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ELDERLY ASSETS, MEDICAID POLICY, AND SPEND-DOWN IN NURSING HOMES

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Recent economic research has suggested that Medicaid long-term insurance may reduce the personal savings levels of elderly citizens. This analysis shows that the opposite behavior, due to welfare aversion, actually happens. Barring any behavioral effects, personal wealth and income alone should determine the length of time an individual must stay in a nursing home until spend-down occurs. Wealth and income data from two different samples of the elderly are used to predict the distribution of time until spend-down, which is then compared with the actual distribution of the time until spend-down among residents of nursing homes. Contrary to expectations, it appears that the elderly receive transfers to avoid Medicaid eligibility. This result cannot be explained away by sample selection, demographics, or uncertainty about prices. One implication of this result is that Medicaid could expand eligibility by raising the asset limit without dramatically increasing expenditures or the number of residents who spend-down.

1. INTRODUCTION

Recent theoretical work has shown that the Medicaid program could have substantial negative effects on the personal savings of the elderly (Sloan, Hoerger, and Picone, 1992; Hubbard, Skinner, and Zeldes, 1993; Hubbard, Skinner, and Zeldes, 1994). The Medicaid program discourages saving because it is a means-tested insurance program for nursing home care. Few elderly citizens purchase private insurance for long-term care, and so they must rely on either their own savings or Medicaid to pay for any nursing home care. Elderly people who have large amounts of savings risk losing their savings during a nursing home stay, while their less thrifty neighbors will be covered by Medicaid. The predicted effect of the Medicaid program is that elderly people in need of nursing home care will give assets above the Medicaid asset limit to children, increase current consumption, or protect their assets by putting them in the form of housing in order to qualify for Medicaid sooner. There is, however, little empirical evidence on the extent of this effect. This article fills this gap in the literature by comparing the distribution of spend-down times with the distribution of assets, thereby deriving the behavioral effects. If, in fact, there is a behavioral effect, it is of interest to public policy-makers because it implies that the Medicaid program distorts the incentives to save, and that it is harder to target benefits to those elderly who are in greatest need.

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The behavioral effect also has implications for the cost of raising the Medicaid asset limit in terms of Medicaid spending and the percentage of the elderly who deplete their savings. Many nursing home residents initially pay for their care with personal assets, but become eligible for Medicaid after exhausting these assets, a process called "spend-down." Therefore, Medicaid eligibility is achieved only after nearly all nonhousing assets have been spent. Medicaid uses spend-down to control nursing home expenditures by limiting the number of elderly eligible for Medicaid. There has been a proposal to raise the Medicaid asset limit substantially, from about $2,000 to as high as $30,000 for an unmarried person (The Pepper Commission, 1990; Norton and Newhouse, 1994). This policy change would transfer wealth from the government to the elderly and their heirs by protecting more assets of the elderly. This study addresses the effects of a change in the Medicaid asset limit given the behavioral effects of elderly citizens depleting or transferring their assets in order to qualify for Medicaid.

The following two questions can both be answered using information about elderly assets and spend-down in nursing homes. First, do nursing home residents spend down more quickly than predicted by their level of assets and income, implying a behavioral effect? Second, what is the effect of a change in policy on Medicaid expenditures given such a behavioral effect? Answering these two questions will provide a greater understanding of how Medicaid policy affects the elderly.

Surprisingly, the results of this analysis show that Medicaid policy influences the economic behavior of the elderly in an unexpected way. Spend-down is less common than predicted by data on assets of the elderly. This finding implies that, if anything, the elderly receive transfer payments from children or liquidate housing assets instead of trying to shelter assets from Medicaid. By increasing assets that can be used to pay for nursing home care, a person increases the time after admission that spend-down occurs. Increasing the time of spend-down means that a person is less likely to spend down because they are more likely to die or be discharged before spending down. In terms of policy changes, the results also show that an increase in the Medicaid asset limit would have little effect on the percentage of the elderly who spend down and on Medicaid expenditures. Medicaid would need to raise the limit substantially to see large effects in either outcome. The analysis uses national data to estimate the distribution of the time of spend-down, despite the lack of specific information on the time of spend-down, using a special estimation technique.

2. Assets and Spend-Down

2.1. *Model of Assets and Spend-down*

Consider a person who has just been admitted to a nursing home. The person must use income and wealth to pay for the nursing home care unless they immediately qualify for Medicaid. Private long-term care insurance is another possibility, but currently covers only a tiny fraction of the elderly. We first consider how long it takes to become eligible for Medicaid assuming there is no behavioral effect, that is, that the person does not change either their income or wealth to affect when they become Medicaid eligible.

For the elderly, Medicaid eligibility depends on both wealth and income, although the rules vary by states. Thirty states, including California, New York, Illinois, Michigan, Pennsylvania, and Ohio, have a medically needy program with no restrictions on income for eligibility. The value of the resident's nonhousing wealth typically must be less than \$2,000 for a person who is not married, and less than \$3,000 for a person who is married (Congressional Research Service, 1988). Although a few states claim to include housing wealth in the asset test, in practice this rule has not been enforced. The remaining 20 states have an income test in addition to an asset test, and those individuals who qualify are referred to as the noncash categorically needy. To qualify, the resident's monthly income typically cannot exceed \$1,020, which may be below the monthly cost of nursing home care and their wealth must still be less than the limits listed above. The model of spend-down below, however, assumes that each person lives in a state with a medically needy program because most elderly at risk of nursing home care either live in a medically needy state or have income less than \$1,020. The limiting criteria is therefore almost always the asset test.

