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Moral hazard in nursing home use

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Abstract

Nursing home expenditures are a rapidly growing share of national health care spending with the government functioning as the dominant payer of services. Public insurance for nursing home care is tightly targeted on income and assets, which imposes a major tax on savings; moreover, low state reimbursement for Medicaid patients has been shown to lower treatment quality, and bed supply constraints may deny access to needy individuals. However, expanding eligibility, increasing Medicaid reimbursement, or allowing more nursing home bed slots has the potential to induce more nursing home use, increasing the social costs of long-erm care. A problem in evaluating this tradeoff is that we know remarkably little about the effects of government policy on nursing home utilization. We attempt to address this shortcoming using multiple waves of the National Long-Term Care Survey, matched to changing state Medicaid rules for nursing home care. We find consistent evidence of no effect of Medicaid policies on nursing home utilization, suggesting that demand for nursing home care is relatively inelastic with respect to public program generosity. From a policy perspective, this finding indicates that changes in overall Medicaid generosity will not have large effects on utilization.

JEL classification: I11; I18

Keywords: Medicaid; Moral hazard; Nursing home; Regulation

The provision of chronic care in nursing homes has become a major component of U.S. health care costs. In 1960, nursing home expenditures constituted roughly 3% of national health expenditures; by the year 2000, the nursing home expenditure share had increased to 7%. As the U.S. population ages, nursing home expenditures could continue to grow in importance over the coming years. Projections suggest that 43% of the population age 65 and older will use a nursing

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home at some point before they die (Kemper et al., 1991). An individual turning age 65 has an expected discounted nursing home cost of roughly US$ 65,000 (in 2005 dollars), a very large expenditure risk for most Americans. Moreover, variation around this average is high, implying that expenditures are relatively concentrated across individuals.

Despite this large risk, private insurance reimburses only about 4% of total nursing home spending.[1] The major form of insurance for nursing home utilization is instead state Medicaid programs, which now pay for roughly half of nursing home expenditures and about 70% of all bed-days. These programs provide reimbursement for nursing home costs for individuals whose income and assets are below certain thresholds. However, there is no coverage available for those who do not meet these means tests, and as a result, roughly one-third of nursing home stays are financed out-of-pocket. State Medicaid programs also set a payment rate for nursing home care, which is significantly below the private market rate in many states. Finally, a majority of states use regulatory policies designed to constrain the growth of the nursing home market and thereby control Medicaid nursing home expenditures.

These public policies raise important tradeoffs for state Medicaid programs. In particular, the means tests under Medicaid pose a large tax on the assets of the elderly, which may raise concerns both on equity and efficiency grounds, because such asset tests have been shown both theoretically and empirically to lower private savings.[2] Loosening the means tests could substantially reduce the financial burden on the elderly and induce them to save more. In addition, the rate at which Medicaid reimburses nursing homes has been shown to be a significant determinant of the quality of nursing home care, with higher rates leading to measurably better outcomes for Medicaid patients.[3] Limiting the number of beds available has the potential to ration nursing home care among those who would benefit from such care.

At the same time, nursing home expenditures constitute a significant portion of total Medicaid spending, consuming approximately 17% of the program's budget. Medicaid is one of the largest items in most state budgets, and Medicaid spending has increased significantly in recent years. As a result, these costs have put enormous fiscal strain on state governments, which may serve as a further incentive to tighten Medicaid income/asset tests, lower reimbursement for nursing homes, or limit access to nursing homes.

A critical question for evaluating the costs and benefits of expanding or tightening state Medicaid policies is how such changes will affect nursing home utilization. On the demand side, an open question is the elasticity of nursing home utilization with respect to public program generosity. On the one hand, nursing home care represents a significant financial risk and major changes in public policy may affect the ability to afford and use a nursing home. On the other hand, nursing home care may be viewed by individuals as an option of last resort, and as such is not responsive to public policy. On the supply side, it is possible that restricting reimbursement for Medicaid patients or limiting the number of nursing home beds available could decrease nursing home

[1] See Brown and Finkelstein (2004b) for details on the long-term care market and a discussion of theories for low levels of private purchase.

[2] See Hubbard et al. (1995) for a model that incorporates such asset tests into a precautionary life-cycle savings model. Empirical evidence on asset tests and savings is provided in Gruber and Yelowitz (1999) and Powers (1998).

[3] An earlier literature claimed the opposite to be true, that higher Medicaid reimbursement led to *lower* quality of care for Medicaid patients, due to excess demand by Medicaid patients and the imposition of common quality of care between Medicaid and private patients. But Grabowski (2001, 2004) shows clearly that higher reimbursement leads to higher quality care for Medicaid patients. Grabowski et al. (2006) also show that there is common treatment of Medicaid and private-pay patients within a nursing home.

utilization, but only if nursing homes are capacity constrained, which may not be true in today's nursing home market.

The purpose of this paper is to assess the impact of Medicaid policy on the utilization of nursing homes, using the substantial variation in that public policy over the past 20 years. In particular, we will look at three different policies: eligibility for Medicaid coverage, Medicaid reimbursement and nursing home capacity. We have collected a new data set of information on these policies for every available state in the U.S. over the 1982–1999 period. We then match this policy information to data on nursing home utilization from the National Long Term Care Survey (NLTCS), a large and repeated nationally-representative survey of community-based and institutionalized elders (and their dependents). This is a longitudinal data set with replenishment, which provides a sufficiently large sample to obtain reasonably precise estimates of the impact of public policy on nursing home utilization.

In a preview of our results, we find no evidence of increases in overall nursing home utilization when Medicaid policies become more generous. Specifically, we find that there is little effect of loosening Medicaid income or asset tests, increasing Medicaid nursing home reimbursement, or allowing more nursing home beds in a state on the odds of using a nursing home. Overall, our results are consistent with an inelastic demand for nursing home care with respect to public program generosity, indicating that the large increase in total nursing home expenditures over the past few decades is not predominantly attributable to increased generosity in state Medicaid eligibility. This suggests that meeting policy goals such as increased savings or access to care for nursing home residents by loosening Medicaid restrictions will not raise the total demand for nursing home use.

