# Nursing Home Care

## The Roles of Medicaid and Economic Factors in the Demand for Nursing Home Care

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**Objective.** To examine nursing home demand, focusing on how Medicaid affects demand, the role of economic variables, and on important interactions between explanatory factors.

**Data Sources.** From the 1989 National Long Term Care Survey, a nationally representative sample of community-based and institutionalized elderly persons with disabilities ($N = 3,837$). Survey data are merged with state- and county-level data on Medicaid policy and local market conditions.

**Study Design.** Sample members are classified as Medicaid-eligible or private pay, were they to enter a nursing home. The probability of being in a nursing home is estimated separately on these two groups using probit. To explore interactions, these subsamples are further divided between married and unmarried persons and between persons with high and low levels of disability.

**Principal Findings.** Demand for nursing home care systematically differs, depending on eligibility for Medicaid. This is attributed in part to the structure of Medicaid benefits. Although economic factors do not appear important to demand decisions in the aggregate, they play a larger role among married persons relative to unmarried persons, and among less disabled persons relative to highly disabled persons.

**Conclusions.** Understanding the nature of nursing home demand requires careful consideration of the different consumption choices people face by virtue of their eligibility for public benefits. Because behavioral responses to changes in policy are found to differ among various groups of disabled persons, policymakers should be sensitive to how these differences affect the efficiency and distributional effects of specific policy changes.

**Key Words.** Nursing home care, healthcare demand, Medicaid, disability, informal care

Nursing home care constitutes a sizable portion of the total health sector. About 43 percent of persons reaching age 65 will use nursing home care at some point during their remaining lives; 55 percent of these users will have at least one year of lifetime use (Kemper and Murtaugh 1991). Over $70

billion per year, or over one percent of GNP, are spent on nursing home care. Nationwide, Medicaid subsidizes about 60 percent of all nursing home residents and provides 36 percent of all nursing home financing.

Despite the size and importance of the market, our understanding of the demand for nursing home care is limited. Although the important roles that disability and informal (unpaid) caregivers play in demand are well established, the literature provides little guidance concerning the effects of economic variables—prices, income, and wealth—on demand. Price elasticity estimates range from −0.16 to −2.30; income elasticity estimates range from −0.38 to 2.27. Moreover, previous demand studies often have not investigated differences in demand among important subgroups. This information is important for both public policymakers and private insurers. Policymakers need to understand how changes in policy will affect nursing home demand, and ultimately public cost. Similarly, private long-term care insurers must factor in moral hazard when pricing insurance products.

The lack of knowledge about nursing home demand largely results from difficulties in estimation arising from Medicaid's major role in the market. While a majority of nursing home residents receive some support from Medicaid, most others pay privately out-of-pocket. Medicaid residents face a fundamentally different budget constraint than private payers and are more likely to face problems of access. This implies that studies of nursing home demand at the individual level should classify sample members as Medicaid eligible or private pay, should they enter a nursing home. Moreover, specifications should account for differential consumption opportunities and access to nursing home care. If not, results will be biased. Unfortunately, few researchers have done this.

In this article, I explore ways in which Medicaid eligibility affects nursing home demand, focusing on the role of economic variables. In addition, I explore how the level of disability and the availability of informal care, specifically from a spouse, interact with other factors. These interactions provide important insights into nursing home placement decisions by families.

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Moreover, they provide important information for public and private insurers about how benefits might be targeted most efficiently.

## BACKGROUND

The Medicaid program is administered by the states, with partial funding and regulatory oversight from the federal government. Nationally, 29 percent of Medicaid funds go to support nursing home care. Medicaid supports persons with inadequate resources to afford nursing home care. For persons in nursing homes as private payers, Medicaid benefits become available if incomes are inadequate to cover charges and after they have depleted most of their non-housing wealth, a process referred to as "spending down." Because of the high cost of nursing home care, which averages over $37,000 per year for private payers, the effective income standards for those seeking nursing home care are higher than for persons seeking Medicaid coverage for acute care. Once eligible for nursing home benefits under Medicaid, residents must contribute all of their income except for a small personal needs allowance as copayment. (Married couples face somewhat different asset and income limits for Medicaid eligibility, since they are able to retain greater amounts of wealth and income for use by the non-institutionalized spouse).

Nursing home residents whose care is covered by Medicare or private insurance constitute a small portion of the nursing home population (Levit, Sensenig, Cowan, et al. 1994). These are mostly post-acute patients with relatively short lengths of stay. In contrast, most Medicaid residents and private payers have chronic disabilities and remain in nursing homes for the rest of their lives. This latter group is the focus of this study.

Apart from different resources available for purchasing care in the community, there are several reasons why the demand for nursing home care differs between Medicaid eligibles and private payers. After entering a nursing home, Medicaid beneficiaries face a more restricted set of consumption opportunities than do private payers. They may not purchase additional amenities such as private rooms, although in some cases family members may pay for these. In addition, they must contribute all of their income, except for a small personal needs allowance (typically $20–$50 per month), as copayment. As a result, Medicaid beneficiaries' consumption of non-medical goods and services not provided as part of a nursing home's basic services is very limited. Changes in income not affecting Medicaid eligibility will alter the required copayment but will not affect consumption opportunities. Consequently, the

size of the copayment should not affect demand. The structure of Medi-caid benefits, however, suggests a negative relationship between income and nursing home demand (Scanlon 1980). As income increases, consumption opportunities in the community increase, while consumption opportunities in a nursing home do not change.

Because of Medicaid's large role as a payer, states are able to exercise monopsony power and to reimburse nursing homes at levels that are generally below those paid by private payers for equivalent services. Scanlon (1980) first recognized that nursing homes, as a result of this, will act as competitive monopolists. They face a kinked demand curve, that is, downward-sloping for private payers and horizontal at the Medicaid reimbursement rate for Medicaid-eligibles. Nursing homes will serve the higher-paying private residents first, until marginal revenue falls below the Medicaid reimbursement rate. They then will serve Medicaid beneficiaries until the marginal cost of providing care equals the reimbursement rate. If reimbursement rates are not high enough to meet the full demand from Medicaid-eligibles, conditions of excess demand will result. This disequilibrium will be permanent because no equilibrating mechanism exists. Moreover, many states attempt to limit Medicaid costs by regulating the supply of nursing home beds through certificate-of-need regulation or building moratoria. When these constraints are binding, excess demand will also result. Because Medicaid-eligibles are the marginal residents, only they will be affected by these constraints on supply. Finally, states attempt to regulate the use of nursing homes by Medicaid-eligibles through preadmission screening. These rules attempt to limit nursing home care to those who are most severely disabled or who lack suitable alternatives.

## Studies of Nursing Home Demand

The wide range of elasticity estimates emanating from nursing home demand studies reflects normal differences in specification and data. However, the excess Medicaid demand resulting from state reimbursement policies, regulation of nursing bed supply, and preadmission screening greatly complicates the estimation of nursing home demand. Different approaches to the problem likely account for much of the variation in elasticity estimates. Under normal assumptions of market equilibrium, observed use is equivalent to market demand. However, if excess Medicaid demand is present, demand is not observed and the use of nursing home services instead represents constrained supply. Consequently, conventional demand equations using the number of nursing home residents as the dependent variable will produce biased demand parameters (e.g., Henry 1970; Chiswick 1976).

