Family, Income, and Medicaid Policy: Modeling Long-Term Care Decisions

by

Selena Caldera

LBJ School of Public Affairs

University of Texas at Austin

Abstract

Providing care for older family members is a difficult and costly decision that many families face. Formal long-term care (LTC) in a facility outside the home is expensive and informal caregivers may incur high opportunity costs, including limiting work hours or forgoing employment. Medicaid is the only public option for LTC services in the U.S., but income eligibility guidelines and service options vary by state. The relatively small share of aged Medicaid beneficiaries generates a disproportionately large share of total spending. Given the high cost and increasing demand for LTC as a result of population aging, understanding what factors into the decision between informal and formal LTC is critical to effective policymaking.

Existing research focuses on individual LTC types and ignores how characteristics of elders, family members, and Medicaid LTC policy jointly factor into decisions between LTC types. A smaller body of research considers how characteristics of the elder at risk, the family, and some community-level factors influence decisions between LTC types, but this research suffers from some common conceptual problems with the state space of LTC alternatives and the specifying the population at-risk of LTC.

I incorporate longitudinal data on elders, potential caregivers, and state Medicaid policy in an event history model to examine how these characteristics factor into individual LTC decisions. Preliminary findings indicate that Medicaid eligibility is the strongest enabling characteristic in the model, motivating a more detailed look at the influence of state policy variation on LTC decisions.

Longer life expectancy and the aging of the Baby Boom generation places growing pressure on American families and federal and state governments to meet the need for long-term care. In 2015, 34 million adults in the U.S. were caregivers for a family member age 50 or older and this trend is expected to continue with the aging of the rest of the Baby Boom generation (National Alliance for Caregiving & AARP Public Policy Institute, 2015; Schulz & Eden, 2016; The MetLife Mature Market Institute, National Alliance for Caregiving, & Center for Long-Term Care Research and Policy New York Medical College, 2011). The lifetime risk of nursing home use is also higher than previous estimates suggested, with half of all Americans projected to spend some time in nursing home care (Hurd, Michaud, & Rohwedder, 2017). Both formal long-term care, in a nursing home or by a home health worker, and informal long-term care, caregiving by a spouse or adult child, incur significant costs. Who bears the burden of those costs, however, differs by long-term care type and policy context.

Formal long-term care is costly, averaging $3000 to $8000 per month (Genworth Financial, 2018). The opportunity cost of informal care, potential lost wages, is estimated at $522 billion annually (Chari, Engberg, Ray, & Mehrotra, 2015). With no universal public provision of care, these costs are borne by the elder or caregivers. Means-tested state Medicaid is the only publicly-funded option for long-term care, but income eligibility and service alternatives vary widely across states. Spending for long-term care makes up a disproportionately large share of all Medicaid spending given that elder beneficiaries receiving that care make up only 8 percent of all beneficiaries (Thach & Wiener, 2018). The growing number of older Americans needing long-term care will place ongoing financial pressure on federal, state, and family budgets. These financial pressures make it critical to effective policymaking to understand the factors influencing decisions between formal and informal long-term care.

Previous research has examined transitions into formal or informal long-term care separately (Carmichael, Charles, & Hulme, 2010; Doty, Jackson, & Crown, 1998; Himes, Jordan, & Farkas, 1996; Noel-Miller, 2010; Liliana E. Pezzin, Pollak, & Schone, 2009; Pillemer & Suitor, 2013) establishing a foundation of knowledge on the factors influencing transitions into formal and informal long-term care, separately. This research, however, tells us little about how these factors fit into the competing risk of transitioning into formal or informal care. A smaller body of research adopts a dynamic approach to understanding transitions into competing types of long-term care over time (Dostie & Léger, 2005; Hiedemann, Sovinsky, & Stern, 2018; Sovinsky & Stern, 2016). This research attempts to incorporate factors of the individual, his or her family, and the community into these models, reflecting the life course factors that influence life transitions.

This research builds on this latter body of research to understand how characteristics of the elder, his or her partner, and their children factor into decisions between informal care, formal care, and no care. I then examine how community factors, like the Medicaid eligibility rules and Medicaid long-term care options (forthcoming) moderate the relationship between individual and family characteristics and the type of long-term care chosen. I improve on previous research designs by limiting the analysis to elders observed to experience some disability putting them at risk of needing care, including no care as an outcome, and incorporating a broad set of individual, family, and community characteristics.

Background

Life expectancy has increased for aging Americans since 1990, and despite theories arguing this would be accompanied by shorter periods of morbidity and disability (Fries, 2005), later-life disability is still a common feature of aging (Freedman, 2018). In 2016, just over one-

third of older Americans reported experiencing some type of disability on the American

Community Survey and the prevalence of disability and limitation increased among those 75

years and older (Administration for Community Living, 2017). Various simulation models show

increases over the next 50 years in the number of elders living with disability (Thach & Wiener,

2018) which will drive continued demand for long-term care. Long-term care is costly, whether

it is formal (nursing facility and home health care) or informal (family caregiving) long-term

care.

Long-term Care is Costly

In 2018, the average cost of nursing home care in the U.S. was between $7,000 to $8,000

per month with monthly home health averaging at about half that cost (Genworth Financial,

2018). Few Americans purchase long-term care insurance (Johnson, 2016) and with no universal

public provision of long-term care, elders needing care must pay out-of-pocket for services or

spend down their assets until they qualify for means-tested Medicaid Long-Term Services and

Supports (LTSS) (Norton, 1995).

States vary widely in income eligibility guidelines for, coverage of, and the types of

service alternatives in their Medicaid LTSS plans. Medicaid's aged and disabled beneficiaries

make up a small share of all beneficiaries, but LTSS spending accounts for a disproportionately

larger percentage of all Medicaid spending (Thach & Wiener, 2018). Medicaid LTSS spending is

projected to continue increasing in the future as the U.S. population ages. Because Medicaid is

jointly funded by state and federal governments, growth in Medicaid costs places pressure on

both state and federal government budgets.

