



The Demographics Behind Aging in Place: Implications for Supplemental Security Income Eligibility and Receipt

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Abstract

Although the US population is aging, the population living in nursing homes has fallen. The decline is the largest among low income older adults. This report explores two possible demographic drivers of this decline: (1) increasing racial and ethnic diversity and (2) increasing life expectancy among men. Using decennial census and American Community Survey data from 1980, 1990, 2000, 2008—2010, and 2014—2018 and nonlinear regression decomposition techniques, I estimate the share of the overall decline in institutional residency attributable to these demographic trends. Additionally, I explore which living arrangements have risen as institutional residence fell and discuss implications for the Supplemental Security Income (SSI) program. I am able to explain 99 percent of the decline in institutional residency, of which changes in racial and ethnic diversity alone explain 19 percent. Medicaid Home and Community Based Care waiver programs alone explain approximately 60 percent. As nursing home residency fell, assisted living rose but not by enough to fully offset the decline in institutional residence and very unequally by race. Coresidence with persons other than a spouse and unmarried partnerships both grew dramatically. Findings indicate increases in community-residence may increase SSI payments and rising rates of coresidence may lead to more complex benefit determinations and greater administrative cost.

Keywords: long-term care; regression decomposition
JEL: I32; J14; R21

1 Introduction

Even though the US population is aging, the nursing home population is *declining*. Between 2000 and 2010, the share of persons aged 65 and older who live in institutional settings fell by 20 percent (West et al., 2014). This paper investigates two key demographic trends that may have contributed to this decline in nursing home residents: (1) increasing racial and ethnic diversity, and (2) increasing longevity among men. In doing so, I explore the implications of changes in residency patterns for the Supplemental Security Income program (SSI).

Although fewer than 5 percent of adults older age 65 and older live in nursing homes, nursing home care accounts for 70 percent of Medicaid long-term care expenditures and 8 percent of total Medicaid spending (Kaiser Family Foundation, 2017). Many older adults eligible for Medicaid are also eligible for federal SSI payments. In 2018, payments to recipients over age 65 totaled \$11.3 billion, and federally administered state supplements added at least another \$726 million (Social Security Administration, 2019c, Tables IV.C1 and IV.C4). These payments supported more than 2.2 million financially vulnerable older adults nationally (Social Security Administration, 2019a, Table IV.B9).¹

As the share of persons age 65 and older living in nursing homes has fallen, so has the share of SSI recipients living in institutional settings. Only 1.3 percent of SSI aged recipients lived in institutional care settings covered by Medicaid in 2018 (Social Security Administration, 2019c, Table 7.E5) but nearly 5 percent did in 1980 (Social Security Administration, 1980, Table E).² As shown in Table 1, the maximum monthly federal SSI payment for a Medicaid recipient living in a nursing home in 2018 was \$30 but the maximum when living in the community was \$750 (Social Security Administration, 2019b). This means changes in living arrangements will affect SSI enrollment and expenditures, and may also impact state and federal Medicaid expenditures, as well.

Having accurate estimates of trends in living arrangements that correspond to SSI payment rules may help to inform expenditure projections. After adjusting for inflation, federal per-recipient SSI expenditures have increased despite the fall in real maximum payments shown in Table 1. Figure 1 plots per recipient annual expenditures in the SSI Aged population as a percent of the maximum individual federal benefit rate in each year. Changes in living arrangements may contribute to these trends.

In addition to the impact on actual payments, changes in living arrangements and coresidency in particular may complicate SSI program administration. Federal SSI payments are reduced up to 1/3 when individuals live in another person's home and do not pay their "fair share"

¹State supplemental expenditures and recipient totals exclude older adults receiving state supplements only (without federal payments) in 36 states that administer their own programs (Social Security Administration, SSI Benefits). Recipient and federal expenditure totals include 1.1 million persons over age 65 classified as blind or disabled and federal expenditures for this group but not state supplementation because amounts for those classified as blind or disabled were not separately reported by age.

²These figures exclude blind and disabled recipients age 65 and older because they are not reported by age in both years. In 1980 4.1 percent of all blind and 6.0 percent of all disabled SSI recipients received institutional care covered by Medicaid as compared to only 1.7 and 1.5 percent in 2018. Many of these individuals are also over age 65.