Researchers have tried to get around this problem in three ways: (1) by limiting the sample to private payers, (2) by adding supply-side variables to demand equations, and (3) by using a bivariate probit with partial observability as an estimation technique. The rationale for the first approach is that nursing homes prefer private payers over Medicaid-eligibles. Subsequently, they will not face access problems and their portion of the market will be in equilibrium (Scanlon 1980; Lamberton, Ellingson, and Spear 1986; Nyman 1989). Apart from questions of whether the demand of private payers can be generalized to the Medicaid-eligible population, this is a reasonable approach. Unfortunately, all of the studies employing this approach use aggregate data. Right-hand-side variables represent characteristics of the general population rather than those of the potential private-pay population, and this may bias the results.

The reasoning behind the second approach is that supply-side variables, such as the number of nursing home beds per capita, will control for local differences in access, allowing other parameters to be interpreted as representing demand (Headen 1993; Hoerger, Picone, and Sloan 1996). However, these are still reduced-form equations that fail to capture the underlying structure of the market. Parameters on many important demand variables (e.g., income, wealth, or disability) may not be identified because the underlying variable is related both to demand and to the probability of being admitted to a nursing home. Moreover, failure to account for the different budget constraints faced by Medicaid-eligibles and private payers will bias results from studies that use a combined sample (e.g., Headen 1993).

Finally, the bivariate probit with partial observability model developed by Abowd and Farber (1982) has been used to infer demand parameters from observations on nursing home use (Sloan, Hoerger, and Picone 1996; Reschovsky 1996, 1998). Scanlon (1980) first characterized the relationship between nursing home use and demand as:

$$Prob(NH\ Use) = Prob(NH\ Demand) * Prob(NH\ Admittance|NH$$
$$Demand > 0) \tag{1}$$

The bivariate probit with partial observability model follows this structure. Although neither demand nor conditional admission decisions are observed, this technique allows simultaneous estimation of the two component equations using observations only on use. This allows the estimation of structural demand parameters unaffected by the existence of excess Medicaid demand. Reschovsky (1996) provides further details.

Sloan, Hoerger, and Picone (1996) use the 1989 National Long Term Care Survey (NLTCS), specifying demand as a function of remaining lifetime wealth (i.e., assets plus the present value of future income) and residual wealth (i.e., wealth net of nursing home payments if the person entered a nursing home for the remainder of his or her life). Reschovsky (1996, 1998) uses data from the National Long Term Care Channeling Demonstration. These studies find differences in nursing home demand between Medicaid-eligibles and private payers and between nursing home users seeking care for post-acute and chronic conditions, respectively. In general, the economic variables were not found to affect demand significantly in either group. This study also found evidence of excess Medicaid demand in the Channeling demonstration sites. Among all nursing home demand studies, these two are unique in attempting to distinguish sample members who would be Medicaid beneficiaries if they entered a nursing home from those who would not.

## DATA AND METHODS

The 1989 NLTCS provides comprehensive data on a national sample of elderly persons who have a chronic disability expected to last at least three months. The sample includes both persons living in the community and those in institutions. Proxy respondents are used for persons unable to respond to the survey. Because the sample is limited to the elderly with long-term disabilities, we cannot generalize results to non-elderly persons who might demand nursing home care and to elderly persons with short-term, post-acute medical needs. Only 9 percent of nursing home residents are under age 65, and only about 6 percent of elderly nursing home users are treated for post-acute conditions (Spector, Reschovsky, and Cohen 1996). The sample is appropriate for policy analysis regarding the population of persons with chronic disabilities.

A total of 5,817 observations are available in the NLTCS. Of these, 4,463 resided in the community and 1,354 in institutions (23 percent). In the institutional sample, 70 were in facilities other than nursing homes, and 1,506 members of the community sample did not have an ADL or IADL limitation.[1] These were excluded from the analysis, reducing the analysis sample to 4,241. Missing data reduced the sample further, to 3,837 observations. Missing values on several key variables were imputed using hot-deck procedures. Population weights are applied to all analyses.

State and county identifiers were used to merge in the state-level Medicaid policy variables and the county-level market data. These data were from

a variety of sources, although most state-level data came from Neuschler (1987). County-level data came from the Area Resource File.

## Estimation Approach

Of the three approaches described earlier for estimating nursing home demand in the presence of excess demand, the bivariate probit with partial observability model appears to be the most suitable. My original intent for this research was to use this technique to replicate my earlier study (Reschovsky 1996) on nationally representative, cross-sectional data. However, when this model was applied to the NLTCS data, conditional admission equation parameters were sensitive to even minor changes in specification or sample definition. Although the cause of this was never definitively diagnosed, one possibility is that, in the cross-section, access to nursing home care was not a significant problem, even for Medicaid-eligibles. If so, there would be little for the conditional admission equation to explain. Since problems of access are more likely to be manifested in longer waits to gain admission to a nursing home than in total exclusion from nursing home care, excess Medicaid demand was more likely to be observed in studies using admissions cohorts rather than cross-section data.[2]

In contrast to the conditional admission equation results, demand results were consistent across specifications and were similar to those obtained from a univariate probit on the probability of nursing home use. They were also robust when supply-side variables were omitted from the specification. This suggests that they are relatively unbiased and represent demand. For ease of presentation, then, this study reports results of univariate probit equations in which several variables hypothesized to be related to the probability of gaining acceptance into a nursing home are also included. Again, demand results were not substantially affected by the inclusion of these supply-side variables or the specific choice of supply-side variables.

## Defining Medicaid-Eligibles

As indicated earlier, the demand for nursing home care is hypothesized to differ between Medicaid-eligibles and private payers. Therefore, sample members had to be classified into one of these two groups. For those in nursing homes at the time of the survey, classifications were based on their payer status at time of admission rather than at the time of the survey. This was done because chronically disabled nursing home residents rarely return to the community. Therefore, their nursing home use more appropriately

reflects consumption opportunities at the time when entry was contemplated. Moreover, because nursing home residents can spend down to Medicaid, current Medicaid-eligibility status is affected by the prior decision to enter a nursing home; this would introduce endogeneity problems if current payment status were used. Approximately 2 percent of the nursing home sample population spent down to Medicaid.

To identify persons living in the community who would be eligible for Medicaid benefits were they to seek entry to a nursing home, an algorithm was developed that replicated each state's Medicaid eligibility rules. Individuals were classified as Medicaid-eligible if they met both the relevant state income tests and asset tests. Others were classified as private payers.[3]

## Model Specification

The disabled person and his or her family face indirect utilities associated with the provision of long-term care services in the community and in a nursing home. Community-based long-term care is provided either by family labor inputs (informal care) or purchased home care services (formal care). The probability of demanding nursing home care is consequently specified to be a function of the price of nursing home care $(P_N)$, the price of formal care provided in the home $(P_{FC})$, the shadow price of providing informal care in the home $(P_{IC})$, the price of other consumption $(P_X)$, and economic resources $(I)$, conditioned on a vector of measures indicating the need for long-term care $(D)$, and a set of demographic variables

$$Prob(N_H = 1) = f(P_{FC},\ P_{IC},\ P_F,\ P_X,\ I;\ D,\ Z) \tag{2}$$

to capture preferences for care settings $(Z)$.

