The Effect of Medicaid Aging Waivers on Mortality and Morbidity

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Abstract

Medicaid aging waivers subsidize the long-term care of older adults at home or in community- based settings. Little is known about how the Medicaid aging waiver program affects the quality of life among the aging population. Using data from the Health and Retirement Study (HRS), this study evaluates the effect of the Medicaid aging waiver program on mortality and morbidity of older individuals. The results show that state-level Medicaid aging waiver funding is associated with increases the mortality rate among adults over age 70. The policy is positively associated with the probability of individuals reporting poor health status, and with the probability that individuals report having difficulty in activities of daily living and mobility. Conversely, funding for the aging waiver policy is negatively associated with reports of heart-related disease diagnoses, and positively associated with cognitive skills of older Americans.

1   Introduction

As the population ages, the need for long-term care (LTC) has dramatically risen (Kemper et al., 2005; Brown & Finkelstein, 2008; National Center for Health Statistics, 2009; Hagen, 2013; Johnson, 2017). In order to meet the challenging LTC needs and reduce the financial burden on government due to costly nursing home care, Medicaid implemented the aging waivers to provide home or community-based services (HCBS) starting in the early 1990s.[1] The home-based care program encourages aging at home and in familiar environments on the assumption that it is beneficial for the quality of life for older people (Callahan et al., 2009; Samus et al., 2014; Griffin et al., 2017; Lehnert et al., 2019; Wagner et al., 2020). In addition, the HCBS program reduces medical costs and serves more people in need with lower cost care provided at home (Hollander et al., 2002; Borsani et al., 2006; Amaral, 2010; Francesca et al., 2011; Houser et al., 2012; Wagner et al., 2020). However, home-based care may result in less oversight of the quality and quantity of care as compared to care provided in nursing homes. Thus, the Medicaid aging waiver program might generate unexpected negative mortality and morbidity outcomes. This paper tests this hypothesis by conducting a causal analysis of the effect of the Medicaid aging waiver program on the mortality and morbidity of the aging population.

The fiscal resources allocated to home or community-based care give incentives to utilize home health care subsidized by Medicaid aging waivers which it is much lower cost. Medicaid aging waivers directly pay home care providers, and enrollees can purchase these formal services at subsidized prices. Home-based care could be beneficial. Older adults are cared for in their home, which might be especially important for the aging population (Marek et al., 2005; Black, 2008; Lee, 2008). Also, the beneficiaries receive affordable care from home aids and professionals, which might prevent some unexpected health event. However, the quality of this affordable care is unclear. First, the home or community-based care provided through the Medicaid aging waiver program varies across several dimensions, such as type of care services, the quality of care offered, degree of professional involvement, and the quality of providers (Landers et al., 2016). The quality of care of nurses might be lower compared to the high-quality care provided in hospitals and nursing homes (Kane et al., 2007; Dick et al., 2019). In addition, in order to limit the costs, the quality of service

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[1]Many OECD countries have shifted resources towards more affordable home-based care to reduce costs of long-term institutional care (Landers et al., 2016).

providers might be compromised. The lower payment by Medicaid attracts less qualified home health aides and providers.[2] Thus, the services offered to beneficiaries might be low quality and detrimental to their health. Second, there exists misaligned incentives between care providers and care receivers (Borsani et al., 2006; Landers et al., 2016). For example, if the providers are paid per capita, they focus on the number of patients treated and less on whether the specific care offered is sufficient and treatable. Most older people suffer from chronic disease and also need palliative care. Therefore, the impact of the care received is not immediately known. These underlying incompatible incentives may lead to poor care coordination and cause poor health outcomes.

This paper empirically estimates the relationship between Medicaid aging waiver funding and mortality and morbidity outcomes of older individuals. Using a two-way fixed effects approach, and data from 1998 to 2014 waves of the Health and Retirement Study (HRS), I estimate the relationship between per capita aging waiver funding at the state level and a broad range of health outcomes. I find that an increase in Medicaid aging waiver expenditures is associated with an increase in the mortality rate. The policy expansion is also associated with increases the probability of individuals reporting poor health relative to good or excellent health. The effect on physical limitations is also negative. Older people in state-years with more generous policy funding tend to report a higher number of physical limitations such as difficulties in the activities of daily living and mobility. Conversely, I find a negative association between aging waiver funding and diagnoses of heart-related disease. I also find that more generous aging waiver funding is positively associated with cognitive skills, and is unrelated to depression.

The paper is organized as follows. Section 2 explains the conceptual framework. Section 3 describes the data, and shows the summary statistics. Section 4 shows the empirical models. Section 5 reports the estimates of Medicaid aging waivers on health outcomes and shows the robustness checks of the estimates. Section 6 concludes.

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[2]The common quality problems include intentional physical injury to patients, workers' tardiness or failure to spend specified time with clients, poor attitudes, abusiveness of clients, and exploitation of financial resources. Medicaid aging waivers provide standards of qualifications of providers and require them to report their quality annually.

2   Conceptual Framework

There are potentially opposing effects of Medicaid aging waivers on health outcomes of older people. To the extent that the policy allows individuals who previously did not have care to access home-based professional help, the policy could lead to better health outcomes. This could allow individuals to have more check-ups and detect health conditions like heart disease, thereby also allowing for better health outcomes. However, if increase contact with service providers results in more diagnoses of illnesses, results of our analysis could indicate more instances of diagnosed illness even if underlying health is better.

To the extent that aging waiver funding shifts older people out of nursing home care into home-based care, there could be beneficial effects on underlying health. Aging at home in a familiar environment with family nearby could be beneficial to health, allowing older people to live longer. Aging in place may also improve mental health and cognitive skills. On the other hand, the quality of care received at home might be worse compared to that provided in nursing homes. Thus, the physical health of old people might deteriorate. Furthermore, if home-based care implies less contact with medical professionals as compared to nursing home care, there is the potential for less diagnosis of illnesses, even if underlying health is worse. Overall, the effect of Medicaid aging waivers on health outcomes is ambiguous.

3   Data

3.1   Medicaid Aging Waiver data

I use Medicaid policy information on aging waiver funding for each state for the years 1995 to 2014. The state application and annual report of Medicaid aging waivers are publicly available on the CMS website.[3] These applications and reports detail the services covered, service definitions, and the total expenditures in covered years for state aging waivers. For some states, they may have more than one waiver serving the older population. The total expenditures per capita of Medicaid aging waivers are calculated across each year, and these are used as the main treatment variable. See chapter 1 for more details.

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[3]https://www.medicaid.gov/

3.2 HRS data

The second data source is the Health and Retirement Study (HRS), a longitudinal dataset which began in 1992. Respondents are surveyed every other year. The HRS is representative of Americans aged 51 and above. The survey includes different cohorts who become age eligible for the study. The core cohort, the HRS cohort, has been followed and interviewed since 1992. Since 1993, the HRS includes the Study of Assets and Health Dynamics Among the Oldest Old (AHEAD) cohort, including those born before 1924; the Children of the Depression Age (CODA) cohort, including those born between 1924 and 1930; and the War Babies cohort (WB), including those born between 1942 and 1947. An additional Early Baby Boomers (EBB) cohort of those born between 1948 and 1953 was added to the sample in 2004, and the Mid-Baby Boomers cohort of those born between 1954 and 1959 was added in 2010. A detailed questionnaire that asks respondents about their demographics, health outcomes, employment status, financial situation, respondents' year of death (if any), and intergenerational transfers is administered on site or via telephone. I use restricted access data that includes the state of residence for each respondent.

I use data collected in years 1998 through 2014. I restrict the sample to respondents who are above 70 (85%). I make this restriction because the majority of HRS respondents die after age 70. Also, an age-70 cutoff complies with state age eligibility rules for the Medicaid aging waivers in all states.[4] Finally, several HRS questions about health-related outcomes are limited to this population.

I merge the HRS data with the Medicaid aging waiver funding data based on the state of residence of respondents. The resulting data is year panel from 1998 to 2014, and include information on 17,588 unique individuals, and 71,870 observations.

3.3 Key variables

The dependent variables are health-related outcomes. I use information from a question that asks respondents the death date to create the mortality indicator. The value of the indicator is zero if the survey years are earlier than the death year. For example, if a respondent died in year 2003, the value of mortality indicator is zero for years 1998 to 2002 and the value of mortality indicator

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[4]Most states use the age threshold 65 and a few age 70.

is one for year 2004. If a respondent died in year 2004, the value of mortality indicator is zero for years 1998 to 2002 and the value is one for year 2004. If a respondent lives through the study years, the value for all years 1998 to 2014 is zero.

I also use information from a question that asks respondents about their self-reported health. The question asks HRS respondents to self-report their general health status, ranging from 1 for excellent, 2 for very good, 3 for good, 4 for fair, and 5 for poor. I create an indicator to denote individuals who assessed their health status as poor.[5]

I additionally use information on individuals' self-assessed difficulties with activities of daily living (ADLs). The survey provides an index ranging from 0 to 5 that measures difficulties in bathing, eating, getting dressed, getting in or out of bed, and walking across a room. For example, an ADL difficulty index with a value of 5 means that an individual has difficulty in all of the activities in daily living, while a value of 0 means they have no difficulty in the activities of daily living. The IADL difficulty index assesses the difficulty in instrumental activities of daily living, such as using the phone, managing money, taking medications, shopping for groceries, and preparing hot meals. This measure also ranges from 0 to 5 with a similar interpretation as the ADL difficulty index. In addition, there is a mobility difficulty index scaling from 0 to 5 to specifically evaluate an individual's flexibility to move. It asks HRS respondents whether they have any difficulty in walking 1 block, walking several blocks, walking across a room, climbing 1 flight of stairs, and climbing several flights of stairs. More details on the construction of these measures can be found in Chien et al. (2015). I use these physical limitation indices not only in the full 5-point scale as shown in the literature (Dave et al., 2006; van Zon et al., 2016), but also using cutoff 3 to create dichotomous indicators of those who have trouble with 3 or more activities.