The paper is organized as follows: Section 1 provides background information regarding the Medicaid program rules and prior evidence regarding the effect of Medicaid coverage on the utilization of nursing home care. Section 2 describes the data and empirical strategy. Section 3 documents the effect of Medicaid program rules on nursing home utilization. Conclusions are presented in Section 4.

1. Background

1.1. Eligibility for Medicaid reimbursement of nursing home costs

Older individuals who demand nursing home services predominantly pay for care in one of four ways. First, if an individual is admitted to the nursing home from the hospital, Medicare (public health insurance for the elderly) will pay for the first 100 days of the stay. Specifically, Medicare offers full coverage on the first 20 days and partial coverage for days 21–100. Second, private long-term care insurance purchased at younger ages can be used to cover nursing home expenditures. However, the purchase of such insurance remains relatively rare in the U.S., constituting only 4% of overall nursing home expenditures. Third, individuals can pay for their care out-of-pocket. Finally, individuals who qualify can turn to public insurance through the Medicaid program for their nursing home costs.

To qualify for Medicaid, individuals must technically be eligible for Supplemental Security Income (SSI) or have a level of income and assets that do not exceed the SSI limits.[4] In 2005,

[4] Federal rules stipulate that a physician must certify the necessity of nursing home care in order for an individual to qualify for Medicaid payment. Beginning in 1992, states could enact preadmission screening programs to further regulate the "need" for nursing home care based on disability. However, the low nursing home denial rates associated with these programs suggest they had little direct effect on nursing home use (Harrington and Curtis, 1996).

the SSI income limit for an unmarried individual was US$ 564 and the asset limit was US$ 2000. However, Medicaid allows states to apply a set of special rules in determining eligibility for nursing home care. This section broadly summarizes these financial eligibility criteria and the reader is referred to a number of recent publications for more detailed descriptions of these rules (Bruen et al., 1999, 2003; Kassner and Shirey, 2000; Schneider et al., 1999).

The key issue in establishing Medicaid eligibility for nursing home care is that the individual meet both income and asset standards. On the income side, states have adopted two broad sets of rules that expand eligibility: "medically needy" programs and special income rules. If an individual's income exceeds the state income test, a number of states have adopted medically needy programs which permit the individual to "spend down" income to qualify for Medicaid. For an individual without a spouse in the community, all income is contributed (minus a small personal needs allowance and other small deductions) and Medicaid pays the remainder of nursing home costs. Other states have enacted special income rules, which allow states to exceed the SSI income limit in determining eligibility provided they do not exceed 300% of SSI.[5]

Individuals in most states must also meet the SSI asset standard to obtain Medicaid coverage. An individual's home is excluded in calculating total assets for Medicaid eligibility, although the value of the housing exemption was recently capped as part of the 2005 Deficit Reduction Act. The determination of countable assets for Medicaid coverage is quite complex, but in addition to the house, the first US$ 2000 of household goods or personal effects, a car used to obtain medical treatment and certain burial funds are also excluded from consideration.

Although most individuals who meet SSI income and asset tests are financially eligible for Medicaid, Congress has allowed "209(b)" states to apply more restrictive financial eligibility criteria. The tradeoff is that these 11 states must allow individuals to spend down their income to qualify for services by either offering a medically needy program or establishing a similar "209(b) spend down" program.

A final set of features that influence eligibility are the spousal protection rules, which are largely an outgrowth of the Medicare Catastrophic Care Act (MCCA) of 1989. Before this act, when a married individual entered a nursing home, their spouse was allowed to keep only assets in the spouse's name (as of 2 years before nursing home entry, to avoid asset shifting) plus US$ 2000 of jointly held assets. The MCCA changed these rules by computing the total value of all assets belonging to either spouse at the point of nursing home entry and attributing half of that total value to each spouse. Thus, unless assets happened to be concentrated in the name of the community-dwelling spouse, this policy change substantially increased the assets available to a couple when one spouse entered a nursing home.

The MCCA allowed each state to establish rules for the minimum and maximum assets that the community-dwelling spouse is allowed to keep. These state standards are further constrained by the Federal rules which establish that the community-dwelling spouse must be allowed to keep at least US$ 16,392 in assets in 1999, for example, even if this is more than half the assets, but not more than US$ 81,960. Given these rules, married couples with combined assets more than twice

[5] Historically, an individual in a state without a medically needy program who exceeded the income test by even US$ 1 would be ineligible for Medicaid coverage. To address this situation, Congress enacted legislation permitting the establishment of Qualified Income Trusts (formerly known as Miller Trusts), which allow individuals with incomes exceeding the state threshold to place part of that income into a trust to become eligible for Medicaid coverage. The dollars put into this trust can only be used to pay for approved costs (e.g., support of a community-dwelling spouse) with the remainder paid to Medicaid either annually or at the death of the beneficiary.

the Federal maximum (US$ 163,920 in 1999) or below the Federal minimum are treated the same across all states. That is, couples face a 0% marginal tax rate on assets up to the Federal minimum but a 100% tax rate on all assets more than twice the Federal maximum. Importantly however, some states have set their minimum and/or maximum levels at or below the Federal maximum, which has introduced cross-state variation in how much an individual can retain when assets are between the Federal minimum and twice the Federal maximum.

1.2. Moral hazard and nursing home utilization: conceptual framework

Elderly individuals in the U.S. who are unable to live independently have a variety of care options other than a nursing home including home health care, assisted living facilities, or informal care from family and friends. The incentives to choose these other options rather than nursing home care relates to many factors including the individual's health, family dynamics and income and wealth. However, the generosity of Medicaid coverage for nursing home care may also explain entry into a nursing home.