Older persons experiencing disability necessitating regular living assistance may also turn

to spouses or adult children for care. While familial caregiving may incur less cost than formal

long-term care for the elder, it can impose significant economic burden on the caregiver. Chari, Engberg, Ray, and Mehrotra (2015) estimated that the opportunity cost of informal care provided to older Americans was $522 billion annually. Informal caregiving may reduce costs to elders at risk and state governments, but the opportunity cost borne by caregivers in lost wages and savings may threaten the economic well-being of caregivers as they age. Financial and practical support for caregivers that might minimize the opportunity cost of care, whether through Medicaid home and community-based services, local aging agencies or other programs, also varies across states (Schulz & Eden, 2016).

The high costs of long-term care and the growing demand for care make it important to understand what factors influence individual choices between forgoing care, formal care, and informal care. Understanding the factors shaping long-term care decisions can help us explore different patterns in care choices and the potential outcomes of those patterns of choices. Are certain groups of elders more likely to rely on family caregiving? Does reliance on informal caregiving impose disproportionate economic or health burdens on those groups of families? As states adjust their Medicaid plans to respond to population aging, do these policies shape individual decisions between care types?

Factors influencing Formal and Informal Care

Transitions from independent, disability-free living to relying on assistance with daily activities constitute significant life transitions common to the aging process. Life course theory broadens the perspective on which factors shape individual long-term care decisions (Elder, Kirkpatrick Johnson, & Crosnoe, 2003) to include not only individual economics and preferences, but also the individual's history, family context, and social circumstances. Individual preferences for formal or informal care will be constrained or reinforced by individual

factors, like an elder's economic status and their level of limitation. Institutional factors, such as state Medicaid policies, may also create opportunities or constraints.

Some states have used waiver programs to expand the range of Medicaid LTSS options to include informal care options. Such states have implemented plans to increase the home and community-based options in their Medicaid programs (Lester, Irvin, Mosca, & Bradnan, 2015; Reinhard, Kassner, & Houser, 2011; Thach & Wiener, 2018) and introduced caregiver support initiatives within their Medicaid programs and other aging-related agencies (Schulz & Eden, 2016). Not all states, however, have Medicaid waivers allowing the expansion of long-term care options and coverage of elders at-risk of care. Variation in state income and resource limits for Medicaid LTSS eligibility can also determine the set of care choices available to elders.

Because informal care relies on family interdependency, the decision between long-term care types is a family decision. Past research has demonstrated that economic and demographic family characteristics greatly influence long-term care type. Family structure, such as the presence of adult children or a spouse, has been shown to influence the risk of nursing home admission (Freedman, 1996; Noel-Miller, 2010). Employment has been found to have a negative effect on potential caregivers' willingness to provide care (Carmichael et al., 2010; Nizalova, 2012) and the hours of care provided by current caregivers (Doty et al., 1998). Other studies have found that the geographic proximity of adult children to a parent, children's marital status, and gender are all important factors in decisions to provide informal care (Himes et al., 1996; L. E. Pezzin, Pollak, & Schone, 2015; Pillemer & Suitor, 2013).

This body of literature has helped researchers and policymakers understand who takes on the duties of providing informal care and the factors determining take up of certain types of long-term care. It tells us little, however, about the competing risks of formal care, informal care, and

foregoing care. Another set of studies examine the competing risks of different long-term outcomes using longitudinal research methods that model the transition into long-term care as a dynamic process.

Literature on the Competing Risks of Long-term Care

Sovinsky and Stern (2016) review the development of a dynamic approach to modelling decisions about long-term care arrangements that accounts for the sources of time-varying effects in this transition. Earlier studies of transitions into formal or informal long-term care used cross-sectional approaches that are subject to several sources of endogeneity. Cross-sectional studies, moreover, cannot address the initial conditions problem of whether the unobserved characteristics or history of individuals under study predisposes them to some transition. In long-term care studies, these unobserved conditions could be prior experience with disability or long-term care. The other primary concerns in modelling long-term care decisions are state dependence (influence of time in the current state on transitions in the future) and parent- and child-specific, unobserved heterogeneity (varied individual preferences for care types).

Dostie and Leger (2005) use the parental histories that respondents recount in the Parental Health Supplement of the Panel Survey of Income Dynamics in a random-effects, competing risks model of transitions between independence, cohabitation, nursing home care, and death. The PSID supplement limits informal caregiving to care provided in the context of cohabitation. The authors find that family structure influences transitions into and out of nursing home care. The initial conditions problem is resolved by first observing all elders at a state of independent living before limiting the sample to those persons unable to live independently.

Heidemann, Sovinsky, and Stern (2018) use a similar methodology to model the primary care arrangement using the Assets and Health Dynamics Among the Oldest Old

(AHEAD)/Health and Retirement Study (HRS). They expand the outcome set to include home health care, care by a spouse, and care by an adult child and incorporate some family characteristics, regional long-term care market indicators, and measures of the generosity of Medicaid eligibility policy. The results of this study point to the expected influence of family structure on provision of informal care and on who provides that care and, notably, finds that more generous Medicaid income limits increase the odds of using formal long-term care.

<div align="center">**Current Study**</div>

The current study builds on existing research that considers long-term care decisions as a function of time-invariant and time-varying factors. I examine the full set of care outcomes (no care, formal long-term care, and informal long-term care) of elders at-risk of needing regular assistance with living activities. Previous studies assumed all elders to equally be at risk of disability and, hence, long-term care. Limiting the risk set to older persons experiencing any limitation to daily activities acknowledges the differences in health trajectories across birth cohorts, race/ethnicity, and socioeconomic status (Haas, Krueger, & Rohlfsen, 2012; House et al., 1994; Lynch, 2003). Because of the interdependency between family members over the life course, I also incorporate characteristics of spouses and adult children.

Andersen's Behavioral Model of Health Utilization

The behavioral model of health utilization is a framework for understanding health services utilization as a function of three pathways: predisposing factors, enabling factors, and need (Andersen, 1995). The pathways of this framework can be easily adapted to the concept that long-term care decisions are informed by individual preferences and constrained or enabled by individual, institutional, and family characteristics. Andersen defines predisposing factor as demographic characteristics of the individual, his or her social structure, and health beliefs.

Enabling resources can be personal, family, and community resources. Lastly, need can be defined as perceived or evaluated need for health services. Modifying Andersen's flow chart of the model, I categorize the factors in individual long-term care decisions as shown in Figure 1.