Model variables and their sources (if not from the NLTCS) are presented in Table 1. As indicated earlier, this study focuses on the demand for chronic care nursing home services, as opposed to post-acute care services. The dependent variable was constructed as a dummy (0,1) variable indicating whether or not the sample person was a chronic-care nursing home resident. Although the sample is limited to persons with chronic disabilities, some will be in nursing homes for short-term post-acute conditions. These persons $(n = 64)$ were identified as those whose care was primarily supported by Medicare, both at admission and at the time of the survey. (Medicare nursing home benefits are limited to those with a recent prior hospitalization and in need of short-term recuperative, rehabilitative, or terminal care. These cases are included in the analysis, but are coded with zeros on the dependent variable.)[4]

## Table 1: Description of Variables

| Variable | Description |
|---|---|
| *Dependent Variable* | |
| In nursing home | Dummy variable indicating sample member as a non-Medicare nursing home resident |
| *Nursing Home Price and Income* | |
| Medicaid copay | Estimated monthly copayment if a person were a Medicaid nursing home resident, in hundreds of dollars |
| Private-pay price | Predicted county-level monthly cost of private pay nursing home care, in hundreds of dollars (Source: NMES, ARF, and NLTCS variables) |
| Income | Total monthly household income, in hundreds of dollars |
| *Assets* | |
| Spend-down assets | Value of non-housing financial assets belonging to disabled person or spouse subject to spend-down before qualifying for Medicaid nursing home benefits (in tens of thousands of dollars) |
| Protected assets | Non-housing financial assets not subject to spend-down (in tens of thousands of dollars) |
| *Price of Home Care* | |
| Home care price | County-level price proxy using the HCFA hospital wage index (Source: Area Resource File) |
| HCBS spending | State Medicaid expenditures for home and community-based services for the elderly per 1000 state residents aged 75 or older (Source: Congressional Research Service 1993; HCFA Form 2082 data) |
| *Availability of Family* | |
| Has children | Dummy variable indicating disabled person has children |
| Number of children | Total number of living children |
| Married | Dummy variable indicating disabled person is married |
| *Disability and Health* | |
| Number of ADLs | Number of the following active ADL needs: eating, transferring, toileting, dressing, and bathing |
| No SPMSQ | Dummy variable indicating sample member did not respond to the short portable mental status questionnaire |
| Cognitive impairment | Number of wrong answers on SPMSQ, takes on value of zero for non-respondents |
| *Demographic Characteristics* | |
| Age | In years |
| Female | Dummy variable |
| African American | Dummy variable indicating African Americans |
| Other minority | Dummy variable indicating Hispanics and other racial minorities |
| *Supply-Side Variables* | |
| Bed availability | County level measure of market tightness. Number of empty nursing home beds per 1000 population aged 75 and older (Source: Area Resource File). |

Table 1:     (continued)

| Variable | Description |
|---|---|
| Expected revenue | Predicted revenue a nursing home would receive from the sample person over the period of one year. Based on local private-pay rates, average state Medicaid reimbursement, and predicted time to Medicaid eligibility (in thousands of dollars) |
| Income gap | Dummy variable indicating residents of income gap states who would fall into income gap (Source: Neuschler 1987; and NLTCS) |
| Preadmission screening | Dummy variable indicating whether sample person would be subject to preadmission screening if they were to enter a nursing home (Source: Neuschler 1987; and NLTCS) |

The price of nursing home care $(P_N)$ was defined as the monthly out-of-pocket cost. Private-pay nursing home prices were not available in the NLTCS. Values were imputed from an extract of private-pay nursing home residents taken from the Institutional Population Component of the 1987 National Medical Expenditure Survey (NMES). That sample, with appropriate weights, was representative of private-pay nursing home residents nationally. For each of these 2,038 persons, billing data, collected as part of the NMES survey, were used to calculate per diem expenditures for basic charges. This variable was then regressed on a set of state dummies and a set of county-level variables obtained from the Area Resource File.[5] An identical set of right-hand-side variables were constructed in the NLTCS and used to construct a county-level instrumental variable for private-pay nursing home prices. Although Medicaid-eligibles do not face a conventional price term, we construct a parallel measure by specifying their price of nursing home care as the monthly copayment, calculated as income less community spouse and personal needs allowances specified by the state.

Formal home healthcare prices $(P_{FC})$ are not available in the NLTCS. Two variables are included to capture the variation in prices. First, for home care services purchased out-of-pocket, HCFA's hospital wage index was entered as a proxy. Home health agencies often draw upon similar labor markets as hospitals. Second, a measure of state Medicaid funding of home- and community-based long-term care services to the elderly was included. Access to Medicaid-supported home- and community-based care across the states through waiver programs or the personal care option differs widely. The variable is calculated as the amount of money expended by the state for these services, divided by the number of elderly persons in the state age 75 and older. Medicaid expenditures are obtained from tabulations of HCFA 2082

and HCFA 64 data. Since Medicaid home- and community-based benefits are restricted to persons who otherwise would be eligible for Medicaid nursing home benefits, this variable is included only in the Medicaid-eligible equation.[6] Other public monies support home- and community-based long-term care services (HCBS) through the Older Americans Act, Veterans Affairs programs, Social Service Block Grants, and state programs. However, data on the magnitude of this spending were not available for 1989 (an omission not likely to be serious). Data from 1993 suggest that Medicaid finances 80 percent of the public spending on these services (Administration on Aging 1994).

Although it would be desirable to construct a shadow price for informal caregiver time $(P_I)$, crucial variables such as caregiver wage rates were not available in the NLTCS. Rather, several variables that capture the availability of family caregivers were included: a dummy variable indicating whether the disabled person is married, a variable for the number of children, and a dummy variable indicating any children. The availability of children was entered as two variables because of the belief that some implicit bargaining takes place among children over responsibility for caring for a disabled parent. This cannot occur when there is only one child and suggests that the marginal effect of having at least one child will differ from the marginal effect of additional children.

The model was normalized on the price of other goods and services $(P_X)$. A state-level cost of living index constructed by McMahon (1991) was used.

Because people often deplete wealth to pay for nursing home care, both wealth and asset income will be affected by the decision to enter a nursing home. Therefore, for purposes of estimating demand, income and wealth for nursing home residents needed to be adjusted to reflect values had these individuals not entered a nursing home. This was accomplished by imputing values for assets and non–Social Security income from members of the community sample, using a sequential hot-deck procedure.[7]

Non-housing wealth was entered as two terms: assets subject to spend-down requirements and protected assets that would be preserved in the event of a prolonged nursing home stay.[8] For unmarried persons, assets subject to spend-down include all except those that fall under the state asset test level. For married persons, it was assumed that half of all assets are assigned to each spouse in a way that applies spend-down to the half assigned to the disabled spouse, less those assets falling under the state asset limit.

