

# APPENDIX

# AGING WITH DIGNITY

## PROVIDING LONG-TERM SUPPORTS AND SERVICES AT HOME FOR OUR NATION'S ELDERS

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# Appendix A: The micro-simulation model

## OVERVIEW

### Section 1: Key data sources

We primarily use data from the Health and Retirement Study (HRS) (HRS 2024). The HRS is a biannual, longitudinal panel survey conducted with a representative sample of nearly 20,000 Americans over the age of 50. The HRS provides a comprehensive perspective on aging within the United States. We use the cleaned and processed RAND-HRS files produced by the RAND Corporation (RAND 2024). The RAND-HRS (herein referred to as the HRS) is a user-friendly subset of data from the HRS-core survey and includes detailed information on demographics, employment, functional and cognitive limitations, assets, wealth, and formal or informal home care.

### Section 2: Analytical sample

We pool together four years of the HRS for the micro-simulation model: 2012 (wave 11) through 2018 (wave 14). All monetary values are adjusted for inflation to 2024 dollars (BLS n.d.-c).

Our analytical sample includes everyone expected to be covered by the proposed program. We impose several eligibility restrictions based on age, medical need, and disability status.

- Individuals over 65 with two or more activities of daily living (ADL) limitations are eligible. We consider six ADLs: bathing, dressing, eating, toileting, getting into and out of bed, and walking across a room.
- Individuals over 65 with cognitive limitations are eligible. The HRS imputes a total cognition score out of 35 that combines results from immediate and delayed word recall, counting, naming, and vocabulary tasks. We consider individuals with a score of 10 or less to be cognitively impaired. We also include cognitively impaired individuals who are responding to the survey via proxy. These individuals do not complete the cognitive questionnaire, so we identify individuals as impaired if their

proxy respondent reports that “The respondent has cognitive limitations that prevent him/her from being interviewed.”

- Individuals under 65 receiving Social Security Disability Insurance (SSDI) who meet the above medical criteria are eligible. (Note: The HRS does not include data about the 50 or younger population. We describe our adjustments in Section 7.)
- Individuals not covered by Old Age, Survivors, and Disability Insurance (OASDI) are ineligible. The HRS does not include information about eligibility for OASDI. Thus, we assume that individuals over 65 with less than 10 years of work experience and living in a household where neither they nor their spouse is receiving Social Security payments are not covered by OASDI. Individuals meeting this criterion are excluded from the eligible population.<sup>1</sup>

### Section 3: Expected care needs and cost

As described in the paper, we model differential care needs based on an individual’s functional and cognitive limitations. These projections are based on current formal and informal care usage among those with varying levels of disability, as well as a review of the home health use literature. The full schedule of allocated hours is presented in Table 1 of the main paper. We also set the cost of home and community-based services (HCBS) care to be \$25 per hour. This is a middle point between current Medicaid reimbursement rates and private reimbursement rates for a personal care aide (Burns et al. 2023). Thus, for each eligible individual, their maximum expected total care costs are their annual allocated care hours priced at \$25 per hour. However, as described in Section 4, for individuals who use fewer than their allocated hours, expected annual care costs will be lower than this maximum amount.

## SECTION 4: MEASURING TAKE-UP

Eligible individuals must first decide whether or not to participate in the program, and then participants can opt to take fewer hours than what they are allocated. Thus, we model the take-up of the program along both the intensive and extensive margin. The intensive mar-

gin refers to the portion of hours that an individual is likely to use among the total number of hours that they have been allocated. The extensive margin estimates the probability that an individual will participate in the program altogether.

There are many reasons why an individual may not want to participate in the program or use all their allocated hours, including access to alternative forms of care, a reluctance to switch providers, or personal preferences. Thus, we base take-up assumptions on an individual's current receipt of informal or formal care, the payer of any current formal care, and the subsidy rate an individual faces under the proposed program. Formal care is defined as paid care provided by a non-family member, while informal care is defined as either unpaid care by a non-family member or any care provided by a family member. Then we consider whether the formal care is paid for by Medicaid or independently. The HRS does not directly inquire about the payer of an individual's formal care. We assume individuals with Medicaid coverage who are receiving formal care are receiving formal care paid for by Medicaid.

