic factors that will affect the need for long-term care services in the future. We show the age composition of the elderly population, fertility history of women retiring in the twenty-first century, and their future living arrangements. We refer to these as demographic "risk" factors because the need for *formal* long-term care services is most acute for persons who are very old, have no living children, and are living alone.

These results illustrate that the size of the frail elderly population—persons aged 85 and older—will be very sensitive to mortality trends. If the optimistic mortality assumptions hold, there will be 12 million frail elderly in 2030, compared with 8.7 million in the baseline projection, a difference of 38 percent. Given that Social Security's baseline projections have historically been too pessimistic, policy makers must seriously consider the implications of the more optimistic mortality scenario (Guralnik, Yanagishita, and Schneider 1988).

Table 3 also illustrates that there will be fewer adult children available to care for elderly parents in the future. Among women aged 65 in 2010 (born prior to the baby-boom cohort) only 10.6 percent will be childless, compared with 18.5 percent of women reaching age 65 in 2030 (born in 1965). As shown, the average number of children born to women will be significantly lower for cohorts of women retiring after 1990.

The last demographic risk factor shown, the number of elderly living alone, also leads us to expect far greater growth in the demand for formal long-term care services in the future than the sheer size of this population might indicate. These projections show dramatic increases in the number of elderly living alone in the future (table 3). Almost 26 million elderly persons will live alone in 2030 under the baseline assumptions, compared with 10 million in 1990, an increase far in excess of the general increase in the elderly population.

These projections take into account not only changing marital status patterns among the elderly, but also the increasing propensity of nonmarried elderly to live alone. The baby-boom cohort has experienced lower marriage rates and higher divorce rates than their predecessors, and fewer of them are likely to be married during retirement, all else being equal (Bloom and Bennett 1985). In addition, the increasingly strong preference of the elderly to live alone, their growing financial independence, the dwindling availability of children as cohabitants, will increase

TABLE 3
Demographic and Health Characteristics of the Elderly Population: 1990–2030

		2010		2030	
	1990	Baseline[a]	Optimistic mortality	Baseline	Optimistic mortality
Age composition[b]					
Age 65–74	18.7	21.7	22.4	34.4	36.6
Age 75–84	10.1	12.8	13.8	21.3	23.9
Age 85 or older	3.3	6.8	8.3	8.7	12.0
Total	32.2	41.2	44.6	64.3	72.5
Fertility history of women[c]					
Percent childless	14.0	10.6	10.6	18.5	18.5
Average number of children	2.86	2.49	2.49	1.94	1.94
Number living in the community with ADL limitations[b]					
Unmarried	3.1	4.1	4.3	6.4	7.3
Married	1.5	2.1	2.3	3.3	4.1
Total	4.6	6.2	6.6	9.7	11.4
Living arrangements[b]					
Community-based					
Living alone	10.4	15.1	15.9	25.5	26.9
Living with others	6.0	5.2	5.4	6.5	7.1
Married	14.0	17.9	19.9	28.0	33.4
Nursing homes	1.8	3.0	3.4	4.3	5.3
Total	32.2	41.2	44.6	64.3	72.5

Source: Dynamic Simulation of Income Model (DYNASIM).
[a] The projection scenarios are defined as follows: baseline scenario (following Social Security Administration intermediate assumptions); optimistic mortality scenario (same as baseline scenario, except for mortality, which is assumed to improve at a rate equal to recent historic trends).
[b] Millions of persons.
[c] Reaching age 65 in projection year.

the proportion of unmarried (single, widowed, and divorced persons) persons living alone (King 1988).

Degree of Dependency

The health characteristics of the future elderly population will interact with demographic characteristics to determine the need for nursing-home

care. Table 3 shows DYNASIM's forecasts of the number of elderly likely to need nursing-home care under the two mortality scenarios, and it shows the number of elderly living in the community with health limitations.

Assuming that recently observed entry patterns continue into the future, the number of elderly persons needing care in nursing homes will increase from about 1.8 million today to 3–3.4 million in 2010 and to 4.3–5.3 million in 2030, depending on the mortality rate assumption. Thus, the need for nursing-home care could nearly triple from 1990 to 2030, despite the fact that the elderly population will only increase by 125 percent over the same period under the optimistic mortality rate projection.

Table 3 also indicates the number of elderly living in the community with health limitations using an index that measures the number of elderly who have difficulty with one or more of the following ADLs: eating, dressing, bathing, going to the toilet, and transferring. The number of unmarried elderly experiencing difficulty with ADLs increases from 3.1 million persons to 6.4 million in 2030, indicating a potentially large increase in the need for in-home services.