Three variables were included to capture the sample person's disability level. Functional disability was captured by the number of activity of daily living (ADL) needs. These included the need for active help in bathing,

dressing, using the toilet, transferring, and eating.[9] As part of the NLTCS interview, sample members were administered a short portable mental status questionnaire (SPMSQ). This consisted of ten questions asking such things as the day of the week, the name of the current U.S. president, and the answer to a simple arithmetic problem. A variable indicating the number of wrong answers is included. A considerable number of respondents (22 percent) were too impaired to be administered the SPMSQ or did not respond for other reasons. Some nursing homes probably did not allow the SPMSQ to be administered to residents. Under these circumstances, imputation of missing data would have been unreliable. Respondents with missing values were consequently indicated with a dummy variable in the model.

The final demand variables included a set of demographic characteristics. These were age and dummy variables indicating women, African Americans, and members of other minority racial groups. To control for differential access to nursing home care, several additional "supply-side" variables were included. The first was the revenue a nursing home might expect to receive if the sample person had a one-year stay. This variable was constructed using private-pay nursing home prices, average state reimbursement for Medicaid nursing home recipients, and the estimated time to Medicaid eligibility as derived from the Medicaid eligibility algorithm mentioned earlier.

The algorithm also identified persons caught in the "income gap." Some states do not use medically needy provisions, but instead apply a special income limit for persons seeking nursing home care. Persons in these states who lack sufficient wealth to support private-pay nursing home care and have incomes above the state eligibility limit but below the cost of private-pay nursing home care fall into the income gap. It is not clear if nursing homes admit these individuals at reduced charges. These individuals, who are classified as private payers, are identified by a dummy variable.

Problems of access will vary depending on how tight the local market is. A measure of bed availability, defined as the number of empty nursing home beds in the county per 1,000 persons ages 75 and older, is included.

In an effort to prevent nursing home use by individuals who do not have need of this level of care, most states have preadmission screening (PAS) regulations that specify minimum levels of disability (Polich and Iversen 1987). Depending on the state, these regulations apply to those who would enter a nursing home as Medicaid-eligible admissions; to those who would expect to spend down to Medicaid eligibility within a specified time; or to all admissions, including private payers. A dummy variable identifying sample members who would face preadmission screening if they were to

apply for nursing home admission was constructed using information on state of residence, Medicaid-eligibility status, and estimated time to spend down. This variable does not attempt to distinguish between sample members who meet a state's specific functional criteria or who fail to meet them under their PAS program.

# RESULTS

## Descriptive Results

Weighted means of model variables, stratified by Medicaid eligibility and nursing home residence, are presented in Table 2. Nursing home use among Medicaid-eligibles was substantially lower than among private payers, 18 percent versus 27 percent, respectively. On average, copayments for Medicaid-eligibles are less than a fourth of those of private-pay prices. As expected, wealth and income among private payers are substantially greater than among Medicaid-eligibles. Incomes are more than twice as great. Average preadmission non-housing wealth is over $70,000, compared to about $2,500 for Medicaid-eligibles.

While private payers have fewer children than Medicaid-eligibles (2.7 versus 2.0), they are more likely to be married (43 percent versus 32 percent). Medicaid-eligibles are more likely to be women and to be members of minority racial groups than are private payers.

Users of nursing home care have lower incomes than non-users on average, although among private payers, they have somewhat greater wealth. As expected, nursing home users are less likely to be married or to have children, and, if they do have children, to have fewer children. Moreover, users have greater levels of functional and cognitive disability than non-users. Finally, minority group Medicaid-eligibles are less likely to use nursing home care than are white Medicaid-eligibles, a pattern not evident among private payers.

## Estimation Results

Table 3 contains probit results for Medicaid-eligibles and private payers. In addition to coefficients and asymptotic *t*-ratios, mean marginal probabilities are provided to aid in the interpretation of results. These were calculated on an individual level and were averaged across the subsamples. Elasticities on selected variables, also calculated on an individual basis and averaged over the subsamples, are reported in Table 4. Reported pseudo $R^2$s are goodness-of-fit measures based on a formula given by McFadden (1974).

Table 2:    Variable Means for Nursing Home and Community
Residents by Medicaid Eligibility Status

| | Medicaid-Eligibles | | | Private Payers | | |
| | Total | Nursing Home | Community | Total | Nursing Home | Community |
|---|---|---|---|---|---|---|
| Medicaid copay | 3.789 | 3.951 | 3.756 | — | — | — |
| Private-pay price ($00) | — | — | — | 17.673 | 17.539 | 17.723 |
| Income ($00) | 5.645 | 4.783 | 5.828 | 12.331 | 10.045 | 13.182 |
| Spend-down assets ($0000) | — | — | — | 3.122 | 3.761 | 2.884 |
| Protected assets ($0000) | 0.251 | 0.070 | 0.289 | 4.308 | 3.822 | 4.489 |
| Home care price | 0.974 | 0.990 | 0.971 | 0.985 | 0.987 | 0.984 |
| HCBS spending | 7.275 | 7.461 | 7.235 | — | — | — |
| Has children | 0.804 | 0.653 | 0.836 | 0.778 | 0.657 | 0.824 |
| Number of children (for those with children) | 3.368 | 2.662 | 3.485 | 2.608 | 2.170 | 2.738 |
| Married | 0.318 | 0.099 | 0.365 | 0.428 | 0.191 | 0.516 |
| Number of ADLs | 1.496 | 3.605 | 1.048 | 1.631 | 3.383 | 0.979 |
| No SPMSQ | 0.311 | 0.417 | 0.288 | 0.290 | 0.362 | 0.263 |
| Cognitive impairment (of those taking the SPMSQ) | 3.076 | 6.086 | 2.445 | 2.549 | 4.931 | 1.780 |
| Age | 78.43 | 82.78 | 77.50 | 79.63 | 82.45 | 78.58 |
| Female | 0.724 | 0.806 | 0.707 | 0.654 | 0.720 | 0.629 |
| African American | 0.209 | 0.098 | 0.233 | 0.035 | 0.036 | 0.034 |
| Other minority | 0.077 | 0.052 | 0.082 | 0.028 | 0.029 | 0.028 |
| Income gap | — | — | — | 0.014 | 0.001 | 0.019 |
| Expected nursing home revenue | 1.821 | 1.820 | 1.821 | 2.053 | 2.060 | 2.051 |
| Bed availability | 1.235 | 1.222 | 1.238 | 1.292 | 1.368 | 1.264 |
| Preadmission screening | 0.541 | 0.634 | 0.522 | 0.091 | 0.127 | 0.078 |
| Unweighted N | 2001 | 432 | 1569 | 1836 | 540 | 1296 |

A likelihood ratio test was conducted to determine whether separate
estimation of the model on the two subsamples was appropriate. It was,
with the test highly significant at the $p < .00001$ level. The specification
of the Medicaid-eligible equation mirrors that of the private-pay equation.
However, interpretation of the coefficients on income and price (e.g., copay)
in this equation is not straightforward. Medicaid rules are structured so that
the followiing identity will hold:

$$Total\ income = copayment + protected\ income \qquad (3)$$

Protected income (mainly personal needs and spousal allowances) is
administratively set. Because of this, an increase in one dollar of income
will increase the required copayment but will not affect protected income.