Finally, we determine an individual's subsidy rate as the share of total HCBS costs that will be covered by the government (described further in Section 6). When calculating the intensive margin, we calculate a subsidy rate assuming take-up of all allocated hours, since we do not yet know the beneficiary's true subsidy rate. Then, when calculating the extensive margin, we recalculate the subsidy rate accounting for the hours that the beneficiary will demand rather than the hours they are allocated. Ultimately, this assumes that when beneficiaries decide whether to participate in the program, they understand how they will respond intensively first.

On the intensive margin, we consider two groups with varying intensive demand:

- For individuals receiving formal care, which is not paid for by Medicaid, we assume that they would use at least their current quantity of formal care hours. Then, they take a portion of their additional allocated hours equal to their subsidy rate.
  - For example, an individual currently using 10 hours per week of formal care and allocated

20 hours under the proposed policy, with a 50% coinsurance rate, would take 15 hours of care per week. Alternatively, this same individual, but with a 90% coinsurance rate, would take 11 hours of care per week.

- For individuals whose current receipt of care is greater than their allocated hours, we assume that they take all of their allocated hours.
- For those not currently paying for care (those on Medicaid, receiving only informal care, or receiving no care), we assume they would take their full allocated hours with a downward adjustment based on their coinsurance rate and a  $-0.25$  intensive elasticity, based on evidence from Japan's HCBS program. (Sano et al. 2022).
  - For example, assuming the individual can pay their full coinsurance, an individual with a 90% coinsurance rate would take 77.5% of their allocated hours, but an individual with a 25% coinsurance rate would take 93.75% of their allocated hours.

Table A1 shows the average take-up rate for each of these groups and for the overall eligible population.

For the extensive margin, there is no strong existing empirical work on the decision to take up subsidized home care, so these are our best attempts to approximate how take-up should work in theory:

- Individuals already receiving formal care paid for by Medicaid are assumed to have 100% take-up of the proposed policy.
- Individuals receiving formal care that is not paid for by Medicaid and individuals receiving only informal care are assumed to have a take-up rate equal to the subsidy rate.
- Individuals receiving no care are assumed to have a take-up rate equal to half of their subsidy rate. For example, an individual with a 60% subsidy rate is assumed to have a take-up rate of 30%

Table A2 shows the average take-up rate for each of these groups and for the overall eligible population. Column 1 presents the take-up rate prior to the calculation of the intensive take-up, while column 2 presents the take-up rate after accounting for intensive take-up.

**Table A1: Impact of Intensive Margin Assumptions on Care Usage**

|                                          | Share of Allocated Hours Used |
|------------------------------------------|-------------------------------|
| Not Receiving Privately Paid Formal Care | 89.9%                         |
| Receiving Privately Paid Formal Care     | 77.9%                         |
| Full Eligible Population                 | 88%                           |



**Table A2: Impact of Extensive Margin Assumptions on Program Participation**

|                                                | Take-up Rate Before Accounting for Intensive Margin | Take-up Rate After Accounting for Intensive Margin |
|------------------------------------------------|-----------------------------------------------------|----------------------------------------------------|
| Receiving Formal Care From Medicaid            | 100%                                                | 100%                                               |
| Receiving No Care                              | 26.4%                                               | 26.2%                                              |
| Receiving Private Formal Care or Informal Care | 50.6%                                               | 50%                                                |
| Full Eligible Population                       | 45.9%                                               | 45.5%                                              |



## SECTION 5: WEALTH AND INCOME DRAWDOWN

### Countable income and assets

We consider all household income and the net value of all household assets as countable. Income includes earnings, pensions, annuities, Supplemental Security Income (SSI), SSDI, Social Security retirement, unemployment, workers’ compensation, other government transfers, capital income, and any other income. Net wealth includes the net value of the following assets: primary residence, secondary residences, real estate, vehicles, businesses, IRA accounts, Keogh accounts, stocks, mutual funds, investment trusts, checking

accounts, savings accounts, money market accounts, CDs, government savings bonds, T-bills, other bonds, pension balances, and all other savings. We also produce estimates in which the primary residence is not countable, meaning that the net value of the primary residence is subtracted from the household’s net wealth. All other debt, such as credit card debt and medical debt, is subtracted.

