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4 The American Way of Aging: An Event History Analysis

David T. Ellwood and Thomas J. Kane

Women who reach age 65 can expect to live eighteen more years on average, men fourteen more years. Yet economists have largely ignored that part of the life cycle after age 65. By 65, most American men and women have retired, but changes linked to marital status, health, economic support, living arrangements, institutionalization, and death lie ahead. This paper represents an attempt to bring into much sharper focus the timing and incidence of events past age 65.

The ideal data set for studying the event history of aging might carry thirty-five years of longitudinal information on several cohorts of 65-year-olds. Since such data do not exist, we used the seventeen-year Panel Study of Income Dynamics (PSID), piecing together different slices of old age from individuals entering and exiting the survey at different ages. Imposing a general statistical structure, we estimated parameters that allowed us then to simulate thirty-five years of longitudinal data for a cohort of 65-year-olds. By estimating our models and then simulating life events for a sample of 65-year-olds, we have essentially brought together the disparate segments of old age captured within the window of the PSID to draw a smoothed profile of the events of aging.

In order to do the simulations, we estimated models of marriage and widowhood, disability, economic status, shared living arrangements, institutionalization, and death. We then applied the model to generate 8,880 simulated lifetimes, using a representative sample of 444 65-year-olds as the starting point.

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With our simulations, we are able both to compare the futures of people with various characteristics at age 65 and to explore what people in particular end states looked like in previous years. For instance, we were able to ask how the aging process differs for those who are white and black, rich and poor, healthy and disabled at age 65. We also analyzed the histories of poor elderly widows and asked what had led them there. Were poor elderly widows formerly middle-class married women or poor married women, or were they already widowed and poor at age 65? Who enters nursing homes? Are they people who are reasonably well to do when they turned 65 who become widowed and whose health failed? Or are they persons who have mostly been poor and sickly for an extended period?

In the paper, we will describe the models we estimated and explore their power and plausibility. We believe that with refinement one may well be able to use models such as this one for a much more detailed understanding of the later years of the life cycle.

4.1 The Data

Trying to estimate the effects of aging with cross-sectional data confuses cohort effects. Particularly with regard to economic status, such effects are likely to be large. For example, in our data, persons turning 65 in the early 1970s had considerably higher poverty rates than those turning 65 in the 1980s. Thus, some of the apparent rise in poverty observed in cross-sectional data among older age groups may reflect the fact that earlier cohorts earned less during their working lives than later ones.

To trace the event histories of those in their old age, we needed a panel data set following a nationally representative sample over an extended period. The PSID is an on-going survey begun in 1968 following an original sample of 5,000 families with annual interviews. We used the seventeen-year sample, following people up through 1984. Our sample consisted of all those who were over 65 for at least three years during the survey (since some of our models use two-year lags). Ultimately, we had a sample of 1,671 persons, 745 men and 926 women.

Until recently, the PSID suffered a major flaw, rendering it inappropriate for use in studying longitudinal patterns of aging. When persons left the sample because of institutionalization, death, or any other reason, their records—including all previous years' information—were dropped from the sample. Thus, the only elderly left on the PSID were the survivors, presenting a potentially serious sample selection problem. Recently, however, a nonresponse sample has been released that includes all people ever surveyed. Most important for our purposes, the nonresponse sample contains information on reason for nonresponse, such as death or institutionalization. Still, we were forced to do a considerable amount of recoding to identify the institutionalized and those who were dependents sharing the household of others. (For a description of our recoding of PSID data, see the appendix.)

4.2 Methodology

Our methodology consisted of three steps. First, we modeled income dynamics and the odds of several discrete events (widowhood and remarriage, disability and return to good health, death, institutionalization and dependent household sharing) separately for men and women. Except when modeling income, where we used a simple OLS estimator, we used hazard models allowing for time-varying covariates. In each case, realizations of other past and contemporaneous events (such as marital status or health) were included as independent variables.

Next, we applied the models to sequentially simulate the paths of aging for a representative sample of 65-year-olds. Each year, we used the models to predict a new set of outcomes for the following year. The simulated results for one year were then used to predict outcomes for the next year and so on for thirty-five years. Because we used a random sample of people and their reported characteristics on turning 65 as the seeds for the simulations, our simulated life expectancies and institutionalization rates should match the actual aggregates for the cohort reaching age 65 during the period 1980–84.

As a final step, we tabulated the simulated data set to study alternative paths of aging. We could compare the lives of those who were disabled and healthy, widowed and married, rich and poor at 65. Taking persons at age 65, we could ask how many were widowed, disabled, poor, dead, or institutionalized by ages 80, 85, 90, and so on. Similarly, we could look at where people ended up and ask what had led them there. Thus, we could ask whether poor elderly widows were formerly middle-class wives. And we could ask whether those entering institutions had been rich or poor, married or unmarried, disabled or healthy, living independently or as a dependent in earlier years.

In effect, our models pull together the experiences of succeeding cohorts within the PSID, capturing the cross-event, intertemporal relations found in the data. We are able to pool the experiences of various cohorts by putting restrictions on the form of the cohort effect. The simulations then reproduce those relations, summarizing the lessons learned in a more intelligible way than might be gotten from piles of cross-tabulations from the original data. In effect, we have projected a thirty-five-year event history for people just turning 65, reflecting the relations gleaned from the original data.

There are important limitations, however. Since the relations observed in current data are assumed to hold into the future, unmodeled trends will lead our projections astray. On the other hand, any projection suffers from these flaws. Our method, at least, allows us to exploit the full longitudinal and cross-sectional information available from the PSID.

4.3 General Modeling Strategy

We used two different types of models in this paper: hazard models for discrete events such as death and institutionalization and a separate model for income dynamics. We discuss the hazard models first.

4.3.1 Hazard Models

In order to predict discrete events such as death and widowhood, we estimated single and multiple-risk hazard models using fixed and time-varying covariates.[1] The odds of death, institutionalization, and dependent household sharing were estimated within a multiple-risk framework. Chances of moving into and out of marriage and into and out of good health were each modeled individually as single risks.

Only a small fraction of the sample was exactly age 65 at the start of the survey. Some turned 65 late in the survey and thus were followed for only a few years; others turned 65 long before the survey began, providing a glimpse of the later years of the aging process but carrying no information on the earlier years. In limiting ourselves to any one cohort, we might have observed at most seventeen years of the aging process, ignoring either the earlier or the later years of the aging process.