The link between spend-down and assets is the adage that time is money. Each additional day in a nursing home costs a fixed price per day p. An unmarried resident with W dollars of nonhousing wealth and no income can pay for $(W-2000)/p$ days of care before spending down to Medicaid eligibility. If the resident has daily income y, than the number of days until spend-down will be even longer. The resident will consume wealth at a rate of only $p-y$ per day. Therefore, the distribution of wealth and income can be used to infer the distribution of how long private residents would spend in the nursing home before spending down under the assumption of no behavioral effect. The following formula gives the number of days until spend-down for an unmarried resident assuming that p and y are unchanged:

$$
\text{(1)} \qquad \text{Days until spend-down} = \begin{cases} 0 & \text{if } W \leq 2000 \\ \dfrac{W-2000}{p-y} & \text{if } p > y \text{ and } W > 2000 \\ \infty & \text{if } p \leq y \text{ and } W > 2000. \end{cases}
$$

Equation (1) is modified to account for details in the Medicaid eligibility rules (Congressional Research Service, 1988). For married residents, replace 2000 with 3000. Also, the value of a car, up to \$4,500, is exempt from the Medicaid asset test and so is subtracted from wealth. Two adjustments are made to reflect average payments for services in the community that would continue while the elderly person was a private resident. For married residents a monthly maintenance needs allowance of \$340 for a spouse in the community is subtracted from income. For home-owing residents, a monthly maintenance needs allowance of \$340 is subtracted from income. The figures used are the average monthly maintenance needs allowances approved by Medicaid. No adjustment is made, however, to income to reflect a decline in asset income over time as assets are depleted.

This biases the results slightly towards taking a longer time to spend down, and therefore a smaller fraction will have spent down at any given time. This bias makes the results found later even stronger in favor of welfare aversion.

The simple model above does not include behavioral effects. Recently, economic research has focused on whether Medicaid insurance for nursing home care affects savings (Sloan, Hoerger, and Picone, 1992; Hubbard, Skinner, and Zeldes, 1993; Hubbard, Skinner, and Zeldes, 1994). Since Medicaid pays for nursing home care for elderly with low savings, there is a disincentive to save. Medicaid policy thus creates a moral hazard problem for saving. If the simple model is modified so that the person's utility depends on how few personal assets are used to pay for nursing home care, then this predicts that nursing home residents will minimize the time until spend-down. For example, altruistic models in which the elderly parent's utility depends on the size of the bequest would predict this result (Kotlikoff and Summers, 1981). An elderly person might spend-down sooner by transferring assets to relatives, placing wealth in a trust, or converting non-housing wealth to housing wealth. The person pays less out of pocket as a result. The negative effect of means-tested programs on savings is not new, having been shown, for example, for college financial aid programs (Feldstein, 1992; Edlin, 1993).

Alternatively, the behavioral effect could work in the other direction if the person has welfare aversion (Moffitt, 1983). Suppose the person's utility depends negatively on being covered by Medicaid. Then instead of dispersing assets, the resident will collect assets, perhaps from relatives, in order to delay going on to Medicaid as long as possible. Many elderly feel strongly about not going on welfare, even if it means paying for services that could be paid for by the government legitimately. The welfare aversion model predicts that residents will take longer to become Medicaid eligible than one would predict in the simple model.

This study addresses the following question: Are data on assets consistent with the observed pattern of spend-down, given the hypothesized behavioral effect? If there are differences, then the conclusion is that there is a behavioral effect in the short run. The distribution of days until spend-down, computed from equation (1) using two data sets on the finances of the elderly, will be compared to the actual distribution of time until spend-down using national data on nursing home utilization. If the elderly spend down more quickly than predicted from data on assets, then this is consistent with the economic model of minimizing personal expenditures on nursing home care. Conversely, if elderly spend down more slowly, then this is consistent with the opposite behavior, that of welfare aversion. This approach, however, cannot detect long-run effects, such as changes in savings in preparation for retirement.

2.2. *Data*

2.2.1. 1985 National Nursing Home Survey

The data on nursing home utilization and spend-down are from the 1985 National Nursing Home Survey (NNHS) current-resident and discharge samples. These are national samples of residents currently in or discharged from skilled nursing facilities and intermediate care facilities. In the first stage of the two-stage probability design, a nationally representative sample of 1,220 facilities was selected. In the second stage, up to six residents who had been discharged from each of the 1,220 facilities during the previous 12 months were chosen at random, and up to five residents in each facility were chosen at random on the day of the survey. The discharge sample has a total of 6,017 observations, and the current-resident sample has 5,238 observations.

This analysis focuses on elderly residents whose primary payer at admission and discharge was private, Medicare, or Medicaid. (Other primary payers include religious organizations, the Veteran's Administration, and other government programs.) Elderly is defined as being age 65 or older. The discharge sample has over 4,000 observations that meet the criteria above; among these there are 2,114 private residents, 472 Medicare residents, and 1,673 Medicaid residents (categorized by payer at admission). The current-resident sample has fewer observations because those covered by Medicaid at admission are not needed for the analysis; among these there are 2,055 private residents and 213 Medicare residents.

A resident is defined as having spent down if the primary payer at admission was not Medicaid and the primary payer at discharge was Medicaid. The exact time of spend-down is not recorded in the data. In the discharge sample, 15 percent of private residents and 25 percent of Medicare residents spent down. In the current-resident sample these numbers are higher—22 and 48 percent, respectively. More residents have spent down in the current-resident sample because it has a disproportionate number of long-stayers.

The covariates are limited to the residents' age, gender, race, and marital status, and are not the primary focus of this analysis. Age is likely to affect the time of discharge (length of stay), being related to unmeasured functional status and the probability of having a caretaker at home. Age may also be correlated with wealth, and hence affect the percentage who spend down. Gender is also correlated with unmeasured functional status. Men are known to be in worse health at admission and to stay a shorter time than women, in part because they are more likely to have a spouse at home to care for them. The variable *Male* equals 1 for men and 0 for women. Race has not previously been found to be an important predictor of length of stay but is included here to test whether it predicts the time of spend-down. The variable *Black* equals 1 for blacks and 0 for all others. Almost all the nonwhites in the sample are black, not Asian. Marital status affects not only the asset limit, being higher for married residents, but is also correlated with income and wealth, and has been shown to be a strong predictor of length of stay (Morris, Norton, and Zhou, 1994). The variable *Married* equals 1 if the resident was married at admission, 0 if not married. No distinction is made between residents who are divorced, widowed, separated, never married, or for the few residents with unknown marital status. The summary statistics for all variables are shown in Tables 1 and 2.