### Cost-sharing calculation

We propose a cost-sharing approach for individuals to contribute to the cost of their long-term services and supports. Individuals can retain up to a certain amount of annual income and net asset—these are protected from cost sharing. They then must annually contribute

a share of their income and assets to help finance the services they receive. Under the retention-based schemes, all medically eligible individuals receive HCBS, however, the share of costs they cover varies depending on their existing financial resources.

Presented in the paper, Formula A demonstrates the calculation used to produce expected annual resources. We first “protect” a share of annual income and total assets. This income and assets will be retained by the individual and cannot be used for cost-sharing. We consider several levels of both asset and income retention. We then must transform all remaining financial resources into an annual flow. While income is already an annual flow, we must transform an individual’s wealth into an annual flow. We do this by dividing an individual’s net wealth (minus the retention amount) by their life expectancy based on age and sex. We collect life expectancy data for men and women from the National Vital Statistics System produced by the Centers for Disease Control and Prevention (CDC).

An individual will then use this pool of annual resources to contribute to their share of annual HCBS costs or HCBS copayment. We vary cost-sharing based on an individual’s total annual income and total net assets. Individuals in the bottom quartile of total resources face 25% cost-sharing, individuals in the second quartile of total resources face 50% cost-sharing, individuals in the third quartile face 75% cost-sharing, and individuals in the top quartile face 90% cost-sharing.

An individual whose annual resources are equal to or more than their expected copayment will simply cover their share of HCBS costs. However, if an individual’s annual resources are less than their expected copayment amount, they are still entitled to HCBS, and the government will subsidize their remaining copayment. Ultimately, the costs to the individual and government vary along several dimensions—the hours of care that the individual requires, their annual flow of resources, and their expected copayment.

## SECTION 6: MODEL RESULTS

In the results of the micro-simulation model, we report the total costs of the program, the number of bene-

ficiaries, the number of eligible individuals, and the average share of costs that beneficiaries will cover via cost-sharing. We display nine cases with varied retention schemes and different countable assets. Across these schemes, we do not vary the expected hours of care.

The base case allows for \$30,000 in retained assets and 150% of the federal poverty line (FPL) in retained income—these assets and income are protected from cost-sharing. Under the base case, housing is countable. Then, Cases 3 to 8 vary the retention amounts or countable assets as described in the paper. Case 9 presents the effects of a more generous copayment schedule where individuals in the bottom quartile of total resources face 10% cost-sharing, individuals in the second quartile of total resources face 25% cost-sharing, individuals in the third quartile face 35% cost-sharing, and individuals in the top quartile face 50% cost-sharing. The Medicaid equivalent case displays results from the eligibility-based model.

The beneficiary and eligible estimates are simply population counts. We first count eligibles, which include everyone that is programmatically eligible, meaning they meet the medical and demographic criteria for coverage. Notably, the program is an entitlement, so all individuals who meet the programmatic eligibility criteria are eligible regardless of the financial scheme in place. Then, to estimate beneficiaries, we count this same sample of eligibles but account for their predicted take-up rate.

To calculate the total costs of the program, we first estimate total HCBS costs per individual after accounting for the intensive margin as described above. Then, we separately consider those who can completely cover their copayment with their annual resources and those who cannot. For those whose annual resources are higher than their copayment, beneficiary costs are equivalent to their copayment amount, and government costs are simply the remainder of total expected care costs after copayment. For those whose annual resources are less than their copayment, beneficiary costs are equal to their annual resources, while government costs are total expected care costs minus annual resources. We multiply these overall expen-

ditures, beneficiary costs, and government costs by everyone's predicted extensive take-up, described in Section 5, and sum across the population to produce total estimates. We also present the share of total costs beneficiaries incur by dividing total beneficiary contributions by overall expenditures.