In order to generate predictions regarding the effect of state Medicaid policy on nursing home use, it is useful to begin with a standard theoretical model with market clearing in the nursing home sector. Individuals desire nursing home care, but they also value bequests for their children. If individuals enter a nursing home, there is some chance they will spend through their assets and have to rely on Medicaid, greatly reducing their bequest amount.

Loosening the eligibility restrictions for Medicaid payment of nursing home stays in such a model has two effects on nursing home utilization. The first is a mechanical effect: for any given distribution of income and wealth, more individuals will become eligible for Medicaid payment of their nursing home stays. This will increase Medicaid's share of nursing home costs, but will not affect total nursing home utilization. The second is a behavioral effect: allowing individuals to quality for Medicaid while retaining more of their assets for bequests will raise total demand for nursing home care.

Likewise, raising the amount that Medicaid pays for nursing home stays can have two effects. First, higher Medicaid reimbursement will make the marginal Medicaid admit more attractive relative to the marginal private-pay admit, raising Medicaid's share of nursing home beds. Second, higher Medicaid reimbursement will make the marginal patient more profitable, so that nursing homes may raise their total number of admitted patients.

Four complications to the standard model make these predictions less clear. First, state certificate-of-need (CON) and construction moratorium regulation have historically been thought to constrain the growth of the nursing home market and create excess demand for beds (Nyman, 1989; Scanlon, 1980). A CON law constrains the growth of beds by employing a need-based evaluation of all applications for any new bed construction. A home must show a clinically legitimate rationale for additional beds to a state CON board. A construction moratorium is even more stringent in that it effectively prevents any expansion within the nursing home sector. If these policies are binding, then more generous Medicaid eligibility standards or payment rates will affect the mix of payers (i.e., a greater Medicaid share) but not overall nursing home utilization. Only an increase in the state-controlled supply of beds will lead to greater utilization.

Although the nursing home market has historically operated under this excess demand model, more recent work suggests that occupancy rates have fallen in many nursing home markets and CON and moratoria are no longer binding in most instances (Bishop, 1999; Grabowski et al., 2003). It is unclear how close we have moved to a market clearing model in which the behavioral effects discussed above may operate.

The second complication of the model is that most Medicaid eligibility rule changes imply relatively small behavioral shifts along both the intensive and extensive margins. With an average annual cost of private nursing home care at US$ 70,912 in 2006 (Genworth Financial, 2006), an increase in the asset standard of US$ 1000 would delay Medicaid eligibility by less than a week. As discussed in the previous section, the two policy experiments that imply relatively larger eligibility shifts are changes in income spend down and spousal impoverishment rules.[6] It is also important to acknowledge that Medicaid eligibility changes will not be binding for very poor or very wealthy individuals. Brown and Finkelstein (2004a) provide simulation estimates on the proportion of assets protected by Medicaid across different wealth levels. As one would expect, Medicaid offers almost 100% coverage for the lowest wealth deciles and nearly no coverage for the highest deciles. Thus, although we will recognize and address this issue in our empirical models below, the behavioral effects implied by Medicaid rules changes are often small and only applicable to a particular segment of the overall wealth distribution.

The third complication to the standard model involves the elasticity of demand for nursing home care. Although there is some possibility of substitution from informal (Van Houtven and Norton, 2004) and formal (Nyman et al., 1997) care sources, nursing homes are the destination of last resort for many individuals, implying that demand is quite inelastic. Individuals generally prefer long-term care in the least restrictive setting possible (Kane and Kane, 2001), and the empirical evidence is suggestive of greater demand responsiveness among nursing home substitutes such as home health care (Lee et al., 1999) or community-based services (Weissert et al., 1988). Similarly, a preference for care from family members and friends has also been offered as a potential explanation for the limited growth of the private long-term care insurance market (Pauly, 1990). If demand for nursing home care is fairly inelastic, public policies should have only a limited effect on overall nursing home utilization, and increased Medicaid eligibility or more generous payment rates would once again predominantly change the payer mix (i.e., increased Medicaid share), not overall utilization.

A final complication to the model is the possibility that Medicaid demand may be relatively insensitive to changes in program generosity due to the prevalence of low-quality care for Medicaid recipients. Although we are not be able to adjust for facility quality in our empirical estimates, Grabowski et al. (2006) show that there is common treatment of Medicaid and private-pay patients within a nursing home. This is significant because the majority of Medicaid recipients receive care in a joint setting alongside higher revenue private-pay or Medicare residents. From the 2004 Online Survey Certification and Reporting data, 70% of Medicaid residents nationwide received care in a facility consisting of at least 20% non-Medicaid patients.

Finally, the work of Nyman (1999) raises the important interpretive issue of whether any findings of a response of nursing home use to Medicaid policy can really be labeled "moral hazard". In his "access" model, he highlights that insurance coverage has both substitution (moral hazard) and income effects, and that the latter should not be counted as a distortion. As with other papers in this literature, we are unable to separate the income and substitution effects implicit in our results. Given our lack of findings, however, this distinction may not be very important in our context.

[6] For example, the adoption of spousal impoverishment allowed community-dwelling spouses to retain as much as an additional US$ 90,000 (in 2006 dollars), which is a significant amount relative to the cost of nursing home care or mean elderly wealth.