I consider the time-invariant characteristics of the elder as factors predisposing him or her to any long-term care and specific types of care. I categorize age and family structure as predisposing characteristics because they form part of the social structure necessary for certain long-term options. Enabling resources include the individual, family, and institutional factors that enable an older person to make use of different long-term care alternatives or constrain him or her from certain alternatives. These resources include household income or wealth, long-term care insurance or Medicaid LTSS eligibility, and characteristics of potential family caregivers. Need is defined here as any physical or instrumental limitation that places the older person at risk of needing regular assistance with daily life activities.

The health services outcomes of interest include two general types of long-term care a) informal long-term care, including spousal care and adult child care, and b) formal long-term care, including home health care and nursing facility care. Past research has found informal familial care to be a substitute for institutional long-term care (Charles & Sevak, 2005; Van Houtven & Norton, 2004) supporting the classification of informal long-term care and institutional long-term care, or formal long-term care, as exclusive alternatives. Van Houtven finds that informal care and home health care are substitutes, however, an exploratory analysis of the data shows that they may be used together as complements. As such, I take care to define these outcomes exclusively in the analysis.

Methods

I use the Health and Retirement Study (HRS), a nationally representative panel study of Americans ages 50 and older conducted by the University of Michigan every two years since 1992. The study also collects information on spouses and other family members of age-eligible respondents. I exploit both the chronological depth of and the breadth of demographic, economic, health, and family data in the HRS for this study of long-term care decisions. I use RAND Version P of the HRS, a processed and longitudinal version of the raw HRS data. Because RAND v.P is not an exhaustive processing of the raw data files, I also use the RAND Enhanced HRS Fat Files to compile measures related to spousal caregiving that are not found on the RAND v. P or the RAND HRS Family data, described below.

RAND's HRS Family data file, is a processed and streamlined version of the HRS data related to age-eligible respondents and their families. RAND's HRS Family file includes data from the 1992 wave of the HRS through the next most recent 2012 wave of the HRS. I draw detailed information on the adult children of respondents from this data source that can be easily matched back to respondent files from the other RAND HRS files.

Analytic Sample

For this paper, I use eight interview waves from the HRS from 1998 to 2012 to identify elders with at least one previous two-year period without any functional limitations and observe individuals who become at risk of needing long-term care any time over the 2000 to 2012 period. I exclude individuals for whom the change from no difficulty with any ADLs to difficulty with at least one ADL is not observed in the data, such as individuals who report functional difficulty when they first appear in the data in the sample period.

I limit the sample to HRS respondents who are age 55 or older when they become at risk of care and who are in the sample for at least four years (two consecutive interview waves). Exploratory analysis of the data showed that the transition from functional health to limitation can happen well before the standard retirement age in the U.S. This is supported by a large body of research documenting differences in senescence by race and socio-economic status (Haas et al., 2012; Umberson, Williams, Thomas, Liu, & Thomeer, 2014; Zhang, Hayward, & Yu, 2016). Limiting the analytic sample to a later age could threaten the representativeness of the findings by excluding individuals who first experience aging-related functional limitation in the pre-retirement ages. I exclude those HRS respondents between age 50 and 54 because functional limitations at these early ages might follow a different trajectory of care.

The sample is limited to individuals with either a living spouse or partner or at least one living child. This ensures that all individuals in the sample have the option of formal and informal care, either via a spouse or an adult child or stepchild. The final sample includes 3,473 respondents (weighted n = 12,479)

Analytic Strategy

Because long-term care decisions are in practice family decisions, I use a linked-lives perspective to factor in the interdependence of parents and children as parents age. The extensive family characteristics captured in the RAND HRS Family data allows for the inclusion of a set of covariates capturing spouse health and the characteristics of adult children that influence their potential to provide care.

I restrict the analysis to those individuals who are initially observed in the data as having no functional limitations to address the initial conditions problem. This ensures that previous experiences with any type of long-term care do not heterogeneously influence the transition

under study and bias the estimated effects. Limiting the initial analysis to the first transition from independence to long-term care removes the potential for dependence dynamics and allows the use of a simpler discrete time event history approach.

Longitudinal data provides a strategy for mitigating the endogeneity problem in other studies of long-term care transitions. The length of time between HRS interviews allow me to define exogenous measures of respondent wealth, child income and employment, and geographic distance between parent and child.

I use a multinomial logistic model of the long-term care decision such that:

$$\log\left(\frac{h_{ti}^{(r)}}{h_{ti}^{(0)}}\right) = \alpha^{(r)}(t) + \boldsymbol{\beta}^{(r)\prime}\mathbf{x}_{ti}^{(r)}$$

where r is the set of long-term care types relative to no care and $\mathbf{x}$ includes the sets of covariates measuring predisposing characteristics, enabling resources, and need of the elder at risk of care.

Figure 2 graphically depicts the state space under analysis with all individuals living independently with no reported functional limitations at time 1. At some point over the next two years (HRS interviews are conducted every two years), individuals experience some limitation to activities of daily living that puts them at risk of needing long-term care. I follow elders from time 2 until they report a transition into formal or informal long-term care, are censored in the data, or are censored in the data because of death. On average, individuals remain in the analytic sample for six years, with those individuals who never seek care remaining in the sample two years longer, on average (see Table 1).

The cumulative hazard of both long-term care types, in Figure 1, over the analysis time frame shows that the hazard of transitioning into long-term care increases over the analysis period. I enforce the least amount of structure on how time is modeled in the regression and include a set of six dummy variables to model each time relative to baseline.

Dependent variables. I specify two long-term care types and no care as the competing outcomes in the multinomial model. Both spousal and parental caregiving are identified using two HRS measures that identify a) if the survey respondent received regular assistance with ADLs and b) if a spouse or child is reported as the person who helps the most with this assistance. Each outcome is modeled exclusive of all other possible outcomes. This is particularly important for home health which can be considered a complement to informal care. To avoid this issue, I assign the outcome of home health only to those individuals who report home health care but no other types of long-term care.