We sought a way to learn from all the scattered segments of old age observed within the PSID. In defining aged "spells" and their distributions, we imposed a general statistical structure on the problem, which allowed us to pool the experiences of the succeeding cohorts to come up with a portrait of the dynamics of aging. We define a spell as the number of years we observed a person in a particular state starting at age 65 or the first year he or she was observed in the state (if he or she was over 65 at the beginning of the survey). Each period, the probability of an event was a function of $Z(t)$, a vector of time-varying covariates (such as age, marital status, and health status), and X, a vector of fixed characteristics (race and education). Note that t is the number of years in which we saw them in a particular state, not the number of years they have lived past 65.

We assume t to have an exponential baseline hazard. In effect, the baseline hazard was assumed to be constant, exhibiting no duration dependence. But, by including age dummies among the time-varying covariates, we allow for a very general form of age-varying failure rates. Our single-risk hazard function takes the simple form below, with an exponential baseline hazard, fixed characteristics X, time-varying covariates $Z(t)$, and no unobserved heterogeneity:

$$h[t; X, Z(t)] = \phi \cdot \exp[X\beta_1 + Z(t)\beta_2].$$

Because age is a time-varying covariate, the hazard is allowed to shift up or down with changes in age. Thinking in terms of a spell of old age, this amounts to a nonparametric form of duration dependence. Changes in other variables such as health or marital status will shift the hazard as well.

In most of our models, there was only a binary choice, but, as will be discussed below, we jointly estimate the odds of death, institutionalization, and sharing models. For simplicity, we assume that each alternative—death, institutionalization, and sharing—is independent of the other alternatives in that period.

4.4 Models and Results

Before discussing the simulation results, we will briefly highlight the models and estimated parameters. The coefficient estimates and asymptotic standard errors are given in the appendix tables. Table 4.1 shows the specification of each one of our models.

4.4.1 Disability Models

We modeled movements into and out of disability as a function of income, age, marital status, and race.[2] By including a dummy for disability status last period, we allowed for the possibility that the newly disabled or the newly healthy might be more likely to change states again, either because of some short-term event or because of some measurement error.

An 80-year-old healthy man who reported being disabled one year earlier had a much higher likelihood of becoming disabled again right away (37 percent) than men in their second or later year of good health (12 percent).

Table 4.1 Model Specification

	Hazard Models: (at time t)			
Variables:	Into and Out of Disability	Into and Out of Marriage	Into Death, Institutionalization, and Dependent Sharing	From Sharing to Death, Institutionalization
Disability_{t-1}		X	X	
Disability_{t-2}	X	X	X	
$\text{Income/needs}_{t-1}$	X	X	X	
Age Group_{t-1}	X	X	X	X
$\text{Marital status}_{t-1}$	X		X	
$\text{Newly married}_{t-1}$	X		X	
$\text{Newly unmarried}_{t-1}$	X		X	
$\text{Year of survey}_{t}$	X	X	X	
Years of school completed	X	X	X	
Race	X	X	X	X
Sex[a]				X

[a]All models except those from sharing into institutionalization and death are estimated separately for men and women.

(For the probabilities of becoming disabled, other characteristics held at their means for those who were not disabled at age 80, see table 4.2.) Disabled men aged 80 who only recently entered disability status had a 40 percent chance of becoming healthy again right away and had a 13 percent chance thereafter. (Estimated probabilities for movements out of disability are not shown since they are largely symmetric to those in table 4.2.)

Persons of both sexes who were more educated or richer were less likely to become disabled. White women were less likely to become disabled and more likely to become healthy again once disabled.

4.4.2 Marriage Models

We modeled movements both into and out of marriage as well. By far, the most common reason for becoming unmarried was widowhood, but the rare cases of divorce were treated in the same model. Our models are based on only the characteristics of the individual. In more complex models, one might

Table 4.2 Predicted One-Year Probabilities of Moving into Disability from Good Health For 80-Year-Old Men and Women Living Independently

Characteristic	Men	Women
Grand mean	.1597	.2187
Previous disability status:		
Disabled one year ago	.3672	.4699
Not disabled two years	.1233	.1944
Marital status:		
Married	.1682	.2343
Unmarried	.1570	.2136
Newly unmarried	.0521	.1893
Income:		
At poverty level	.2266	.2752
2 times poverty	.1974	.2269
3 times poverty	.1819	.2021
4 times poverty	.1716	.1859
5 times poverty	.1640	.1742
Age:		
65–69	.1143	.1877
70–74	.1220	.2037
75–79	.1419	.2245
80–84	.1597	.2187
85–89	.2340	.3076
90+	.0898	.4076
Race:		
White	.1585	.2151
Nonwhite	.1813	.2974

Note: When varying each characteristic, other characteristics are held at sample means.

include spousal characteristics such as age or disability in modeling widowhood, but that would greatly complicate the simulations.

In modeling movements out of marriage, we included disability this year and last, age, race, and income. Table 4.3 reports the probability of becoming unmarried, varying one characteristic at a time, holding all else at the mean for those who were married at age 80. Not surprisingly, the most important predictor of widowhood was age. Holding other characteristics at their means for married men at age 80, the annual chances of becoming unmarried for men increased from 1.2 percent at age 65 to 3.8 percent at age 90. For two reasons—because they have longer life expectancies and because they are typically younger than their mates—women are much more likely to be widowed. Again holding other characteristics at their mean for women age 80, women's annual chances of widowhood increased from 3.2 percent to 14 percent between ages 65 and 90.

Income was an important predictor of a woman's chances of becoming widowed. An 80-year-old married woman who was poor had a 17 percent annual chance of widowhood; an otherwise similar woman with income five times the poverty level had only a 11 percent chance.

4.4.3 Death, Institutionalization, and Dependent Sharing

We modeled the transition from independent living to death, institutionalization, and dependent sharing separately for men and women. As shown in

Table 4.3 One-Year Probabilities of Becoming Unmarried for Currently Married 80-Year-Old Men and Women Living Independently

Characteristic	Men	Women
Grand Mean	.0383	.1337
Income:		
At poverty level	.0463	.1668
2 times poverty	.0425	.1413
3 times poverty	.0404	.1281
4 times poverty	.0390	.1195
5 times poverty	.0379	.1131
Age:		
65–69	.0117	.0323
70–74	.0220	.0431
75–79	.0212	.0759
80–84	.0383	.1337
85–89	.0306	.0593
90+	.0377	.1397
Race:		
White	.0387	.1330
Nonwhite	.0346	.1598

Note: When varying each characteristic, other characteristics are held at sample means.

table 4.1, the variables used to predict were health status in the past two periods, income, marital status, and recent changes in marital status, age, and race. For those who became dependent sharers, we also had to model transitions into death and institutionalization.[3]

Death

Marital status, age, and especially disability were the most important predictors of death rates for men and women. The average 80-year-old man who was disabled in both of the past two years had a 13 percent chance of dying in the next year as compared to 4 percent for those who were healthy (see table 4.4).