2.2.2. 1989 Panel Survey of Income Dynamics

The first of two data sources on the finances of the elderly is the 1989 Panel Survey of Income Dynamics (PSID). The 1989 PSID asked detailed questions about wealth and income which have been shown to be of high quality (Curtin,

TABLE 1

SUMMARY STATISTICS FOR DISCHARGED RESIDENTS IN THE 1985 NNHS

Continuous Variables	Minimum	Median	Mean	Maximum	Standard Deviation
Private (2,114 observations)					
Length of Stay (days)	3	205	615.7	9,727	945.3
Age (years)	65	83	82.6	106	7.3
Medicare (472 observations)					
Length of Stay (days)	3	59	204.2	4,265	441.6
Age (years)	65	82	81.5	99	7.5
Medicaid (1,673 observations)					
Length of Stay (days)	1	309	736.5	8,130	1,007.4
Age (years)	65	82	81.3	105	7.9

Dichotomous Variables	Mean		
	Private	Medicare	Medicaid
Male	0.32	0.29	0.30
Black	0.02	0.06	0.10
Married	0.22	0.24	0.17
Spend-down	0.15	0.25	1.00

TABLE 2

SUMMARY STATISTICS FOR CURRENT RESIDENTS IN THE 1985 NNHS

Continuous Variables	Minimum	Median	Mean	Maximum	Standard Deviation
Private (2,055 observations)					
Length of Stay (days)	32	615	938.8	8,504	1,008.4
Age (years)	65	83	82.2	106	7.3
Medicare (213 observations)					
Length of Stay (days)	36	446	687.2	4,975	743.8
Age (years)	65	82	81.7	97	7.2

Dichotomous Variables	Mean	
	Private	Medicare
Male	0.25	0.23
Black	0.02	0.05
Married	0.18	0.17
Spend-down	0.22	0.48

Juster, and Morgan, 1989). Since the PSID was not originally intended for studies of the elderly, the number of elderly in the sample is small: 861 observations. The sample consists of all persons in a household in which the head was age 70 or older. There are two records per married household and one record per single household.

The PSID variables for nonhousing wealth and income correspond to the Medicaid eligibility requirements. Nonhousing wealth is defined as net wealth less housing equity, less the value of any business, and less the value of a car up to

TABLE 3

SUMMARY STATISTICS FOR ELDERLY PERSONS IN THE 1989 PSID

Variables	Minimum	Median	Mean	Maximum	Standard Deviation
Nonhousing wealth	0	12,500	60,755	1,625,500	141,162
Income ($ per day)	0	38	61	1,490	95
Income less maintenance allowances	0	25	47	1,467	93
Age of head of household	70	76	76.9	98	5.3
Male	0	0	0.34	1	0.47
Married	0	0	0.50	1	0.50

N = 861

$4,500. Housing equity is the value of the home in 1989 less the remaining mortgage. A home can be excluded from nonhousing wealth only if it is the person's primary residence. Few elderly in the PSID have any business wealth. The value of the car was also subtracted from net wealth, up to a value of $4,500, in accordance with Medicaid eligibility rules (Congressional Research Service, 1988, pp. 61–62). Income was converted to daily income. Married persons included their spouses' income as their own, less a per diem deduction of $11.33 for the spouse to live in the community. The value of $11.33 per day was chosen as an average of the different state rules, which range from $5.00 to $18.33 (Congressional Research Service, 1988, pp. 362–363). Summary statistics are given in Table 3.

2.2.3. 1990 Longitudinal Study of Aging

The other data source on the finances of the elderly is the 1990 Longitudinal Study of Aging (LSOA). This is the fourth wave in a longitudinal survey of a representative sample of noninstitutionalized elderly aged 70 and over in 1984. The 1990 survey was the only one that collected detailed information about wealth and income. Of the original 7,542 surveyed in 1984, 3,400 had died, been admitted to an institution, or could not be located by 1990. Therefore, the final sample in 1990 was 4,142. There are two records per married household and one record per single household.

Nonhousing assets include savings and bank accounts, stocks, bonds, mutual funds, and real estate other than the primary residence. Although the sample from the LSOA is larger, the data on wealth are not as good as those in the PSID. A high nonresponse rate on the economic portion of the survey led to many missing values for wealth and income. Only 54 percent answered the mail-back economic questionnaire. Therefore, wealth and income were imputed for the remaining 46 percent, using the hotdeck method (Rubin and Schenker, 1991). One reason that the average wealth in the LSOA is lower is that the sample is older and less likely to be married. Income, as in the PSID, includes spousal income less a daily allowance, and includes pensions, Social Security, interest, and rents received. The summary statistics for all variables are shown in Table 4.

TABLE 4

SUMMARY STATISTICS FOR ELDERLY PERSONS IN THE 1990 LSOA

Variables	Minimum	Median	Mean	Maximum	Standard Deviation
Nonhousing wealth	0	9,000	61,021	2,459,643	157,731
Income ($ per day)	0	40	61	1,210	78
Income less maintenance allowances	0	34	54	1,187	77
Age of head of household	76	81	81.6	102	4.8
Male	0	0	0.35	1	0.48
Nonwhite	0	0	0.08	1	0.28
Married	0	0	0.43	1	0.50
N = 4,142					

The demographic characteristics of the elderly in the PSID and LSOA are not markedly different from those in the NNHS. This is consistent with there being little selection effect for who is admitted to a nursing home. However, the age distribution for the NNHS is approximately bell-shaped and centered around 82, while the number at each age in the PSID and LSOA decreases with each year of age. Also, the minimum age was 70 in the PSID and 76 in the LSOA, compared to 65 in the NNHS. The primary difference between the PSID and LSOA, besides sample size, is the higher average nonhousing wealth in the PSID.

2.3. *Results*

2.3.1. Spend-down

The estimated fraction of elderly who spend down as a function of time is displayed graphically in Figure 1 using the 1985 National Nursing Home Survey (NNHS) discharge sample. The NNHS sample is divided into three groups, according to the primary payer at admission. For private and Medicare residents, the fraction who had spent down given the time of discharge is displayed on the y-axis, and the time of discharge is displayed on the x-axis. This plot is smoothed with a kernel estimator on a log scale because the number of discharges falls off over time, but is displayed on an unlogged time scale. The x-axis covers a period of 10 years. Medicaid residents spend down prior to admission, so for this group the fraction who spend down is not a function of time. The experience for the population as a whole is shown by combining the three groups according to the fraction of residents covered by each payer at admission, as shown in Figure 2. Nonhousing wealth was converted to days until spend-down using equation (1). Married residents had $3,000 subtracted from wealth instead of $2,000 as for nonmarried residents. The variance is indicated by bootstrapping 20 samples from the original sample, and graphing the fraction who spend down for each of these new samples over time with a dotted line.