I also use information on psychological outcomes. The HRS includes the Center for Epidemiologic Studies Depression (CESD) score. The CESD score captures the number of adverse sentiments experienced all or most of the time in the past two years, including if an individual was depressed, felt alone, felt sad, had restless sleep, felt everything is an effort, could not get

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[5]The self-reported poor health indicator is commonly used in the Survey of Health, Aging, and Retirement in Europe (SHARE) data, an European version of HRS and the Household, Income, and Labor Dynamics in Australia (HILDA) data (Coe & Zamarro, 2011; Zhu, 2016). The self-reported fair or poor health is also employed using HRS data in Dave et al. (2006) and in Eibich (2015) using the German Socio-Economic Panel Study (SOEP). In this paper, I show the results on both indicators.

going, felt unhappy, and did not enjoy life. The CESD scale is validated in the research as an instrument to identify major depression in older adults (Irwin et al., 1999). In addition, the cognition summary score calculates the total scores on word recall and mental status question, and range from 0 to 35. The word recall asks respondents the immediate and delayed word recall, which is popularly used to measure one's cognitive skills (Bonsang et al., 2012; Mazzonna & Peracchi, 2012). The mental status includes the scores for serial 7's, backwards counting from 20, object, date, and President/Vice-President naming tasks. The cognitive measure is an important measure among older adults since the aging process is strongly related to a decline in the ability to perform cognitive tasks (Souchay et al., 2000; Anderson & Craik, 2000; Prull et al., 2000; Dixon, 2004; Hertzog et al., 2008). For the morbidity outcome, HRS asks respondents have ever had a cancer diagnosis, lung diagnosis, heart diagnosis, or stroke. These dichotomous indicators are used to show the morbidity events of individuals.

3.4 Sample statistics

Table 1 presents the summary statistics of the sample of HRS respondents who are 70 and above in each survey year. About 58 percent of respondents are female. The average educational attainment is about 12 years. On average, each individual has about 2 siblings. The majority of the respondents are white and 13 percent are black. The average age in this sample is about 78 years. Half of the respondents are married or live with a partner. Thirty-six percent of respondents have lost their spouses or partners. For the health outcomes, on average, 42 percent of individuals die during the period from 1998 to 2014. Each year, approximately 2.5 percent of survey respondents have died since the last survey. This rate aligns with the Social Security Administration life table mortality rates (Kapteyn et al., 2006). The average self-reported health status is good. The average ADL difficulty index score is close to 1, indicating difficulty with one of the activities of daily living. The average IADL difficulty index score is similar to the average of ADL difficulty score. The value of mobility difficulty index is approximately 1.5, showing that on average individuals have difficulty with 1 to 2 mobility tasks. The average CESD depression score is 1.5 out of 8. The average cognition score is about 21. In addition, 20 percent of the individuals report ever having a diagnosis of cancer, 12 percent report ever having a lung diagnosis, and 34 percent report even having a heart-related diagnosis. For behavioral health variables, 55 percent of individuals report

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ever smoking and about 7 percent report currently smoking. Forty-six percent report ever drinking alcohol. Among people who currently drink alcohol, the average person drinks about once per week, and the average person drinks about one half of a standard drink per sitting. The detailed definitions of these variables can be found in Table A1 in the Appendix.

4 Estimation Model

4.1 Mortality

To estimate the effect of Medicaid aging waivers on mortality, I conduct a survival analysis using a mixed-proportional hazard (MPH) model (Khwaja et al., 2007, 2009; Bissonnette et al., 2017; Grevenbrock et al., 2020). The model allows for the controls such as individual demographics and other covariates such as policy funding in this study. Let T be a nonnegative random variable, duration which indicates the time taken to realize a failure event, death, in the survival model. In general, one living to age t is assumed to have a continuous probability distribution $f(t)$, where t is a realization of the random variable T. The probability that the duration time will be less than t is $F(t) = \text{Prob}(T \leq t) = \int_0^t f(s)ds$ and the survival function denotes the probability that the duration will be at least t, $S(t) = 1 - F(t) = \text{Prob}(T \geq t)$. The hazard ratio function is the ratio of the probability that an individual will survive beyond time t, given that they have survived until time t, $\lambda(t) = \frac{f(t)}{S(t)}$. The MPH model assumes that the mortality rate is conditional on individual characteristics and other covariates like the aging waiver policy in our context. I estimate the following model:

$$\lambda\left(t_i \mid \mathbf{x_i}; \alpha, \beta, \delta\right) = \lambda_0\left(t_i; \alpha\right) \cdot \exp\left(\mathbf{x}_i'\beta + \delta Funding_{st-2}\right) \tag{1}$$

where $\lambda_0(\cdot)$ is the baseline hazard, and $\exp(\cdot)$ is the mixed proportional hazard with individual characteristics. The $\mathbf{x}$ vector include the demographics of individuals, health behavioral variables such as drinking and smoking, year fixed effects which control for common economic shocks, state fixed effects, and state characteristics. $Funding_{st-2}$ indicates the Medicaid aging waiver expenditures in state s and in year $t-2$. The lagged policy funding accounts for the fact that, due to the HRS design, there is a time inconsistency between years. For example, an individual survival status in 2012 should be a function of policy expenditures in year 2010. For the baseline

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hazard function $\lambda(t)$, I assume two different distributions, an exponential one (λ) and a Weibull distribution:

$$\lambda_0 \left(t_i \right) = \alpha t_i^{\alpha-1}$$

The coefficient of interest is δ. A δ with a value greater than one means that as the funding of Medicaid aging waiver increases, the duration time of death is lower and it is more likely for the death event to happen with other covariates constant. A coefficient less than one implies that mortality decreases with the policy funding.

4.2 Model on health outcomes

I use an individual fixed effects model to account for individual heterogeneity in longitudinal data. The model is as follows:

$$Y_{ist} = \alpha_i + \delta_{policy}Funding_{st-2} + \text{Year}_t + \eta_s + \eta_s * t + \beta_x X_{it} + \epsilon_{ist} \tag{2}$$

where i indicates the individual, s is the state where the individual lives, t is the survey year an individual is observed. Y_{ist} is the health outcome for an individual i in state s and year t. *Funding* is the expenditures of Medicaid aging waivers measured per individual over age 65 living in the state. The model controls for individual fixed effect, α_i, state fixed effect η_s , and year fixed effect, Year_t. The individual fixed effect controls for the unobservable factors that are constant within individuals. η_s is a state fixed effect which controls for unobserved time-invariant state characteristics. The year fixed effect controls for secular trends that could affect the health outcomes. $\eta_s * t$ is a state-specific linear time trend which controls for the heterogeneous trends in outcomes that might be spuriously correlated with policy expenditures across states. X is a set of time varying characteristics of individuals such as age, marital status, and number of living siblings. The standard errors are clustered at the individual level.

5 Results

Table 2 reports the effect of Medicaid aging waiver expenditures on mortality. On average, 42 percent of individuals die at some point during the period from 1998 to 2014. The annual death

rate in the sample is about 2.5 percent. The model in column 1 controls for individual demographics, year, state fixed effects and state year trend. Column 2 adds in individual's lifestyle variables. Column 3 controls further for state characteristics. Columns 1 to 3 assume an exponential hazard function and column 4 assumes Weibull hazard function. The magnitude of the estimated coefficients is consistent across models and hazard distribution assumptions. Overall, an increase in Medicaid aging waiver expenditures is associated with an increase in the hazard rate. Specifically, an increase in Medicaid Aging Waiver funding of $1 per older person in the state is associated with an increase in the probability of dying of 0.12 to 0.13 percent. Also, being older, being single, and smoking significantly increases the mortality rate. Being female, having more education, and having more siblings are negatively associated with the mortality rate. See Table A2 in Appendix for detailed results for all controls.

Table 3 shows the results on self-reported health. The outcome variable indicates those who reported their own health as fair or poor. Model 1 does not control for individual fixed effects. Model 2 adds the individual fixed effects. Model 3 adds controls for the time-variant demographics of HRS respondents. Model 4 further controls for drinking and smoking behavior. Model 5 includes state characteristics. Model 6 includes all controls, but excludes individual fixed effects. In all models with the exception of model 6, I estimate a positive, statistically significant coefficient on aging waiver funding. A $1,000 increase in Medicaid aging waiver funding per older person is associated with an increased in the probability of reporting fair or poor health of 6 percentage points; the magnitude of the effect decreases to 4 percentage points after controlling for individual fixed effects. On a baseline poor health rate of 35 percent, the estimated effect size corresponds to an 11 percent increase in the probability of reporting poor health. The estimated effect is relatively stable and consistent across models with individual fixed effects and different controls. The estimate in column 6, however, is statistically insignificant and smaller in magnitude. In addition, the effects of age, marital status, smoking, and drinking are negative and statistically significant on self-evaluated poor health. See Table ?? in Appendix for detailed results for all controls. See Table A3 in Appendix for detailed results for all controls.