We expect that these trends will increase elderly persons' awareness of the risk of needing long-term care support. The *proportion* of the elderly needing nursing-home care will expand most significantly between 1990 and 2010 (from 5.7 percent to more than 7 percent of the elderly population) because the proportion of the elderly who are very old, unmarried, and with health limitations will increase faster during this period. Another 15 percent of the elderly will be living in the community with health limitations, and most of these will not have a spouse to care for them. Furthermore, the ***number*** of elderly requiring long-term care services will continue to increase after 2010 as the size of the elderly population continues to grow. When the baby boom population reaches their very senior years (in the 2040s, beyond these projections), the *proportion* of elderly needing long-term care services will again increase.

Will More of the Elderly Be Able to Afford Long-term Care?

The ability of the elderly to pay for long-term care will depend crucially on their economic status in the 1990–2030 period, the future cost of

nursing-home care, and the type of mechanisms available to finance care. This section examines expectations about future growth in retirement income of the elderly, and estimates whether the future elderly will be better able than their predecessors to afford the cost of long-term care. Of course, real growth in the incomes of the elderly will have to outpace significantly the growth in the cost of nursing-home care to improve the current affordability picture because the cost of nursing-home care currently exceeds the incomes of most elderly persons.

The Changing Income Profile: 1990–2030

The DYNASIM projections show that real postinflation incomes of the elderly will rise significantly between 1990 and 2030, but income growth will be uneven among subgroups of the elderly population and across time (table 4). Particularly strong growth in retirement income is

TABLE 4
Projected Real Median Income by Marital Status, Age, and Sex: 1990–2030[a,b]

Marital categories	Baseline scenario (1988 dollars)			Percentage change	
	1990	2010	2030	1990–2010	2010–2030
Married couples	$20,800	$32,700	$48,900	+57	+50
Age: 65–69	23,600	38,600	54,900	+63	+42
70–79	19,600	31,300	48,200	+60	+54
80+	16,500	21,200	38,100	+28	+80
Unmarried men[c]	$9,500	$14,200	$22,300	+51	+55
Age: 65–69	10,800	18,900	23,500	+76	+24
70–79	10,500	16,200	24,700	+55	+52
80+	7,900	10,600	17,900	+34	+69
Unmarried women[c]	$7,700	$10,500	$16,500	+35	+59
Age: 65–69	9,100	14,500	21,500	+59	+48
70–79	7,600	10,400	16,900	+36	+63
80+	7,100	9,200	14,500	+30	+58

Source: Dynamic Simulation of Income Model (DYNASIM).
[a] Includes entire elderly population (community-based plus institutionalized).
[b] Income includes social security benefits, private pensions, government pensions, interest and dividend income, SSI and earnings.
[c] The unmarried group for men and women includes persons who were never married, divorced and widowed persons.

expected for the "young elderly" (persons aged 65 to 69) in 2010. These persons represent the cohort born between 1941 and 1945, the generation just prior to the baby boomers. This cohort benefited from the strong economic growth in the 1960s U.S. economy during the beginning of their careers, and they were well established by the time the economic difficulties of the post-1973 economy began (Levy and Michel 1991). Table 4 shows, for example, that incomes for married couples, aged 65 to 69 in 2010, will be 63 percent higher than the incomes of married couples in 1990. Incomes for unmarried men will increase by 76 percent during this period, and incomes for unmarried women will increase by 59 percent.

Real incomes for married couples and for unmarried men aged 70 to 79 are also significantly higher in 2010 than in 1990 for similar reasons. Real income increases by 60 percent for married couples and by 55 percent for unmarried men. Persons in this cohort, many of whom were parents of the baby-boom generation, economically outperformed succeeding and preceding cohorts, often by substantial margins. In contrast, real incomes for unmarried women in this age group only grow by 36 percent over the 1990–2010 period. This generation of women did not participate in the labor force as fully as their successors and thus did not benefit from the favorable economic and pension conditions as much as men.

Table 4 also shows that the projected increases in income for the young elderly between 1990 and 2010 will have an enormous impact 20 years later when this generation reaches their eighties. For example, real median income for elderly married couples aged 80 and older will be 80 percent higher in 2030 than in 2010; income for unmarried men aged 80 and older will increase by 69 percent, and income for unmarried women aged 80 and older will increase by 58 percent.