Table 3:    Probit Estimation Results for Medicaid-Eligibles and Private Payers

| | Medicaid-Eligibles | | | Private Payers | | |
|---|---|---|---|---|---|---|
| | Coefficient | t-Ratio | Marginal Probability | Coefficient | t-Ratio | Marginal Probability |
| Constant | −2.465*** | −4.13 | | −1.830*** | −3.01 | |
| Medicaid copay | −0.084* | −1.86 | −0.011 | | | |
| Private-pay price | | | | −0.034 | −1.64 | 0.006 |
| Income | 0.068* | 1.90 | 0.009 | −0.009 | −1.62 | −0.002 |
| Spend-down assets | | | | 0.000 | 0.07 | 0.000 |
| Protected assets | −0.282*** | −2.63 | −0.037 | 0.005 | 1.47 | 0.001 |
| Home care price | 0.066 | 0.21 | 0.009 | 0.348 | 0.93 | 0.064 |
| HCBS spending | −0.007 | −1.51 | −0.001 | | | |
| Has children | −0.298** | −2.32 | −0.042 | −0.119 | −1.01 | −0.022 |
| Number of children | −0.080*** | −2.98 | −0.009 | −0.086*** | −2.73 | −0.015 |
| Married | −1.182*** | −4.66 | −0.141 | −0.963*** | −8.41 | −0.180 |
| Number of ADLs | 0.494*** | 16.55 | 0.065 | 0.504*** | 18.57 | 0.093 |
| No SPMSQ | 0.286** | 1.96 | 0.039 | −0.138 | −1.14 | −0.025 |
| Cognitive impairment | 0.169*** | 7.87 | 0.019 | 0.102*** | 5.47 | 0.017 |
| Age | 0.011* | 1.95 | 0.001 | 0.007 | 1.30 | 0.001 |
| Female | −0.106 | 0.87 | −0.014 | −0.383*** | −3.79 | −0.071 |
| African American | −0.885*** | −6.50 | −0.107 | −0.346 | −1.57 | −0.060 |
| Other minority | −0.535*** | −2.67 | −0.071 | −0.121 | −0.43 | −0.022 |
| Income gap | | | | −1.513* | −1.71 | −0.200 |
| Expected revenue | −0.106 | −1.40 | −0.014 | 0.246 | 1.40 | 0.045 |
| Bed availability | 0.018 | 0.45 | 0.002 | 0.066* | 1.70 | 0.012 |
| Preadmission screening | 0.174* | 1.72 | 0.023 | 0.216 | 1.54 | 0.041 |
| Unweighted N | 2001 | | | 1836 | | |
| Mean of dependent variables | 0.175 | | | 0.271 | | |
| Log likelihood | −481.307 | | | −607.389 | | |
| Pseudo R-squared | 0.539 | | | 0.454 | | |

* $p \le .10$; ** $p \le .05$; *** $p \le .01$.

Therefore, the coefficient on the Medicaid copayment will represent not a price effect, which theory suggests should be zero, but rather the negative of the effect of protected income on nursing home demand. Moreover, the income effect is not directly obtained from the coefficient on the income variable, but by summing the effects of the copayment and the income variables.[10] Consequently, the income effect for Medicaid-eligibles is very small and insignificant, reducing the probability of nursing home use by .2 percent for every additional $100 of monthly income. The effect of protected income on demand is positive and associated with an elasticity of .66. The

Table 4:    Elasticities for Selected Demand Variables

|  | All | Subgroup | | | |
|---|---|---|---|---|---|
|  | | Married | Unmarried | Low Disability | High Disability |
| *Medicaid-Eligibles* | | | | | |
| Protected income | 0.66 | 2.30 | | 2.81 | −0.20 |
| Total income | −0.20 | −2.03 | −0.05 | −1.01 | −0.13 |
| Protected assets | −0.29 | −0.18 | −0.52 | −6.10 | −0.05 |
| Home care price | 0.14 | −7.06 | 0.37 | 1.15 | −0.16 |
| HCBS spending | −0.11 | 0.26 | −0.09 | 0.06 | −0.14 |
| *Private Payers* | | | | | |
| Private-pay price | −0.98 | −2.40 | −0.53 | −1.92 | −0.36 |
| Income | −0.21 | −0.94 | −0.05 | −0.18 | −0.16 |
| Spend-down assets | 0.00 | 0.00 | −0.01 | −0.00 | 0.01 |
| Protected assets | 0.04 | 0.23 | 0.00 | 0.14 | −0.01 |
| Home care price | 0.55 | 2.86 | 0.08 | 1.91 | −0.05 |

underlying coefficient is significant at only the .10 level, however. A clearer view of these relationships will emerge when the demand of married and unmarried Medicaid-eligibles are described later on. Assets among Medicaid-eligibles are negatively and significantly associated with demand, although the elasticity is small (−.29). Coefficients on price, income, and wealth in the private-payer equation are all statistically insignificant.

As expected, informal care resources are negatively associated with nursing home demand. The primacy of spouses as informal caregivers, as compared with children, is in evidence among both Medicaid-eligibles and private payers. In these two groups, married persons are 14 and 18 percentage points less likely to demand nursing home care than are unmarried persons, respectively. In contrast, having children reduces the probability of demand by only 4 and 2 percentage points, respectively. Each additional child decreases the probability of demand by about one percent.

Disability is strongly related to nursing home demand, as previous studies have found. For the most part, the relationships between disability and demand are similar between the two subgroups. An additional ADL dependency is associated with an increased likelihood of nursing home demand of 7 percent among Medicaid-eligibles, and 9 percent among private payers. These relationships may be somewhat overstated, however, because nursing home staffs assessed the ADL limitations for nursing home residents while community residents mostly made self-assessments of these limitations.

Women are significantly less likely to demand nursing home care among private payers, associated with a 7 percent lower probability. Consistent with previous studies, African Americans and other minorities are less likely to demand nursing home care, although these relationships are significant only among Medicaid-eligibles. African American Medicaid eligibles were 11 percent less likely to demand nursing home care than were whites, and other minorities were 7 percent less likely.

Because results are not robust, the effects of most supply-side variables will not be discussed. For the most part, these variables do not have significant coefficients.

## Marital Status and Nursing Home Demand

Earlier results indicated that married persons and persons with children were much less likely to demand nursing home care than were unmarried persons. The economic interpretation of this finding is intuitive. Informal caregivers can provide home-based care at a lower "implicit" price than formal providers can, particularly when they share the same household with the disabled elder. This suggests that persons with ample informal care resources will be less likely to consider the economic costs associated with nursing home care as long as the relative prices of nursing home and home care greatly diverge. On the other hand, when a person has fewer informal care resources to draw on or has care needs that greatly tax current resources, formal home care may be needed to supplement informal caregivers—and the relative prices between the two care settings are likely to become closer and more relevant.