Marriage had opposite implications for men and women. Marriage helped men's and hurt women's chances of survival. This may reflect the traditional

Table 4.4 Probability of Death, Institutionalization, or Dependent Sharing for 80-Year-Old Men and Women Currently Living Independently

	Men			Women		
Characteristic	Death	Institution	Share	Death	Institution	Share
Grand Mean	.0819	.0036	.0067	.0314	.0124	.0044
Disability:						
Disabled at least 2 years	.1265	.0041	.0120	.0941	.0519	.0069
Healthy at least 2 years	.0418	.0028	.0030	.0236	.0085	.0038
Newly disabled	.0823	.0069	.0020	.0538	.0355	.0071
Marital status:						
Married	.0751	.0029	.0041	.0380	.0121	.0019
Unmarried	.1010	.0053	.0202	.0292	.0125	.0057
Newly unmarried	.0927	.0158	.0448	.0311	.0163	.0212
Newly married	.0675	.0029	.0041	.1546	.0121	.0019
Income:						
At poverty level	.0952	.0206	.0058	.0346	.0164	.0061
2 times poverty	.0883	.0085	.0062	.0310	.0121	.0042
3 times poverty	.0844	.0051	.0065	.0291	.0101	.0034
4 times poverty	.0818	.0035	.0067	.0278	.0089	.0029
5 times poverty	.0799	.0026	.0068	.0268	.0080	.0026
Age:						
65–69	.0395	.0005	.0022	.0187	.0025	.0034
70–74	.0429	.0008	.0019	.0232	.0038	.0028
75–79	.0561	.0017	.0040	.0246	.0048	.0047
80–84	.0819	.0036	.0067	.0314	.0124	.0044
85–89	.0928	.0042	.0100	.0481	.0117	.0076
90+	.1605	.0122	.0107	.1486	.0543	.0076
Race						
White	.0831	.0035	.0064	.0323	.0138	.0042
Nonwhite	.0733	.0041	.0095	.0242	.0051	.0061

Note: When varying each characteristic, all other characteristics are held at the means for 80-year-old men or women.

roles of husband and wife. Married men live longer because they are cared for by their wives. In the process, wives' health may be endangered lifting and helping a disabled husband.

As expected, death rates for both men and women rose with age.

Institutionalization

As described in the appendix, we coded someone as institutionalized in several ways. Our data may understate the extent of institutionalization for several reasons. First, nursing home stays that are expected by family members to be short will not be reported. Second, those who enter nursing homes and die in the interval between annual interviews will be counted as nonresponse due to death, so the spell of nursing home residence will be missed. Third, those from single person households entering nursing homes after living alone are likely to be undercounted. PSID interviewers often pursued a single-person household into an institution and provided no direct indicator where they were (until 1984, when an institutionalization indicator was added). We worked with PSID staff to develop a recoding scheme to capture this third group, as described in the appendix. Still, we are uncertain whether we have fully resolved the problem.

While exits from nursing homes would be observed in some cases, most could not have been traced, given PSID procedures. As a result, we treated institutionalization as an absorbing state.

Age, disability, income, and marital status were the best predictors of nursing home entry for men and women. Ninety-year-olds were twenty times more likely to enter nursing homes than 65-year-olds. Disability also had a moderate effect.

Wealthier men and women were less likely to enter nursing homes. For instance, a woman with the mean characteristics of an 80-year-old but with income at the poverty level was twice as likely as a woman with income five times the poverty level to enter an institution within a year (1.6 vs. .8 percent).

With a spouse to care for them, married men were less likely to enter institutions; recently widowed men were more likely. We found similar results for women, but with large standard errors.

Dependent Sharing

Adult children often return to their parents' home temporarily. To maintain the distinction between those who were dependents and those who were merely sharing their home, we adopted the label "dependent sharing." To be a "dependent sharer," one not only lived with others but depended on others who owned or rented the house and accounted for more than half the income.

Marital status, income, and age were the most important predictors of dependent sharing. For both men and women, being married sharply reduced the chances of becoming a dependent sharer. Newly widowed women were especially likely to move in with their children.

There is a broad literature relating the increase in independent living among the elderly to higher incomes (see, e.g., Schwartz, Danziger, and Smolensky 1984; Michael, Fuchs, and Scott 1980; and Pampel 1983). Our models provide consistent results that those with higher incomes were less likely to become dependent sharers.

Unlike death and institutionalization, dependent sharing was not assumed to be absorbing. We estimated separate models of the movement from dependent sharing to death and to institutionalization. (Virtually no one returned to independent living.) Because of small sample sizes, we pooled observations of males' and females' dependent sharing and modeled transitions into death and institutionalization as a function of age and race alone. We also included a sex dummy. Holding constant race and age, female dependent sharers were less likely to die and to enter nursing homes in a given year than men.

4.4.4 Income Dynamics

The major factor affecting the standard of living of the elderly is changed marital status. Since spousal benefits for Social Security are considerably lower than those of the primary beneficiary, one would expect a large fall in income for women if their husband dies. Pensions usually offer even less protection to widows. For men, we would also expect a fall in income since the spouse's benefits are lost, but not nearly as great a fall as for women.

In all our models, we use income relative to the poverty line as a simple indicator of economic well-being. Since the poverty line differs by family size, dividing income by the poverty need standard adjusts for family size. Alternatively, one could have modeled income separately and then divided by family size. We have estimated the models both ways, and the results are similar. In the end, we used income/needs ratios because the coefficients are more readily interpretable.

We modeled the log of income relative to needs as a function of past disability, current marital status, recent and past changes in marital status, race, education, age, and survey year (to account for cohort differences). We also included three years of lagged income/needs (in logs), restricting their coefficients to sum to one so that the model would not create regression to the mean due to measurement error.[4]

The poverty line in 1985 was $5,156 for a one-person household and $6,503 for a two-person home. Since the poverty line for a one-person home is 79 percent of that for a two-person one, income relative to the poverty/needs ratio would fall when a person became widowed only if income fell by more than 21 percent.

New widowers and new widows face very different changes in economic status on the death of a spouse. When a man loses his wife, his standard of living (income relative to needs) is estimated to fall by 10 percent initially (implying that total income fell by roughly 30 percent). It remains 10 percent lower in succeeding years.

In sharp contrast, widows experience a 56 percent drop in standard of living initially (created by a 77 percent drop in income!). But more than half the loss is recovered in the next year, presumably as survivors' benefits of various sorts are paid. Ultimately, we estimated that women experience a 20 percent drop in their standard of living on the death of their husband (caused by a 41 percent decline in their income). It is clear that the current system of income support leaves women at far greater risk than men.