After 2010, however, the growth in income for young elderly persons is likely to be slower. Married couples aged 65 to 69 in 2030 will have incomes about 42 percent higher than their predecessors in 2010, and unmarried men's incomes will only be about 24 percent higher. This cohort, born in the early 1960s, entered the labor force after 1973 during years of sluggish growth or at least growth rates not as high as the 1960s. They will also be the first to experience the *full* effects of the 1983 Social Security Amendments, which will gradually increase the age at which full retirement benefits are available. The current retirement age of 65 will begin to increase in the year 2000 until it reaches age 67 in

2022. Benefits for persons retiring before age 67 are expected to be about 12.5 percent lower than they were for preceding cohorts retiring at the same age (Bernstein 1990). Moreover, the increase in the retirement age is not expected to substantially reduce the proportion of the elderly who retire early (Fields and Mitchell 1984). The DYNASIM projections incorporate these changes and show that the amendments will significantly reduce social security benefits.

The 48 percent growth in retirement income for unmarried women aged 65 to 69 during the 2010–2030 period is still relatively strong, however. The effects of increased labor force participation of women and changes in pension regulations during the 1970s influence these results. That is, more women will retire with substantial pensions and with significantly higher social security benefits because of their increased labor force participation and these effects mitigate the reduction in retirement income due to the 1983 amendments.

Despite the real growth in retirement incomes over the 1990–2030 period shown here, the average rate of income growth for the elderly will, in general, be slower than that experienced by their predecessors. Figure 1 compares these projections to historic patterns. The median income of married couples increased by 3.3 percent per year between 1967 and 1984, compared with 2.9 percent during the 1990–2010 period and 2.5 percent between 2010 and 2030. Average increases for unmarried

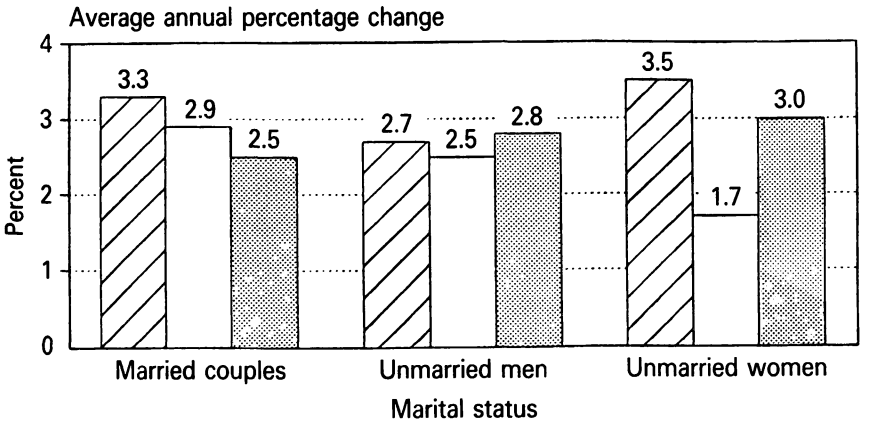


FIG. 1. Average growth in real median income; historical and projected. (*Source:* Dynamic Simulation of Income Model [DYNASIM].) ▨ 1967–1984; ▭ 1990–2010; ▩ 2010–2030.