According to the NNHS data, the percentage of elderly who have spent down by the time of discharge rises gradually with length of stay for both private and Medicare residents, as shown in Figure 1. The y-axis should be interpreted as the

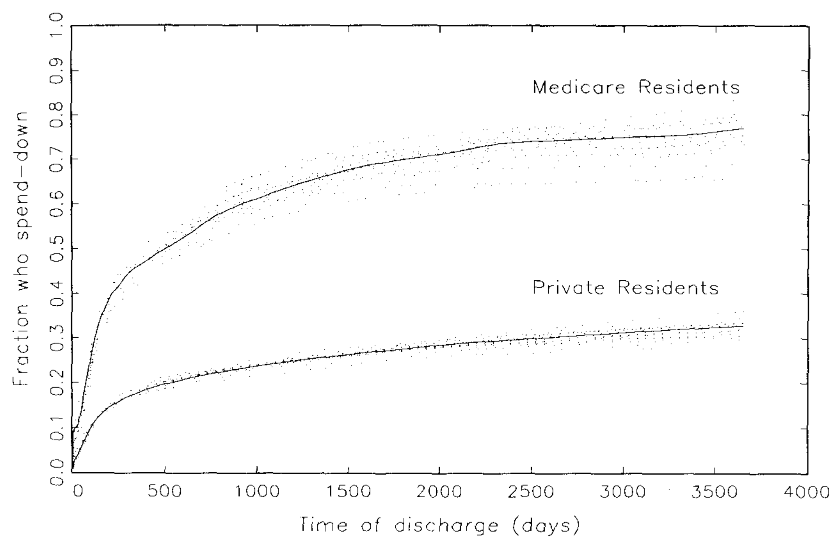

Figure 1. Fraction who Spend-down, Given Time of Discharge (NNHS)

fraction of residents who would spend down if no resident were ever discharged. For example, among private residents about 18 percent would spend down after 1 year, about 25 percent after 5 years, and about 32 percent after 10 years. Therefore, spend-down is not prevalent for private residents even after many years. A greater fraction of Medicare residents spend down for any given time.

Other research on spend-down has found results that are consistent with the findings here. These studies can be divided into those that use national data and

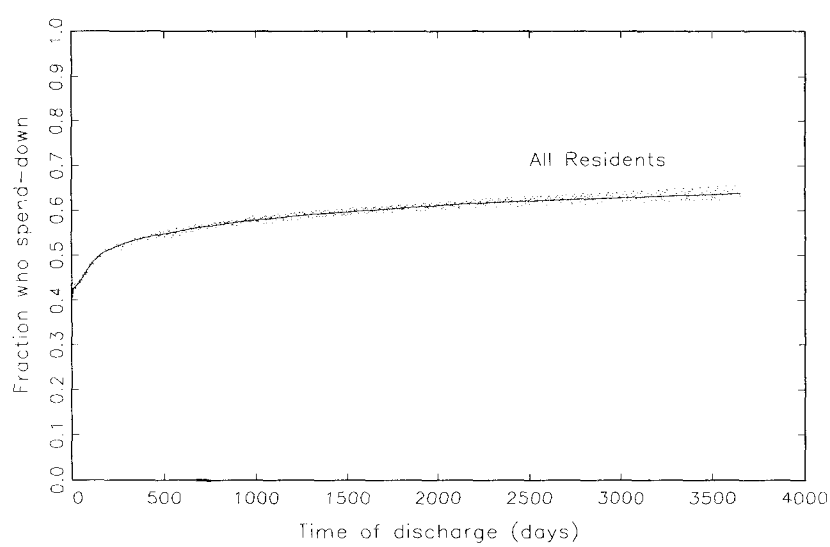

Figure 2. Fraction who Spend-down, Given Time of Discharge (NNHS)

those that use state-level data (Adams, Meiners, and Burwell, 1992) with differences in the available data and the techniques used for analysis. The national studies have the advantage of presenting results that can be considered representative of the entire country. For example, Spence and Wiener (1990) use data from the 1985 National Nursing Home Survey to estimate that 10 percent of private residents spend down. They estimated both the percentage of residents admitted as private who were discharged as Medicaid and the percentage of residents discharged as Medicaid who were admitted as private, and found the same result. Short and colleagues (1992) found slightly higher estimates using data from the National Medical Expenditure Survey in 1987. The disadvantage of the national studies is the lack of information on when residents spend down, which confines the analysis to summary statistics. A recent study by Sloan and Shayne (1993) used the National Long-term Care Survey to simulate the time until spend-down. They also found that many persons would never spend down if they went to a nursing home. In contrast, state-level data typically record the time of spend-down, which allows researchers to use duration analysis. However, there is tremendous variability in spend-down rates across states, making generalizations about the country difficult. For example, Mor, Intrator, and Laliberte (1993) found that in a sample of 43 nursing homes in four states 19 percent of residents spent down after 1 year. Using a sample from Michigan, Burwell, Adams, and Meiners (1990) estimated that 27.2 percent of residents spend down.

2.3.2. Assets

Surprisingly, the predicted number of days until spend-down for both the PSID and the LSOA population of elderly, shown respectively in Figures 3 and 4, is higher than the observed pattern of spend-down, shown in Figure 2. Economic theory predicts that these curves should lie below the curve in Figure 2. The higher the curves in Figures 3 and 4, the sooner residents spend down and the poorer the population. The curves in both figures have an intercept just under 0.4, indicating that about 37 percent of the elderly qualify for Medicaid at admission. What is surprising is that the slopes of the PSID and LSOA curves are so much higher than the corresponding NNHS curve. After a few years the NNHS curve is well below the other two.