For the Medicaid equivalent case, we produced these same estimates, but because this is an eligibility-based scheme rather than a retention-based scheme, individuals eligible for the program face no cost-sharing. Therefore, individual government costs are simply their total expected care costs, and their subsidy rate is 100%. We still produce a take-up rate as described in Section 5 and apply this take-up rate to produce population-weighted cost and beneficiary estimates. Our count of eligible individuals includes all those who meet both the programmatic and financial criteria of the current Medicaid program. We conducted a comprehensive analysis of state Medicaid waivers and state plan amendments to produce a beneficiary-weighted average income cutoff of 208% of the FPL and modal asset cutoff of \$2,000.

## **SECTION 7: ADJUSTING RESULTS FOR THE UNDER 50 POPULATION**

While the proposed policy covers eligible Americans of all ages, the HRS only collects information from those 50 and older. Thus, we adjust our results to account for those younger than 50. Importantly, we assume that those ages 50 to 64 on SSDI eligible for the HCBS benefit are representative of those younger than 50 on SSDI. This likely leads to an overestimation of total costs, as per-capita HCBS expenditures tend to be lower for younger individuals, although available evidence on HCBS expenditure by age primarily examines differences in spending between children and adults as opposed to differences in spending between younger and older adults (Wysocki et al. 2024). We use the annual statistical reports from the SSDI program to identify the age distribution of those on SSDI (SSA 2013). We then produce a multiplier equal to the inverse of the share of those aged 50 to 64 receiving SSDI among everyone under 65 receiving SSDI. This multiplier ranges between 1.4 and 1.5, depending on the year. We then adjust the survey weights for everyone ages 50 to 64 with this multiplier to account for the under-50 population.

## SECTION 8: EXAMPLE CASES

**Table A3: Five Example Cases Assuming the Base Retention Scheme of \$30,000 Asset Retention and 150% of the Federal Poverty Line Income Retention**

|        | Demographics                                                                                                                                                                         | Financial status                                                                                                                                                          | Annual resources                                                                                                                               | Government costs (Unadjusted for take-up)                                                                                                                                              |
|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Case 1 | 66-year-old female with three ADLs. We estimate a life expectancy of 20 years with 15 hours per week of HCBS needs. Her annual HCBS costs are \$19,500.                              | She has \$0 of income and \$43,684 of total assets. She is in the bottom resource quintile and faces a 25% copayment.                                                     | With base case retention, she has annual assets of \$684.23. Her annual resources are \$684.23.                                                | She is unable to pay her copayment with her annual resources, so she will contribute all her annual resources, and the rest will be covered. The cost to the government is \$18,815.8. |
| Case 2 | 81-year-old female with five ADLs and cognitive impairment. We estimate a life expectancy of nine years with 60 hours per week of HCBS needs. Her annual HCBS costs are \$78,000.    | She has \$116,805 in income and \$445,584 in total assets. 150% of the FPL for her household is \$37,924. She is in the top resource quintile and faces a 90% copayment.  | With the base retention scheme, she has annual assets of \$46,176 and annual income of \$78,880. Her annual resources are \$125,056.           | She can pay her full copayment with her annual resources, so the cost to the government is the remaining 10%, equaling \$7,800.                                                        |
| Case 3 | 71-year-old male with two ADLs and no cognitive impairment. We estimate a life expectancy of 25 years with 10 hours per week of HCBS needs. His annual HCBS costs are \$13,000.      | He has an income of \$75,125.21 and (-)\$9,361 in assets. 150% of the FPL for his household is \$17,634. He is in the third resource quintile and faces a 75% copayment.  | With the base retention scheme, he has \$0 of available annual assets and \$57,491 of annual income. His annual resources are \$57,491.        | He can pay his full copayment with his annual resources, so the cost to the government is the remaining 25%, equaling \$3,250.                                                         |
| Case 4 | 85-year-old female with two ADLs and no cognitive impairment. We estimate a life expectancy of seven years with 10 hours per week of HCBS needs. Her annual HCBS costs are \$13,000. | She has an income of \$22,810.93 and \$54,917 in assets. 150% of the FPL for her household is \$22,224. She is in the second resource quintile and faces a 50% copayment. | With the base retention scheme, she has \$3,559 in available annual assets and \$586 in available income. Her annual resources are \$4,146.    | She is unable to pay her copayment with her annual resources, so she will contribute all her annual resources, and the rest will be covered. The cost to the government is \$8,853.    |
| Case 5 | 54-year-old male with four ADLs and no cognitive impairment. We estimate a life expectancy of 33 years with 15 hours per week of HCBS needs. His annual HCBS costs are \$19,500.     | He has \$48,215.48 in income and \$13,104.80 in assets. 150% of the FPL for his household is \$38,544. He is in the third resource quintile and faces a 75% copayment.    | With the base retention scheme, he has \$0 of available annual assets and \$9,671.48 of available income. His annual resources are \$9,671.48. | He is unable to pay his copayment with his annual resources, so he will contribute all his annual resources, and the rest will be covered. The cost to the government is \$9,828.52.   |