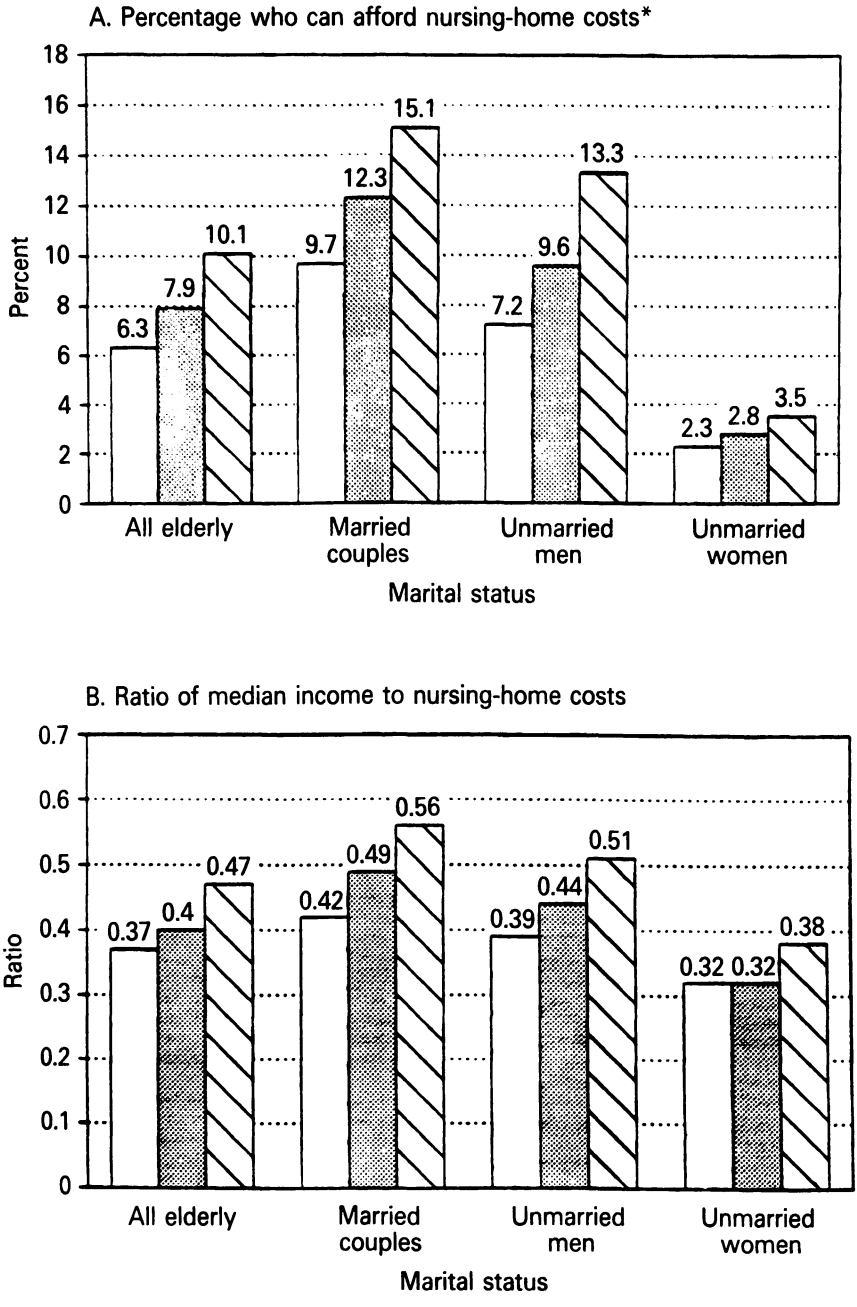
men are very similar to historic increases, however. For women, the pace of growth between 1990 and 2010 is significantly below the historic rates shown, but the rapid rate of income growth for this group is restored in the 2010–2030 period. It must be noted, however, that the growth in income for the elderly during the 1967–1984 period was unusually strong, primarily because of federal policy changes designed to alleviate poverty among the elderly, and a surge in private pension benefits and real interest rates (Burkhauser and Duncan 1988; Zedlewski et al. 1990). Thus, the future growth in income for the elderly would not be expected to match this pattern.

Affordability of Nursing-home Care

Although the elderly population will be in a better financial position than their predecessors, it is not clear whether this means that more will be able to afford nursing-home care. The cost of nursing-home care exceeds the incomes of the vast majority of today's elderly. Whether or not the proportion of elderly who can afford to pay for long-term care expenses out of pocket will increase depends on whether the income growth of the elderly will significantly exceed the real increase in the cost of nursing-home care.

In 1990 the estimated annual cost of care in a skilled nursing-home facility was about $24,300 (American Association for Retired Persons 1989). Assuming that the cost of this care will increase with real wage rates, the average annual cost of nursing-home care (in 1990 dollars) will increase 34 percent between 1990 and 2010 (to about $32,600 in 2010) and an additional 33 percent between 2010 and 2030 (to about $43,500 in 2030). Figure 2 compares the per person, real median incomes of the elderly with these projections of nursing-home costs. Despite the substantial growth in income expected for the elderly, only 10 percent of the elderly will be able to finance the cost of nursing-home care out of their incomes in 2030 (figure 2A). However, the percentage of nursing-home costs that could be financed out of the incomes of the elderly will increase. In 1990, for all elderly the ratio of median income to nursing-home costs was only 0.37, but by 2030 the ratio will increase to 0.47 (figure 2B).

These projections suggest that most of the future elderly will not escape the financial risk of long-term care. The problem will be especially



*Percentage whose income exceeds 100 percent of costs.