Table 4 demonstrates the results on the physical limitation outcomes. For these outcomes, I report results of the fully saturated model. The first column for each physical limitation index shows the results on the original 5-point scale, and the second column reports the estimates on

binary outcomes created using cutoffs. The effect of Medicaid aging waiver funding on the original ADL limitation index is statistically insignificant. However, I do find a significant association between aging waiver funding and the indicator for experiencing three or more ADL limitations as shown in column 2. The magnitude of this effect is around 4 percentage points. The mean of the ADL difficulty index indicator is 0.09, suggesting that a $1,000 per capita increase in aging waiver funding is associated with a 44 percent increase in the chances of having at least three ADL limitations. The effect of the policy on IADL limitations is insignificant, both for the original scale and for the dichotomous indicator. Columns 5 and 6 demonstrates the estimates on the mobility difficulty measures. The effect of Medicaid aging waiver funding on the mobility difficulty index is statistically indistinguishable from 0. The estimate on the indicator of experiencing three or more mobility limitations is statistically significant. I estimate that a $1,000 per capita increase in aging waiver funding is associated with a 5 percentage point increase in the likelihood of reporting three or more mobility difficulties. This effect size translates into a relative magnitude of about 14 percent. Like the effect of demographics on self-reported health, age, martial status, smoking and drinking are associate with increases in difficulties with ADL, IADL, and mobility. See Table A4 in Appendix for detailed results for all controls.

Table 5 reports the effects on self-reported depression scale, and disease diagnosis outcomes. The effect of Medicaid aging waiver funding on depression is statistically insignificant. A $1,000 per capita increase in Medicaid aging waiver funding is associated with an improvement in cognitive skills of by 0.5 points. The average cognitive scores are around 21 so the expansion of the policy improves the cognition scores by 2 percent. Medicaid aging waiver funding is not significantly associated with diagnoses of cancer, lung disease or stroke. However, I do find a $1,000 per capita increase in aging waiver funding is associate with a 9 percentage point reduction in the likelihood of having received a heart disease diagnosis. This effect size corresponds to a reduction in the likelihood of having a heart disease diagnosis of about 26 percent. Drinking and smoking are positively related to disease diagnosis. See Table A5 in Appendix for detailed results for all controls.

5.1 Sample attrition

As shown in the mortality results, the health estimates affected by the Medicaid aging waiver might be biased due to death-related attrition. According to the literature, physical limitations

and depression are positively related the probability of dying (Khwaja et al., 2007, 2009; Kutlu-Koc & Kalwij, 2017). To address the concern that individuals with poor health drop out of the sample, I employ two strategies to address potential bias in the analyses of the health outcomes. First, I limit the sample to a balanced panel of individuals who are observed in all nine waves of the HRS between 1998 and 2014. This limitation leaves a sample that includes 1,000 HRS respondents. Table 6 shows the results of the analyses using the balanced panel. With the exception of the cognitive skills score, the health results do not withstand this attrition check. See Table A6 in Appendix for detailed results for all controls.

The second approach limits the sample to individuals who are still alive and respond to the survey in 2014, regardless of when they entered the HRS panel. The sample excludes individuals who exit the survey due to mortality issue or due to other reasons. This approach leaves a sample of 7,187 individuals. Table 7 reports the results on health outcomes. Again, most results do not stand up to this robustness check, turning insignificant. This suggests that sample attrition may play a role in explaining the main health outcome results. See Table A6 in Appendix for detailed results for all controls.

5.2 Robustness checks

Medicaid is a means-tested program and mainly serve people with limited resources. Thus, the effect of Medicaid aging waivers on health outcomes should be larger for poor people. In order to test this hypothesis, Table A8 in Appendix shows the effect of policy on mortality by education. Education is highly correlated with financial well-being. I define a high education group, including individuals with at least a high school diploma, and a low education group including individuals with less than a high school education. The results of this analysis show that the estimated mortality effect of the aging waiver policy is driven by the low education sample. The magnitude of the effect on the mortality rate among less educated individuals is very similar to the main hazard ratio in Table 2, 1.0013. The effect on the high education sample is negative and statistically insignificant. The opposite effect of Medicaid aging waiver expenditures by education validates the idea that the policy indeed increases the probability of mortality hazard. Table A9 in Appendix shows the effect of Medicaid aging waivers on self-reported poor health by education. Like the mortality results, the effect on self-reported poor health is mainly driven on the low education sample. The magnitude

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of the coefficient is similar to the main result shown in Table A3, 0.04 percentage points.

As discussed in the variable creation section, there are several ways to construct the health outcomes. To test the sensitivity of the cutoffs used to create the health variables, I estimate model 2 on different transformations of the self-reported health measure. Table A10 in Appendix shows the results of Medicaid aging waivers on an indicator that equals one if an individual reports their health as poor. The magnitude of these estimates is identical to the main estimates. The statistical significance has disappeared, however. I also estimate the model on the original scale, which ranges from 1 (excellent) to 5 (poor). Table A11 in Appendix reports the estimates. An increase in Medicaid aging waiver expenditures per older person is associated with an 1.7 point increase in the reported score.

As described in chapter 1, there are several states that experience large reductions in Medicaid aging waiver expenditures. For example, Vermont and Rhode Island merged all waivers into a global waiver in 2006 and 2010, respectively. The expenditures on the aging waiver program plummet to zero in these years. Some big states such as Tennessee, Texas, Oregon, and New Jersey also reduced the expenditures on aging waivers by more than 50% of previous year's spending. One may have concerns that these big drops in expenditures in these years do not represent real variation in the services provided to aging waiver clients, but rather are reallocations of spending. To check the robustness of my results to these large drops, Table A12 shows the results for the self-reported health indicator after eliminating observations for individuals who live in states in years following large reductions in Medicaid aging waiver spending. The estimates are robust to this sample restriction.

One may also have concerns about the age sample restrictions. The main sample is limited to age above 70. The common age eligibility for the Medicaid aging waiver is 65 in most states. In order to address the sensitivity of the age threshold, I also limit the sample to individuals 65 and over and re-estimate the model on self-reported health. The results of this check are shown in Appendix Table A13. The results of this analysis are nearly identical to the main results.

5.3   Channels

To better understand how the Medicaid aging waiver affects the health outcomes and mortality, Table 8 tests the relationship between program funding and several potential mechanism outcomes.

Column 1 shows the effect on an indicator for use of a home health care aide. The Medicaid aging waiver provides subsidies for home health aides to provide care at home. Therefore, we expect that the policy should increase use of home health care aides. As confirmed in column 1, the use of home health care is positively associated with per capita aging waiver funding. Columns 2 to 3 shows the results on nursing home use. The policy encourages eligible older people to age at home and avoid the expensive nursing facilities. Thus, the policy could affect mortality and health outcomes by shifting individuals out of nursing homes. In column 2, I show the relationship between per capita aging waiver funding and an individual's predicted probability that they will move into a nursing home in the next 5 years. I estimate an insignificant, negative relationship between aging waiver funding and the reported likelihood of moving into a nursing home. In column 3, I estimate an insignificant, positive relationship between the policy and duration of living in a nursing home, and the length of hospital stays.

6   Conclusion

In this paper, I find that there are mixed effects of Medicaid aging waivers on health outcomes. I find evidence of a damaging health effects of the policy of several indicators. Most importantly, I estimate a robust, positive association between the policy and mortality rates. Second, I also find evidence of increased reports of physical limitations and difficulty with everyday tasks in state-years with more generous funding of the aging waivers. On the other hand, I find that Medicaid aging waiver funding is negatively associated with reported diagnoses of heart diseases. This finding could be the result of reduced contact with doctors, since the aging waiver policy may keep individuals out of institutional care where they would be more likely to get diagnosed. Also, the policy seems to increases the performances in cognitive skills. It is possible that while the aging waivers lead to more physical health issues, they also allow individuals to age-in-place, thereby preserving their cognitive and psychological health.

The findings of this study are informative in the development of long-term care policy. CMS is currently planning to have the regulations in Medicaid aging waivers to return to normal. During the 2020 pandemic, states are allowed to loose the quality requirement of home health providers to assure continued services to Medicaid aging waiver clients. Also, some states increase pay rate

in order to attract more providers to provide services to older Americans aging in place during the health crisis. Understanding the detailed effects of the policy on health outcomes is essential as the federal government is planning for the eventual return to regular operations after the public health emergency ends. The results are helpful to adjust how much service needs to be covered and what type of care is more efficient to improve the quality of life for older people aging in place. Moreover, strategies that can help to coordinate the incentives around home care providers, patients, family caregivers, and social workers might be important to increase the efficiency of care delivery.

To realize the goals of costs reduction by shifting resources towards home or community- based settings, improving the quality of care provided by home health agencies is the priority of CMS. Each state Medicaid aging waiver has minimum requirements for certification of service providers guided by the federal government. These requirements might vary across states. Also, states are responsible for surveying and monitoring home health agencies to provide a high quality of care. However, with so many individuals served and thousands of agencies, it is difficult to monitor and ensure that all patients are treated fairly. The findings in this paper provide direct evidence on the health outcomes which can be discussed in depth and help better create quality indicators to regulate home care providers.

References

Amaral, M. M. (2010). Does substituting home care for institutional care lead to a reduction in Medicaid expenditures? *Health Care Management Science*, *13*(4), 319–333.

Anderson, N. D. & Craik, F. I. (2000). Memory in the aging brain. *The Oxford Handbook of Memory*, 411–425.

Bissonnette, L., Hurd, M. D., & Michaud, P.-C. (2017). Individual survival curves comparing subjective and observed mortality risks. *Health Economics*, *26*(12), e285–e303.

Black, K. (2008). Health and aging-in-place: Implications for community practice. *Journal of Community Practice*, *16*(1), 79–95.