1.3. Related work examining Medicaid rules and nursing home utilization

A series of studies have examined the effects of Medicaid policies on nursing home utilization, with mixed results.[7] Cutler and Sheiner (1994) exploited cross-state variation in Medicaid policies to examine nursing home entry across the 1982 and 1984 waves of the NLTCS. They found that the presence of a medically needy program increased the probability of nursing home use by 2.5 percentage points (relative to a mean of 15%). They also examined the effect of Medicaid "underpayment" (defined as the private-pay price minus the Medicaid payment rate) on nursing home utilization. A one standard deviation increase in underpayment (US$ 4.60 per day) lowered the probability of nursing home use by 1.7 percentage points. Hoerger et al. (1996) combined Medicaid payment and eligibility measures into a single variable measuring the Medicaid "discount" – the difference between the projected revenue a nursing home would receive if the sample person never qualified for Medicaid and the projected revenue taking into account when the sample person would qualify for Medicaid and the corresponding Medicaid payment rate. When Medicaid extracted an additional US$ 10,000 from nursing homes in expected discounts, it reduced the probability of nursing home entry by 0.016 (relative to a mean of 0.10). In terms of other Medicaid policies, an increase in the ratio of nursing home beds in the state per 100 individuals aged 75 and older increased nursing home utilization by 0.016.

Other studies suggest little behavioral effect of Medicaid policy on nursing home use. Using cross-sectional data from the 10-site National Long-Term Care Channeling Demonstration from the early 1980s, Reschovsky (1996) found that both Medicaid income and asset tests were not associated with an increase in nursing home entry. Norton (1995) analyzed the effect of the Medicaid asset limit on spend down using two different cross-sectional samples, the 1989 Panel Survey of Income Dynamics and the 1999 Longitudinal Study of Aging. Because most nursing home stays are short and even most long stays do not result in a transition from private-pay to Medicaid, an increase in the Medicaid asset limit was found to have a minimal effect on the percentage of residents who spent down, and thus, overall Medicaid utilization. The results were actually suggestive of a Medicaid "stigma" effect. Barring any behavioral effects, the time to spend-down is predictable from an individual's income and wealth. However, the predicted time to spend-down was found to be less than the actual time to spend-down, suggesting that the elderly receive transfers to avoid Medicaid eligibility.

Finally, using the 1989 and 1994 waves of the NLTCS, Norton and Kumar (2000) employed a differences-in-differences approach to examine nursing home utilization before and after the adoption of the MCCA spousal impoverishment rules across single and married individuals. The authors found that there was no increase in nursing home use for married people relative to single people following the MCCA.

In sum, the evidence for Medicaid eligibility criteria having a moral hazard effect on nursing home utilization is mixed. However, there are several limitations of the existing literature worth noting. Most importantly, with the exception of the Norton–Kumar study, all the studies are

[7] There is also research examining the effect of Medicare payment policy on post-acute nursing home use. The structure of the Medicare nursing home benefit requires an increasing copayment over time with full coverage on days 1–20 following an inpatient hospital stay, partial coverage on days 21–100, and no coverage after day 100. Garber and MaCurdy (1993) estimated a discharge hazard function for Medicare residents and found large peaks around day 20 and day 100, implying that post-acute nursing home use is quite price sensitive. However, the significant differences in the post-acute and chronic care nursing home populations makes it difficult to generalize the Medicare results to the chronic care (i.e., Medicaid) side of the market.

based on cross-state variation in Medicaid policies, which may lead to biased estimates due to unobserved heterogeneity. For example, states where demand for nursing home use is particularly high may be more or less inclined to have generous Medicaid policies. The one study that is not subject to this criticism is the Norton–Kumar analysis, which compares nursing home utilization before and after the MCCA across single and married individuals. However, this study imposes a different identification assumption that may be problematic: that there are no differential trends in the demand for nursing homes between single and married individuals around the time of the MCCA.

A second limitation is that studies have generally not considered the full menu of Medicaid policies in a common framework, but rather have focused on specific aspects of state Medicaid rules. Finally, several of the older studies do not account for recent changes in the market for nursing home care such as the decline in the importance of CON laws in many states (Grabowski et al., 2003). Our study addresses these limitations by exploiting within-state variation in a full menu of state Medicaid rules using five waves of the NLTCS (1982–1999). By using within-state changes, we can include state fixed effects to control for secular differences in demand across states. We can also control for differential trends between married and single elderly as well.

2. Data and methods

Our source of nursing home utilization data is the National Long-Term Care Survey (NLTCS). The NLTCS is a longitudinal sample with replacement of all Medicare-eligible individuals. We use all five waves of the NLTCS: 1982, 1984, 1989, 1994 and 1999. In 1982, the NLTCS sampled only community-dwelling individuals, but in subsequent waves, both community-dwelling and institutionalized individuals were entered into the sample.

We model nursing home utilization based on whether an individual was in a nursing home at the time of the NLTCS survey. Because the 1982 wave sampled only community-dwelling elderly, this wave is excluded from this approach. In order to avoid short stays in nursing homes that are paid for by Medicare, and are therefore not affected by Medicaid incentives, we drop Medicare-financed nursing home stays from the file, although our results are robust to retaining these observations.[8]

In addition to nursing home use, the NLTCS contains extensive data on the sample person's demographics, health and wealth. Summary statistics for all the variables are contained in Table 1.

A critical input into this effort is data over a long span of time on Medicaid policies towards nursing homes. Although there have been efforts to summarize state Medicaid policy for a given point in time (Bruen et al., 1999, 2003; Kassner and Shirey, 2000; Schneider et al., 1999), we are not aware of a published source summarizing these policies over time. Thus, after compiling as much information as possible from the cross-sectional efforts, we conducted our own survey of state Medicaid officials regarding eligibility policy for nursing home care for the period 1982–1999. Based on this survey, we construct a range of state Medicaid policies that may affect nursing home utilization.[9] We assign these rules to individuals in the NLTCS by state, year and marital status.

[8] Some long-term care may be delivered in facilities that are not certified for Medicaid reimbursement. Unfortunately, the NLTCS only breaks out the type of facility in two of our four waves, so we cannot restrict the sample to those facilities. However, tabulations for those years show that 83% of stays are in facilities that we know are certified, and only 10% are in facilities that we know are not certified, with 7% uncertain. Thus, this issue is unlikely to significantly affect our analysis.