4.5 Simulation Results

We used the parameter estimates to simulate the events of old age for a representative sample of 65-year-olds. Starting with the 444 PSID sample members who turned 65 between 1980 and 1984, we used each individual as the seed for twenty different simulated life histories. In doing the simulation, we estimated the probability of each event in the subsequent year. Drawing from a uniform (0,1) distribution, we modeled the occurrence of each event. We also estimated expected income/needs ratios for those at age 66 using the income model. Taking a draw from a normal distribution with mean zero and variance equal to the estimated variance of the disturbance term in the income equation, we reproduced the observed distribution of incomes. Proceeding sequentially, we used simulated characteristics at age 66 to predict characteristics at age 67 and so on. Generating twenty equiprobable lifetimes for each of the 444 sample members, we eventually had 8,880 simulated spells of old age to study.

In table 4.5, we compare our simulated life expectancies with those reported by the U.S. National Center for Health Statistics (NCHS).[5] This is a rough measure of the external validity of our predictions. With the exception of nonwhite females, our predictions were close for all groups. For instance, for white females, our simulations show a life expectancy at age 65 of 18.5 years as compared to the NCHS estimate of 18.7 years. For white men and for nonwhite men, our estimates were also very close for those aged 65: 14.9 simulated versus 14.5 in the life tables for white men; our simulations of life expectancies for nonwhite men at age 65 were equal to that in the life tables, 13.4 years. Nonwhite females, though, had a simulated life expectancy of 19.4, though the life table estimate was only 17.3.

In many respects, the close correspondence between our simulated and the actual life expectancies is remarkable. Each year, for each individual, life events are being simulated within ten different models. Realizations in one year for each event help predict changes in all other events in future years. Poor predictions in one model would distort the entire simulation since each simulated event would be used to predict other events in later years. That such a large-scale serially dependent model would correspond with life-table estimates is reassuring.

Table 4.5 Comparison of Simulated Life Expectancies with Life-Table Estimates

	Life Expectancy at Age:				
	65	70	75	80	85
White females:					
Life table	18.7	15.1	11.8	8.8	6.5
Simulated	18.5	15.7	12.6	9.8	6.9
Nonwhite females:					
Life table	17.3	14.1	11.5	9.0	7.4
Simulated	19.4	16.1	12.5	9.7	7.1
White males:					
Life table	14.5	11.5	9.0	6.9	5.2
Simulated	14.9	12.6	9.9	8.3	6.0
Nonwhite males:					
Life table	13.4	10.9	9.0	7.1	6.0
Simulated	13.4	11.3	8.7	7.1	5.8

Note: Life-table estimates drawn from U.S. Bureau of the Census, Statistical Abstract of the United States, 1987 (Washington, D.C.: U.S. Government Printing Office, 1986), table 108. Life-table estimates are for blacks, simulations for nonwhites.

4.5.1 Looking Forward from Age 65

The extent of institutionalization is much higher than might be expected on an initial inspection of those who were in institutions at a point in time. For instance, according to the 1980 census, only 4 percent of the population 75–79 and 12 percent of the population 80 and over were in institutions (drawn from Bureau of the Census 1984). But the size of the stock of elderly and institutions leaves a false impression that only a few of the elderly ever enter. In the simulations, 12 percent of men and 38 percent of women aged 65 were eventually institutionalized. These estimates are in fact quite consistent with alternative estimates of 25–50 percent for both sexes combined (see, e.g., Vicente, Wiley, and Carrington 1979; and McConnell 1984).

We wanted to compare the prospects of those who were rich and poor, disabled and healthy, married and unmarried, white and nonwhite at age 65. In tables 4.6 and 4.7, we report the status at age 80 for those with selected characteristics at age 65.

With the simulated data, we were able to pose a number of questions not answerable with cross sections. Reassuringly, the answers were for the most part as expected. For example, men and women who were disabled at age 65 were much more likely to be dead or in nursing homes by age 80 than those who were healthy. Further, men and women who were married at age 65 lived two years longer than men and women who were unmarried. (Although marriage lowers women's chances of survival after controlling for income, married women tended to have higher standards of living.) White men were less likely to be institutionalized by age 80 than nonwhite men, white women

Table 4.6 Simulated Status at Age 80 for Those with Selected Characteristics at Age 65 (Men)

	Of Persons Alive at 65				Of Persons Alive and Independent at 80		
Characteristic at Age 65	Life Expectancy at Age 65	% Dead by Age 80	% Institutional by Age 80	Of Persons Alive at 80, % Sharing	% Unmarried	% Disabled	% Below 2 Times Poverty
All Persons	14.7	53	4	20	15	43	28
White	14.9	52	4	18	15	41	26
Nonwhite	13.4	55	7	34	17	72	35
Disabled	12.7	59	6	16	17	54	35
Not Disabled	16.0	48	3	16	15	39	23
Married	14.9	52	4	16	14	43	28
Unmarried	12.9	60	6	21	44	61	30
Income < 2 times poverty	12.4	58	10	49	18	76	61
Income 2–5 times poverty	14.3	54	4	17	19	48	36
Income 5+ times poverty	16.8	46	2	12	11	30	10

more likely. White men and women were much less likely to be dependent sharers by age 80 than nonwhites.

The differences in the prospects for those who were low and high income at age 65 were most dramatic. (Low income is defined as having income less than two times the poverty level, high income as having income greater than five times the poverty level.) Those who were low income at age 65 lived four fewer years on average, were much more likely to be in a nursing home or dependent sharers by age 80, and were much more likely to be disabled.

4.5.2. Looking Backward

We were also interested in tracing back the life histories of those in particular end states. Two were of particular policy interest: institutionalization and poor widowhood. For instance, were those who ended up in institutions identifiable at age 65? Were they rich or poor, healthy or disabled, married or unmarried? What changes in disability status, marital status, and income did they see in the few years preceding their institutionalization? How many of those who were poor widows at age 80 were middle-class wives at age 65?