**Note:** Activities of Daily Living (ADLs); home and community-based services (HCBS); federal poverty line (FPL)

# Appendix B: Producing final federal savings and state clawback estimates

## SECTION 1: STATE SPENDING ON THE ELIGIBLE POPULATION

We estimate the amount of current HCBS spending, which will be replaced by the proposed program. However, we first needed to estimate current HCBS expenditures. Data from Mathematica shows \$137.58 billion of HCBS expenditures in 2024 dollars (Wysocki et al. 2024). The detailed expenditure data from Mathematica includes one-time claims and short-term acute care events in addition to long-term HCBS. This means that Mathematica's overall expenditure estimate is an overestimate of HCBS spending on long-term care beneficiaries—our covered population. Therefore, we leveraged improved beneficiary data from the Kaiser Family Foundation (KFF), which excludes single-claim beneficiaries and makes other adjustments to better capture the long-term care population (Chidambaram and Burns 2023). Their work indicates that 4.2 million individuals are on HCBS, with 1.9 million on state plans, 1.7 million on waivers, and 837,000 on “other” HCBS, with half a million individuals receiving more than one form of either state plans and “other” HCBS. However, the KFF analysis does not produce an equivalent expenditure estimate for these beneficiaries.

Thus, using data from Mathematica, we produce per-capita expenditure estimates for each of these care categories, finding that state plan HCBS costs \$12,465.65 per person, waivers cost \$35,493.75 per person, and “other” HCBS costs \$2,485.7 per person.<sup>2</sup> Finally, we multiply the per-capita expenditure by the KFF beneficiary count, finding total HCBS expenditures for the long-term care population of \$90.90 billion, in 2024 dollars. We face an important limitation here in that we are using the national Mathematica expenditure and beneficiary counts to produce our per-capita spending estimates. Because the data includes acute care events, we are likely underestimating per-capita costs for the long-term HCBS population. However, for costing our proposal, it was useful for us to underestimate current spending to produce a more conservative final, after-offset cost estimate.

Given this improved overall spending estimate of \$90.90 billion, we can now turn to the share of spending that will be replaced by the proposed program. Dual-eligibles currently receiving HCBS would now be covered by the proposed program. Mathematica reports that in 2022, Medicaid spent \$76.98 billion (81.86 billion in 2024 dollars) on 2.4 million dual-eligible HCBS beneficiaries. Again, Mathematica data does not differentiate between long-term and short-term HCBS users, so we assume that the portion of overall spending on long-term HCBS (and subsequently beneficiaries) is the same for the entire population and the dual-eligible population. Thus, we find that 1.58 million dual-eligibles are currently receiving long-term HCBS, costing a total of \$54.08 billion in 2024 dollars. These individuals would now all be covered by the proposed program, leading to \$54.08 billion in savings.