[9] These policy variables are available upon request from the authors.

Table 1
Summary statistics (using sample weights)

	Mean	Standard deviation
Nursing home use	0.046	0.210
Spend-down provision	0.66	0.47
Income test	619	1,026
Asset test	3,234	1,323
Spousal asset test	12,928	26,372
Medicaid payment rate	84.13	25.79
Beds per 100 elderly (age 65+)	5.33	1.55
Certificate-of-need/moratorium	0.90	0.30
Age	74.49	7.44
Female	0.59	0.49
White	0.88	0.32
Black	0.09	0.28
Other race	0.02	0.13
Married	0.53	0.50
Number of children	2.52	2.17
Income: less than US$ 15,000	0.40	0.49
Income: US$ 15,000–29,999	0.22	0.41
Income: US$ 30,000–49,999	0.09	0.28
Income: US$ 50,000	0.05	0.22
Income: missing	0.25	0.43
Activities of daily living score	0.55	1.44
Hospitalized in last year	0.21	0.41
N	25,697	

Notes: Data include the 1984, 1989, 1994 and 1999 National Long-Term Care Survey waves.

We analyzed six policies in particular. First, as noted in the previous section, a number of states have spend-down provisions through either medically needy programs or 209(b) status. Thus, we included a dummy for "spend-down" in our models. Between 1982 and 1999, Georgia (1990), Louisiana (1993), New Jersey (1995), Oregon (1986), Rhode Island (1986) and Tennessee (1989) all adopted spend-down rules with Oregon (1991) eventually repealing these provisions. Observations in these six states account for 11% of our sample. These changes allow us to identify the effect of introducing a spend-down provision on utilization, while conditioning on state differences in tastes for nursing home care through state fixed effects. Given that these rules changes rarely coincide with the NLTCS panel years, we are generally estimating long-run effects of spend-down rules. Our results are robust to dropping Tennessee from the analysis, the only state which changed their spend-down rules in a NLTCS panel year.

Second, the actual income standard used to qualify for Medicaid may also be important in those states without spend-down provisions. Based on our conversations with state officials, the income standard is not an important barrier towards determining eligibility in states with spend-down provisions, because the high cost of nursing home care (that is effectively added on to the state income test level) swamps the income test in importance. Thus, we set the income standard equal to zero in those states with spend-down provisions, given that the spend down dummy variable described above accounts for the impact of the very high income limits on savings.

Third, in addition to the income test, we also included the asset test used to qualify for services. Over the period 1982–1999, 35 states set their asset standard directly from the SSI asset limit: a limit for unmarried individuals of US$ 1500 in 1982, a series of US$ 100 increases beginning in the mid-1980s, and the establishment of today's limit of US$ 2000 in 1990. Other states were

slightly above or below this limit. Given that the asset limits in most states have remained relatively constant in nominal terms, these policies have become more generous over time in real terms.

Fourth, one important policy innovation over our period of study was the adoption of the spousal impoverishment rules in 1990 under the MCCA. Prior to the MCCA, the community-dwelling spouse was able to retain US$ 2000 of jointly held assets. Following the MCCA, there was no cross-state variation in the spousal rules for couples with assets below the Federal minimum or twice the Federal maximum. However, for couples within this interval, states varied in their generosity based on the state-mandated minimum and maximum standards. Clearly, states that set their minimum asset standard near the Federal maximum were the most generous and states that set their maximum asset standard near the Federal minimum were the least generous. In 1990, the minimum standard in 17 states approached the Federal maximum level, and by 1995, this had increased to 20 states with Colorado, Maine and Massachusetts all substantially increasing their asset limit. In order to quantify the generosity of the spousal rules across states in our empirical models for the post-MCCA period, we set our spousal impoverishment variable equal to the amount a community-dwelling spouse would retain if the couple's assets were exactly equal to the Federal maximum.[10] For the pre-MCCA years (1984 and 1989 waves), we set the variable equal to US$ 2000 for married individuals; the variable was set to zero for non-married individuals in all waves.

Fifth, we include a measure of the real Medicaid payment rate per day of nursing home care. Finally, we control for supply side restrictions on nursing home care. We do so in two ways. First, we include a dummy variable measuring whether a state had either a CON or a moratorium in place for a given state-year. At the beginning of our study period, every state had a CON law in place. Over our period of study, 10 states repealed their CON law without instituting a moratorium. The disadvantage of this measure is that it is a relative crude indicator of the overall tightness of state policy towards nursing home capacity. Thus, we also include a common measure from other studies, the number of beds per elderly individuals (age 65+) in the state. On the other hand, this measure has the clear potential to be endogenous to demand for nursing home care, so we present results both including and excluding this measure. Data on the Medicaid payment rate and the supply constraints were obtained from multiple editions of the *State Data Book on Long-Term Care Program and Market Characteristics* (Harrington et al., 1999) and unpublished data from Harrington and co-workers. The population data were obtained from the U.S. Bureau of the Census.