Bonsang, E., Adam, S., & Perelman, S. (2012). Does retirement affect cognitive functioning? *Journal of Health Economics*, *31*(3), 490–501.

Borsani, V., Matta, A., Beschi, G., & Sommaruga, F. (2006). A home care scheduling model for human resources. In *2006 International conference on service systems and service management*, volume 1, (pp. 449–454). IEEE.

Brown, J. R. & Finkelstein, A. (2008). The interaction of public and private insurance: Medicaid and the long-term care insurance market. *American Economic Review*, *98*(3), 1083–1102.

Callahan, C. M., Boustani, M., Sachs, G. A., & Hendrie, H. C. (2009). Integrating care for older adults with cognitive impairment. *Current Alzheimer Research*, *6*(4), 368–374.

Chien, S., Campbell, N., Hayden, O., Hurd, M., Main, R., Mallett, J., Martin, C., Meijer, E., Miu, A., Moldoff, M., et al. (2015). RAND HRS data documentation, version N. *RAND Corporation*.

Coe, N. B. & Zamarro, G. (2011). Retirement effects on health in Europe. *Journal of Health Economics*, *30*(1), 77–86.

Dave, D., Rashad, I., & Spasojevic, J. (2006). The effects of retirement on physical and mental health outcomes. Technical report, National Bureau of Economic Research.

Dick, A. W., Murray, M. T., Chastain, A. M., Madigan, E. A., Sorbero, M., Stone, P. W., & Shang, J. (2019). Measuring quality in home healthcare. *Journal of the American Geriatrics Society*, *67*(9), 1859–1865.

Dixon, R. A. (2004). *New frontiers in cognitive aging.* Oxford univ. press.

Eibich, P. (2015). Understanding the effect of retirement on health: Mechanisms and heterogeneity. *Journal of Health Economics*, *43*, 1–12.

Francesca, C., Ana, L.-N., Jérôme, M., & Frits, T. (2011). *OECD health policy studies help wanted? Providing and paying for long-term care*, volume 2011. OECD publishing.

Grevenbrock, N., Groneck, M., Ludwig, A., & Zimper, A. (2020). Cognition, optimism and the formation of age-dependent survival beliefs. *International Economic Review.*

Griffin, J. M., Malcolm, C., Wright, P., Hagel Campbell, E., Kabat, M., Bangerter, A. K., & Sayer, N. A. (2017). US veteran health care utilization increases after caregivers' use of national caregiver telephone support line. *Health & Social Work*, *42*(2), e111–e119.

Hagen, S. A. (2013). *Rising demand for long-term services and supports for elderly people.* Congressional Budget Office.

Hertzog, C., Kramer, A. F., Wilson, R. S., & Lindenberger, U. (2008). Enrichment effects on adult cognitive development: Can the functional capacity of older adults be preserved and enhanced? *Psychological Science in the Public Interest*, *9*(1), 1–65.

Hollander, M., Chappell, N., Havens, B., McWilliam, C., & Miller, J. A. (2002). Study of the costs and outcomes of home care and residential long term care services. *A Report prepared for the Health Transition Fund, Health Canada. http://www. homecarestudy. com/reports/full-text/substudy-05-final_report. pdf (Date of Access: June 5, 2014).*

Houser, A. N., Fox-Grage, W., & Ujvari, K. (2012). *Across the states: Profiles of long-term services and supports.* AARP Public Policy Institute.

Irwin, M., Artin, K. H., & Oxman, M. N. (1999). Screening for depression in the older adult:

Criterion validity of the 10-item Center for Epidemiological Studies Depression Scale (CESD). *Archives of Internal Medicine*, *159*(15), 1701–1704.

Johnson, R. W. (2017). What is the lifetime risk of needing and receiving long-term services and supports? *Washington, DC: The Urban Institute.*

Kane, R. L., Shamliyan, T., Mueller, C., Duval, S., & Wilt, T. J. (2007). Nurse staffing and quality of patient care. *Evidence Report/Technology Assessment*, (151), 1–115.

Kapteyn, A., Michaud, P.-C., Smith, J. P., & Van Soest, A. (2006). Effects of attrition and non-response in the Health and Retirement Study.

Kemper, P., Komisar, H. L., & Alecxih, L. (2005). Long-term care over an uncertain future: What can current retirees expect? *INQUIRY: Journal of Health Care Organization, Provision, and Financing*, *42*(4), 335–350.

Khwaja, A., Silverman, D., Sloan, F., & Wang, Y. (2009). Are mature smokers misinformed? *Journal of Health Economics*, *28*(2), 385–397.

Khwaja, A., Sloan, F., & Chung, S. (2007). The relationship between individual expectations and behaviors: Mortality expectations and smoking decisions. *Journal of Risk and Uncertainty*, *35*(2), 179–201.

Kutlu-Koc, V. & Kalwij, A. (2017). Individual survival expectations and actual mortality: Evidence from Dutch survey and administrative data. *European Journal of Population*, *33*(4), 509–532.

Landers, S., Madigan, E., Leff, B., Rosati, R. J., McCann, B. A., Hornbake, R., MacMillan, R., Jones, K., Bowles, K., Dowding, D., et al. (2016). The future of home health care: a strategic framework for optimizing value. *Home Health Care Management & practice*, *28*(4), 262–278.

Lee, M. M. E. (2008). Aging in place: A contemporary social phenomenon.

Lehnert, T., Heuchert, M., Hussain, K., & Koenig, H.-H. (2019). Stated preferences for long-term care: A literature review. *Ageing and Society*, *39*(9), 1873–1913.

Marek, K. D., Popejoy, L., Petroski, G., Mehr, D., Rantz, M., & Lin, W.-C. (2005). Clinical outcomes of aging in place. *Nursing Research*, *54*(3), 202–211.

Mazzonna, F. & Peracchi, F. (2012). Ageing, cognitive abilities and retirement. *European Economic Review, 56*(4), 691–710.

National Center for Health Statistics (2009). *Health, United States, 2008: With special feature on the health of young adults.* Number 2009. US Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Health Statistics.

Prull, M. W., Gabrieli, J. D., & Bunge, S. A. (2000). Age-related changes in memory: A cognitive neuroscience perspective.

Samus, Q. M., Johnston, D., Black, B. S., Hess, E., Lyman, C., Vavilikolanu, A., Pollutra, J., Leoutsakos, J.-M., Gitlin, L. N., Rabins, P. V., et al. (2014). A multidimensional home-based care coordination intervention for elders with memory disorders: The maximizing independence at home (MIND) pilot randomized trial. *The American Journal of Geriatric Psychiatry, 22*(4), 398–414.

Souchay, C., Isingrini, M., & Espagnet, L. (2000). Aging, episodic memory feeling-of-knowing, and frontal functioning. *Neuropsychology, 14*(2), 299.

van Zon, S. K., Bültmann, U., Reijneveld, S. A., & de Leon, C. F. M. (2016). Functional health decline before and after retirement: A longitudinal analysis of the Health and Retirement Study. *Social Science & Medicine, 170*, 26–34.

Wagner, A., Schaffert, R., Möckli, N., Zúñiga, F., & Dratva, J. (2020). Home care quality indicators based on the Resident Assessment Instrument-Home Care (RAI-HC): A systematic review. *BMC Health Services Research, 20*, 1–12.

Zhu, R. (2016). Retirement and its consequences for women's health in Australia. *Social Science & Medicine, 163*, 117–125.

Table 1: Summary Statistics of the Sample

Variable	Mean	S.D.	Unique individuals	Obs.
Time-invariant Demographics				
Female	0.58	0.49	17,588	71,870
Education	11.83	3.45	17,417	71,860
Siblings	2.11	2.13	17,581	71,608
Race/ethnicity				
White	0.84		17,588	71,870
Black/African	0.13		17,588	71,870
Other	0.03		17,588	71,870
Time-varying Demographics				
Age	78.39	6.43	17,588	71,870
Marital status				
Married/partnered	0.53		17,586	71,837
Separated/divorced	0.08		17,586	71,837
Widowed	0.36		17,586	71,837
Never married	0.03		17,586	71,837
Heath variables				
Probability to die over years	0.25		17,588	73,183
Self-report health	3.06	1.11	17,578	71,773
ADL difficulty	0.6	1.26	17,255	70,871
IADL difficulty	0.61	1.31	17,252	70,859
Mobility difficulty	1.54	1.67	17,253	70,829
CEDS Depression scores	1.52	1.91	16,000	62,954
Cognition scores	20.64	5.42	16,009	62,968
Cancer diagnosis	0.2		17,260	70,876
Lung diagnosis	0.12		17,258	70,862
Heart diagnosis	0.34		17,256	70,843
Stroke	0.11		17,254	70,859
Smoke now	0.07	0.05	17,526	71,411
Smoke ever	0.55	0.49	17,437	71,253
Drink ever	0.46	0.50	17,587	71,854
Drink days	0.96	2.04	17,587	71,719
Drink number	0.44	0.96	17,587	71,707

Notes: The data used is from HRS 1998 to 2014 of individuals who are 70 and above. The self-reported health is asked about the general health status of HRS respondents, 1 for excellent, 2 for very good, 3 for good, 4 for fair, and 5 for poor. The ADL difficulty is index of difficulties in Activities of Daily Living (ADL) ranging from 0 to 5, indicating respondents having any problem in bathing, eating, getting dressed, getting in/out of bed, and walking across a room. The IADL difficulty is index of difficulties in Instrumental Activities of Daily Living (IADL) ranging from 0 to 5, indicating respondents having any problem in using the phone, managing money, taking medications, shopping for groceries, and preparing hot meals. The mobility difficulty index refers to respondents having any problem in walking 1 block, walking several blocks, walking across a room, climbing 1 flight of stairs, and climbing several flights of stairs, ranging from 0 to 5. The definition of these variables can be referred to Table A1 in the Appendix.