Past research supports viewing home health care as a substitute rather than a complement to informal care (Van Houtven & Norton, 2004). Van Houtven et al. find that informal care substantially reduces the overall use of home health care, as such I consider the home health care as an exclusive alternative to all other informal types of care.

Independent variables. I include age both as a measure of time in the model and as a predisposing characteristic. Other predisposing characteristics include gender, race, ethnicity, marital status, and the number of living children. Almost 60 percent of the sample is married or partnered at baseline and almost all elders in the sample have living adult children (see Table 1).

I include employment status of the elder as a predisposing characteristic because the analytic sample includes those in pre-retirement ages – one quarter of the analytic sample is still working at baseline. Almost two-fifths of the sample never enter long-term care during the time under study, despite reporting difficulty with at least one activity of daily living. An exploratory estimate of the cumulative hazard of any long-term care by employment status (Figure 4) shows that cumulative hazard of any care is lower for those still working at every time and the cumulative hazard of care increases more slowly over time for those working.

The primary enabling resources of the respondent in this model are wealth, private long-term care insurance, and Medicaid beneficiary status, all of which are measured over time. I use household income as a proxy for wealth because of the inconsistency with which wealth is measured in the HRS. I include Medicaid beneficiary status, but not a measure of whether the individual is enrolled in Medicare or any other health insurance, because neither Medicare nor standard health insurance policies cover long-term care.

I hypothesize, as found in other research (Freedman, 1996; Gaugler, Kane, Kane, Clay, & Newcomer, 2005), that the inputs to the long-term care decision differ for elders with a living spouse potentially able to provide care compared with elders who only have living children. To test this, I include the number of ADLs reported as difficult as a time-varying measure of the health of the spouse or partner. I also include the employment status of the spouse as an enabling resource. The summary statistics in Table 1 show variations in the share of non-working spouses across the no care and long-term care outcomes, which may influence which care alternatives are available.

The child characteristics include time-varying indicators for whether any adult children: work full-time, are married, are daughters, and live within 10 miles of the elder parent. The child gender indicator is especially important in the context of informal caregiving, previous studies of caregiving have examined daughters exclusively (Himes et al., 1996; Liliana E. Pezzin & Schone, 1999). Past research has shown gender-matching effects in the likelihood of caregiving and in caregiving persistence (Allen, Lima, Goldscheider, & Roy, 2012; Noel-Miller, 2010). I tested the inclusion of a gender concordance indicator in earlier models and found that it did not add to the explanatory power of the model. The indicator for geographic proximity to the elder parent is important given that past research has shown that co-residence increases the likelihood

of care for that child relative to other children (L. E. Pezzin et al., 2015). As shown in Table 1,

over half of the elders in the sample have children who live within ten miles of their home.

The need variables in the model include two covariates counting the number of ADLs

and IADLs reported as difficult at each analysis period. The ADLs as discussed earlier indicate

the need for regular daily assistance. IADLs, however, are not necessarily predictive of the

inability to live independently but in combination with ADLs might indicate the intensity of care

required or whether the respondent also experiences some cognitive impairment. I also include a

time-varying indicator of whether a proxy completed the interview for the respondent to capture

more severe cognitive impairment.

Results

The first model in Table 2, which includes only the predisposing characteristics of the

elder, follows an expected pattern. Having a living spouse or partner significantly lowers the

odds of formal long-term care relative to both informal care and no care. In this base model, race

and Hispanic ethnicity also significantly distinguish between the various outcomes, with both

African American and Hispanic elders having lower odds of entering formal care relative to all

other alternatives. Lastly, the need measures operate as expected in this model. Increasing

difficult with ADLs translates to higher odds of any care relative to no care and, interestingly,

higher odds of informal care relative to formal care. Difficulty with more IADLs follows a

similar pattern, with the proxy interview measure picking up the influence of more intense

cognitive impairment on the decision process. Elders interviewed by proxy have higher odds of

formal care relative to both informal care and no care.

Adding the enabling resources into the model changes the story significantly. While the

estimated relative risk of the need covariates is still significant in this model, most of the other

predisposing characteristics no longer shape the decision-making process in the same way. The

health of the spouse measured by functional limitations significantly distinguishes the odds of all

other forms of care relative to informal care for the elder. None of the enabling characteristics of

the adult children significantly factor into decision model.

Lending support to the role of policy context as an enabling resource or constraint,

Medicaid enrollment significantly distinguishes the odds of formal care relative to no care and

informal care. The risk of transitioning into formal care relative to continuing without care is

2.48 times higher for Medicaid beneficiaries at each time period and this risk of transitioning into

formal care relative to informal care is 1.22 times higher for those with Medicaid access.

Limitations. The strategy outlined above for dealing with the initial conditions problems

relies on the assumption that the disability process follows a monotonic path. Barring an

extensive review of each respondent's past functional status, observing an initial period of health

is the next best option to verifying that the initial condition has no influence on subsequent

transitions. Similar limitations apply to the approach for ensuring the exogeneity of wealth, child

income and employment, and child geography. The exogeneity of lagged variable assumes that

there are no other health conditions anticipating disability that might influence these variables at

baseline. Wooldridge (Wooldridge, 2005) outlines some further options for tackling the initial

conditions problem in dynamic process models by conditioning on variables exogenous to the

process.

The assumption of the independence of irrelevant alternatives (IIA) underlying the

multinomial logistic regression introduces a broader limitation to this work. Tests of the IIA

assumption for multinomial logistic exist, but they have been shown to perform poorly over a

range of sample sizes and data structures (Allison, 2012). It would be informative, however, to

estimate a similar model using a nested logistic two-step specification to relax the IIA assumption.

The cross tabulations of labor force participation by care outcome and the significance of that covariate in the models estimated indicate that the respondent's labor force participation could serve as a conditioning variable for distinguishing no care relative to any long-term care in a conditional model. Alternatively, a mixed logistic model that incorporates random effects might also be useful in testing the IIA assumption by modelling different specifications of the long-term care decision process.

Discussion

The characteristics of both the elder at risk of needing long-term care and his family members factor into the decision among the different long-term care types and no care. These characteristics enter the process as enabling resources, adding greater explanatory power to the model of the process. As shown in the results, it is not simply the presence of a spouse that raises the odds of informal care relative to all other outcomes, but the functional health of the spouse that continues to significantly distinguish the relative risk of formal care versus informal care.