The statistical significance of the result is shown by comparing the position of the confidence intervals. The variance of the predicted fraction who spend down is shown by graphing predictions for 20 samples created by bootstrapping. The dotted lines representing the predictions for the bootstrap samples indicate approximately a 95 percent confidence interval. The differences are clearly statistically significant after a few years for the PSID, and even earlier for the LSOA. If the graphs focused only on those who are not Medicaid eligible at admission by aligning the intercepts, the differences would be statistically significant after less than one year.

Any difference between the curves should be due to short-run behavioral effects. However, the behavioral effects that would explain the difference go against the hypothesis derived from economic theory. One possible explanation for these differences in spend-down time is that there are transfers between the elderly and

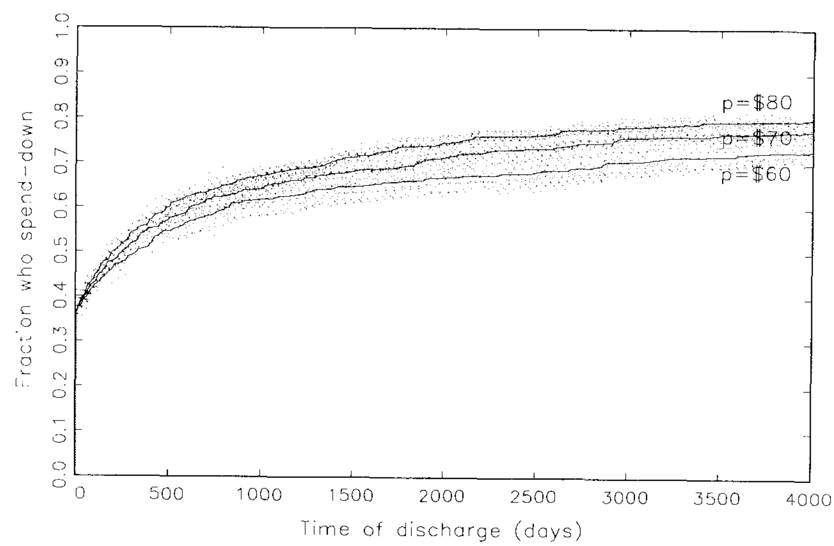

Figure 3. Fraction who Spend-down, Given Time of Discharge (PSID)

their children (Rosenzweig and Wolpin, 1993). According to these results, however, the transfers would have to flow from the children to their elderly parents. This is in stark contrast to the literature on intergenerational transfers. For example, both Morgan (1983) and Kotlikoff and Morris (1989) find that transfers from children to their parents are uncommon. Another possible explanation is that the elderly move their assets between forms that are or are not subject to Medicaid means-testing, specifically housing. However, the results again imply that the elderly do the opposite of what is expected—namely, convert housing equity into liquid assets that can be used to pay for nursing home care out of pocket.

Although the samples of the PSID, LSOA, and NNHS are not perfectly comparable, the differences make our results appear stronger, not weaker. The demographics of the PSID and LSOA are skewed toward people who are younger, male, and married; these samples are wealthier than a sample of predominantly older, female, unmarried persons, such as the NNHS. Yet, in order to explain away the difference, the PSID and LSOA samples would have to be poorer than the NNHS sample of elderly who enter nursing homes.

Selection bias in who enters the nursing home also makes the results stronger. Residents living in the community do not go to a nursing home with equal probability. In general, those who are poorer are more likely to go to a nursing home. Yet, in order to explain away the difference, one would have to argue that demand for nursing home care increases with wealth and income.

The curves of the number of days until spend-down in Figures 3 and 4 depends on the private price per day, which is unknown and varies widely across states. The average of $70 was chosen as a reasonable, conservative guess after talking with industry analysts. Also plotted are the curves for $60 and $80, which show that the results are not sensitive to this assumption. In order for the curves

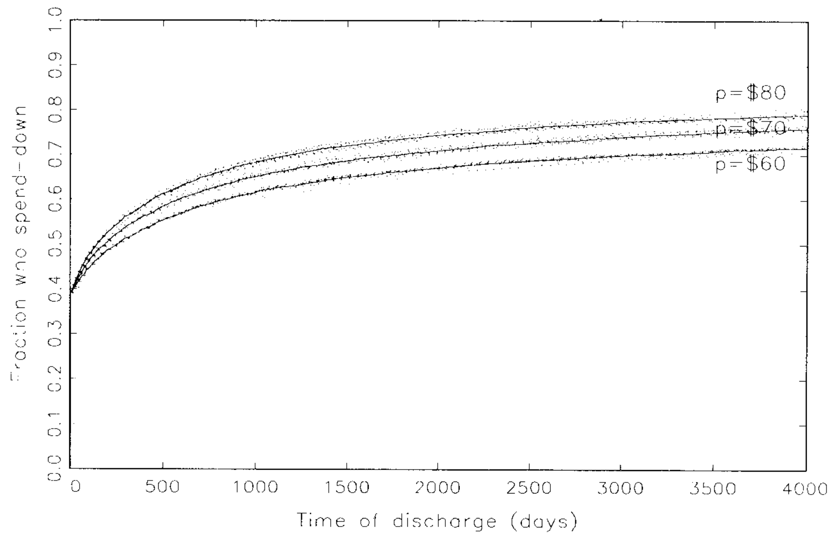

Figure 4. Fraction who Spend-down, Given Time of Discharge (LSOA)

in Figures 2, 3, and 4 to align, the private price per day would have to be substantially lower. Therefore, the choice of private price does not seem to explain the difference.

If wealth is underreported then this could also explain the discrepancy. However, Curtin, Juster, and Morgan (1989) find that the PSID has excellent wealth data. In their comprehensive comparison of the PSID to the Survey of Consumer Finance, Curtin, Juster, and Morgan find that PSID wealth is not underreported, with the possible exception of the small percentage of households with more than half a million dollars in wealth. Since these extremely wealthy persons are not at risk of spending down, underreporting of wealth is not the cause of the discrepancy. The differences between the PSID and the LSOA in terms of summary statistics are small (see Tables 3 and 4), which provides support for the LSOA wealth and income data. The median wealth is slightly lower in the LSOA but the median income is slightly higher.

Sensitivity analysis showed that the underreporting of wealth and income would have to be enormous to explain the discrepancy. Figures 3 and 4 were redrawn under different assumptions about underreporting. The discrepancy could only be explained if everyone's income increased by 70 percent, or if wealth increased by 200 percent. Underreporting of this magnitude is not plausible, especially for income which for the elderly usually consists of Social Security and other pension income.