Table 2: Effect of Medicaid Aging Waivers on Mortality

	(1) Exponential	(2) Exponential	(3) Exponential	(4) Weibull
Medicaid aging waiver expenditures				
per older person	1.00117*	1.00108*	1.00113*	1.00131**
	(0.00062)	(0.00062)	(0.00063)	(0.00065)
Number of individuals	17,588	17,406	17,261	17,261
Observations	73,799	73,183	73,183	73,183
Demographics	Y	Y	Y	Y
Health behavior	N	Y	Y	Y
State characteristics	N	N	Y	Y

Notes: The data used is from HRS 1998 to 2014 of individuals who are 70 and above. For mortality outcome, the sample includes HRS respondents with specific death year. For each individual, the records surveyed before the death years are living records and the record in the specific death year or after the specific death year indicate death status. The mean of policy funding per older person is around $150. All models include individual demographics, state fixed effects, year fixed effects, and state year trend.

Table 3: Results of Medicaid Aging Waivers on Fair or Poor Health

	Dependent variable: Self-report fair or poor health					
	(1)	(2)	(3)	(4)	(5)	(6)
Medicaid aging waiver expenditures						
per older person	0.00006**	0.00004**	0.00004**	0.00004**	0.00004**	0.00002
	(0.00003)	(0.00002)	(0.00002)	(0.00002)	(0.00002)	(0.00003)
Mean of health	0.35	0.35	0.35	0.34	0.34	0.34
Number of individuals		17,578	17,406	17,339	17,339	
Observations	71,773	71,773	71,479	70,884	70,884	70,884
Adjusted R-squared	0.011	0.022	0.022	0.025	0.025	0.025
Individual FE	N	Y	Y	Y	Y	N
Demographics	N	N	Y	Y	Y	Y
Health behavior	N	N	N	Y	Y	Y
State characteristics	N	N	N	N	Y	Y

Notes: The data used is from HRS 1998 to 2014 of individuals who are 70 and above. The self-reported health is asked about the general health status of HRS respondents, 1 for excellent, 2 for very good, 3 for good, 4 for fair, and 5 for poor. The self-reported fair or poor health is an indicator showing that an individual self-assess his or her general health status as fair or poor. The mean of poor health is in bracket. The mean of policy funding per older person is around $150. All models include state fixed effects, year fixed effects, and state year trend. The definition of these variables can be referred to Table A1 in the Appendix.

Table 4: Estimates of Medicaid Aging Waivers on Physical Limitations

	ADL limitations		IADL limitations		Mobility difficulty	
	(1)	(2)	(3)	(4)	(5)	(6)
	Original (0-5)	Cutoff at 3	Original (0-5)	Cutoff at 3	Original (0-5)	Cutoff at 3
Medicaid aging waiver expenditures						
per older person	0.00013	0.00004**	0.00000	0.00001	0.00013	0.00005*
	(0.00008)	(0.00002)	(0.00008)	(0.00002)	(0.00010)	(0.00003)
Mean	0.60	0.09	0.61	0.10	1.54	0.35
Number of individuals	17,333	17,333	17,330	17,330	17,331	17,331
Observations	70,893	70,893	70,881	70,881	70,851	70,851
Adjusted R-squared	0.173	0.089	0.208	0.118	0.201	0.095
Individual FE	Y	Y	Y	Y	Y	Y
Demographics	Y	Y	Y	Y	Y	Y
Health behavior	Y	Y	Y	Y	Y	Y
State characteristics	Y	Y	Y	Y	Y	Y

Notes: The data used is from HRS 1998 to 2014 of individuals who are 70 and above. The ADL difficulty is index of difficulties in Activities of Daily Living (ADL) ranging from 0 to 5, indicating respondents having any problem in bathing, eating, getting dressed, getting in/out of bed, and walking across a room. The IADL difficulty is index of difficulties in Instrumental Activities of Daily Living (IADL) ranging from 0 to 5, indicating respondents having any problem in using the phone, managing money, taking medications, shopping for groceries, and preparing hot meals. The mobility difficulty index refers to respondents having any problem in walking 1 block, walking several blocks, walking across a room, climbing 1 flight of stairs, and climbing several flights of stairs, ranging from 0 to 5. The mean of policy funding per older person is around $150. All models include individual fixed effects, state fixed effects, year fixed effects, state year trend, demographics, and state characteristics. The definition of these variables can be referred to Table A1 in the Appendix.

Table 5: Effects of Medicaid Aging Waivers on Depression and Diagnosis

	(1)	(2)	(3)	(4)	(5)	(6)
	Depression	Cognition	Cancer diagnosis	Lung	Heart	Stroke
Medicaid aging waiver expenditures						
per older person	0.00007	0.00053*	0.00000	-0.00002	-0.00009**	0.00002
	(0.00013)	(0.00028)	(0.00002)	(0.00003)	(0.00004)	(0.00003)
Mean	1.52	20.64	0.20	0.12	0.34	0.11
Number of individuals	16,045	16,054	17,338	17,336	17,334	17,332
Observations	62,928	62,943	70,900	70,884	70,867	70,881
Adjusted R-squared	0.017	0.245	0.022	0.005	0.028	0.024
Individual FE	Y	Y	Y	Y	Y	Y
Demographics	Y	Y	Y	Y	Y	Y
Health behavior	Y	Y	Y	Y	Y	Y
State characteristics	Y	Y	Y	Y	Y	Y

Notes: The data used is from HRS 1998 to 2014 of individuals who are 70 and above. Depression scores are using a score on the Center for Epidemiologic Studies Depression (CESD) scale: sum of five negatve indicators minus two positive indicators. The negative indicators measure sentiments all or most of the time: depression, everything is an effort, restless sleep, felt alone, sad, and could not get going. The positive indicators measure whether respondents felt happy and enjoyed life. The toal cognition score summing the total word recall and mental status ranging from 0 to 35. The word recall index sums the immediate and delayed word recall scores The mental status index includes the scores for serial 7's, backwards counting from 20, object, date, and President/Vice-President naming tasks. The mean of policy funding per older person is around $150. All models include individual fixed effects, state fixed effects, year fixed effects, state year trend, demographics, and state characteristics. The definition of these variables can be referred to Table A1 in the Appendix.

Table 6: Effects of Medicaid Aging Waivers Using the Balanced Sample from 1998 to 2014

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Health	ADL	IADL	Mobility	Depression	Cognition	Cancer	Heart
Medicaid aging waiver expenditures								
per older person	0.00002	-0.00018	0.00002	0.00019	0.00039	-0.00107*	0.00003	-0.00002
	(0.00004)	(0.00020)	(0.00020)	(0.00021)	(0.00030)	(0.00055)	(0.00005)	(0.00010)
Number of individuals	1,114	1,114	1,114	1,114	1,107	1,107	1,114	1,114
Observations	9,934	9,943	9,942	9,944	9,287	9,291	9,941	9,940
Adjusted R-squared	0.027	0.212	0.253	0.257	0.022	0.358	0.029	0.035
Individual FE	Y	Y	Y	Y	Y	Y	Y	Y
Demographics	Y	Y	Y	Y	Y	Y	Y	Y
Health behavior	Y	Y	Y	Y	Y	Y	Y	Y
State characteristics	Y	Y	Y	Y	Y	Y	Y	Y

Notes: The data used is from HRS 1998 to 2014 of individuals who are 70 and above. The self-reported health is asked about the general health status of HRS respondents, 1 for excellent, 2 for very good, 3 for good, 4 for fair, and 5 for poor. The ADL difficulty is index of difficulties in Activities of Daily Living (ADL) ranging from 0 to 5, indicating respondents having any problem in bathing, eating, getting dressed, getting in/out of bed, and walking across a room. The IADL difficulty is index of difficulties in Instrumental Activities of Daily Living (IADL) ranging from 0 to 5, indicating respondents having any problem in using the phone, managing money, taking medications, shopping for groceries, and preparing hot meals. The mobility difficulty index refers to respondents having any problem in walking 1 block, walking several blocks, walking across a room, climbing 1 flight of stairs, and climbing several flights of stairs, ranging from 0 to 5. The mean of policy funding per older person is around $150. The dependent variables are dichotomous indicators. All models include individual fixed effects, state fixed effects, year fixed effects, state year trend, demographics, and state characteristics. The definition of these variables can be referred to Table A1 in the Appendix.