FIG. 2. Affordability of nursing home care; 1990–2030. (*Source:* DYNASIM projections.) ☐ 1990; ▨ 2010; ▧ 2030.

acute for unmarried women, whose median income will cover barely one third of nursing-home costs. Many of the elderly will continue to be forced to spend down assets until they can qualify for means-tested government coverage of long-term care services. Those who live in states without medically needy programs may find themselves unable to qualify for Medicaid because many are likely to have real incomes above their states' income eligibility limits. In summary, the financial catastrophe that long-term care presents today will not be eliminated on the basis of a change in the income picture of the future elderly.

Affordability of Long-term Care Insurance

Although increasing real income will not enable most of the elderly to finance nursing-home care out of pocket, it would improve their ability to finance a larger share of these expenses. More important, increasing real incomes, coupled with growing awareness of the potential financial catastrophe of long-term care expenses, may increase their interest in other financing mechanisms. Specifically, more may consider the advantages of risk pooling and purchase long-term care insurance. Of course, the viability of long-term care insurance as a financing option will depend on the ability of the elderly to pay for insurance premiums.

Current long-term care insurance premiums can be projected and compared with incomes of the elderly to assess the affordability of long-term care insurance. This requires making assumptions about the cost of long-term care insurance premiums and the "affordability" of long-term care insurance. That is, how much of their incomes could the elderly be expected to devote to long-term care insurance? It is important to note that these projections do not assume that the elderly will consume their assets in order to pay for long-term care insurance. However, this would be an unlikely scenario if the future elderly conserve their assets during retirement like their predecessors (Hurd 1987). Moreover, for reasons discussed earlier, many analysts expect that the future elderly population, particularly the baby-boom generation, will own considerably fewer assets in real terms than their parents (Levy and Michel 1991).

To project insurance affordability, we use a composite of the 15 most popular long-term care insurance policies sold today, as described in the survey by the Health Insurance Association of America (HIAA 1991a). These plans can be characterized as follows:

1. *Type of policy:* The plan covers the cost of a nursing-home bed (at a cost of $80 per day in 1990 dollars and at least some inflation protection) for up to four years, and in-home services for up to eight years.
2. *Cost of coverage at age 65:* The 1990 cost of this type of policy, purchased individually at age 65, was $1,400, and $1,100 if the coverage was purchased through a group policy (HIAA 1991a). We assume that premiums for persons reaching age 65 in subsequent years will increase because nursing-home costs will rise as real wages in the economy increase. Real wage growth (shown in table 2) will increase premiums by 34 percent between 1990 and 2010 and by 33 percent between 2010 and 2030.
3. *Purchase age:* In these simulations, we assume that each individual would evaluate the purchase of insurance at age 65. Long-term care insurance premiums are assumed to remain constant over an individual's life span, but "affordability" is reevaluated during the retirement period. Real income and, therefore, insurance affordability, can decline during retirement because not all sources of income are fully indexed. (Note that affordability estimates are not provided for persons aged 70 and older in 1990 because coverage of the type described here was not available when they reached age 65.)
4. *Affordability:* We assume the elderly can afford long-term care coverage if the premium is less than or equal to 5 percent of income. To allow for sensitivity analysis, however, we also present two alternative income thresholds: 2.5 percent and 7.5 percent.

To project affordability, we compute the ratio of the assumed premium for the policies described above to the incomes of the elderly in the 1990–2030 period. We take for granted that the long-term care insurance policy is affordable only if the resulting ratio is less than the assumed affordability ratio (e.g., 2.5 percent, 5 percent, or 7.5 percent). Note that we do not assume that individuals will necessarily purchase these policies; we only provide estimates of the percentage of elderly who could *afford* to purchase a policy.

Table 5 shows the simulation results using the 5 percent affordability threshold and two premium assumptions: purchase of insurance individually, and purchase through group policies. In 1990 only 6 percent of the elderly in the 65–69 age category could afford individually pur-

chased long-term care insurance. The proportion of this age group who can afford such insurance using 5 percent of their incomes almost doubles between 1990 and 2010—from 6 to 11 percent—the obvious result of rapid increases in income expected for this group during this period. The slowing of income growth for this group in the 2010–2030 period, however, results in only a 3-percentage point increase in the proportion of the population that will be able to afford long-term care coverage.