The reason for the difference is therefore a puzzle for economists. The only consistent explanation is that there is a strong aversion to welfare. Anecdotal evidence from nursing home administrators and residents suggests that among the elderly, welfare aversion is a powerful force that could cause these results. Moffitt (1983) found strong aversion to welfare in a population of female-headed households. He found that less than half of the households eligible for AFDC actually participated. The results found here are therefore another example of welfare stigma.

3. Effect of Changes in Medicaid Asset Limit on Spend-Down

3.1. *Model of Spend-down*

Determining the effect of a change in the Medicaid asset limit on the probability of spend-down and Medicaid expenditures requires a different model than section 2 and will be estimated using data from the NNHS. The two variables that determine whether or not a resident will spend down to Medicaid eligibility are the time of spend-down T_S and the time of discharge T_D (the length of stay). A resident will spend down if and only if the time of spend-down is less than the time of discharge, $T_S < T_D$. Both T_S and T_D are random variables, with density functions f_S and f_D. These density functions may depend on demographic factors, such as age and gender, denoted by the vectors θ_S and θ_D. Since these random variables are assumed to be independent, the probability that the time of spend-down is sooner than the time of discharge can be calculated if the density functions are known:

$$\text{(2)} \qquad \text{P(Spend-down)} = \text{P}(T_S < T_D)$$

$$\text{(3)} \qquad = \int_0^\infty F_S(t|\theta_S) f_D(t|\theta_D)\, dt$$

where F is the cumulative distribution function and $1 - F$ is the survival function.

Without the assumption of independence of T_S and T_D, the probability of spend-down would depend on the joint distribution of T_S and T_D. Unfortunately, given the data, it is not possible to test this assumption because T_S is never observed. This identification problem is similar to the independence assumption in a competing hazards model, which is not identified. The assumption of independence of T_S and T_D is reasonable, however, since a resident's assets are not likely to be correlated with the time of discharge.

Another calculation of policy interest is the number of days covered by Medicaid for those who are not Medicaid eligible at admission. This is the expected difference between the times of discharge and spend-down, $T_D - T_S$, conditional on having spent down before discharge. When this total is multiplied by the charge per day, the result is Medicaid expenditures or, equivalently, assets protected by insurance. The expected number of days covered by Medicaid for a resident who is not Medicaid eligible at admission is

$$\text{E(days covered by Medicaid)} = \text{E}(\max\,(T_D - T_S, 0)) \qquad (4)$$

$$= \int_0^\infty F_S(t|\theta_S)(1 - F_D(t|\theta_D))\, dt. \qquad (5)$$

3.1.1. Effect of a Policy Change

The policy questions of interest are how an increase in the Medicaid asset limit affects the percentage who spend down and Medicaid expenditures. Recall that money can be expressed in units of days. Therefore, a change in the Medicaid asset limit of M dollars will be expressed as a change in $L = M/p$ days.

An increase in the Medicaid medically needy asset limit by L days has two effects on the percentage who spend down. First, it decreases the time of spend-down for each resident by L, so the density changes to $f_S(t+L|\theta)$. Second, it increases the number of residents who are Medicaid eligible at admission by $F_S(L|\theta_S)$. The percent who spend down when the asset limit changes by L is

$$(6) \quad P(T_S - L < T_D) = \int_0^\infty f_S(t+L|\theta_S)(1 - F_D(t|\theta_D))\,dt + F_S(L|\theta_S)$$

$$(7) \quad = \int_0^\infty (F_S(t+L|\theta_S) - F_S(L|\theta_S)) f_D(t|\theta_D)\,dt + F_S(L|\theta_S).$$

Similarly, an increase in the Medicaid medically needy asset limit by L days has two effects on Medicaid expenditures. First, residents who spend down sooner are covered by Medicaid longer. Second, some residents are covered by Medicaid from their first day in the nursing home. The expected number of days covered by Medicaid when the asset limit changes by L is

$$(8) \quad E(\max(T_D - T_S + L, 0)) = \int_0^\infty (F_S(t+L|\theta_S) - F_S(L|\theta_S))(1 - F_D(t|\theta_D))\,dt + F_S(L|\theta_S)E(T_D)$$

where $E(T_D)$ is the expected length of stay for a Medicaid resident.

The calculations above assume that the time of discharge is independent of the insurance status (i.e. the probability of discharge does not change when a resident spends down). This assumption may be false. Studies have shown that nursing home residents' length of stay depends on the price per day (Garber and MaCurdy, 1993). Since the marginal cost of an additional day falls when a resident is covered by Medicaid, private residents have a shorter length of stay than those covered by Medicaid, presumably in part because the marginal out-of-pocket cost is lower for Medicaid residents. The implication of this assumption is that equation (8) underestimates the effect of a change in policy on Medicaid expenditures.

In summary, the goal is to estimate F_S and f_D for private, Medicare, and Medicaid residents, then to use the above equations to calculate the effect of a change in policy on the variables of interest.

3.2. *Data*

The data used to estimate the time until spend-down and time until discharge are from the 1985 NNHS, described in section 2.2. The variable *Age* is centered at 80; in other words, the baseline group consists of residents who are 80 at the time of admission.

3.3. *Methods*

3.3.1. Estimation of the Time of Discharge

The distribution of the time of discharge is estimated using a parametric duration model. The model specifies a continuous, positive distribution for the time of discharge T_D with the natural logarithm of T_D linearly predicted by explanatory variables in Table 1. The model is then

$$\log(T_D) = X\beta + \sigma U \tag{9}$$

$$T_D = e^{X\beta} W^{\sigma}, \; W \equiv e^{U} \tag{10}$$

where X is a vector of known covariates, β is a location vector, σ is a scalar constant, and U has a specified univariate distribution. In the previous notation, $\theta_D = (\beta, \sigma)$. Since there are no censored observations in the discharge sample, the likelihood function is the product of the density functions:

$$\mathscr{L}(\theta_D) = \prod_{i=1}^{n} f(t_i \mid \theta_D) \tag{11}$$

where t_i is the time of discharge, and θ_D is a vector of parameters to be estimated. Different distributions for U, corresponding to different functional forms for f, are discussed below.