## SECTION 2: STATE SPENDING ON INELIGIBLES

There are individuals under 65 and not covered by SSDI who are currently receiving HCBS services but are excluded from the proposed Medicare program. Disregarding the dual-eligibles from the overall beneficiary count, 2.62 million individuals currently receiving long-term HCBS are ineligible for the proposed program, accounting for \$36.82 billion in spending. However, there are individuals who would be medically and financially qualified for Medicaid HCBS, but due to caps on services and other restrictions, are unable to access Medicaid HCBS. Thus, we produce a separate estimate of the cost to state Medicaid programs to ensure that individuals ineligible for the proposed program, who meet financial and medical eligibility criteria, receive Medicaid HCBS irrespective of current access to HCBS services.

For this analysis, we rely on the pooled 2013, 2015, 2017, and 2019 Current Population Survey (CPS) surveys—because these surveys collect certain data retrospectively, and these years capture program enrollment for 2012, 2014, 2016, and 2018 calendar

years. Our analytical sample includes all individuals who are financially and medically eligible for Medicaid HCBS, so those whose household income is less than 208% of the federal poverty line and who received SSDI or SSI in the previous year for either a disability or a child’s disability. Then, we exclude all individuals that would be eligible for the proposed policy—specifically, those that are 65 and older, or enrolled in SSDI—to produce a population of ineligible with HCBS needs. Notably, we define medical eligibility using SSDI and SSI enrollment because the CPS does not collect information on ADLs. However, additional analysis confirms that, for the ages 50 to 64 group, conducting this same analysis using data from the HRS with medical eligibility determined via functional limitations, we produce similar beneficiary (and therefore expenditure) results.

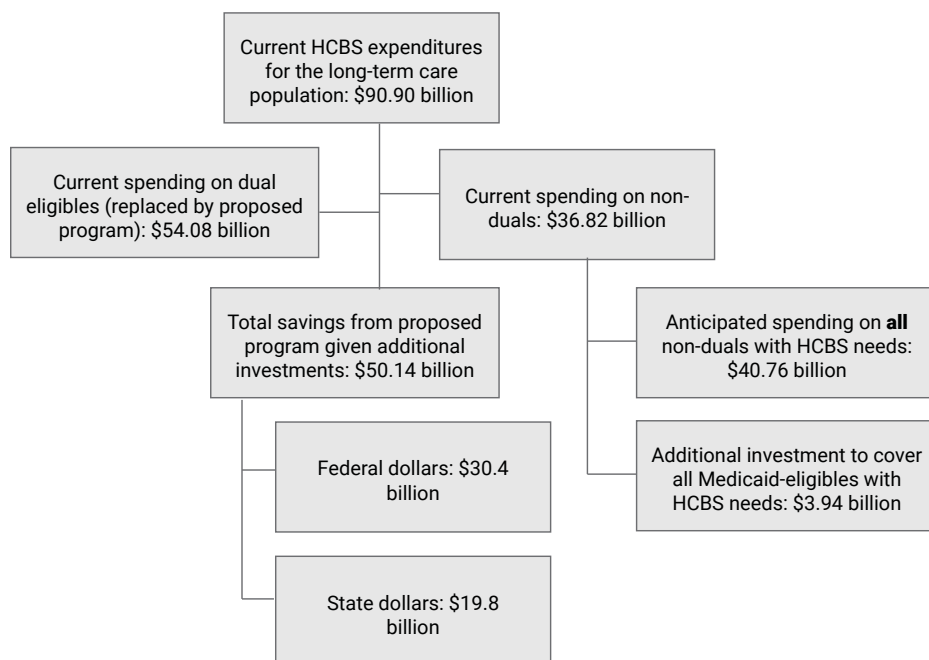
We find that 2.74 million individuals meet financial and medical criteria for HCBS but are not Medicare eligible. This is about 120,000 more than the number of ineligible individuals currently receiving state HCBS. Currently, per-capita spending on this ineligible population is about \$14,053, so we assume \$15,000 per person of annual spending on the expanded beneficiary population. Since this population is all Medicaid eligible, we do not impose cost-share requirements similar to the Medicare program. Thus, we estimate costs of \$40.76

billion on those uncovered by the proposed program. Since current spending on the ineligible population amounts to \$36.82 billion, states and the federal government will now spend an additional \$3.94 billion to “wrap around” our new program and cover the remaining disabled folk ineligible for the Medicare program.