Because spouses have the greatest effect in preventing nursing home demand, we estimate our models separately for married and unmarried persons to allow us to investigate the interactions between informal care resources and other factors. Results are shown in Table 5.[11]

Although the elasticities that were reported in Table 4 appear to confirm our hypothesis concerning the greater responsiveness to economic factors among unmarried disabled elders, underlying coefficients are mostly insignificant. Among unmarried Medicaid-eligible persons, those with greater wealth are significantly less likely to demand nursing home care. This is surprising given the fact that these persons typically can protect only about $2,000 in non-housing assets. In contrast, married private payers with greater wealth protected from Medicaid spend-down are significantly more likely to demand nursing home care. This suggests that Medicaid provisions to protect the economic well-being of older married persons when their spouse enters a nursing home (such as those contained in the unrepealed portions of the

Table 5:    Probit Estimation Results for Medicaid-Eligibles and Private Payers by Marital Status

|  | Married Persons | | | Unmarried Persons | | |
|---|---|---|---|---|---|---|
|  | Coefficient | t-Ratio | Marginal Probability | Coefficient | t-Ratio | Marginal Probability |
| *Medicaid-Eligibles* | | | | | | |
| Constant | −4.289* | −1.92 | | −2.505*** | −4.05 | |
| Medicaid copay | −0.179 | −1.40 | −0.008 | | | |
| Income | 0.116* | 1.75 | 0.005 | −0.007 | −0.30 | −0.001 |
| Protected assets | −0.204 | −1.25 | −0.009 | −0.408** | −2.51 | −0.069 |
| Home care price | −1.924 | −1.55 | −0.088 | 0.211 | 0.65 | 0.035 |
| HCBS spending | 0.010 | 0.60 | 0.000 | −0.007 | −1.37 | −0.001 |
| Has children | −0.163 | −0.32 | −0.008 | −0.311** | −2.31 | −0.055 |
| Number of children | −0.015 | −0.18 | −0.001 | −0.089*** | −3.11 | −0.014 |
| Number of ADLs | 0.609*** | 5.19 | 0.028 | 0.496*** | 15.57 | 0.083 |
| No SPMSQ | 2.107*** | 3.06 | 0.110 | 0.117 | 0.75 | 0.020 |
| Cognitive impairment | 0.504*** | 4.51 | 0.013 | 0.143*** | 6.32 | 0.021 |
| Age | 0.011 | 0.44 | 0.000 | 0.012** | 2.00 | 0.002 |
| Female | −0.072 | −0.17 | −0.003 | −0.081 | −0.63 | −0.014 |
| African American | −1.679*** | −2.84 | −0.058 | −0.830*** | −5.91 | −0.130 |
| Other minority | −0.350 | −0.53 | −0.019 | −0.527** | −2.48 | −0.089 |
| Expected revenue | −0.252 | −0.93 | −0.012 | −0.110 | −1.38 | −0.019 |
| Bed availability | 0.022 | 0.17 | 0.001 | 0.018 | 0.42 | 0.003 |
| Preadmission screening | 0.545 | 1.57 | 0.024 | 0.155 | 1.45 | 0.026 |
| Unweighted *N* | 567 | | | 1434 | | |
| Mean of dependent variables | 0.054 | | | 0.232 | | |
| Log likelihood | −47.244 | | | −436.684 | | |
| Pseudo *R*-squared | 0.648 | | | 0.483 | | |
| *Private Payers* | | | | | | |
| Constant | −4.535*** | −3.43 | | −1.441** | −2.12 | |
| Private-pay price | −0.057 | −1.24 | −0.006 | −0.025 | −1.06 | −0.006 |
| Income | −0.022* | −1.82 | −0.002 | −0.004 | −0.64 | −0.001 |
| Spend-down assets | 0.000 | 0.03 | 0.000 | −0.001 | −0.19 | −0.000 |
| Protected assets | 0.016** | 2.42 | 0.002 | 0.001 | 0.24 | 0.000 |
| Home care price | 1.242 | 1.47 | 0.136 | 0.066 | 0.16 | 0.015 |
| Has children | −0.022 | −0.08 | −0.002 | −0.084 | −0.64 | −0.020 |
| Number of children | −0.001 | −0.02 | −0.000 | −0.129*** | −3.37 | −0.029 |
| Number of ADLs | 0.540*** | 9.25 | 0.059 | 0.503*** | 16.04 | 0.116 |
| No SPMSQ | 0.178 | 0.73 | 0.020 | −0.260* | −1.82 | −0.058 |
| Cognitive impairment | 0.135*** | 3.59 | 0.010 | 0.098*** | 4.42 | 0.022 |
| Age | 0.019 | 1.55 | 0.002 | 0.007 | 1.02 | 0.002 |
| Female | −0.093 | −0.51 | −0.010 | −0.586*** | −4.58 | −0.142 |
| African American | 0.283 | 0.75 | 0.034 | −0.752*** | −2.65 | −0.157 |
| Other minority | −0.143 | −0.22 | −0.015 | −0.088 | −0.29 | −0.020 |

*continued*

Table 5: (continued)

| | Married Persons | | | Unmarried Persons | | |
|---|---|---|---|---|---|---|
| | Coefficient | t-Ratio | Marginal Probability | Coefficient | t-Ratio | Marginal Probability |
| Income gap | −3.490 | −0.07 | −0.122 | −1.577* | −1.87 | −0.279 |
| Expected revenue | 0.260 | 0.67 | 0.029 | 0.233 | 1.17 | 0.054 |
| Bed availability | −0.081 | −0.88 | −0.009 | 0.098** | 2.21 | 0.023 |
| Preadmission screening | −0.368 | −1.02 | −0.037 | 0.350** | 2.26 | 0.084 |
| Unweighted N | 702 | | | 1134 | | |
| Mean of dependent variables | 0.121 | | | 0.384 | | |
| Log likelihood | −137.998 | | | −467.890 | | |
| Pseudo R-squared | 0.475 | | | 0.207 | | |

*$p \leq .10$; **$p \leq .05$; ***$p \leq .01$.

Medicare Catastrophic Coverage Act) will have the effect of encouraging the demand for nursing home care. Since the demand for nursing home care among the disabled elderly who are married is fairly low to begin with, this may not be have great policy significance, however.

The results clearly indicate a hierarchy of family caregivers. While the spouse assumes a primary role in preventing institutionalization, children assume a greater role if there is no spouse. This is demonstrated by the stronger negative effects of the two children variables in equations estimated on unmarried samples. Not surprisingly, the presence of a spouse diminishes the role of disability in contributing to the demand for nursing home care. The marginal effect of greater ADL limitations or cognitive impairment on nursing home demand is greater among unmarried persons than married persons.

Among private payers, there is a large difference in the effect of gender on nursing home demand between married and unmarried disabled persons. While the gender of married persons has little effect on nursing home demand, unmarried women are substantially less likely to use nursing home care than unmarried men. Although this may reflect differences in the strength of informal caregiver networks that men and women have, it may also indicate that men are less able or willing to engage in the domestic activities necessary for self-care. Curiously, this pattern is not found among Medicaid-eligibles.

It has been speculated that lower demands for nursing home care among African Americans, and perhaps among other minority racial groups, reflects a stronger and more broad-based informal care system (Silverstein and Waite

1993). Our results offer some indirect evidence to support this hypothesis. On average, the effect of being African American is substantially greater for unmarried than for married persons (−6 percent versus −13 percent for Medicaid-eligibles; 3 percent versus −16 percent for private payers).