We have already noted that, in our simulations, 12 percent of men and 38 percent of women alive at age 65 eventually entered institutions. Table 4.8 compares the characteristics of the ever institutionalized with the average characteristics at age 65. Men who were eventually institutionalized were

Table 4.7 Simulated Status at Age 80 for Those with Selected Characteristics at Age 65 (Women)

	Of Persons Alive at 65				Of Persons Alive and Independent at 80		
Characteristic at Age 65	Life Expectancy at Age 65	% Dead by Age 80	% Institutional by Age 80	Of Persons Alive at 80, % Sharing	% Unmarried	% Disabled	% Below 2 Times Poverty
All Persons	18.6	26	12	16	69	42	34
White	18.5	26	13	13	68	40	31
Nonwhite	19.4	26	8	38	80	64	57
Disabled	17.2	28	15	14	70	42	41
Not Disabled	19.8	22	11	9	68	42	29
Married	19.3	25	10	11	55	41	28
Unmarried	17.9	24	18	10	97	44	43
Income < 2 times poverty	16.3	32	15	34	84	52	70
Income 2–5 times poverty	19.6	22	12	9	69	43	28
Income 5+ times poverty	20.8	22	7	6	56	33	9

Table 4.8 Comparison of Characteristics of Persons Who Eventually Become Institutionalized with the Characteristics of All Persons at Age 65 by Sex

	Men		Women	
Characteristics at Age 65	All	Ever Institutionalized	All	Ever Institutionalized
Unmarried	5	7	37	41
Disabled	38	41	38	38
< 2 times poverty	17	29	33	37
2–5 times poverty	49	50	43	40
5+ times poverty	34	21	24	22

disproportionately low income. However, their disability status was very similar to that of persons who did not enter institutions. We suspect that this results from the fact that disabled men die more quickly, often not living long enough to be institutionalized.

The results for women are even more interesting. By the criteria shown in the table, women who eventually became institutionalized are virtually indistinguishable from those who do not. Once again, the result almost certainly reflects differential mortality. Low-income women are more likely to be institutionalized if they get very old, but they are less likely to reach very old age. Those who eventually enter institutions thus appear to be a real cross section of American women at age 65.

In table 4.9, we report the characteristics of the institutionalized in the few years immediately preceding their institutionalization. Over one-third (38 percent) of men who were institutionalized were dependent sharers the year before entering institutions. For men who enter the nursing home from living independently, there is a sudden jump in widowhood and disability in the last year before institutionalization. Still, 68 percent of men who were institutionalized were married only the year before.

Women who enter nursing homes were more likely to have been living independently and more likely to have been widows for a while. Theirs seems to be a gradual deterioration, not a sudden change. Only 18 percent of women were sharing the year before institutionalization. Among eventually institutionalized women who were living independently, 72 percent were widows as many as five years before institutionalization, and two-thirds (66 percent) were widows nine years before.

We also looked at the past history of poor, unmarried women at age 80. In our simulations, these women were often relatively disadvantaged even at age 65. About 60 percent had been below the poverty line fifteen years before. Only 3 percent had had incomes five times the poverty level. Even more interestingly, over half the poor unmarried women at age 80 were not married at age 65. In our results, few middle-class wives became poor elderly widows.

Table 4.9 Simulated Characteristics of Persons in Various Years Prior to the First Year of Institutionalization (persons who were simulated to enter institutions only)

	Years before Institutionalization				
	1	2	3	4	9
Percentage of all men dependent sharing	38	34	31	27	22
Of all men who were not dependent sharing:					
Percent unmarried	32	22	21	21	19
Percent disabled	66	45	51	47	45
Percent < 2 times poverty	71	66	62	54	46
Percent 2–5 times poverty	23	28	29	37	37
Percent 5+ times poverty	5	6	8	9	16
Percentage of all women dependent sharing	18	16	15	13	11
Of all women who were not dependent sharing:					
Percent unmarried	81	78	77	72	66
Percent disabled	80	64	53	43	38
Percent < 2 times poverty	47	45	46	44	40
Percent 2–5 times poverty	32	44	33	35	40
Percent 5+ times poverty	21	21	21	21	21

4.6 Conclusion

Even in this initial effort, we have noted some intriguing results. For example, rich and poor at age 65 face very different experiences in old age, higher-income persons living more than four years longer on average. Second, widowhood created a 20 percent drop in the standard of living of women as compared to a 10 percent drop for men. Third, women who ultimately enter institutions have very similar incomes, rates of disability, and rates of marriage at age 65 to women who do not enter nursing homes. Finally, poor widows were likely to have been widowed or low income already at age 65.

We see this paper as a pioneering effort to use recursive simulation models to explore the events of aging. It remains experimental. Nonetheless, we were surprised at the close correspondence between our results and external estimates. We outline a methodology for piecing together the disparate slices of old age captured within a panel survey covering a number of cohorts. Rather than wait twenty more years for a long-term panel of a single cohort to trace the events of aging, the methodology described allows one to develop a smoothed profile of the aging process by pooling the experiences of a number of cohorts.

Appendix
Data Recoding on the PSID

We describe here our recoding scheme in more detail.

Nonresponse

A sample member of the PSID can become a nonrespondent for a number of reasons: death, institutionalization, refusal, disability, inability to locate, etc. We treated nonrespondents for reasons other than death and institutionalization as right-censored observations.

Women's Health Status

In six out of seventeen years, disability status data on wives, but not female heads, was missing. Since we would have had disability status for female heads but not for wives, measured disability would have been capturing marital status differences. As a result, we treated disability status as missing for all women in those years.

Institutionalization

There are four different ways to identify the institutionalized on the PSID. First, someone is coded as institutionalized if remaining sample members of a household report the absence of a household member perceived to have left the household for a long-term stay in a nursing home. Those who are temporarily out of the household at the time of the interview—for instance, on a short-term hospital stay—will not be coded as "institutionalized." Second, if a single person household enters a nursing home and there are no remaining sample family members outside, the PSID interviewers will still attempt to obtain an interview. If they fail, the household should be coded as nonresponse due to institutionalization. Third, if the PSID staff succeeded in obtaining an interview in the nursing home, there is an indicator of institutionalization in 1984. We reverse coded anyone who was coded as institutionalized in 1984 as institutionalized until his or her previous move.

Before 1984, however, there are no direct indicators of institutionalization for single person households who were interviewed in nursing homes. We worked with PSID staff in developing a method for identifying such households. If a single person moves into a housing type "other" (as opposed to an apartment, house, condominium, or trailer) for involuntary reasons (such as health), if there are two rooms or less, and if the household size never grows past one before the person moves, than we coded that person as "institutionalized."

Because we checked each recode by hand, we are confident that we have not overcounted institutionalization. However, we are uncertain about the degree of undercounting. We are particularly likely to miss short-term stays. Those who are in what are perceived to be short-term stays will not be reported as institutionalized when reported absent by household members. In addition, those who enter nursing homes and die between interviews will be reported as dead, the spell of nursing home use missed. For all the above reasons, our estimates of ever institutionalization should be treated as lower bounds.