I plan to continue building on this understanding of the process underlying long-term care transitions by developing a future model for repeated long-term care transitions. Such a model would reveal how the dynamics of the long-term care decision process modeled here change over time with persistence (the influence of the perceived cost of switching on future transitions) and state dependence (the influence of the current state on future transitions) effects. I am interested in how the role of individual and family enabling resources changes in response to burnout of caregivers and more intense care needs. The newer mixed logistic models provide a useful

method for modelling correlated unobserved factors, such as state dependence and persistence effect.

Medicaid enrollment is the second enabling resource significantly distinguishing the odds of formal long-term care relative to all other alternatives. The results provide evidence that this jointly federal and state-funded program, as the only government source of long-term care assistance, shapes the long-term care decision-making process. This also sheds light on the complexity of long-term care choices. The types of long-term care that individuals take up reflect more than just preferences, they also reflect the economic enabling resources of the elder needing care.

This is a key finding given the lack of institutional support in the United States for one of the costliest forms of health care. The next step in this research is to explore the enabling role of Medicaid enrollment in long-term care decisions in more detail. I am interested in examining how state differences in long-term care Medicaid shape the role of this resource in the decision. Specifically, I will include variables measuring state differences in the generosity of Medicaid programs and the structure of long-term care types in state Medicaid plans in a second set of models to determine if this variation differentially shapes elders' long-term care decisions. If the estimated regressions of the long-term care decision differ meaningfully across states with different policies on Medicaid eligibility generosity and the availability of HCBS options, this would suggest that policy serves as a significant constraint on and enabler in individual long-term care decisions.

References

Administration for Community Living. (2017). *Profile of older Americans*. Washington, DC:

U.S. Department of Health and Human Services

Allen, S. M., Lima, J. C., Goldscheider, F. K., & Roy, J. (2012). Primary caregiver

characteristics and transitions in community-based care. *The journals of gerontology.

Series B, Psychological sciences and social sciences, 67*(3), 362-371.

doi:10.1093/geronb/gbs032

Allison, P. D. (2012). How Relevant is the Independence of Irrelevant Alternatives? Retrieved

from https://statisticalhorizons.com/iia

Andersen, R. M. (1995). Revisiting the Behavioral Model and Access to Medical Care: Does it

Matter? *Journal of Health and Social Behavior, 36*(1), 1-10. doi:10.2307/2137284

Carmichael, F., Charles, S., & Hulme, C. (2010). Who will care? Employment participation and

willingness to supply informal care. *J Health Econ, 29*(1), 182-190.

doi:10.1016/j.jhealeco.2009.11.003

Chari, A. V., Engberg, J., Ray, K. N., & Mehrotra, A. (2015). The Opportunity Costs of Informal

Elder-Care in the United States: New Estimates from the American Time Use Survey.

Health Services Research, 50(3), 871-882. doi:10.1111/1475-6773.12238

Charles, K. K., & Sevak, P. (2005). Can family caregiving substitute for nursing home care? *J

Health Econ, 24*(6), 1174-1190. doi:10.1016/j.jhealeco.2005.05.001

Dostie, B., & Léger, P. T. (2005). The Living Arrangement Dynamics of Sick, Elderly

Individuals. *The Journal of Human Resources, 40*(4), 989-1014.

Doty, P., Jackson, M. E., & Crown, W. (1998). The impact of female caregivers' employment

status on patterns of formal and informal eldercare. *Gerontologist, 38*(3), 331-341.

Elder, G. H. (1998). The Life Course as Developmental Theory. *Child Development, 69*(1), 1-12.

    doi:10.1111/j.1467-8624.1998.tb06128.x

Elder, G. H., Kirkpatrick Johnson, M., & Crosnoe, R. (2003). The emergence and development

    of life course theory. In J. T. Mortimer & M. J. Shanahan (Eds.), *Handbook of the Life*

    Course (pp. 3-19). New York: Springer.

Freedman, V. A. (1996). Family structure and the risk of nursing home admission. *J Gerontol B*

    Psychol Sci Soc Sci, 51(2), S61-69.

Freedman, V. A. (2018). The demography of late-life disability. In M. D. Hayward & M. K.

    Majmundar (Eds.), *Future Directions in Demography of Aging: Proceedings of a*

    Workshop (pp. 269-305). Washington, DC: The National Academies.

Fries, J. F. (2005). The Compression of Morbidity. *Milbank Quarterly, 83*(4), 801-823.

Gaugler, J. E., Kane, R. L., Kane, R. A., Clay, T., & Newcomer, R. C. (2005). The Effects of

    Duration of Caregiving on Institutionalization. *The Gerontologist, 45*(1), 78-89.

    doi:10.1093/geront/45.1.78

Genworth Financial. (2018). Cost of Care Survey. from Genworth Financial

    https://www.genworth.com/aging-and-you/finances/cost-of-care.html

Haas, S. A., Krueger, P. M., & Rohlfsen, L. (2012). Race/ethnic and nativity disparities in later

    life physical performance: the role of health and socioeconomic status over the life

    course. *The journals of gerontology. Series B, Psychological sciences and social*

    sciences, 67(2), 238-248. doi:10.1093/geronb/gbr155

Health and Retirement Study, RAND HRS Data File (v.P). (2017).

Hiedemann, B., Sovinsky, M., & Stern, S. (2018). Will You Still Want Me Tomorrow? The Dynamics of Families' Long-Term Care Arrangements. *Journal of Human Resources, 53*(3), 663-716. doi:10.3368/jhr.53.3.0213-5454R1

Himes, C. L., Jordan, A. K., & Farkas, J. I. (1996). Factors influencing parental caregiving by adult women: variations by care intensity and duration. *Research on Aging, 18*(3), 349-370. doi:10.1177/0164027596183005

House, J. S., Lepkowski, J. M., Kinney, A. M., Mero, R. P., Kessler, R. C., & Herzog, A. R. (1994). The social stratification of aging and health. *J Health Soc Behav, 35*(3), 213-234.