The basic model specification is as follows:

$$\mathrm{NH}_{ijt} = \alpha + \beta \mathrm{POLICY}_{ijt} + \gamma X_{ijt} + \nu_i + (\lambda_t \nu_i) + \eta_j + \lambda_t + \varepsilon_{ijt} \quad (1)$$

where i indexes individuals, j states, and t years, NH an indicator of nursing home use, POLICY the vector of the policy variables based on state–year–marital status described above, X the set of individual characteristics, and ν_i, η_j and λ_t are marriage, state and year fixed effects. An

[10] We chose the Federal maximum because it is the asset level with the greatest cross-state variation for determining Medicaid eligibility. For example, in 1999, the Federal minimum was US$ 16,392 and the Federal maximum was US$ 81,960 with states varying in how they set their minimum/maximum standards. For a couple with assets totaling US$ 81,960, the community-dwelling spouse retained US$ 16,392 in Arizona, US$ 49,176 in Texas and the full US$ 81,960 in California. Thus, the nursing home spouse would have to spend-down US$ 65,568 in Arizona, US$ 32,784 in Texas, and US$ 0 in California before qualifying for Medicaid. Our results were robust to applying other assets levels and also to using a cumulative measure of total assets retained by the community-dwelling spouse over the Federal minimum to twice the Federal maximum range.

interaction of marriage and year ($\lambda_t \times \nu_i$) is also included. Thus, the model is identified by within-state variation in policies over time. X includes age, gender, marital status, race/ethnicity, and the number of children.[11] In addition to these clearly exogenous indicators, we also include measures of health and income. For health, we control for the number of activities of daily living (bathing, dressing, eating, toileting, transferring out of bed, and walking) for which the individual requires assistance; for income, we include the following dummies for an individual's annual income: less than US$ 15,000, US$ 15,000–29,999, US$ 30,000–49,999, US$ 50,000 or greater, and income missing.[12] The health and income measures are potentially endogenous to nursing home utilization, but are also very important correlates of nursing home use, and their inclusion significantly increases the precision of our policy estimates. In order to assess the potential bias from the endogeneity of these measures, we also present models that exclude them.

All models are adjusted using the NLTCS weights. One concern with the approaches discussed above is autocorrelation in outcomes and policies. To address this concern, we correct the standard errors for autocorrelation using the Huber/White estimator and relaxing the independence assumption within states by specifying the "robust cluster" option in Stata.

3. Results

3.1. Basic results

The first set of results is based on a standard two-way fixed effects specification, which exploit within-state variation in policies over time (see Table 2). These models are estimated as probits, but the coefficients are presented as marginal probability effects.

The first column of Table 2 presents the coefficients of interest from a regression specification that includes all of the controls described above. The coefficients of all of the policy variables in this specification are statistically insignificant, and are typically even wrong-signed. That is, we find no statistical evidence here that any changes in Medicaid generosity within states affect the rate of nursing home utilization. Moreover, a Wald test that the policy parameters are jointly equal to zero cannot be rejected at conventional levels of significance.

The estimated effects are substantively insignificant as well, and given the small standard errors we can rule out meaningful effects of Medicaid policy.[13] For example, the estimated coefficient on the availability of a spend-down program indicates that such a program *lowers* nursing home utilization by 0.01 percentage points, with a standard error of 0.07 percentage points. The resulting confidence interval implies that we can rule out an effect of introducing a spend-down program of more than 0.13 percentage points. This is less than 3% of the baseline nursing home utilization rate

[11] In an unreported robustness check, we also controlled for the gender of the children, but the inclusion of this variable did not change our policy results.

[12] In constructing the income dummies, the NLTCS collected slightly different income data for the institutionalized elderly. For these individuals, the low category cutoff is US$ 14,400 rather than US$ 15,000 and the high category cutoff is US$ 48,000 rather than US$ 50,000. We did not include assets in the model, because the NLTCS did not collect this measure in the 1999 wave.

[13] Given the large number of state policies in the model, the standard errors may have been biased upwards due to multicollinearity. As a robustness check, we compared our main specification with all the policy variables to specifications entering each policy into the model independently. The point estimates were quite similar across these approaches, but as one would expect, the standard errors were slightly smaller in the models with each policy entered independently. This check provides further support towards ruling out any Medicaid policy effects.

Table 2
Effects of Medicaid policies: basic specification

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
Spend-down provision	−0.0001 (0.0007)	0.0024 (0.0040)	−0.00001 (0.0007)	0.0008 (0.0005)	−0.0003 (0.0010)
Income test (US$ 10,000)	−0.0005 (0.0029)	0.0160 (0.0123)	−0.0005 (0.0029)	0.0025 (0.0023)	−0.0008 (0.0030)
Asset test (US$ 10,000)	−0.0014 (0.0012)	−0.0124 (0.0099)	−0.0009 (0.0011)	−0.0003 (0.0016)	0.0008 (0.0010)
Spousal asset test (US$ 100,000)	−0.00003 (0.0012)	0.0003 (0.0049)	−0.0001 (0.0012)	−0.0007 (0.0013)	0.0007 (0.0011)
Medicaid payment rate (US$ 100)	−0.0002 (0.0017)	−0.0082 (0.0143)	−0.0001 (0.0018)	0.0009 (0.0018)	−0.0005 (0.0026)
Certificate-of-need/moratorium	−0.0007 (0.0006)	−0.0062 (0.0026)	−0.0006 (0.0007)	−0.0008 (0.0009)	−0.0015 (0.0012)
Beds per 100 elderly (age 65+)	0.0006 (0.0003)	0.0036 (0.0020)	–	0.0007 (0.0003)	0.0006 (0.0008)
Includes health/income	Y		Y	Y	Y
State-specific time trends					Y
Nursing home outcome	Use	Use	Use	Entry	Use
Wald test (probability > χ^2)	5.48 (0.60)	11.33 (0.12)	1.57 (0.95)	11.42 (0.12)	5.35 (0.62)
N	23,630	24,079	23,630	11,984	23,630

Notes: All models adjust for age, gender, marital status, race/ethnicity, and the number of children and include state, year and year × marriage fixed effects. Estimates are generated with a probit model and marginal effects are presented with standard errors in parentheses. The Wald test includes all the policy variables in the model specification.

of 4.6 percentage points. So we can rule out any substantive effects of introducing a spend-down program on utilization rates.

The coefficient on the level of the income limits, which applies to the non-spend-down states, indicates that a US$ 1000 increase in income limits *lowers* nursing home use by 0.005 percentage points. The confidence interval on this estimate is also sufficiently small such that we can rule out an estimated effect of doubling the mean income limit (US$ 619/month) of more than 0.03 percentage points, or only 0.66% of baseline utilization rates. The estimates on asset limits, both own and spousal, are likewise trivially small and tightly estimated.