*Level of Disability and Nursing Home Demand*

While disability clearly is related positively to nursing home demand, previous research has not investigated the interactions between level of disability and economic factors. This has bearing on the efficiency of public nursing home subsidies (or home care subsidies) targeted to persons of various levels of disability.

At higher levels of disability, the financial and time burdens placed on family members to support a disabled elder in the community can become considerable and often untenable. At the same time, the financial costs to the family associated with institutionalization are limited under Medicaid rules. In light of this, the demand for nursing home care may become insensitive to price when disability becomes sufficiently severe. If this is the case, nursing home subsidies will be more efficient (will induce less additional demand) when they are targeted to those with higher levels of disability, whose demand is less elastic. Moreover, income and wealth are likely to become less important in nursing home placement decisions as long-term care needs test the capacity of the family to provide adequately for the disabled elder in the home. Since private payers have greater financial resources with which to moderate the effect of increased disability, they are expected to be more responsive to economic factors at higher levels of disability than are Medicaid-eligibles.

Models estimated on Medicaid-eligibles and private payers with higher and lower levels of disability are reported in Table 6. High-disability individuals are those with either three or more ADL needs or a high level of cognitive impairment, as indicated by four or more wrong answers on the SPMSQ.[12]

Among Medicaid-eligibles, persons with lower levels of disability are more responsive to variations in protected income, total income, and wealth. For instance, the elasticity with respect to protected income is 2.81 for low-disability persons and −0.20 for high-disability persons. Corresponding elasticities are −1.01 and −0.13 for total income, −6.10 and −0.05 for wealth, and 1.15 and −0.16 for home care price. It also appears that spending on Medicaid home and community care has its primary effect on those with high levels of disability, suggesting that these funds are either targeted to or have their greatest effect on those with high levels of disability and at greatest risk of

Table 6:    Probit Estimation Results for Medicaid-Eligibles and Private
Payers by Level of Disability

| | Low Disability | | | High Disability | | |
|---|---|---|---|---|---|---|
| | Coefficient | t-Ratio | Marginal Probability | Coefficient | t-Ratio | Marginal Probability |
| **Medicaid-Eligibles** | | | | | | |
| Constant | −1.234 | −0.975 | | −3.129*** | −4.347 | |
| Medicaid copay | −0.233** | −2.798 | −0.014 | 0.041 | 0.579 | 0.009 |
| Income | 0.181*** | 3.035 | 0.011 | −0.057 | −0.889 | −0.012 |
| Protected assets | −2.813** | −2.378 | −0.171 | −0.215** | −1.989 | −0.046 |
| Home care price | 0.373 | 0.573 | 0.023 | −0.119 | −0.322 | −0.026 |
| HCBS spending | 0.003 | 0.374 | 0.000 | −0.012*** | −2.171 | −0.003 |
| Has children | −0.633** | −2.372 | −0.048 | −0.241 | −1.585 | −0.053 |
| Number of children | −0.039 | −0.626 | −0.002 | −0.097*** | −3.210 | −0.021 |
| Married | −2.081*** | −3.913 | −0.102 | −0.519 | −1.478 | −0.111 |
| Number of ADLs | 0.699*** | 5.652 | 0.043 | 0.542*** | 12.323 | 0.116 |
| Did not take SPMSQ | 0.199 | 0.732 | 0.013 | 0.392* | 1.940 | 0.086 |
| Cognitive impairment | 0.251** | 2.353 | 0.014 | 0.205*** | 7.149 | 0.035 |
| Age | −0.004 | −0.307 | −0.000 | 0.018*** | 2.629 | 0.004 |
| Female | −0.473** | −2.061 | −0.034 | 0.060 | 0.414 | 0.013 |
| African American | −0.962** | −2.521 | −0.040 | −0.844*** | −5.668 | −0.182 |
| Other minority | −3.546 | −0.106 | −0.050 | −0.438** | −2.076 | −0.100 |
| Expected revenue | −0.004*** | −0.268 | 0.000 | −0.016* | −1.759 | −0.003 |
| Bed availability | 0.002 | 0.180 | 0.000 | 0.001 | 0.135 | 0.000 |
| Preadmission screening | 0.241 | 1.142 | 0.014 | 0.115 | 0.960 | 0.025 |
| Unweighted *N* | 1087 | | | 914 | | |
| Mean of dependent variables | 0.041 | | | 0.351 | | |
| Log likelihood | −124.19 | | | −349.747 | | |
| Pseudo *R*-squared | 0.437 | | | 0.435 | | |
| **Private Payers** | | | | | | |
| Constant | −2.741*** | −2.834 | | −1.559* | −1.901 | |
| Private-pay price | −0.047 | −1.412 | −0.006 | −0.024 | −0.893 | −0.007 |
| Income | −0.006 | −0.613 | −0.001 | −0.013* | −1.822 | −0.004 |
| Spend-down assets | −0.001 | −0.053 | 0.000 | 0.004 | 0.563 | 0.001 |
| Protected assets | 0.016*** | 2.849 | 0.002 | −0.003 | −0.631 | −0.001 |
| Home care price | 0.848 | 1.413 | 0.101 | −0.064 | −0.130 | −0.017 |
| Has children | −0.339* | −1.801 | −0.045 | 0.038 | 0.250 | 0.010 |
| Number of children | −0.041 | −0.823 | −0.004 | −0.115*** | −2.794 | −0.031 |
| Married | −1.296*** | −6.184 | −0.139 | −0.813*** | −5.724 | −0.237 |
| Number of ADLs | 0.604*** | 6.885 | 0.072 | 0.541*** | 12.440 | 0.147 |
| Did not take SPMSQ | −0.241 | −1.267 | −0.027 | −0.080 | −0.459 | −0.022 |
| Cognitive impairment | 0.044 | 0.566 | 0.005 | 0.122*** | 4.752 | 0.029 |
| Age | 0.012 | 1.371 | 0.001 | 0.008 | 1.020 | 0.002 |
| Female | −0.571*** | −3.443 | −0.077 | −0.303** | −2.297 | −0.080 |

Table 6:    (continued)

| | Low Disability | | | High Disability | | |
|---|---|---|---|---|---|---|
| | Coefficient | t-Ratio | Marginal Probability | Coefficient | t-Ratio | Marginal Probability |
| African American | −0.631 | −0.976 | −0.054 | −0.265 | −1.100 | −0.073 |
| Other minority | −0.060 | −0.116 | −0.007 | −0.158 | −0.466 | −0.043 |
| Income gap | −3.807 | −0.097 | −0.087 | −1.589* | −1.663 | −0.387 |
| Expected revenue | 0.047 | 1.635 | 0.006 | 0.006 | 0.255 | 0.002 |
| Bed availability | 0.010* | 1.713 | 0.001 | 0.004 | 0.810 | 0.001 |
| Preadmission screening | 0.227 | 1.080 | 0.030 | 0.137 | 0.703 | 0.037 |
| Unweighted $N$ | 1061 | | | 775 | | |
| Mean of dependent variables | 0.087 | | | 0.545 | | |
| Log likelihood | −231.513 | | | −369.958 | | |
| Pseudo $R$-squared | 0.296 | | | 0.302 | | |

$*p \leq .10; **p \leq .05; ***p \leq .01.$

nursing home placement. Although not shown here, the effect of Medicaid HCBS spending is further concentrated among unmarried persons with high levels of disability.