Hurd, M. D., Michaud, P. C., & Rohwedder, S. (2017). Distribution of lifetime nursing home use and of out-of-pocket spending. *Proceedings of the National Academy of Sciences, 114*(37), 9838-9842. doi:10.1073/pnas.1700618114

Johnson, R. W. (2016). *Who is covered by private long-term care insurance?* Retrieved from Washington, DC: https://www.urban.org/sites/default/files/publication/83146/2000881-Who-Is-Covered-by-Private-Long-Term-Care-Insurance.pdf

Lester, R. S., Irvin, C. V., Mosca, A., & Bradnan, C. (2015). *Tipping the Balance: The Balancing Incentive Program and State Progress on Rebalancing Their Long-Term Services and Supports*. Retrieved from Cambridge, MA: https://www.mathematica-mpr.com/our-publications-and-findings/publications/tipping-the-balance-the-balancing-incentive-program-and-state-progress-on-rebalancing-their-longterm

Lynch, S. M. (2003). Cohort and Life-Course Patterns in the Relationship between Education and Health: A Hierarchical Approach. *Demography, 40*(2), 309-331. doi:10.1353/dem.2003.0016

National Alliance for Caregiving, & AARP Public Policy Institute. (2015). *Caregiving in the U.S.* Retrieved from Washington, DC: http://www.caregiving.org/wp-content/uploads/2015/05/2015_CaregivingintheUS_Final-Report-June-4_WEB.pdf

Nizalova, O. (2012). The Wage Elasticity of Informal Care Supply: Evidence from the Health and Retirement Study. *Southern Economic Journal, 79*(2), 350-366. doi:10.4284/0038-4038-2010.133

Noel-Miller, C. (2010). Spousal loss, children, and the risk of nursing home admission. *J Gerontol B Psychol Sci Soc Sci, 65B*(3), 370-380. doi:10.1093/geronb/gbq020

Norton, E. C. (1995). ELDERLY ASSETS, MEDICAID POLICY, AND SPEND-DOWN IN NURSING HOMES. *Review of Income & Wealth, 41*(3), 309-329. doi:10.1111/j.1475-4991.1995.tb00122.x

Pezzin, L. E., Pollak, R. A., & Schone, B. S. (2009). Long-term care of the disabled elderly: do children increase caregiving by spouses? *Review of Economics of the Household, 7*(3), 323-339. doi:10.1007/s11150-009-9057-6

Pezzin, L. E., Pollak, R. A., & Schone, B. S. (2015). Bargaining Power, Parental Caregiving, and Intergenerational Coresidence. *J Gerontol B Psychol Sci Soc Sci, 70*(6), 969-980. doi:10.1093/geronb/gbu079

Pezzin, L. E., & Schone, B. S. (1999). Intergenerational Household Formation, Female Labor Supply and Informal Caregiving: A Bargaining Approach. *The Journal of Human Resources, 34*(3), 475. doi:10.2307/146377

Pillemer, K., & Suitor, J. J. (2013). Who Provides Care? A Prospective Study of Caregiving Among Adult Siblings. *The Gerontologist, 54*(4), 589-598. doi:10.1093/geront/gnt066

Reinhard, S. C., Kassner, E., & Houser, A. (2011). How the Affordable Care Act can help move States toward a high-performing system of long-term services and supports. *Health Aff (Millwood), 30*(3), 447-453. doi:10.1377/hlthaff.2011.0099

Schulz, R., & Eden, J. (Eds.). (2016). *Families Caring for an Aging America*. Washington, DC: The National Academies of Sciences, Engineering, and Medicine.

Sovinsky, M., & Stern, S. (2016). Dynamic modelling of long-term care decisions. *Review of Economics of the Household, 14*(2), 463-488. doi:10.1007/s11150-013-9236-3

Thach, N. T., & Wiener, J. M. (2018). *An overview of long-term services and support and Medicaid: final report*. Washington, DC: U.S. Department of Health and Human Services Retrieved from https://aspe.hhs.gov/basic-report/overview-long-term-services-and-supports-and-medicaid-final-report#conclude

The MetLife Mature Market Institute, National Alliance for Caregiving, & Center for Long-Term Care Research and Policy New York Medical College. (2011). *The MetLife Study of Caregiving Costs to Working Caregivers*. Retrieved from Westport, CT:

Umberson, D., Williams, K., Thomas, P. A., Liu, H., & Thomeer, M. B. (2014). Race, gender, and chains of disadvantage: childhood adversity, social relationships, and health. *J Health Soc Behav, 55*(1), 20-38. doi:10.1177/0022146514521426

Van Houtven, C. H., & Norton, E. C. (2004). Informal care and health care use of older adults. *J Health Econ, 23*(6), 1159-1180. doi:10.1016/j.jhealeco.2004.04.008

Wooldridge, J. M. (2005). Simple solutions to the initial conditions problem in dynamic, nonlinear panel data models with unobserved heterogeneity. *Journal of Applied Econometrics, 20*(1), 39-54. doi:10.1002/jae.770

Zhang, Z., Hayward, M. D., & Yu, Y. L. (2016). Life Course Pathways to Racial Disparities in

Cognitive Impairment among Older Americans. *J Health Soc Behav, 57*(2), 184-199.
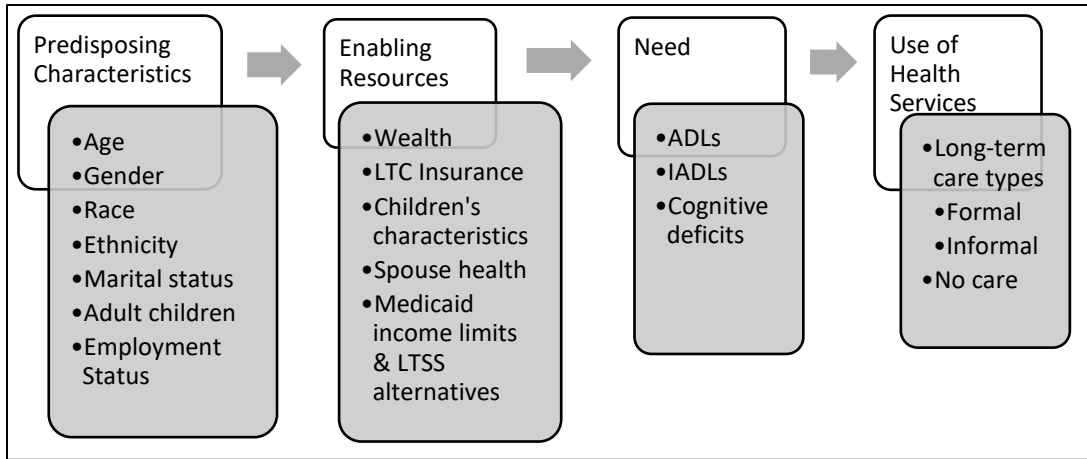
doi:10.1177/0022146516645925