On the supply side, we also get a substantively small effect of reimbursement rates on utilization. The coefficient suggests that raising reimbursement rates by US$ 100/day lowers utilization by 0.02 percentage points. At the mean daily reimbursement rate of US$ 84, the confidence interval implies that we can rule out a utilization effect of doubling the daily reimbursement rate of more than 0.27 percentage points, or 6% of baseline utilization rates. The estimated effect on CON/moratoria is the expected sign but insignificant, implying that such a policy lowers the odds of utilization by 0.07 percentage points, or 1.5% of baseline (with an upper bound of the confidence interval of 0.19 percentage points, or 4.1% of baseline). Finally, our coefficient estimates suggests that increasing supply by one additional nursing home bed per 100 elderly increases utilization by 0.06 percentage points, which amounts to slightly more than 1% of baseline, and it is also insignificant.

Thus, this model suggests only very modest impacts of increased policy generosity on nursing home utilization. Perhaps more importantly, our estimates are sufficiently precise to rule out any likelihood of large effects of Medicaid policies.[14]

3.2. Sensitivity to specification

In estimating the model shown in the first column of Table 2, we included two types of potentially endogenous variables. The first is measure of income and health. Income may be endogenous to Medicaid policy through spend-down behavior, while (reported) health may be endogenous through "justification effects": individuals whose nursing home behavior changes in response to Medicaid policy changes may justify this by changing their reported health status. Thus, in column (2) of Table 2, we show the effects of excluding the income and health measures.

Excluding these measures has no effect on our basic conclusions: all of the policy variables remain insignificant, and often wrong-signed. But there is a dramatic effect on the confidence intervals, as the standard errors rise by a factor of 5–10 when these variables are excluded. This reflects the critical role that the health variables in particular play in explaining nursing home utilization; indeed, the partial R-squared associated with the health variables is 0.32. Thus, potential concerns about endogeneity may not be sufficient to overcome the loss of precision when the measures are excluded. Nevertheless, when the health variables are excluded from the model, the imprecise estimates do not allow us to rule out large Medicaid policy effects.

In column (3) of Table 2, we address another potential endogeneity concern by excluding the beds per elderly measure from the regression. This has little effect on the results.

[14] Another prediction of the theoretical model discussed earlier was that more generous Medicaid policy would lead to a shift in payer mix towards Medicaid. We have estimated models among nursing home residents where the dependent variable is Medicaid status, but the results were imprecise and we could not rule out zero or large effects on payer mix.

3.3. Robustness to alternative measure

Because our rejection of moral hazard effects is so strong, we want to ensure that it does not result from the particular construction of our data. In this subsection, therefore, we consider an alternative measure of nursing home utilization: transition rates. That is, rather than modeling the cross-sectional probability of being in a nursing home, we model the probability of transitioning from the community into the nursing home, paralleling work by Cutler and Sheiner (1994) and others. Thus, we limit the data to only those observations that had a preceding NLTCS survey indicating the individual was residing in the community.[15]

The result of using this alternative approach is shown in the fourth column of Table 2. The results are very similar to those shown in the first column: little evidence of an effect of any policy, although there is a significant effect of the number of beds per elderly. Once again, the standard errors are very small, so that confidence intervals are tight. Thus, even using this alternative transition-based measure, there is no evidence that Medicaid policy changes affect nursing home utilization.

3.4. State-specific trends

The working assumption of the analysis thus far has been that changes in state Medicaid policy are exogenous with respect to changing demand for nursing home care. Although this would seem to be a plausible assumption, we can assess its robustness in two ways. The first is to include in the model state-specific linear time trends. These trends allow for a slowly evolving change in tastes for nursing home care across states. By including them in the model, we control for the possibility that states where there is generally growing/shrinking demand for nursing home care are the ones where policies are changed to facilitate or mitigate nursing home utilization.

The fifth column of Table 2 shows the results of including these trends. In fact, we find that including these trends has relatively little effect on any of the estimated policy coefficients, although the estimates become more imprecise. The one particularly notable effect is that the coefficient on beds per elderly becomes insignificant, although this arises from an increase in the standard error, not a change in the coefficient estimate.

3.5. Results by income group

Medicaid eligibility rules are not equally binding across the income and wealth distribution. In particular, Medicaid offers almost 100% coverage for the lowest wealth deciles and nearly no coverage for the highest deciles (Brown and Finkelstein, 2004a). Thus, the types of Medicaid rule changes we exploit in this paper—the adoption of income spend-down or spousal impoverishment rules, for example—will be largely irrelevant towards establishing Medicaid eligibility for the very poor and the very wealthy. In an effort to determine whether there are large policy effects for the intermediate group, we next present estimates for our primary model specification (Table 2, column 1) conditional on four income groups: less than US$ 15,000, US$ 15,000–29,999, US$ 30,000–49,999, and US$ 50,000 or greater.

[15] Put alternatively, an observation was dropped from this specification if it was the respondent's initial NLTCS survey or if the prior NLTCS survey indicated nursing home residence. The sample size for this specification was 11,984 (compared with 23,630 in the main specification) and the number of unique individuals was 7939 (compared with 15,609).