Dependent Sharing

We sought to distinguish between living arrangements where adult children move back in with their parents and cases where elderly parents move in with others, becoming economically dependent on them. Having noted the frequency of adult childrens' return to their parents' home, we wanted to avoid treating both dependent sharers and household heads similarly.

At the start of the survey, who was designated as head did reflect the degree of economic independence. For instance, the head was often the person who owned the home. As a result, at the start of the survey, the elderly who were designated as nonheads were dependent sharers. However, if a person started the survey as a family head, it was rare that they would ever become a nonhead, even if they became dependent. The key to understanding coding procedures is to note that the PSID is a family-centered survey that carries a host of questions specifically for family heads. In trying to maintain a consistent series of data for each head, PSID interviewers rarely changed the household status of those who ever were designated heads, except for reasons of marriage.

We identified three different groups of dependent sharers. The first group was those who were explicitly categorized as parents of the head or other relatives of the heads. Most of these started the survey in that status.

The second group was made up of family heads that moved in with other sample members. When a sample household moves in with another sample household, there is often no direct indicator that the other family is present. For instance, if an elderly parent moves in with an adult child who had been part of the original sample family in 1968 and both parent and child had been followed over the years, the PSID often did not recombine the two households' records if they moved back in with each other. Indeed, there was often no direct indicator that the other family was present. We worked with the PSID staff to develop a method for detecting such shared living arrangements. If the family composition was described as "other" (rather than as a primary family with relatives or nonrelatives included within the family unit), if the person neither owned nor rented his or her housing, and if the reason he or she neither owned nor rented was not that housing was some form of compensation or gift, then we considered that person a dependent sharer.

Third, we tried to identify sample heads moving in with nonsample families. In such cases, the PSID usually carries no indicator that the other family is present. Even if someone in the nonsample household owns or rents the home, the sample head is listed as an owner or renter. Eventually (often in the second year of coresidence), the PSID will indicate the nonsample members as "moving in" with the sample person's household, even if sample member had moved in with them. The sample head would have remained listed as head. Again, we worked with the PSID staff to develop a way of identifying such living situations. We coded people as dependent sharers if all the following conditions are met: they are unmarried; they move; a child or grandchild is shown to move in with them; family size never returns to one before their next move; and the head's income is less than half the family's income over the period of coresidence.

One other problem arose. Little information is reported on nonheads. As a result, we had limited information on disability, marital status, and even income on sharing dependents if they were not heads. Thus, we did not model these characteristics for sharers.

Table 4A.1 Hazard Models for Movements into Disability

Variable	Men, Healthy → Disabled Coefficient	Men, Healthy → Disabled Standard Error	Women, Healthy → Disabled Coefficient	Women, Healthy → Disabled Standard Error
White	−.147	.125	−.377	.160
Education	−.021	.012	−.034	.016
Disabled (*t* − 2)	1.255	.093	1.077	.132
log inc/need (*t* − 1)	−.224	.075	−.323	.093
Married (*t* − 1)	.026	.133	.101	.118
Newly unmarr (*t* − 1)	−1.210	.781	−.141	.410
Year of survey	.040	.011	.007	.012
Newly married (*t* − 1)	.538	.452	−.161	1.429
Health missing (*t* − 2)			.348	.127
Age 70–74	.070	.111	.091	.131
Age 75–79	.232	.136	.201	.154
Age 80–84	.360	.173	.171	.203
Age 85–89	.787	.238	.570	.255
Age 90+	−.254	.645	.924	.369
Phi	.305	.017	.308	.018
Observations	832		1,227	

Note: All standard errors are asymptotic.

Table 4A.2 Hazard Models for Movements Out of Disability

Variable	Men, Disabled → Healthy Coefficient	Men, Disabled → Healthy Standard Error	Women, Disabled → Healthy Coefficient	Women, Disabled → Healthy Standard Error
White	.016	.144	.291	.166
Education	−.001	.014	.019	.018
Disabled (*t* − 2)	−1.320	.098	−.939	.143
log inc/need (*t* − 1)	.320	.086	.121	.106
Married (*t* − 1)	−.065	.140	.301	.135
Newly unmarr (*t* − 1)	.535	.302	.104	.342
Year of survey	.010	.011	−.024	.014
Newly married (*t* − 1)	−.136	1.010		
Health missing (*t* − 2)			−.490	.149
Age 70–74	−.005	.125	−.040	.146
Age 75–79	−.301	.151	−.293	.180
Age 80–84	−.105	.177	.304	.187
Age 85–89	−.502	.301	−.014	.301
Age 90+	−.307	.518	−.390	.607
Phi	.295	.017	.274	.017
Observations	932		1,243	

Note: All standard errors are asymptotic.

Table 4A.3 Hazard Models for Becoming Unmarried

	Men, Married → Unmarried		Women, Married → Unmarried	
Variable	Coefficient	Standard Error	Coefficient	Standard Error
White	.113	.341	−.199	.314
Disability ($t-1$)	−.239	.317	−.294	.246
Disability ($t-2$)	.314	.283	−.311	.283
log inc/need ($t-1$)	−.127	.203	−.260	.154
Year of survey	.031	.030	.020	.021
Health missing ($t-1$)			−.048	.193
Health missing ($t-2$)			.053	.195
Age 70–74	.639	.325	.295	.222
Age 75–79	.601	.357	.877	.234
Age 80–84	1.200	.372	1.475	.296
Age 85–89	.975	.600	.621	.773
Age 90+	1.186	1.029	1.523	3.262
Phi	.014	.003	.038	.005
Observations	712		541	

Note: All standard errors are asymptotic.

Table 4A.4 Hazard Models for Becoming Married from Unmarried

	Men, Unmarried → Married		Women, Unmarried → Married	
Variable	Coefficient	Standard Error	Coefficient	Standard Error
White	.037	.565	.343	.974
Education	.055	.058		
Disabled ($t-1$)	−.160	.620	−.831	1.775
Disabled ($t-2$)	.320	.622	1.494	1.392
log inc/need ($t-1$)	.302	.363	−.082	1.028
Year of survey	.032	.054	−.047	.109
Health missing ($t-1$)			−.667	1.481
Health missing ($t-2$)			.779	1.117
Age 70–74	−.453	.561	−.328	.976
Age 75–79	−.409	.558	−1.647	1.518
Age 80+	−1.738	.804	−1.687	1.751
Phi	.024	.007	.003	.002
Observations	216		687	

Note: All standard errors are asymptotic.