Figure 1. Andersen's Behavioral Model adapted to Long-Term Care Decisions
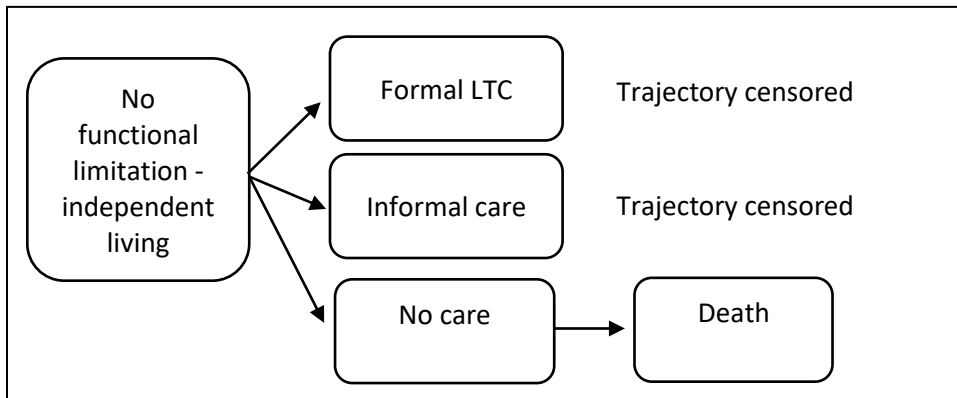

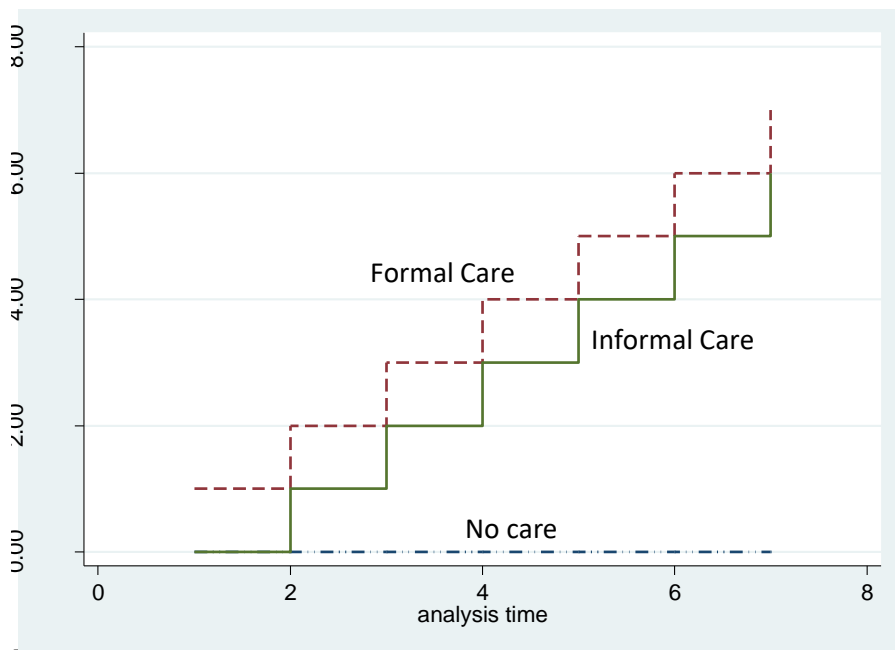Figure 2. State Space of Initial Transition from Independent Living to Long-Term Care

Figure 3. Nelson-Aelen Cumulative Hazard of Long-Term Care by Type

Table 1. Summary Statistics for Independent Variables at Baseline, by Outcome (percentages)

| % | Long-term care (LTC) type | | | |
	No care	Formal	Informal	Total
Respondent age (mean)	72.6	77.2	73.9	74.4
Male	43.7	34.4	45.0	41.4
Married or partnered	58.7	43.1	71.5	58.0
Has adult children	99.3	99.6	99.8	99.6
Number of children (mean)	3.5	3.4	3.7	3.5
Live within 10 mi.	0.7	0.9	0.9	0.8
Married	1.7	2.0	2.0	1.9
Work full-time	1.8	1.9	2.0	1.9
Race				
White	78.1	83.7	78.0	79.7
African American	16.9	13.8	17.3	16.1
Other	5.0	2.4	4.7	4.2
Hispanic	11.8	6.6	11.9	10.3
Household income (mean)	$46,623	$37,991	$42,786	$42,696
Has LTC care insurance	10.9	11.0	10.4	10.8
Medicaid coverage	8.4	15.6	9.1	10.8
Working for pay	29.7	17.6	22.5	23.6
ADLs with difficulty (mean)	1.3	2.0	2.0	1.8
IADLs with difficulty (mean)	0.4	1.4	1.3	1.0
Interviewed by proxy	5.1	23.7	21.6	16.2
Spouse or partner working for pay	29.3	22.1	25.9	26.2
Spouse ADLs with difficulty	0.4	0.6	0.3	0.4
Waves contributed (mean)	2.89	2.03	1.54	2.21
n	2,104	1,557	1,693	5,354