### SECTION 3: PRODUCING FINAL FEDERAL SAVINGS AND STATE CLAWBACK ESTIMATES

As shown in Section 1, the proposed program will result in savings of \$54.08 billion. After accounting for the additional investments required to cover non-eligibles (\$3.94 billion), these savings amount to \$50.14 billion. However, these are Medicaid dollars, so a portion of the dollars comes from the federal government, while the rest comes from state governments and will need to be clawed back. Using the 2024 CPS, we produce a population-weighted adjustment of the federal match rate, accounting for the higher match rate for individuals made eligible for Medicaid after expansion. We find an average federal match rate of 60.55%. Therefore, \$30.4 billion of the \$50.14 billion in savings will come from federal dollars, while the remainder will come from state dollars.

**Figure B1: Summary of savings calculations**



## Appendix C: Increased tax collection from informal caregivers

We estimate the increased tax base from improved labor force participation of informal caregivers. We rely on the 2018 HRS for this analysis, replicating the eligible population and hours schedule as described in Appendix A. We do not replicate our take-up assumptions in this calculation. This analytical sample represents the base of individuals who are likely receiving some amount of informal care that will now be replaced with formal care. We then merge on a novel dataset based on the HRS helper files. The HRS helper files link HRS respondents to their informal caregivers while providing extensive demographic and care provision details about these caregivers. Then, using the methodology developed by Gruber and co-authors, these caregiver files are supplemented with labor market data to predict the wage rate for informal caregivers based upon their observable characteristics, including age, education, and gender (Gruber and McGarry 2023).<sup>3</sup> They also used this same model to predict the probability that caregivers are working, as many caregivers may choose not to work even if not caregiving.

We use this data set to estimate each caregiver's current income and then their expected income given reduced caregiving hours facilitated via the proposed policy. Importantly, we assume that an individual has 40 hours of labor available per week that can either be used for caregiving or labor. We estimate a caregiver's current labor hours as 40 minus their current weekly hours of caregiving, and a caregiver's improved labor hours as their current labor hours plus the formal care hours provided by the proposed policy. For both the current labor hours and improved labor hours, we bottom-code at zero and top-code at 40.

Then, to estimate a caregiver's current income, we multiply their current labor hours by their predicted annual wage and their probability of working. Similarly, to estimate a caregiver's predicted income, we multiply their improved labor hours by their predicted annual wage and their probability of working. However, not all informal care hours will be exactly replaced by paid labor. Karen Shen and coauthors estimate that the replacement rate between informal caregiving and labor force participation is about one-third (Shen 2024). Thus, we offer a lower-bound estimate in which a caregiver's improved labor hours are their current labor hours plus one-third of the formal care hours provided by the proposed policy. We again multiply this hours estimate by their predicted annual wage and their probability of working to estimate a lower-bound improved wage.

These calculations produce a dataset with each caregiver's current income, an upper-bound and lower-bound estimate of their expected income, as well as marital status from the HRS helper files. These data are then input into the TAXSIM model from the National Bureau of Economic Research, via their Stata interface, to produce individual-level federal income tax estimates (Feenberg et al. 1993). We then subtract each caregiver's current income tax (for both the upper and lower-bound estimates) from their expected income tax. Finally, we produce population-weighted sums of these differences in federal income tax to estimate the total increased tax base.

## Appendix D: Increased tax base from home health aides

The proposed policy likely results in an expanded home health aide workforce, which must now pay income tax. To estimate this new income tax, we first calculate the additional hours of formal HCBS that each eligible individual will receive under this program by subtracting their annual current formal care hours (Appendix A.3) from their annual expected formal care hours. After accounting for expected take-up (Appendix A.5), we cost these additional hours at \$20 per hour. We then produce population-weighted sums of the total increase in formal HCBS hours and HCBS costs for the eligible population. To estimate the increased income tax, we multiply this total increase in costs by the average tax rate for a home health worker (6.54%). To produce the average tax rate, we rely on income data from the Bureau of Labor Statistics. We find that the average annual wage for a home health worker in 2024 was \$34,990 (BLS n.d.-a). After applying the standard tax deduction for a single individual, the average home health worker would pay \$2,215 in taxes, making their average tax rate 6.33%. Thus, we estimate that the expanded tax base from home health workers amounts to about \$3.4 billion. Importantly, not all home health workers are newly added to the workforce. Much of the workforce will instead have transitioned from another industry to a newly expanded home care sector, substantially reducing additional tax revenue.