Table 3
Effects of Medicaid policies by income level

Variable	Model 1 (Table 2)	Income: <US$ 15,000	Income: US$ 15,000–30,000	Income: US$ 30,000–50,000	Income: >US$ 50,000
Spend-down provision	−0.0001 (0.0007)	0.00001 (0.00004)	0.0004 (0.0002)	0.0004 (0.0003)	−0.0018 (0.0066)
Income test (US$ 10,000)	−0.0005 (0.0029)	−0.00001 (0.00018)	0.0020 (0.0016)	0.0004 (0.0010)	0.0013 (0.0187)
Asset test (US$ 10,000)	−0.0014 (0.0012)	0.0002 (0.0002)	0.0011 (0.0009)	0.0001 (0.0007)	0.0097 (0.0205)
Spousal asset test (US$ 100,000)	−0.00003 (0.0012)	−0.0001 (0.0001)	0.0002 (0.0002)	0.0002 (0.0002)	−0.0003 (0.0036)
Medicaid rate (US$ 100)	−0.0002 (0.0017)	−0.00001 (0.00006)	0.0003 (0.0013)	0.0001 (0.0004)	−0.0061 (0.0159)
Certificate-of-need/moratorium	−0.0007 (0.0006)	0.00001 (0.00002)	−0.0002 (0.0002)	0.00003 (0.00012)	0.0023 (0.0033)
Beds per 100 elderly (age 65+)	0.0006 (0.0003)	−0.0001 (0.0001)	−0.00001 (0.00020)	0.0009 (0.0005)	−0.0165 (0.0182)
Wald test (probability > χ^2)	5.48 (0.60)	10.68 (0.15)	4.44 (0.73)	185.69 (<0.001)	4.73 (0.69)
N	23,630	8807	3292	1337	1061

Notes: All models adjust for health, age, gender, marital status, race/ethnicity, and the number of children and include state, year and year × marriage fixed effects. Estimates are generated with a probit model and marginal effects are presented with standard errors in parentheses. The Wald test includes all the policy variables in the model specification.

Before reviewing the results, there are several caveats worth mentioning in the interpretation of these estimates. First, because assets were not collected in the 1999 NLTCS wave, we are only able to break out the primary results by income level. If income and assets are positively correlated within our sample, this omission will not pose a major problem, but if they are not correlated, the intermediate income groups may not identify the marginal treatment group for asset-based policies such as spousal impoverishment. Second, missing data are a significant concern; income is missing for roughly 40% of the sample in our baseline specification (Table 2, column 1). Thus, when we break out the data into the four income groups in the context of these missing data, we will inevitably lose precision in our estimates. Specifically, across the four income groups, the sample size ranges from 1061 (for income US$ 50,000 or greater) to 8807 (for income less than US$ 15,000).

The results by income group are presented in Table 3 (along with the full model specification from column 1 in Table 2 for comparative purposes). As one would expect, the coefficient estimates are largest for the two intermediate income groups across several key eligibility variables including the spend-down provision, the income test and the spousal asset test. The US$ 30,000–50,000 income category is the only specification in which we are able to reject ($p < 0.001$) the Wald test that the policy parameters are jointly equal to zero. This serves as a useful specification check towards establishing that the Medicaid eligibility rules are indeed most binding for the expected groups. Nevertheless, the coefficient estimates are rarely statistically significant and the size of the standard errors still allows us to reject meaningful effects even for these intermediate income groups. In using the estimates from the second income group (US$ 15,000–30,000), the resulting confidence interval implies that we can rule out an effect of introducing a spend-down program of more than 0.08 percentage points. This is 5% of the baseline nursing home utilization rate of 1.6 percentage points for this income group. Similarly, if the spousal impoverishment limit was increased by US$ 100,000, we can also rule out an effect less than 3% of the baseline nursing home utilization rate. Although the confidence intervals are slightly larger, we can also rule out large policy effects when either the income or asset test is increased by US$ 10,000. Similar results hold when we conduct these comparisons for the third income group (US$ 30,000–50,000). Thus, the findings basically confirm our conclusions for the whole sample, although with less precision in certain instances.

4. Conclusions

The optimal policy for long-term care expenditures under Medicaid is a critical issue facing state governments in the 21st century. Long-term care expenditures have been growing explosively, putting enormous pressure on state budgets. At the same time, tight asset limits threaten to weaken asset accumulation in the U.S. and leave many without access to public coverage of this enormous expense, and reduced reimbursement for nursing homes threatens the quality of care delivered in those homes. The appropriate resolution of this tension is a central issue for public health policy.

One important input into this resolution is an understanding of the elasticity of demand for nursing home care with respect to public program generosity: does more generous Medicaid policy towards nursing homes lead to more nursing home utilization? We have addressed this question through a careful empirical framework which incorporates the range of relevant nursing homes policies. Doing so, we find consistent and clear evidence that nursing home utilization is inelastic with respect to state policies. Thus, the large increase in nursing home expenditures over the past few decades is not likely attributable to increased generosity in state Medicaid payment programs.

This result has important policy implications in the context of the 2005 Deficit Reduction Act (DRA), the first major Federal changes to Medicaid eligibility rules since the 1990 spousal impoverishment rules. The DRA tightened the asset rules for Medicaid nursing home eligibility in several ways, but one important change involved the treatment of housing equity. Prior to the DRA, housing was an exempt asset towards establishing Medicaid eligibility, but the law makes individuals with more than US$ 500,000 in home equity ineligible for Medicaid nursing home benefits (states have the option to raise this threshold to US$ 750,000). This rule change does not apply if the individual has a spouse, minor child or disabled child (any age) living in the house. Thus, in addition to meeting the other Medicaid financial eligibility rules, an individual would have to cover their nursing home costs by "spending down" any housing equity above the limit before qualifying for Medicaid coverage.

Although the Congressional Budget Office projects significant Medicaid savings from this rule change, our findings suggest that savings will result from a decrease in the Medicaid share of total nursing home days rather than a decrease in overall utilization. That is, individuals who previously qualified for Medicaid nursing home care will now pay privately for these services. Our results are not suggestive of large behavioral effects in which individuals who do not qualify for Medicaid seek care in non-nursing home settings. That said, it will be interesting to monitor whether these rule changes imply other behavioral effects such as increased private long-term care insurance purchase or a re-structuring of exempt and non-exempt assets among the elderly. These types of effects are outside the scope of this current study, but interesting areas for further research.

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