Table 4A.5 Hazard Models of Elderly Living Arrangements

	Transition to Death			
	Men		Women	
Variable	Coefficient	Standard Error	Coefficient	Standard Error
White	.131	.184	.295	.235
Education	.007	.019	.003	.026
Disability ($t-1$)	.700	.180	.839	.217
Disability ($t-2$)	.454	.177	.580	.211
log inc/need ($t-1$)	−.114	.108	−.161	.144
Married ($t-1$)	−.312	.151	.265	.175
Newly unmarr ($t-1$)	−.093	.428	.067	.525
Newly married ($t-1$)	−.112	1.023	1.470	.734
Year of survey	.005	.015	−.057	.018
Health missing ($t-1$)			.710	.223
Health missing ($t-2$)			.202	.212
Age 70–74	.085	.180	.218	.204
Age 75–79	.359	.183	.278	.225
Age 80–84	.752	.196	.525	.264
Age 85–89	.882	.259	.962	.304
Age 90+	1.468	.364	2.144	.407
Phi	.037	.004	.022	.003
Observations	745		926	

Note: All standard errors are asymptotic.

Table 4A.6 Hazard Models of Elderly Living Arrangements

	Transition to Institutionalization			
	Men		Women	
Variable	Coefficient	Standard Error	Coefficient	Standard Error
White	−.160	.472	.998	.495
Disability ($t-1$)	.920	.738	1.439	.521
Disability ($t-2$)	−.525	.489	.388	.366
Log inc/need ($t-1$)	−1.280	.373	−.448	.184
Married ($t-1$)	−.562	.450	−.028	.313
Newly unmarr ($t-1$)	1.129	.703	.276	.800
Year of survey	.050	.048	.052	.335
Health missing ($t-1$)			1.398	.508
Health missing ($t-2$)			−.246	.401
Age 70–74	.369	.870	.406	.420
Age 75–79	1.149	.733	.652	.476
Age 80–84	1.883	.695	1.605	.435
Age 85–89	2.047	.897	1.541	.508
Age 90+	3.116	.910	3.101	.471
Phi	.0012	.0007	.0029	.0010
Observations	738		921	

Note: All standard errors are asymptotic.

Table 4A.7 Hazard Models of Elderly Living Arrangements

	Transition to Dependent Sharing			
	Men		Women	
Variable	Coefficient	Standard Error	Coefficient	Standard Error
White	−.401	.896	−.373	.606
Disability (t − 1)	−.423	.612	.621	.630
Disability (t − 2)	1.820	1.004	−.033	.748
log inc/need (t − 1)	.105	.494	−.536	.446
Married (t − 1)	−1.585	.657	−1.053	.574
Newly unmarr (t − 1)	.834	1.113	1.376	.639
Year of survey	−.033	.098	−.041	.068
Health missing (t − 1)			1.440	.593
Health missing (t − 2)			.611	.642
Age 70–74	−.112	.915	−.178	.530
Age 75–79	.621	.857	.335	.545
Age 80–84	1.130	.879	.256	.561
Age 85–89	1.540	1.154	.818	.791
Age 90+	1.605	1.273	.818	.791
Phi	.0014	.0007	.0028	.0011
Observations	737		917	

Note: All standard errors are asymptotic.

Table 4A.8 Hazard Models of Elderly Living Arrangements

	Men and Women, Dependent Sharing → Death		Men and Women, Dependent Sharing → Institut.	
Variable	Coefficient	Standard Error	Coefficient	Standard Error
White	−.459	.242	−.270	.469
Male	.492	.233	.844	.385
Year of survey	.003	.027		
Age 70–74	.330	.354		
Age 75–79	1.002	.324		
Age 80–84	1.344	.335	3.211	.976
Age 85+	2.301	.318	3.780	.961
Phi	.0329	.0048	.0029	.0019
Observations	194		194	

Note: All standard errors are asymptotic.

Table 4A.9 **Ordinary Least Squares Estimates of Determinants of Log of Income/Needs Ratio**

	Men		Women	
Variable	Coefficient	Standard Error	Coefficient	Standard Error
Intercept	−.0375	.0275	.0580	.0269
Disab ($t-1$)	−.0059	.0143	.0016	.0166
Disab ($t-2$)	.0103	.0144	.0007	.0166
Unmar (t)	.0022	.0162	.0129	.0100
New unm (t)	−.0991	.0447	−.5621	.0307
New unm ($t-1$)	−.0493	.0460	.0600	.0321
New unm ($t-2$)	−.0134	.0460	.0761	.0313
New unm ($t-3$)	.0263	.0450	.0997	.0320
New mar (t)	.1799	.0820	.4118	.1118
New mar ($t-1$)	.0453	.0750	.3668	.0915
New mar ($t-2$)	−.0391	.0780	.1287	.0889
New mar ($t-3$)	−.0799	.0750	−.0569	.0773
Health missing	.0250	.0799	−.0375	.0119
Education	−.0018	.0014	−.0021	.0014
Log inc/need ($t-1$)[a]	.5707	.0160	.5392	.0138
Log inc/need ($t-2$)[a]	.2432	.0180	.2464	.0151
Log inc/need ($t-3$)[a]	.1860	.0160	.2143	.0135
White	−.0118	.0158	−.0021	.0135
Age 70–74	.0281	.0130	−.0001	.0109
Age 75–79	.0193	.0150	.0114	.0133
Age 80–84	.0160	.0200	.0038	.0170
Age 85–89	.0698	.0320	.0376	.0260
Age 90+	.0131	.0720	−.0003	.0546
Year of survey	.0018	.0016	−.0033	.0014
Observations	3,538		4,886	
R^2	.8063		.8114	
MSE	.1004		.0979	

[a]The coefficients on lagged income were constrained to sum to one.

Notes

1. We gratefully acknowledge the help of Bruce Meyer of Northwestern University, who provided us with the software for estimating the hazard models and offered much helpful advice.

2. People were categorized as disabled if they reported some limitation on the type or amount of work they could do.

3. We did not model movements from dependent sharing back to independent living as they were quite rare in our data.

4. We also estimated the model without these constraints, with little effect on the results.

5. Our simulated "life expectancy" is the expected number of years before death or institutionalization in the simulations. To the extent that people live a while longer once

entering institutions, we should understate life expectancies for those who are institutionalized. This should be less of a problem for men, who are much less likely to become institutionalized.

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Comment James H. Schulz

Ellwood and Kane state two primary objectives at the beginning of their paper. First, they seek to move beyond the limitations of cross-sectional data by utilizing seventeen years (1968–84) of longitudinal survey data to study certain life events for various cohorts of persons over age 64. Second, they develop a simulation modeling process in order to "compare the futures of people" as they move from being young old to old old and also to look backward to help explain where elderly people started with regard to the life events that actually occurred later in life. This is certainly an ambitious pair of tasks.