Among private payers with low and high levels of disability, coefficients on economic variables are mostly insignificant. Only protected assets are positively associated with nursing home demand for those with low levels of disability. Nevertheless, estimated elasticities for nursing home prices, protected wealth, and home care prices are consistently smaller for high-disability private payers than for low-disability private payers (see Table 4).

The effect of family informal resources in reducing nursing home demand appears to be greater for high-disability persons than for low-disability persons. This pattern is particularly strong among private payers. The results also indicate that the relationship between level of disability and nursing home demand is not linear. For both cognitive and physical disabilities, the marginal effect of disability on nursing home demand increases as the level of disability increases.

## CONCLUSIONS

The results of this study have both important methodological and important policy implications. Although this research confirms the important effects of informal caregivers and disability on the demand for nursing home care

found in virtually all previous studies, the results highlight several new and important aspects of the demand for nursing home care. First, Medicaid benefits are more complex in structure than are simple price subsidies. Persons eligible for Medicaid nursing home benefits face a budget constraint in a nursing home that is fundamentally different from what they would face if they entered as a private payer. This implies that researchers studying nursing home demand should identify potential Medicaid-eligible persons—a complex process involving replication of each state's eligibility rules—and that demand equations be allowed to differ between Medicaid-eligibles and private payers. Interpretation of some coefficients will also differ, depending on Medicaid status. Studies that fail to capture these complexities will likely produce biased results. Finally, we have shown that important interactions occur between economic factors and other factors. We now discuss the implications of these interactions.

Recent years have seen greater efforts by states to provide a broader range of care options for the disabled Medicaid-eligible population. If current political efforts both to restrain federal Medicaid spending and to offer states greater flexibility in the design of their Medicaid programs succeed, then states may be in a position to alter the basic structure of nursing home subsidies. They are also likely to attempt to limit nursing home subsidies more tightly to those most in need. The results from this study offer some insights into how these subsidies might be targeted.

Most long-term care consists of low- and unskilled custodial services rendered by family caregivers. Because of this, a central concern in designing public insurance for nursing home care has been moral hazard. If the cost of institutional long-term care is lowered, it is feared that families will abandon their caregiving role at the expense of taxpayers. The results of this study suggest that many of these fears may be unfounded. The demand for nursing home care appears to be relatively inelastic to price. Moreover, the fact that nursing home care is found to be an inferior good suggests that persons who have a greater choice among care settings prefer home- and community-based options over institutional options.

This study suggests that nursing home demand is more elastic with respect to price, income, and wealth among married disabled elders than among nonmarried ones. In addition, persons with lower levels of disability have a somewhat more elastic demand for nursing home care than those with greater levels. This implies that nursing home subsidies targeted to those lacking informal care resources or to those with greater levels of disability will be most efficient. Although this appears obvious, recent research suggests that

significant numbers of nursing home residents, including both private payers and those receiving public subsidies, have levels of disability low enough to suggest that home and community settings might be more appropriate and more cost effective (Spector, Reschovsky, and Cohen 1996).

A remaining question is how the price and availability of formal home care services affects nursing home demand. The expansion of home- and community-based care options, both through Medicare and Medicaid, has been one of the most profound changes in long-term care policy over the past decade. Although we find little relationship between the price and availability of HCBS and nursing home demand, these results may reflect our inability to measure these variables accurately. Future research efforts should be directed at gaining a better understanding of whether or not the expansion of HCBS options has affected nursing home demand.

## ACKNOWLEDGMENTS

## NOTES

1. The NLTCS includes non-disabled members because the sample includes surviving members of the 1984 NLTCS sample, some of whom have recovered.
2. Reschovsky (1996) does find considerable excess demand. There are important differences between the data used in that study and in this one. Apart from using data from an earlier time period, the earlier study uses an admission cohort, while this study uses a cross-section.
3. Medicaid eligibility rules are similar for married persons, but apply only to those assets and income allocated by state and federal rules to the disabled spouse (generally based on ownership). Minimum amounts of income and assets are preserved for the non-institutionalized spouse. Rules governing protections for community spouses changed with passage of the Medicare Catastrophic Coverage Act of 1989 (MCCA). The data used in this analysis predate the implementation of these MCCA provisions, however. To operationalize the rules for married persons, assumptions were made concerning the division of income and wealth between spouses. It was assumed that assets were divided equally between spouses. Income was assumed to be divided on a 70%/30% basis between the male and female spouse, respectively.
4. Some persons will enter nursing homes as Medicare patients and remain permanently because they fail to recover or because they experience new conditions.

Although this is potentially a source of bias in our results, results were insensitive to how these 64 cases were coded or whether they were included in the analysis sample.

5. Explanatory variables were a set of urbanicity dummies, the HCFA hospital wage index, nursing home bed supply per 1,000 persons age 75 and older, the number of empty nursing home beds per 1,000 persons age 75, per capita income, and the number of nursing homes in the county per 1,000 persons age 75 and older.

6. Medicare and Medicaid home healthcare does not require copayments, so there is no geographic variation in prices for these services.

7. Since long-term care is often provided by family members other than a spouse, the income and wealth of these other family members ideally should be entered into the model. This information is not available in the NLTCS. This omission is not likely to seriously bias results since empirical evidence suggests that intergenerational financial transfers from children to elderly parents are rare, and that when they do occur, they are of small amounts (Kotlikoff and Morris 1989). It is further assumed that all income accruing to the sample member and spouse is unearned. This is not unreasonable considering that the average age of sample members is 78.

8. In recent years, some anecdotal evidence has suggested an increased use of Medicaid estate planning, shifting of assets to other family members, or otherwise sheltering assets in order to avoid spend-down requirements and more quickly qualify for Medicaid nursing home benefits (Burwell 1991). The prevalence of these activities is unknown, and no effort was made to incorporate them into the model.

9. Active ADLs include cases where another person must actively assist in the activity, as opposed to being on hand in case assistance is needed. Since ADLs are intended to measure dependency, a person who is able to perform an activity with the use of an assistive device was not considered to have an ADL need for that activity.

10. This can be easily demonstrated mathematically. The Medicaid-eligible equation (in linear form for ease of exposition) is specified as $Pr(NH) = \beta_0 + \beta_1 \text{ COPAY} + \beta_2 \text{ INCOME} + \beta_i X_i + \epsilon$, where $X_i$ represents the other model variables. Since COPAY = INCOME − PROTECTED INCOME, the equation can be rewritten as $Pr(NH) = \beta_0 + (\beta_1 + \beta_2) \text{ INCOME} - \beta_1 \text{ PROTECTED INCOME} + \beta_i X_i + \epsilon$. Consequently, the income effect is given by $\beta_1 + \beta_2$ and the effect of protected income on demand is given by $-\beta_2$.

11. Among unmarried Medicaid-eligibles, the Medicaid copayment essentially equals income, differing only by the small personal needs allowance. Subsequently, the copayment is not entered into the equation. Unlike the other equations on Medicaid-eligibles, the coefficient on income will reflect an income effect in this equation.

12. This criterion roughly mirrors the criteria most commonly used to target public programs to persons with greater levels of disability.

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