Source: University of Michigan. (2017). *Health and Retirement Study, RAND HRS Data File (v.P), 1998 to 2012. Health and Retirement Study, RAND HRS Data File (v.P), 1998 to 2012. Health and Retirement Study, RAND HRS Data File (v.P), 1998 to 2012.* [Data file]. Retrieved from https://hrs.isr.umich.edu/data-products/access-to-public-data?_ga=2.225927130.137828334.1501396413-587578987.1477586438.
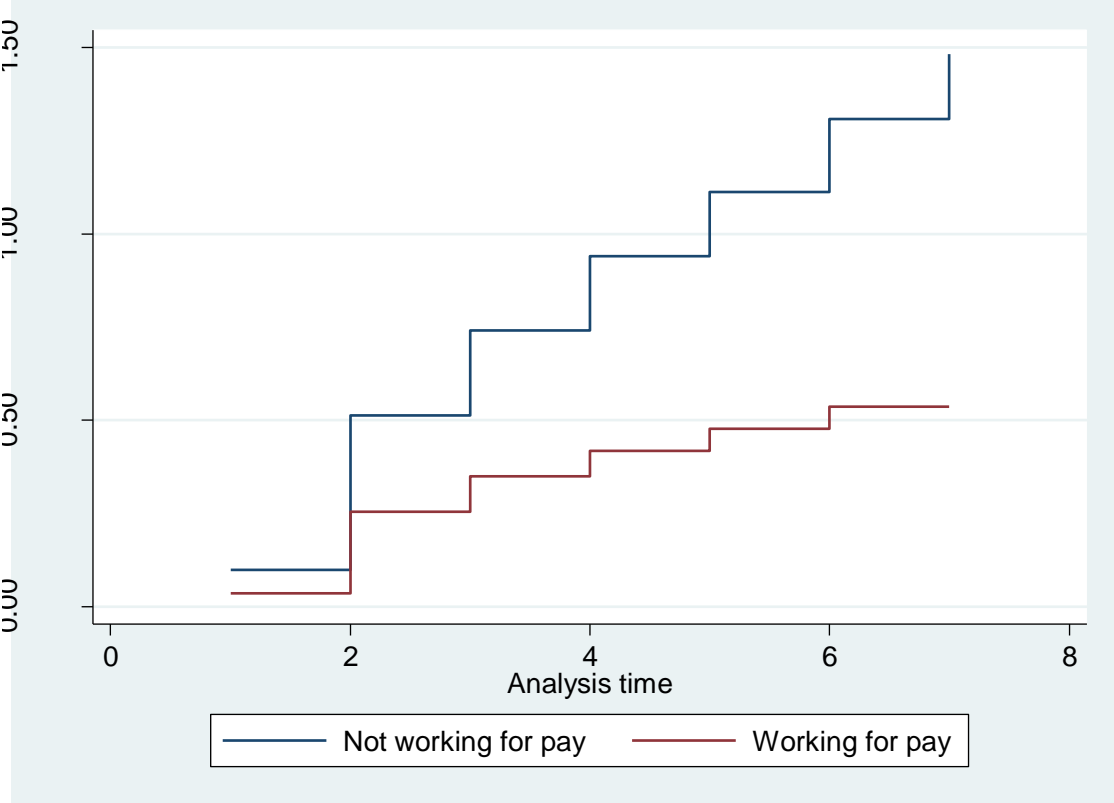
Figure 4. Nelson-Aelen Cumulative Hazard of Long-Term Care by Employment Status

Table 2. Estimation of Behavioral Model of Long-Term Care Decisions (exponentiated coefficients)

Variable	Model with predisposing characteristics & need			Full model with enabling resources		
	No_care	Formal LTC	Informal LTC	No_care	Formal LTC	Informal LTC
Respondent characteristics:						
Age	-	1.040***	1.000	-	1.031***	1.010
		(0.00384)	(0.00351)		(0.00707)	(0.00551)
Female	-	1.277***	0.815***	-	1.413**	0.999
		(0.0847)	(0.0505)		(0.149)	(0.0830)
Has adult children	-	2.842*	5.057**	-	-	-
		(1.234)	(3.169)			
Race (reference: White)						
African American	-	0.736***	0.898	-	1.027	1.176
		(0.0674)	(0.0750)		(0.167)	(0.149)
Other	-	0.741	1.038	-	0.565	1.183
		(0.151)	(0.162)		(0.200)	(0.244)
Hispanic	-	0.585***	0.990	-	0.431***	0.946
		(0.0748)	(0.102)		(0.0926)	(0.134)
Lagged working for pay	-	0.910	0.941	-	0.949	0.856
		(0.0858)	(0.0754)		(0.131)	(0.0880)
Number ADLs with some difficulty	-	1.675***	1.974***	-	1.927***	2.741***
		(0.0439)	(0.0496)		(0.0900)	(0.109)
Number IADLs with some difficulty	-	1.401***	1.383***	-	1.516***	1.424***
		(0.0382)	(0.0377)		(0.0701)	(0.0575)
Interviewed via proxy	-	2.801***	1.827***	-	2.757***	1.527**
		(0.289)	(0.193)		(0.447)	(0.222)
Lagged household income	-	-	-	-	1.000	1.000
					(0.00000197)	(0.00000108)
Lagged household income^2	-	-	-		1.000	1.000
					(4.74e-12)	(1.40e-12)
Long term care insurance	-	-	-	-	1.015	1.034
					(0.156)	(0.129)
Medicaid enrollee	-	-	-	-	2.479***	0.731
					(0.434)	(0.125)

	Model with predisposing char. & needs			Model with enabling resources		
Variable	No_care	Formal LTC	Informal LTC	No_care	Formal LTC	Informal LTC
Characteristics of children:						
Any daughters	-	-	-	-	1.314	1.023
					(0.203)	(0.116)
Any children living within 10 miles	-	-	-	-	0.876	0.962
					(0.0919)	(0.0801)
Any children working full-time	-	-	-	-	1.107	0.918
					(0.226)	(0.140)
Any children married	-	-	-	-	1.142	1.000
					(0.242)	(0.152)
Spouse characteristics:						
Number ADLs with some difficulty	-	-	-	-	0.990	0.769***
					(0.0435)	(0.0351)
Working for pay	-	-	-	-	1.035	0.953
					(0.138)	(0.0952)
Constant	1	0.0011***	0.0241***	1	0.0243***	0.0576***
		(0.00069)	(0.01713)		(0.00167)	(0.02767)
Observations		11,626	11,626		6,110	6,110

Note: *** $p<0.001$, ** $p<0.01$, * $p<0.05$. Standard errors in parenthesis.