The increasing use of longitudinal data sets by researchers to investigate various questions is certainly a welcomed development. And the use of various simulation techniques to generate longitudinal data streams and to explore variable interactions is, in my opinion, one of the most important methodological developments in recent years—especially with regard to policy research. In the absence of longitudinal data, researchers have had to make major inferences about the behavior of individuals and institutions based on

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cross-sectional information. This has certainly been true with regard to research concerning the biological and social processes of aging.

In their now classic inventory of gerontological research findings, Riley and Foner (1968) emphasized and warned us of the dangers. Their conclusions are still relevant today: ''[Aging research using cross-sectional information has promoted] a tragic stereotype of the older person as destitute, ill, facing irreparable losses, no longer integrated into society, and no longer subject to society's controls and sanctions. Old age appears as the nadir: the end of a long decline that follows peaks that occur at the early life stages in intelligence, capacity for work, income, sexual capability, and so on'' (7). Riley and Foner discuss the early research and the incorrect conclusions that were drawn from various cross-sectional data: ''Fallacies such as these pose a particular problem for social scientists because they produce distortions in substantive and theoretical understanding of the aging process'' (9).

Certainly, much of the improvement recently documented in the living situation of the elderly is a result of explicit changes that have occurred in pension, health, and service delivery programs. But part of the change in our image of the aged is a result of our ability to get closer to the realities of aging through better research methods. Ellwood and Kane's paper is an attempt to bring both improved data and innovative research methods to bear on a set of familiar research questions. What are good predictors of death, disability, institutionalization, and financial dependency in old age? What is the effect of a spouse's death on a survivor's well-being? To what extent does economic status change as people age?

It was the pioneering efforts of Guy Orcutt (Orcutt et al. 1961) that encouraged the use of micro-simulation techniques in the social sciences. Ellwood and Kane's efforts join a now long history of simulation models developed by economists—for example, the Brookings Institution tax model, the Urban Institute TRIM and DYNASIM models, and the pension models by James Schulz, ICF Inc., the Social Security Administration, and the Brookings Institution. Ellwood and Kane have learned what others before them have learned; development of these models is difficult, time consuming, and expensive.

Unlike the efforts referred to above, Ellwood and Kane have tried to economize in their efforts by using only one data set, one basic estimating technique (hazard models),[1] a truncated simulation cohort of people ages 65 and over, and a very small number of variables in the model. This approach severely limits what they can do and the quality of their results.[2] For example, they find that the major factor affecting the standard of living of the elderly is changed marital status but reach that result after ignoring the effect of employment on income because labor force participation is not modeled.

Almost all the findings from their simulations will be very familiar to researchers in the field of gerontology. Nonwhites tend to die sooner, are more likely to be disabled, and are less likely to live independently as they grow very old. The incidence of disability rises with age, and the disabled are more likely to die at an earlier age. Unmarried older males are a clearly disadvantaged group, both economically and health-wise. And the poorer elderly are more vulnerable than those with more income. It is useful to have this confirmation, based on the PSID longitudinal data, of prior research in these important areas.

Ellwood and Kane give a lot of attention to the issue of poverty among women. Their simulation indicates that the death of a spouse in the retirement years results in a sharp drop in income and, furthermore, that the drop is significantly greater for surviving women than for widowers. They also find that unmarried older women are often relatively disadvantaged even at age 65—with 60 percent of this group already in poverty. Again, however, this finding will not be surprising to gerontologists since such findings have been reported repeatedly over the years (see, e.g., Sass 1979).

To explain the deterioration of economic status among widows, the authors correctly draw attention to the decline in public and private pension income that results when a spouse dies. However, they incorrectly attribute the effect on Social Security benefits to low spouse benefits[3] rather than to the modest levels of "worker benefits" that put many older couples *close to* the poverty level—creating a situation of extreme vulnerability if the survivor does not have access to a private pension supplement. As the life insurance industry can verify, another part of the problem has been a difficulty over the years in getting people to adequately insure themselves to supplement pension survivor benefits.

With regard to private pension supplementation, Burkhauser, Holden, and Feaster (1988) have recently shown that there are dramatic differences in the economic status of older widows eligible only for Social Security and those eligible also for an employer-sponsored benefit. However, a major problem is the low coverage in the past (and still today) of women under such private pension plans. Moreover, the Tax Reform Act of 1986 probably makes the situation worse—given the pension coverage disincentives unintentionally built into it. While the 1986 act's new minimum coverage rules will expand coverage under some plans, many pension experts think that other provisions of the act discourage plan creation and liberalization of coverage provisions.

We cannot expect to see most women covered by good private pension plans in the near future, if ever (in the absence of government compulsion). To get the supplemental income necessary to stay out of poverty in retirement, women would do well to marry a covered male, be sure to stay married, and then opt for survivor's protection. But that is easier said than done. Many men are still not covered in private employment; rates of divorce (currently at historically high levels) show no sign of abating; and families often gamble on foregoing survivor protection in order to get higher pension benefits at retirement.

But having pointed out the coverage, divorce, and survivor protection issues, many people forget to point out another equally important matter. Even if all women were covered by private plans, it is highly unlikely that many would earn the benefits they need to ensure an adequate income in retirement—given their employment histories. The Social Security Administration released in 1986 longitudinal information on the work histories of recent beneficiaries that graphically illustrates the problem (Snyder 1986). Looking at women receiving their first Social Security benefit between June 1980 and May 1981, 43 percent were covered by an employer-sponsored pension plan on their *longest* job. Of those women with coverage, more than half (52 percent) had less than twenty years' service on that job. This means that, to get an adequate retirement income in their own right, many women have to piece together pensions from more than one plan. But employer-sponsored pensions in the United States (both public and private) are not indexed when vested. The result is that vested pensions accumulated early in the work career are typically worth little at retirement. Thus, the problem of inadequate income for widows is extremely complicated.

To help us understand and deal with complex issues like the high rates of poverty among older women, Ellwood and Kane would have to expand their modeling effort significantly. Short of that, however, their approach provides a way of checking the accuracy of many prevailing views on the elderly that are based on cross-sectional analysis.

Notes

1. There is one exception, where they use ordinary least squares techniques.
2. They are encouraged by how well their estimates track actual data for life expectancies. But, as other simulation modeling efforts have shown, this is one of the easiest variables to simulate accurately over short periods of time. Other variables, such as the occurrence of disability, are notorious for the difficulty arising in tracking actual disability experience among subgroups of the population.
3. When a primary earner husband dies, the surviving wife gets 100 percent of his benefit (not her former, and lower, spouse benefit).

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