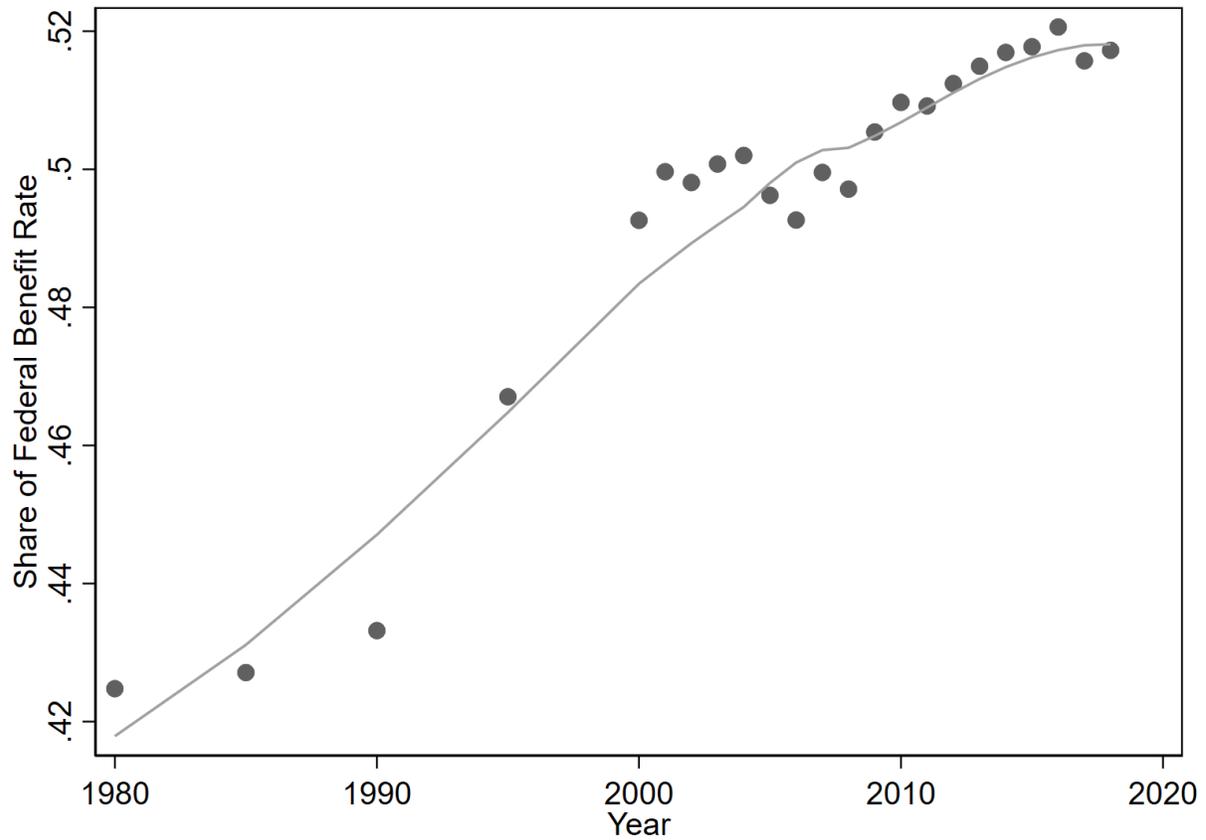


Figure 1: Trend in SSI annual payments per recipient relative to maximum federal benefit rates

Notes: Figure plots expenditures per SSI aged recipient divided by the maximum federal benefit rate in each year as reported in Social Security Administration (2020).

Table 1: Maximum Federal SSI Monthly Payment by Living Arrangement, 1980 and 2018

	1980		2018	
	Individual	Couple	Individual	Couple
Own Household	\$759	\$1,139	\$750	\$1,125
Other's Household	\$506	\$759	\$500	\$750
Medicaid Institution	\$78	\$160	\$30	\$60

Source: (Social Security Administration, 2019b, Tables IV.A2 and V.A1)

Notes: Author inflation adjusted nominal dollar figures to 2018 dollars using CPI U, rounded to the nearest whole dollar.

of living expenses. Determining what constitutes one's fair share of expenses can require an assessment of fair market value of property if rented and depends on the number of people living in the household who share expenses. Payments can also be reduced when recipients live in their own homes and receive help with expenditures from persons living outside the home, but in these cases, there is an actual cash transfer or payment made rather than the sharing of a home at no cost to the beneficiary. Also, the individual and couple determinations reflected in Table 1 can be complex when there are coresident unmarried couples. In these cases, the Social Security Administration (SSA) relies on the "holding-out" as a married couple provisions to determine whether the couple or individual benefit rates apply. These determinations are complex and appear rare relative to the incidence of unmarried partnerships based on survey data (Koenig and Rupp, 2003). So, an increase in unmarried partnership in the SSI eligible population where both parties pay their fair share of expenses is likely to increase the numbers of persons qualifying for the maximum individual benefit amount.

Using decennial census and American Community Survey data from 1980 through 2018, I study the decline in institutional residency in the older adult population among low-income older adults. I examine which non-institutional living arrangements rise as institutionalization falls and investigate demographic correlates of reductions in institutional residency. I find rates of institutional residence fell by 56 percent; my regression decomposition analysis explains 99 percent of this decline, 19 percent of which is attributable to increasing racial and ethnic diversity. Changes in the sex ratio and marital status do not contribute to the decline. Assisted living was one of the fastest growing living arrangements after 2000 for both low-income and higher-income older adults, but the increase occurred nearly exclusively among whites. Among racial and ethnic minority groups, coresidence with family members and unrelated persons rose dramatically. Together these findings indicate SSI payment amounts should be rising but multifamily coresidence and coresidence among unrelated persons may make benefit determinations more complex and should reduce benefit expenditures relative to a scenario where the decline in institutional residence is accompanied by a rise in fully independent living situations.