As would be expected from the income disparities discussed earlier, long-term care insurance is more affordable for married couples than for singles (even though married couples must purchase two policies). However, differentials in affordability narrow between 2010 and 2030 because the incomes of single elderly persons are expected to rise faster than the incomes of their married counterparts. Whereas women make

TABLE 5
Long-term Care Insurance Affordability: 1990–2030[a,b]

Characteristics	Individually purchased premium			Group-purchased premium		
	1990[c]	2010	2030	1990[c]	2010	2030
	(Thousands of persons)					
All elderly	—[d]	3,090	6,400	—	5,320	11,560
By age:						
65–69	620	1,340	2,380	990	2,430	4,090
70–79	—	1,230	3,070	—	2,160	5,510
80+	—	520	950	—	730	1,970
Married couples, total	—	2,130	4,040	—	3,460	6,940
Age 65–69	490	1,030	1,770	770	1,760	2,920
Age 70–79	—	860	1,830	—	1,370	3,280
Age 80+	—	230	430	—	340	740
Unmarried men, total	—	550	1,460	—	1,000	2,620
Age 65–69	60	170	310	110	310	580
Age 70–79	—	240	830	—	490	1,420
Age 80+	—	130	310	—	190	630
Unmarried women, total	—	420	900	—	860	2,000
Age 65–69	70	140	300	120	370	590
Age 70–79	—	130	400	—	300	810
Age 80+	—	150	210	—	200	600

continued

TABLE 5 continued

Characteristics	Individually purchased premium			Group-purchased premium		
	1990[c]	2010	2030	1990[c]	2010	2030
	(Percentage of total persons)					
All elderly	—	7.5%	9.9%	—	12.9%	18.0%
By age:						
65–69	6.0	10.6	13.3	9.6	19.1	22.8
70–79	—	7.8	10.7	—	13.6	19.2
80+	—	4.1	5.4	—	5.8	11.1
Married couples, total	—	11.9	14.4	—	19.4	24.7
Age 65–69	7.9	13.3	16.7	12.3	22.5	27.5
Age 70–79	—	11.6	13.9	—	18.4	24.9
Age 80+	—	8.9	10.2	—	12.9	17.5
Unmarried men, total	—	9.2	13.7	—	16.7	24.7
Age 65–69	5.1	12.8	11.6	9.9	23.2	21.5
Age 70–79	—	11.2	17.9	—	22.7	30.5
Age 80+	—	5.4	9.5	—	7.9	19.1
Unmarried women, total	—	2.4	3.5	—	5.0	7.8
Age 65–69	2.4	3.8	6.4	3.8	10.2	12.7
Age 70–79	—	2.1	2.7	—	4.7	7.5
Age 80+	—	2.0	2.0	—	2.6	5.9

Source: Dynamic Simulation of Income Model (DYNASIM).
[a] Percent who can afford insurance with less than 5 percent of income.
[b] Both policies include coverage for four years in a nursing home, eight years of home care, and an inflation-adjusted payment for nursing home costs ($80 per day in 1990 dollars).
[c] Because this type of policy was not available in the mid-1980s, when persons aged 70 and older retired, calculations were not made for 1990 for persons aged 70 and older.
[d]Dash denotes cells where the sample size is too small to report results separately.

some gains in their ability to pay for long-term care insurance premiums, under the individually purchased premium assumption this type of insurance is still unaffordable for most of them.

The lower-cost group-insurance premium assumption portrays a rosier picture for financing long-term care through a private insurance mechanism. The percent of the young elderly who can afford group premiums with no more than 5 percent of their incomes rises to 19 percent in 2010 and to 23 percent in 2030 from about 10 percent in 1990. Almost a

quarter of all elderly married couples and single men would be able to afford group long-term care insurance in 2030. The extent to which this scenario presents a realistic picture of the future will depend on either increasing worker demand for group policies or declining insurance premiums as insurers' risks become spread over a larger participating group. A more mature long-term care insurance market could also result in lower premiums if more insurers compete in the market.

It is also important to consider alternative affordability thresholds. Some elderly may be willing to spend a higher proportion of their incomes on insurance, whereas others may consider 5 percent a burden on their family budget. In fact, the 5 percent assumption represents a relatively high budget share for insurance. For example, in 1987, middle-income ($15,000 to $30,000) families headed by a retired individual aged 62 to 74 spent about 9 percent of their incomes on all health care spending, including about 4 percent for health insurance (Moehrle 1990).