Table 7: Effects of Medicaid Aging Waivers Using the Alive Sample until 2014

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Health	ADL	IADL	Mobility	Depression	Cognition	Cancer	Heart
Medicaid aging waiver expenditures								
per older person	0.00003	-0.00004	-0.00002	0.00007	0.00028**	0.00013	0.00001	-0.00004
	(0.00002)	(0.00007)	(0.00008)	(0.00010)	(0.00013)	(0.00033)	(0.00003)	(0.00004)
Number of individuals	7,187	7,187	7,187	7,187	7,042	7,045	7,187	7,187
Observations	36,948	36,967	36,965	36,968	34,803	34,803	36,964	36,958
Adjusted R-squared	0.016	0.145	0.182	0.183	0.017	0.235	0.026	0.024
Individual FE	Y	Y	Y	Y	Y	Y	Y	Y
Demographics	Y	Y	Y	Y	Y	Y	Y	Y
Health behavior	Y	Y	Y	Y	Y	Y	Y	Y
State characteristics	Y	Y	Y	Y	Y	Y	Y	Y

Notes: The data used is from HRS 1998 to 2014 of individuals who are 70 and above. The self-reported health is asked about the general health status of HRS respondents, 1 for excellent, 2 for very good, 3 for good, 4 for fair, and 5 for poor. The ADL difficulty is index of difficulties in Activities of Daily Living (ADL) ranging from 0 to 5, indicating respondents having any problem in bathing, eating, getting dressed, getting in/out of bed, and walking across a room. The IADL difficulty is index of difficulties in Instrumental Activities of Daily Living (IADL) ranging from 0 to 5, indicating respondents having any problem in using the phone, managing money, taking medications, shopping for groceries, and preparing hot meals. The mobility difficulty index refers to respondents having any problem in walking 1 block, walking several blocks, walking across a room, climbing 1 flight of stairs, and climbing several flights of stairs, ranging from 0 to 5. The mean of policy funding per older person is around $150. The definition of these variables can be referred to Table A1 in the Appendix.

Table 8: Channels of Medicaid Aging Waivers on Health Outcomes

	(1)	(2)	(3)	(4)
VARIABLES	Home health care	Probability of moving	Days in nurse homes	Hospital stays
Medicaid aging waiver expenditures				
per older person	0.00004*	-0.00214	-0.08273	0.00004
	(0.00003)	(0.00186)	(0.18512)	(0.00004)
Mean	0.13	0.16	484	0.35
Number of individuals	16,976	15,308	2,177	17,326
Observations	69,083	55,546	3,469	70,680
Adjusted R-squared	0.052	0.032	0.222	0.030
Individual FE	Y	Y	Y	Y
Demographics	Y	Y	Y	Y
Health behavior	Y	Y	Y	Y
State characteristics	Y	Y	Y	Y

Notes: The data used is from HRS 1998 to 2014 of individuals who are 70 and above. Home health care indicates any home care aids or professional help received at home. The probability of moving is measured for future five years whether the HRS respondent is willing to move to nurse homes. Days in nurse homes indicates the number of days staying in nurse homes in the past two years. Hospital stays is the length of days spent in a hospital in the last two years. The mean of policy funding per older person is around $150.

Table A1: Definition of Variables

Variable	Definition
Heath variables	
Self-report health	Respondent's self-reported general health status, 1 for excellent, 2 for very good, 3 for good, 4 for fair, and 5 for poor.
ADL difficulty	Index of difficulties in Activities of Daily Living (ADL) ranging from 0 to 5, indicating respondents having any problem in bathing, eating, getting dressed, getting in/out of bed, and walking across a room
IADL difficulty	Index of difficulties in Instrumental Activities of Daily Living (IADL) ranging from 0 to 5, indicating respondents having any problem in using the phone, managing money, taking medications, shopping for groceries, and preparing hot meals
Mobility difficulty	Index of mobility difficulties ranging from 0 to 5, indicating respondents having any problem in walking 1 block, walking several blocks, walking across a room, climbing 1 flight of stairs, and climbing several flights of stairs
Depression scores	Index of mental health ranging from 0 to 8 using a score on the Center for Epidemiological Studies Depression (CESD) scale: sum of five negative indicators minus two positive indicators. The negative indicators measure sentiments all or most of the time: depression, everything is an effort, restless sleep, felt alone, sad, and could not get going. The positive indicators measure whether respondents felt happy and enjoyed life
Cognition scores	The total cognition score summing the total word recall and mental status ranging from 0 to 35. The word recall index sums the immediate and delayed word recall scores The mental status index includes the scores for serial 7's, backwards counting from 20, object, date, and President/Vice-President naming tasks
Cancer diagnosis	Dichotomous indicator of respondents ever been had a cancer or a malignant tumor of any kind
Lung diagnosis	Dichotomous indicator of respondents ever been had a lung related disease
Heart diagnosis	Dichotomous indicator of respondents ever been told by doctor that he or she had a heart attack, coronary heart disease, angina, congestive heart failure, or other heart problems
Stroke	Dichotomous indicator of respondents ever had a stroke
Smoke now	Dichotomous indicator of respondents smoking at the time of being surveyed
Smoke ever	Dichotomous indicator of respondents ever smoking
Drink ever	Dichotomous indicator of respondents ever drinking
Drink days	The number of days per week respondents have had any alcohol to drink in the last three months, for example, beer, wine, or any drink containing liquor
Drink number	The number of drinks per day respondents have in the last three months on the days they drink

Table A2: Full Results of Medicaid Aging Waivers on Mortality

	(1)	(2)	(3)	(4)
	Exponential	Exponential	Exponential	Weibull
Medicaid aging waiver expenditures				
per older person	1.00117*	1.00108*	1.00113*	1.00131**
	(0.00062)	(0.00062)	(0.00062)	(0.00063)
Age	0.11586	0.1231	0.12172	0.12002
	(0.07455)	(0.07509)	(0.07510)	(0.0651)
Age squared	-0.00028	-0.00031	-0.0003	-0.00003
	(0.00043)	(0.00043)	(0.00043)	(0.00042)
Single	0.02655***	0.02061**	0.02052**	0.02002**
	(0.01013)	(0.01021)	(0.01021)	(0.0092)
Female	-0.43411***	-0.46974***	-0.46802***	-0.47251***
	(0.05450)	(0.05530)	(0.05529)	(0.04512)
Education years	-0.02929***	-0.01911***	-0.01918***	-0.01714***
	(0.00713)	(0.00729)	(0.00728)	(0.0073)
Black/Hispanic	0.0154	-0.00559	-0.00589	-0.0059
	(0.05683)	(0.05687)	(0.05684)	(0.0568)
Number of siblings	-0.05325***	-0.05453***	-0.05448***	-0.05448***
	(0.01429)	(0.01439)	(0.01439)	(0.0144)
Smoke now		0.55051***	0.55053***	0.55051***
		(0.08968)	(0.08969)	(0.08953)
Drink days		-0.12527***	-0.12523***	-0.12527***
		(0.01736)	(0.01735)	(0.01733)
State poverty below 200%			-2.99355	5.99684
			(6.99671)	(6.9967)
State unemployment rate			24.0612	24.0512
			(17.44930)	(17.3247)
State married percentage			-4.89153	-4.8815
			(4.88550)	(4.8875)
State low education percentage			2.0095	2.1595
			(5.16242)	(5.6624)
State white percentage			-2.34254	-2.3425
			(6.68578)	(6.6858)
State female percentage			5.66606	5.6696
			(9.92475)	(9.9568)
Observations	73,799	73,183	73,183	73,183

Table A3: Full Results of Medicaid Aging Waivers on Self-Reported Poor Health

	(1)	(2)	(3)	(4)
Medicaid aging waiver expenditures				
per older person	0.00004**	0.00004**	0.00004*	0.00004*
	(0.00002)	(0.00002)	(0.00002)	(0.00002)
Age		-0.01243*	-0.01301**	-0.01304**
		(0.00635)	(0.00637)	(0.00637)
Age squared		0.00013***	0.00014***	0.00014***
		(0.00003)	(0.00003)	(0.00003)
Number of siblings		0.00088	0.00078	0.00076
		(0.00238)	(0.00241)	(0.00241)
Single		-0.00240***	-0.00248***	-0.00249***
		(0.00090)	(0.00091)	(0.00090)
Smoke now			-0.06190***	-0.06195***
			(0.01197)	(0.01197)
Drink days			-0.00895***	-0.00889***
			(0.00100)	(0.00100)
State poverty below 200%				0.15318
				(0.20256)
State unemployment rate				0.37148
				(0.57336)
State married percentage				0.12874
				(0.15792)
State low education percentage				0.09047
				(0.16004)
State white percentage				-0.13415*
				(0.07896)
State female percentage				0.97884**
				(0.40243)
Number of individuals	17,578	17,406	17,339	17,339
Observations	71,773	71,479	70,884	70,884
Adjusted R-squared	0.0219	0.0225	0.0250	0.0251