3.3.2. Estimation of the Time of Spend-down

Although the NNHS does not report the time of spend-down for those who spend down, it is still possible to estimate the cumulative distribution function of the time of spend-down, F_S. This can be done with just two pieces of information: the time of discharge, and whether or not the resident spent down prior to discharge (Hanemann, Loomis, and Kanninen, 1991).

This estimation problem can be stated more generally. Suppose that there are two independent random variables S and D, and that the objective is to estimate the cumulative distribution function of S. Let the cumulative distribution function of S be $F(S \mid \theta_S)$, and the cumulative distribution function of D be $G(d \mid \theta_D)$, where θ_S and θ_D are vectors of unknown parameters. Therefore, the objective is to estimate θ_S while θ_D is vector of nuisance parameters. D is observed but S is not. In addition, the variable Z, an indicator variable for whether $S > D$, is observed. The probability of observing the data (d, z) is

$$P(D=d, Z=0 \mid \theta_S, \theta_D) = P(D=d \mid \theta_D) P(S > d \mid \theta_S) \tag{12}$$

$$= g(d \mid \theta_D)(1 - F(S \mid \theta_S)) \tag{13}$$

$$P(D=d, Z=1 \mid \theta_S, \theta_D) = P(D=d \mid \theta_D) P(S < d \mid \theta_S) \tag{14}$$

$$= g(d \mid \theta_D) F(S \mid \theta_S). \tag{15}$$

There are two implications of S being independent of D. First, the likelihood function is separable in θ_S and θ_D. It is not necessary to estimate the nuisance parameters θ_D in order to estimate θ_S. Second, it is not necessary to know anything about the distribution of D in order to estimate the distribution of S. As long as S and D are independent, one can estimate the cumulative distribution function of S without actually observing S. The hazard and density functions for S can be derived from $F(S|\theta_S)$.

In terms of the nursing home data, S is the unobserved time of spend-down, D is the observed time of discharge, and Z is whether or not the resident spent down prior to discharge. The likelihood function is

$$\mathscr{L}(\theta_S)=\prod_{i=1}^{n} F_S(t_i|\theta_D)^z(1-F(t_i|\theta_S))^{(1-z)} \tag{16}$$

where t_i is the observed time of discharge, and θ_S is a vector of parameters to be estimated. Specific functional forms for F_S are discussed below. F_S in equation (16) is *not* the percentage who spend down, but is the percentage who would spend down if no resident were ever discharged. The percentage who spend down depends also on the distribution of T_D.

3.3.3. Specification Tests

There are no a priori reasons to choose one functional form for F_S and f_D over another. Therefore, equations (11) and (16) were estimated for five different functional forms and the results were compared (Morris, Norton, Zhou, 1994). The Weibull model, commonly used in duration analysis by researchers, assumes that U has an exponential distribution with unit mean. The Log Normal model assumes that $U \sim N(0, 1)$. The Log Logistic model assumes that U has an extreme value distribution. The Generalized Gamma model assumes that $U \sim \Gamma(\alpha)$, $\alpha > 0$. In addition to these four parametric models, a more flexible piecewise linear exponential model, which has a hazard function that is a step function, was estimated.

These five models were compared using both graphical and formal tests. Graphs of the estimated survival functions for the time of spend-down and hazard functions for the time of discharge were compared to nonparametric kernel estimators. The graphs showed that the Log Normal and Generalized Gamma models fit best. Formal tests confirmed the results of graphical tests. The first test relies on the fact that the Generalized Gamma model is a generalization of both the Weibull and the Log Normal models. The Generalized Gamma model corresponds to the Weibull model for $1/\alpha = 1$ and to the Log Normal model for $1/\alpha = 0$. The estimated values of $1/\alpha$ were always closer to 0 than 1, and the Log Normal was only rejected once in five comparisons with the Generalized Gamma model. A second kind of test compares the values of the log-likelihood functions. The log likelihood was always higher for the Log Normal model than for the Weibull model, and only once was lower than Log Logistic models. The difference between the Log Normal and the Generalized Gamma models was distinctly less, being greater than 1 in only two of the five comparisons. The Log Normal model was chosen for the simulations because it seems to fit the data nearly as well as the Generalized Gamma model is much simpler computationally.

3.4. *Results*

3.4.1. Time of Discharge

The estimated density functions for the time of discharge show that the number of discharges rises for a few weeks, then falls off gradually, according to

TABLE 5

TIME OF DISCHARGE BY PRIMARY PAYER AT ADMISSION

Variable	Private	Medicare	Medicaid
Constant	5.499*	4.335*	5.818*
	(0.064)	(0.075)	(0.050)
Age–80	−0.0101	0.0175	−0.0055
	(0.0077)	(0.0082)	(0.0038)
Male	−0.251*	−0.054	−0.219*
	(0.095)	(0.087)	(0.087)
Black	−0.13	0.31	−0.31*
	(0.17)	(0.24)	(0.11)
Married	−0.338*	−0.32*	−0.39*
	(0.099)	(0.13)	(0.11)
$\gamma = 1/\sigma$	0.6232*	0.765*	0.6563*
	(0.0070)	(0.026)	(0.0090)
N	2,114	472	1,673
log-likelihood	−15,234.67	−2,820.11	−12,526.19

Note: Standard deviations are shown in parentheses.
*Denotes statistical significance at the 5 percent level.

the results in Table 5. A positive coefficient corresponds to a longer time until discharge. Medicare residents have the shortest length of stay, and Medicaid residents have the longest, according to the constant term. Age and race are not significant predictors of the time of discharge, but gender and marital status are. Men and married residents have shorter lengths of stay. Men and married residents tend to be less healthy and so are more likely to die, and they are more likely to have alternative care-givers at home and so are more likely to go home (Norton, 1992).