Table 6 shows the results using alternative income affordability thresholds. The first shows the percentage of elderly whose insurance premiums cost less than 7.5 percent of income, and the second shows the percentage of elderly whose insurance premiums cost less than 2.5 percent of income. The higher budget share results show that over 26 percent of the elderly could individually purchase long-term care insurance in 2030. A significantly higher percentage—44 percent—would be able to afford the lower-cost group premium for long-term care insurance. On the other hand, the lower budget share results (less than 2.5 percent of income) show that only about 4 percent of the elderly could afford insurance in 2030, even assuming the insurance would be available at the lower-cost group premium price.

Conclusions

Demographics, health, and income trends will interact to increase the demand for nursing-home care faster than many now realize. Whereas the number of elderly will increase by 100 to 125 percent by 2030, the number requiring nursing-home care will triple during the same period. Marital patterns and fertility histories of recent generations of Americans will shape a future elderly population that is more likely to be living

TABLE 6

Percentage of Elderly That Can Afford Long-term Care Insurance (1990–2030): Comparisons of Affordability Assumptions[a]

Affordability threshold characteristics	Individually purchased premium			Group-purchased premium		
	1990[b]	2010	2030	1990[b]	2010	2030
Less than 2.5% of income						
All elderly	—	2.3%	2.3%	—	3.2%	3.6%
By age:						
65–69	1.8	2.7	3.3	3.1	4.2	5.1
70–79	—	1.9	2.4	—	2.9	3.8
80+	—	2.3	1.4	—	2.7	1.9
Married couples	—	3.5	3.8	2.5	5.0	5.8
Unmarried men	0.8	2.8	2.6	1.2	3.9	4.2
Unmarried women	—	0.9	0.7	—	1.2	1.1
Less than 5% of income						
All elderly	—	7.5	9.9	—	12.9	18.0
By age:						
Age 65–69	6.0	10.6	13.3	9.6	19.1	22.8
Age 70–79	—	7.8	10.7	—	13.6	19.2
80+	—	4.1	5.4	—	5.8	11.1
Married couples	4.5	11.9	14.4	6.7	19.4	24.7
Unmarried men	1.7	9.2	13.7	3.5	16.7	24.7
Unmarried women	0.8	2.4	3.5	1.2	5.0	7.8
Less than 7.5% of income						
All elderly	—	18.9	26.4	9.5	30.6	44.3
By age:						
Age 65–69	13.0	28.6	32.1	22.5	45.9	52.6
Age 70–79	—	19.6	27.7	—	31.7	45.0
Age 80+	—	8.1	18.6	—	13.9	34.9
Married couples	8.9	28.3	35.0	14.6	42.9	55.7
Unmarried men	4.9	24.0	34.8	9.2	37.7	52.1
Unmarried women	2.0	7.4	13.6	4.2	15.6	28.8

Source: Dynamic Simulation of Income Model (DYNASIM).

[a] Both policies include coverage for four years in a nursing home, eight years of home care, and an inflation-adjusted payment for nursing home costs ($80 per day in 1990 dollars).

[b] Because this type of insurance was not available in the mid-1980s when persons aged 70 and older retired, calculations were not made for persons aged 70 and older in 1990.

alone and less likely to have family caregivers. Thus, more will require formal, professional long-term care services to substitute for substantial family caregiving services.

The need to find alternative long-term care financing arrangements will be acute. Our baseline projections of the number of elderly requiring nursing-home care, and relatively conservative assumptions about the cost of nursing-home care in the future, imply that annual expenditures for nursing-home care will increase from about $44 billion in 1990 to $98 billion by 2010 and to $187 billion by 2030. Thus, although the number of elderly in nursing homes will increase by two-thirds between 1990 and 2010 (from 1.8 to 3.0 million, as shown in table 4), nursing-home expenses will more than double (from $44 billion in 1990 to $98 billion in 2010). These estimates imply faster increases in nursing-home spending than those reported by Rivlin and Wiener (1988), primarily because the DYNASIM methodology projects a faster increase in the population at risk for nursing-home use. Over the 1990–2030 period, the need for nursing-home care will increase by 138 percent (4.3 million persons compared with 1.8 million in 1990), but nursing-home expenditures will increase by 325 percent (to $187 billion) because the real cost of nursing-home care will also be increasing.

Current prospects for the financing of long-term care through alternative public sector programs seem bleak. After a decade of large budget deficits, many feel it is unlikely that policy makers will consider increasing public expenditures by the amounts projected here. Given this situation, it is likely that private-sector solutions for long-term care financing will continue to receive attention.