## Appendix E: Sensitivity analysis

Below we present sensitivity analysis of our main micro-simulation model base case results to important take-up and financing assumptions. Row 1 repeats the results presented in the paper, applying our preferred modeling specifications.

Rows 2 and 3 show the effects of alternative take-up assumptions. Row 2 then presents the result costs, assuming that all beneficiaries take up all care hours that they are allocated. This leads to increased participation in the program overall of about 30,000 beneficiaries and, subsequently, increased overall expenditure of about \$8 billion. However, a larger share of these additional hours is covered via individual beneficiary contributions, meaning that total government costs increase by about \$4 billion. Row 3 presents the results assuming that rates of program take-up are 50% higher than our preferred model. Under this assumption, 845,000 more individuals participate in the program, leading to a \$20 billion increase in overall expenditures. Of this increase, \$7.7 billion will be financed

via individual contributions, while \$12.4 billion will be financed via increased government expenditures.

Row 4 presents costs if the life expectancy determination used in the asset amortization formula accounts for the reduced life expectancy among those with ADLs (Haomiao and Lubetkin 2020). Individuals with six ADLs at age 65 had about 3.5 fewer expected years of life than those without ADLs at 65. These differences have a small but notable effect on the rate at which wealth is amortized. Because the rate of wealth amortization has increased, the share of costs that beneficiaries cover increases, and subsequently, program participation declines. The number of beneficiaries is reduced by about 25,000 individuals, and total expenditure is reduced by about \$1.8 billion. However, these reduced costs occur only at the government level. Total beneficiary contributions increase by about \$200 million, while government costs are reduced by about \$1.9 billion.

Table E1: Sensitivity of Micro-simulation Model to Demand and Amortization Assumptions

| Category                                                           | Eligibles (Thousands) | Beneficiaries (Thousands) | Total Expenditures (Billions) | Beneficiary Contributions (Billions) | Total Gov. Cost (Billions) | Share of Total Costs Beneficiaries Incur | Gov. Cost Covered by Direct Financing (Billions) |
|--------------------------------------------------------------------|-----------------------|---------------------------|-------------------------------|--------------------------------------|----------------------------|------------------------------------------|--------------------------------------------------|
| 1 Preferred Model Specification                                    | 8,198                 | 3,726                     | \$111.1                       | \$19.9                               | \$91.2                     | 17.9%                                    | \$41.1                                           |
| 2 Assuming 100% Intensive Margin (Full Take-up of Allocated Hours) | 8,198                 | 3,759                     | \$119.0                       | \$23.5                               | \$95.5                     | 19.7%                                    | \$45.4                                           |
| 3 Assuming 50% Increase in Extensive Take-up                       | 8,198                 | 4,571                     | \$131.2                       | \$27.6                               | \$103.6                    | 21.0%                                    | \$53.5                                           |
| 4 Applying Average Life Expectancy of those with ADLs              | 8,198                 | 3,701                     | \$109.4                       | \$20.0                               | \$89.3                     | 18.3%                                    | \$39.2                                           |

Source: Long-term care micro-simulation model

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## Endnotes

- 1** This excludes 0.195% of the 65 and older population according to the authors' calculations.
- 2** Mathematica state plan expenditures include expenditures from PACE, private nursing duty, and MFP, which are not included in the KFF counts. The KFF counts also include individuals on 1115 waivers, which are not captured in the Mathematica expenditure data. We define "Other HCBS" in the Mathematica data based on the categories of care that KFF buckets as "other" HCBS.
- 3** Actual wages may be biased due to caregiving or other unobserved characteristics, so predicted wages offer a more complete perspective of a caregiver's earning potential.

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