3.4.2. Time of Spend-down

The estimated cumulative distribution function of the time of spend-down for both private and Medicare residents rises sharply for several months, and then gradually levels off, according to the results in Table 6. The higher constant term for private residents means that the hazard for spend-down at any time is lower than for Medicare residents, which is consistent with the overall lower probability of spend-down for private residents shown in Table 1. A positive coefficient corresponds to a longer time until spend-down and a lower percentage who spend down. The negative coefficients for the variable *Black*, for example, means that blacks have a shorter time until spend-down and are more likely to spend down than nonblacks. The other personal characteristics are inconsistent in sign. However, older private residents and black Medicare residents have a significantly shorter time of spend-down. The values of $\hat{\gamma}$ are less than 1, which indicates that the hazard rates fall over time (i.e. the cumulative distribution function levels off). The values of $\hat{\gamma}$ for the time of discharge are larger than $\hat{\gamma}$ for the time of spend-down, which implies that the hazard for discharge declines more slowly over time than the hazard for spend-down.

TABLE 6

TIME OF SPEND-DOWN BY PRIMARY PAYER AT ADMISSION

Variable	Private	Medicare
Constant	9.19*	6.07*
	(0.20)	(0.18)
Age-80	−0.025*	0.003
	(0.010)	(0.018)
Male	0.47*	−0.13
	(0.19)	(0.32)
Black	−1.63*	−2.13*
	(0.51)	(0.53)
Married	−0.38	0.90*
	(0.20)	(0.38)
$\gamma = 1/\sigma$	0.298*	0.441*
	(0.041)	(0.041)
N	4,169	685
log-likelihood	−1,824.45	−343.10

Note: Standard deviations are shown in parentheses.
*Denotes statistical significance at the 5 percent level.

3.5. *Simulation of Policy Change*

The results from the empirical work are used to simulate the effect of an increase in the Medicaid asset limit on the percentage who spend down and on Medicaid expenditures, using equations (6) and (8) in section 3.1. The integrals are solved using a numerical integration program. Table 7 presents the results for a change in the asset limit L from 0 to 1,000 days, assuming that all residents are 80-year-old, unmarried white women. Changing this assumption to a more realistic distribution of resident types does not change the qualitative results, because in general the personal characteristics are economically insignificant. The case in which $L=0$ represents the current status, is shown in the first row of Table 7. Overall, 16 percent of private residents and 25 percent of Medicare residents are predicted to spend down, which approximates very closely the actual numbers shown in Table 1 (15 and 25 percent, respectively).

As the asset limit increases, the percentage who spend down increases, but quite slowly. Raising the asset limit by 1,000 days, which is nearly three years or about $100,000, results in only 29 percent of private residents spending down. The percentage for Medicare residents is more than twice as large, at 67 percent. Medicare residents are more likely to spend down sooner because many are dual-eligible for Medicaid.

As the asset limit increases, the additional days covered by Medicaid also increases slowly. For private residents, raising the asset limit by 1,000 days results in an increase in days covered by Medicaid of about 58 days, compared to an average of about 237 when $L=0$. The numbers for Medicare residents are again higher: an increase of 59 days over an average of 65 when $L=0$.

A more reasonable increase in the asset limit of 100 days would result in a 3 percent increase in Medicaid days for private residents, and a 26 percent increase

TABLE 7

SIMULATION OF THE EFFECT OF CHANGES IN THE MEDICAID ASSET LIMIT ON THE PERCENTAGE WHO SPEND-DOWN AND THE NUMBER OF DAYS COVERED BY MEDICAID, BY PRIMARY PAYER AT ADMISSION

Change in the Asset (days) Limit L	Private		Medicare	
	% who Spend-down	Additional Days Covered by Medicaid	% who Spend-down	Additional Days Covered by Medicaid
0	16	0	25	0
20	17	1	29	4
40	17	3	31	8
60	18	5	34	11
80	18	7	36	14
100	19	9	38	17
200	21	16	45	26
400	24	29	54	39
600	26	40	59	48
800	28	49	63	54
1,000	29	58	67	59

for Medicare residents. Given the fraction of residents who are private, Medicare, and Medicaid, this change results in a projected increase in Medicaid spending of only about 6 percent.

These results imply that large increases in the Medicaid asset limit will have only small effects on both the percentage who spend down and the number of days covered by Medicaid, particularly for private residents. Few additional residents will spend down because most stays in a nursing home are short, and even after a long stay most residents do not spend down. For similar reasons, the number of days covered by Medicaid, and therefore Medicaid expenditures, also will increase only slightly.

4. CONCLUSION

This study finds evidence for strong welfare aversion in the elderly. A simple model with no behavioral effects was proposed as a starting point, and then compared with two alternative models. One behavioral model predicts that a nursing home resident will want to spend as little as possible on care and so will spend down sooner than in the simple model, perhaps by transferring non-housing wealth to a trust or relatives. Alternatively, the welfare aversion model predicts that the desire to avoid being on welfare is so strong that the resident will take longer to spend down than otherwise, perhaps by receiving transfers from relatives.

Analysis that compares the predicted time of spend down using data on income and wealth to the actual time of spend down supports the welfare aversion model. The predicted time of spend down was much shorter using data from income and wealth than the actual time of spend down found from a sample of nursing home residents. Therefore the elderly take longer to spend down than is implied by data on wealth and income alone. The most common explanations of the discrepancy make the result stronger. For example, differences in demographics between the samples, possible selection bias, and uncertainty in the true nursing home price all bias the results against the welfare aversion model, thus making the results stronger.

One implication of the welfare aversion model concerns the expansion of the Medicaid program. If the Medicaid asset limit were raised, the increase in Medicaid expenditures would be small, as would be the fraction who spend down. Simulations show that the number of days covered by Medicaid will be far less due to welfare aversion than would be predicted by the simple model. Thus, the cost of expanding Medicaid will be less because fewer persons will allow themselves to become eligible.

There are other implications from this study for how the elderly spend their income and wealth. One way to avoid Medicaid coverage is to purchase private long-term care insurance. Although relatively rare now, the fraction of elderly with long-term care insurance is growing rapidly. Another way is to increase the level of savings prior to nursing home entry, as suggested by Hubbard, Skinner, and Zeldes (1993, 1994). This is of course a long-term effect that cannot be detected in short-run data. Welfare aversion may also help to fuel the growth in home health care, which is covered by Medicare instead of Medicaid, because home health may be a substitute to nursing home care. Therefore, if welfare aversion is correct, then there are strong implications for public policy and for savings for the elderly.

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