However, this study suggests that private financing of long-term care through the types of insurance mechanisms available today will be difficult. These projections confirm an emerging picture that, although the economic status of the elderly will improve over the next four decades (see, for example, Easterlin, MacDonald, and Macunovich 1990), private financing of nursing-home care will still not be a viable option for many of the elderly. Very few of the elderly will be able to personally finance nursing-home care out of pocket, and the type of long-term care insurance policies prevalent today—privately purchased insurance with four years of coverage for a nursing-home stay—will not be a viable option for most of the elderly. Its viability is restricted because the expected cost of premiums will still represent a significant proportion of the incomes of the future elderly. Using our best-educated guesses

about the course of future events, we estimate that only about 10 percent of the elderly will be able to purchase a fairly generous individual long-term care insurance policy at a cost of less than 5 percent of their incomes in 2030. Under more optimistic assumptions that the expansion of the long-term care insurance market will lead to lower premiums or that lower-priced group insurance policies will become more common, the proportion of the elderly who could afford insurance only rises to 18 percent.

These findings generally seem to confirm those reported by Rivlin and Wiener (1988) using a microsimulation technique. Although results are not directly comparable (the Rivlin and Wiener projections focus on four-year average profiles rather than single-year projections and the forecast periods of the two studies differ), we can make some general comparisons. The DYNASIM projections suggest that the future elderly population, especially persons aged 80 and older, will be better-off economically than the Rivlin and Wiener study. For example, Rivlin and Wiener (1988, 39) project a median income of $8,000 for persons aged 85 and older in 2016–2020 (in 1987 dollars), whereas the DYNASIM median income projection for persons aged 80 and older is $20,800 in 2030 (in 1988 dollars). However, the 1990 premiums used in this study are significantly higher than those used in the Rivlin and Wiener simulation. Both studies reach the conclusion that the type of privately marketed comprehensive long-term care insurance policy available today will be affordable only for upper-income elderly persons (using a 5 percent of income affordability assumption).

Thus, policies that reduce the cost of long-term care insurance are urgently needed. These policies might include tax incentives that would effectively reduce the cost of long-term care insurance to individuals and businesses. Insurance regulation that would require insurers to provide partial protection to those who have to drop policies during retirement may also be needed to increase the number of elderly willing to purchase these policies. Increased participation should reduce the cost of premiums as the risk for long-term care is spread over a larger segment of the elderly population. And policies that make the insurance option more attractive for the elderly may also decrease the age at which premiums are purchased, thereby reducing the annual cost of premiums during the retirement period. Policies that focus on alternatives to our current long-term care service delivery system may also be helpful. For example, more efficient and less expensive home care services that

would substitute for nursing-home care could reduce insurers' expected payouts, thereby reducing the cost of insurance premiums. In short, the viability of private long-term care financing will depend on innovative policies that reduce the cost of long-term care insurance because only a minority of elderly persons will be able to afford the types of comprehensive policies marketed today.

Limitations of This Study

The projections presented here provide our best estimates of the number of elderly who could afford to purchase insurance coverage for long-term care. However, it is important to note that these estimates are based on a simulation model predicting 40 years into the future. The obvious limitations to these types of models serve as a caveat to the results presented here. For example, we noted earlier that nursing-home entry is predicted on the basis of recently observed entry patterns. Thus, the projections implicitly assume that the supply or demand for nursing-home care will be constant over time, given an individual's demographic and health profile. To the extent that the entry into nursing homes can be delayed through more in-home services or alternative living arrangements, these projections will overstate the number in nursing homes. Even in this case, however, it is likely that significant financial resources will still be required to maintain the elderly in alternative settings.

Microsimulation model results provide estimates of the implications of current demographic and economic trends on the future needs of the elderly, assuming a continuation of current policies affecting long-term care. As such, future changes in the delivery and financing of long-term care would affect the affordability estimates provided here. More study is needed to understand the evolving market for long-term care insurance. Although these policies have improved in recent years, policies may become more restrictive and premiums may increase considerably when insurance companies are forced to provide benefits for current policy holders. Moreover, little is known about the decision to purchase long-term care insurance by the elderly. Whereas our study provides projections of the number of elderly who *could* afford to purchase insurance, we need to understand what types of people are likely to purchase coverage before an assessment of the viability of private options for fi-

nancing long-term care can be made. Finally, more research is needed to assess whether the elderly will be able to use their assets to pay for long-term care in the future. Although it is not clear at all whether the asset position of the elderly will improve in the future, it is even less clear how the elderly use their assets to pay for their long-term care needs.

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