Table A4: Full Results of Medicaid Aging Waivers on Physical Limitations

	ADL limitations		IADL limitations		Mobility difficulty	
	(1)	(2)	(3)	(4)	(5)	(6)
	Original (0-5)	Cutoff at 3	Original (0-5)	Cutoff at 3	Original (0-5)	Cutoff at 3
Medicaid aging waiver expenditures						
per older person	0.00013	0.00004**	0.00000	0.00001	0.00013	0.00005*
	(0.00008)	(0.00002)	(0.00008)	(0.00002)	(0.00010)	(0.00003)
Age	-0.56953***	-0.10175***	-0.61447***	-0.11514***	-0.38967***	-0.09354***
	(0.02847)	(0.00652)	(0.02842)	(0.00667)	(0.03050)	(0.00799)
Age squared	0.00416***	0.00075***	0.00471***	0.00090***	0.00311***	0.00074***
	(0.00016)	(0.00004)	(0.00016)	(0.00004)	(0.00017)	(0.00004)
Number of siblings	-0.01382	-0.00316	-0.02439**	-0.00527**	-0.01725	-0.00312
	(0.00968)	(0.00206)	(0.01042)	(0.00229)	(0.01057)	(0.00279)
Single	0.00914**	0.00179**	0.01430***	0.00315***	0.0042	0.00195*
	(0.00390)	(0.00083)	(0.00420)	(0.00091)	(0.00443)	(0.00116)
Smoke now	-0.29787***	-0.04456***	-0.19387***	-0.04015***	-0.33201***	-0.08000***
	(0.04359)	(0.00929)	(0.04556)	(0.01024)	(0.04817)	(0.01322)
Drink days	-0.04332***	-0.00748***	-0.04304***	-0.00696***	-0.04543***	-0.00916***
	(0.00391)	(0.00083)	(0.00417)	(0.00087)	(0.00467)	(0.00120)
State poverty below 200%	-0.96479	-0.04911	-0.4087	-0.15308	-0.75091	0.02085
	(0.70875)	(0.16298)	(0.78632)	(0.17565)	(0.86709)	(0.23936)
State unemployment rate	0.99186	0.61082	-1.11757	-0.56844	2.47431	0.07782
	(1.97424)	(0.44056)	(2.05418)	(0.47019)	(2.43719)	(0.69394)
State married percentage	-0.19315	-0.02423	-0.46574	-0.05295	-0.07745	-0.21263
	(0.56849)	(0.12299)	(0.62113)	(0.14039)	(0.70931)	(0.19318)
State low education percentage	0.14655	-0.08457	0.45048	0.11131	0.33741	0.1337
	(0.57457)	(0.12524)	(0.63813)	(0.14321)	(0.69655)	(0.19493)
State white percentage	-0.20659	-0.0129	-0.63136	-0.03771	0.12399	0.00022
	(0.33111)	(0.07038)	(0.38686)	(0.08489)	(0.37498)	(0.09441)
State female percentage	1.8038	-0.09205	1.25388	0.45258	1.64505	0.22534
	(1.22489)	(0.28033)	(1.31621)	(0.30689)	(1.55619)	(0.44888)
Number of individuals	17,333	17,333	17,330	17,330	17,331	17,331
Observations	70,893	70,893	70,881	70,881	70,851	70,851
Adjusted R-squared	0.173	0.089	0.208	0.118	0.201	0.095

Table A5: Full Results of Medicaid Aging Waivers on Depression and Diagnosis

	(1) Depression	(2) Cognition	(3) Cancer diagnosis	(4) Lung	(5) Heart	(6) Stroke
Medicaid aging waiver expenditures						
per older person	0.00007	0.00053*	0.00000	-0.00002	-0.00009**	0.00002
	(0.00013)	(0.00028)	(0.00002)	(0.00003)	(0.00004)	(0.00003)
Age	0.04569	1.65018***	0.03729***	0.02305**	0.01405	-0.02250**
	(0.03725)	(0.09450)	(0.00773)	(0.00931)	(0.01492)	(0.00909)
Age squared	0.00001	-0.01154***	-0.00022***	-0.00017***	-0.00028***	0.00023***
	(0.00020)	(0.00052)	(0.00004)	(0.00005)	(0.00008)	(0.00005)
Number of siblings	0.00029	-0.02803	0.0023	0.00729**	0.00718	0.00518
	(0.01467)	(0.03476)	(0.00284)	(0.00322)	(0.00670)	(0.00431)
Single	0.07896***	0.02768**	-0.00222*	-0.00119	0.00375*	0.00122
	(0.00638)	(0.01313)	(0.00122)	(0.00139)	(0.00220)	(0.00128)
Smoke now	-0.21731***	0.23389	0.00221	-0.07721***	-0.08247***	-0.00373
	(0.06246)	(0.14386)	(0.01524)	(0.01769)	(0.02349)	(0.01339)
Drink days	-0.02231***	0.05073***	-0.00158	-0.00015	-0.00156	-0.00574***
	(0.00586)	(0.01469)	(0.00127)	(0.00151)	(0.00232)	(0.00147)
State poverty below 200%	-1.3855	-0.22535	0.07109	0.09013	0.99022**	0.21327
	(1.17729)	(2.77806)	(0.26993)	(0.29319)	(0.46673)	(0.27838)
State unemployment rate	10.01863***	13.81419*	0.45368	0.06729	-0.78398	0.17051
	(3.18903)	(7.68495)	(0.66537)	(0.80682)	(1.24106)	(0.71208)
State married percentage	0.06025	2.06398	-0.03252	0.05716	-0.19368	0.14537
	(0.93657)	(2.22719)	(0.18878)	(0.23357)	(0.40133)	(0.23724)
State low education percentage	0.37511	2.33945	0.00371	0.17579	-0.01742	-0.19106
	(0.95159)	(2.21595)	(0.18632)	(0.22918)	(0.40660)	(0.21763)
State white percentage	-0.13182	0.63031	-0.11375	-0.26076**	-0.29753	0.07921
	(0.51063)	(1.23161)	(0.08463)	(0.13252)	(0.19338)	(0.13313)
State female percentage	-1.07639	5.79173	-0.46907	-0.13264	-0.357	0.08301
	(2.08735)	(5.14426)	(0.43459)	(0.52094)	(0.84979)	(0.45215)
Number of individuals	16,045	16,054	17,338	17,336	17,334	17,332
Observations	62,928	62,943	70,900	70,884	70,867	70,881
Adjusted R-squared	0.017	0.245	0.022	0.005	0.028	0.024

Table A6: Full Results of Medicaid Aging Waivers Using the Balanced Sample from 1998 to 2014

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Health	ADL	IADL	Mobility	Depression	Cognition	Cancer	Heart
Medicaid aging waiver expenditures								
per older person	0.00002	-0.00018	0.00002	0.00019	0.00039	-0.00107*	0.00003	-0.00002
	(0.00004)	(0.00020)	(0.00020)	(0.00021)	(0.00030)	(0.00055)	(0.00005)	(0.00010)
Age	-0.01321	-0.47940***	-0.43848***	-0.30107***	0.19999**	1.54892***	0.03710*	0.08264**
	(0.01549)	(0.08200)	(0.08144)	(0.08963)	(0.09399)	(0.26915)	(0.02127)	(0.04197)
Age squared	0.00011	0.00346***	0.00354***	0.00234***	-0.00096**	-0.01151***	-0.00021*	-0.00047**
	(0.00008)	(0.00045)	(0.00046)	(0.00049)	(0.00048)	(0.00144)	(0.00011)	(0.00023)
Number of siblings	-0.00157	-0.00618	-0.02662	-0.00524	0.02553	0.12905	0.01073	-0.00215
	(0.00392)	(0.03115)	(0.03232)	(0.03066)	(0.03207)	(0.09157)	(0.00805)	(0.01551)
Single	-0.00234	0.00328	0.01472	0.00546	0.05925***	0.02187	-0.00451*	-0.00032
	(0.00158)	(0.00825)	(0.00929)	(0.00959)	(0.01338)	(0.02842)	(0.00269)	(0.00473)
Smoke now	-0.05239	-0.34912**	-0.20595	-0.21533	-0.20186	-0.21287	-0.01854	-0.18069**
	(0.03449)	(0.17031)	(0.17323)	(0.17439)	(0.17843)	(0.40648)	(0.06700)	(0.09183)
Drink days	-0.00531***	-0.03636***	-0.03077***	-0.03319***	-0.02392*	0.05532	0.00236	0.00227
	(0.00176)	(0.01039)	(0.01094)	(0.01264)	(0.01311)	(0.03885)	(0.00310)	(0.00598)
State poverty below 200%	0.25483	-0.34363	-1.20796	0.55863	-4.63658*	6.00763	0.15271	0.6251
	(0.40017)	(1.56735)	(1.71001)	(2.08531)	(2.64613)	(6.54159)	(0.55273)	(1.13239)
State unemployment rate	-1.03889	-2.5811	-7.43045	-3.22199	0.78992	8.36459	-0.47178	-2.15293
	(1.14609)	(4.61457)	(5.07634)	(5.92694)	(7.16482)	(18.50620)	(1.66293)	(2.97574)
State married percentage	-0.28795	-1.11176	-0.8142	-0.74394	2.31219	11.67587**	-0.67398	-1.27235
	(0.25235)	(1.37801)	(1.42954)	(1.70140)	(2.09016)	(4.85672)	(0.42327)	(0.80767)
State low education percentage	0.19512	-0.12637	-0.15485	1.14152	2.95692	3.31701	0.33911	-0.41282
	(0.29267)	(1.21962)	(1.32757)	(1.47276)	(2.00221)	(4.48783)	(0.35608)	(0.81263)
State white percentage	-0.033	-0.95882	-1.25242*	0.22956	0.03164	-1.05077	0.0266	0.59873
	(0.10054)	(0.60216)	(0.71007)	(0.79189)	(0.91789)	(2.26442)	(0.18239)	(0.37413)
State female percentage	-1.33342*	-3.15265	-1.45907	3.90746	0.77201	10.44152	0.95114	0.43644
	(0.80669)	(2.88136)	(3.08884)	(3.50250)	(4.79338)	(11.91450)	(0.90586)	(1.90479)
Number of individuals	1,114	1,114	1,114	1,114	1,107	1,107	1,114	1,114
Observations	9,934	9,943	9,942	9,944	9,287	9,291	9,941	9,940
Adjusted R-squared	0.027	0.212	0.253	0.257	0.022	0.358	0.029	0.035

Table A7: Full Results of Medicaid Aging Waivers Using the Alive Sample until 2014

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Health	ADL	IADL	Mobility	Depression	Cognition	Cancer	Heart
Medicaid aging waiver expenditures								
per older person	0.00003	-0.00004	-0.00002	0.00007	0.00028**	0.00013	0.00001	-0.00004
	(0.00002)	(0.00007)	(0.00008)	(0.00010)	(0.00013)	(0.00033)	(0.00003)	(0.00004)
Age	-0.01831**	-0.41050***	-0.48663***	-0.29777***	0.08787*	1.56350***	0.02312**	0.02009
	(0.00759)	(0.03703)	(0.03687)	(0.03975)	(0.04615)	(0.12249)	(0.00951)	(0.01708)
Age squared	0.00014***	0.00311***	0.00379***	0.00251***	-0.0002	-0.01156***	-0.00016***	-0.00007
	(0.00004)	(0.00022)	(0.00022)	(0.00023)	(0.00025)	(0.00070)	(0.00005)	(0.00010)
Number of siblings	0.0024	0.00657	-0.00059	0.0064	0.00371	0.07092	0.00379	0.00706
	(0.00319)	(0.01507)	(0.01523)	(0.01581)	(0.02004)	(0.05049)	(0.00463)	(0.00832)
Single	-0.00216**	0.00153	0.01267***	0.00637	0.07489***	0.01742	-0.00171	0.00411
	(0.00099)	(0.00436)	(0.00488)	(0.00545)	(0.00800)	(0.01654)	(0.00143)	(0.00253)
Smoke now	-0.05029***	-0.14651**	-0.05843	-0.18647***	-0.21780***	-0.03266	-0.00301	-0.08287***
	(0.01704)	(0.05686)	(0.06181)	(0.06788)	(0.08424)	(0.20019)	(0.02093)	(0.02987)
Drink days	-0.00498***	-0.03200***	-0.02527***	-0.03435***	-0.01315*	0.04525**	-0.00214	-0.00108
	(0.00103)	(0.00461)	(0.00484)	(0.00606)	(0.00751)	(0.01954)	(0.00165)	(0.00265)
State poverty below 200%	0.26182	0.4894	0.08719	-0.5226	-2.15384	-0.87971	0.24096	0.56649
	(0.21912)	(0.73487)	(0.80971)	(1.05577)	(1.46932)	(3.49446)	(0.29795)	(0.53643)
State unemployment rate	-0.01013	0.97448	-0.06232	2.65528	6.67611*	20.46722**	0.02458	0.67559
	(0.56530)	(1.82340)	(1.94154)	(2.62757)	(3.63371)	(8.76270)	(0.69120)	(1.24265)
State married percentage	-0.02066	-0.12118	-0.24829	0.06663	0.26579	5.17943*	-0.07384	-0.66069
	(0.17457)	(0.67229)	(0.71274)	(0.93735)	(1.21674)	(2.91003)	(0.23612)	(0.42825)
State low education percentage	0.08163	-0.04626	-0.23912	-0.06505	0.53842	2.14178	0.19051	-0.07441
	(0.17488)	(0.62410)	(0.69516)	(0.85047)	(1.16774)	(2.83558)	(0.23979)	(0.40476)
State white percentage	-0.09996	-0.24418	-0.51936	0.54965	0.26427	0.02015	-0.07945	0.18922
	(0.08011)	(0.39449)	(0.43057)	(0.50627)	(0.60617)	(1.54097)	(0.11735)	(0.21790)
State female percentage	0.37756	-0.28904	-1.38446	1.9334	0.34922	6.09728	0.28901	-0.38127
	(0.45734)	(1.44782)	(1.55028)	(1.98626)	(2.77860)	(7.00883)	(0.50518)	(0.94913)
Number of individuals	7,187	7,187	7,187	7,187	7,042	7,045	7,187	7,187
Observations	36,948	36,967	36,965	36,968	34,803	34,803	36,964	36,958
Adjusted R-squared	0.016	0.145	0.182	0.183	0.017	0.235	0.026	0.024

Table A8: Effect of Medicaid Aging Waivers on Mortality by Education

	(1) Low	(2) High
Medicaid aging waiver expenditures		
per older person	1.00127*	0.99993
	(0.00070)	(0.00081)
Observations	51,845	21,338
Demographics	Y	Y
Health behavior	Y	Y
State characteristics	Y	Y

Notes: The data used is from HRS 1998 to 2014 of individuals who are 70 and above. For mortality outcome, the sample includes HRS respondents with specific death year. For each individual, the records surveyed before the death years are living records and the record in the specific death year or after the specific death year indicate death status. High education means individuals with at least high school degree. Low means education level without any high school degree. The mean of policy funding per older person is around $150. On average, there are 42 percent of individuals who die during the period from 1998 to 2014. Each year, there is approximately 2.5 percent of individuals dying. All models control for demographics, state fixed effects, year fixed effects, and state year trend.

Table A9: Effect of Medicaid Aging Waivers on Poor Health by Education

	(1) Low	(2) High
Medicaid aging waiver expenditures		
per older person	0.00005**	-0.00019
	(0.00002)	(0.00081)
Unique individuals	12,816	4,523
Observations	51,266	19,618
Demographics	Y	Y
Health behavior	Y	Y
State characteristics	Y	Y

Notes: The data used is from HRS 1998 to 2014 of individuals who are 70 and above. . High education means individuals with at least high school degree. Low means education level without any high school degree. The mean of policy funding per older person is around $150. All models control for demographics, state fixed effects, year fixed effects, and state year trend.

Table A10: Results of Medicaid Aging Waivers on Poor Health

| | Dependent variable: Self-report poor health | | | |
	(1)	(2)	(3)	(4)
Medicaid aging waiver expenditures per older person	0.00004	0.00004	0.00004	0.00004
	(0.00003)	(0.00003)	(0.00003)	(0.00003)
Number of individuals	17,578	17,406	17,339	17,339
Observations	71,773	71,479	70,884	70,884
Adjusted R-squared	0.037	0.038	0.040	0.040
Individual FE	Y	Y	Y	Y
Demographics	N	Y	Y	Y
Health behavior	N	N	Y	Y
State characteristics	N	N	N	Y

Notes: The data used is from HRS 1998 to 2014 of individuals who are 70 and above. The self-reported health is asked about the general health status of HRS respondents, 1 for excellent, 2 for very good, 3 for good, 4 for fair, and 5 for poor. The self-reported fair or poor health is an indicator showing that an individual self-assess his or her general health status as poor. The mean of policy funding per older person is around $150. The definition of these variables can be referred to Table A1 in the Appendix. All models include individual fixed effects, state fixed effects, year fixed effects, and state year trend.

Table A11: Results of Medicaid Aging Waivers on Original Health

	Dependent variable: health status			
	(1)	(2)	(3)	(4)
Medicaid aging waiver expenditures per older person	0.00017**	0.00017**	0.00016**	0.00017**
	(0.00007)	(0.00007)	(0.00007)	(0.00007)
Number of individuals	17,578	17,406	17,339	17,339
Observations	71,773	71,479	70,884	70,884
Adjusted R-squared	0.063	0.063	0.066	0.066
Individual FE	Y	Y	Y	Y
Demographics	N	Y	Y	Y
Health behavior	N	N	Y	Y
State characteristics	N	N	N	Y

Notes: The data used is from HRS 1998 to 2014 of individuals who are 70 and above. The self-reported health is asked about the general health status of HRS respondents, 1 for excellent, 2 for very good, 3 for good, 4 for fair, and 5 for poor. The results are estimated using the original scale of self-reported health. The mean of policy funding per older person is around \$150. The definition of these variables can be referred to Table A1 in the Appendix. All models include individual fixed effects, state fixed effects, year fixed effects, and state year trend.

Table A12: Results of Medicaid Aging Waivers on Poor Health Without Big Drop States

	Dependent variable: Self-report fair or poor health			
	(1)	(2)	(3)	(4)
Medicaid aging waiver expenditures				
per older person	0.00004*	0.00004**	0.00004**	0.00004**
	(0.00003)	(0.00002)	(0.00002)	(0.00002)
Number of individuals	16,233	16,189	16,012	16,012
Observations	64,932	64,614	63,925	63,925
Adjusted R-squared	0.022	0.022	0.025	0.025
Individual FE	Y	Y	Y	Y
Demographics	N	Y	Y	Y
Health behavior	N	N	Y	Y
State characteristics	N	N	N	Y

Notes: The data used is from HRS 1998 to 2014 of individuals who are 70 and above. The self-reported health is asked about the general health status of HRS respondents, 1 for excellent, 2 for very good, 3 for good, 4 for fair, and 5 for poor. The self-reported fair or poor health is an indicator showing that an individual self-assess his or her general health status as fair or poor. The mean of poor health is in bracket. The mean of policy funding per older person is around $150. Big drop states include Tennessee, Texas, Oregon, New Jersey, Vermont, and Rhode Island. The definition of these variables can be referred to Table A1 in the Appendix. All models include individual fixed effects, state fixed effects, year fixed effects, and state year trend.

Table A13: Results of Medicaid Aging Waivers on Fair or Poor Health of 65+

	Dependent variable: Self-report fair or poor health			
	(1)	(2)	(3)	(4)
Medicaid aging waiver expenditures per older person	0.00003**	0.00003**	0.00003*	0.00003**
	(0.00002)	(0.00002)	(0.00002)	(0.00002)
Number of individuals	21,417	21,193	21,124	21,124
Observations	98,027	97,637	96,846	96,846
Adjusted R-squared	0.019	0.021	0.023	0.023
Individual FE	Y	Y	Y	Y
Demographics	N	Y	Y	Y
Health behavior	N	N	Y	Y
State characteristics	N	N	N	Y

Notes: The data used is from HRS 1998 to 2014 of individuals who are 65 and above. The self-reported health is asked about the general health status of HRS respondents, 1 for excellent, 2 for very good, 3 for good, 4 for fair, and 5 for poor. The self-reported fair or poor health is an indicator showing that an individual self-assess his or her general health status as poor. The mean of policy funding per older person is around $150. The definition of these variables can be referred to Table A1 in the Appendix.