2 Prior Research

Bishop (1999) estimated if 1985 rates of nursing home residence by age and sex persisted through 1995 there would have been nearly 250,000 more adults over age 65 in nursing homes. Yet, this estimate does not adjust for changes in other demographics, like race and ethnicity. Prior research indicates the risk of institutionalization varies by sex, age, race and ethnicity, marital status, availability of informal support, and health and disability status (Gaugler et al., 2007).

The associations between sex, race, ethnicity and institutional residence may operate through coresidence. As men live longer, there are fewer widows and more coresident married couples. Historically, multigenerational coresidence rates among non-Hispanic whites have been substantially lower than among persons of color Freedman (1996); McCann et al. (2011); Thomeer et al. (2015). Glick and Van Hook (2002) examine the role of immigration in explaining increasing coresidence between older adults and their children and conclude recent immigration does help to explain racial and ethnic differences in the incidence of coresidence in an adult child's household but not coresidence of adult children in their parents' home. This finding is important because prior research indicates nursing home care and coresidence with family are substitutes in demand (Mommaerts, 2018).

Changes in the sex, racial and ethnic composition of the older adult population may also operate through changes in marital patterns. Marriage patterns have changed dramatically over time. Though stark differences by race and ethnicity persist, divorce and remarriage rates later in life are higher in more recent cohorts of older adults than in prior generations (Aughinbaugh et al., 2013; Stevenson and Wolfers, 2007). These changes may reshape living arrangements because rates of institutional residence are substantially higher for widowed, divorced and never married adults Noël-Miller (2010); Thomeer et al. (2016).

Yet, Bishop (1999) notes patterns of nursing home use by race may have changed since the 1980s. In 2000, the rate of nursing home use among African Americans was 14 percent higher than among whites (Smith et al., 2007). Feng et al. (2011) provide more recent evidence (from 1999 to 2008) that rates of nursing home use among Black, Hispanic and Asian populations grew faster than their population shares. The number of Hispanic and Asian nursing home residents each grew over 50 percent, while the number of white residents declined by just over 10 percent (Feng et al., 2011).

Research also points to possible changes in the association between marital status and institutionalization in the most recent cohorts of older adults. Chevan (1996) documents increases in non-marital cohabitation among older persons from 1960 through 1990, a living arrangement that was virtually nonexistent among older adults in 1960. Shares of single-headed families and never-married persons have also increased in the older adult population, especially among the financially vulnerable (Harrington Meyer and Abdul-Malak, 2015; Tamborini, 2007).

There is also a small literature that investigates the associations between SSI benefits and living arrangements. McGarry and Schoeni (2000) study patterns in living arrangements

among widows from 1940 through 1990 using decennial census data. They find an over three—fold increase in the incidence of living alone and similarly sized reduction in coresidence with adult children. This study period encompasses the introduction of the SSI program and they attribute much of this increase to expansions in Social Security, state Old Age Assistance (OAA) programs, SSI benefits, and coverage.³ Costa (1999) also studies the rise in independent living among nonmarried women and finds more generous state OAA programs, and programs that do not impose relative responsibility on adult children, were associated with higher rates of independent living. In contrast, Tissue and McCoy (1981) study changes in living arrangements when SSI was first introduced. Most recipients experienced an increase in benefits relative to any benefits they received under state OAA programs, and Tissue and McCoy (1981) find this increase was associated with a rise in coresidence, specifically in other persons moving in with beneficiaries. Yet, Favreault and Wolf (2004) find the expected negative association between SSI participation and coresidence; persons who coreside are less likely to participate in SSI and they conclude these decisions are likely linked. In more recent cohorts, coresidence between older women and their adult children has increased but research indicates this is primarily to benefit the adult children rather than to provide care for parents (Wiemers et al., 2017). If so, these trends may have less to do with changes in SSI benefits but nonetheless will impact program expenditures.

Many of these studies of changes in institutional residence use demographic information from the administrative records of Medicare and Medicaid nursing facilities, or surveys of the nursing home population. While these data sources often provide many detailed measures of disability and functioning, they cannot reveal concomitant trends in the non-institutionalized population. This limitation is especially important because the long-term care industry has diversified to include many community-based alternatives to institutional care and most states now cover some Home and Community-Based Care Services (HCBS) under Medicaid. Conversely, surveys that do include both institutionalized and community-dwelling older adults, like the Health and Retirement Study, are longitudinal and provide information about the availability of kin with whom they may coreside. Yet, these surveys lack adequate sample size to produce reasonably precise estimates of the role of state policies that shape long-term care, especially among racial and ethnic minority groups or SSI eligible older adults. The nursing home population and the Medicaid eligible older adult population are small, but there are many state programs aimed at supporting them. This report seeks to address these limitations using decennial census and American Community Survey data, which includes both community-dwelling and institutionalized populations, to study changes in living arrangements over a nearly 40-year span.

3 Data and Measures

The data for this analysis comes from Public Use Microdata Samples (PUMS) of the 1980, 1990, and 2000 decennial census, the 2010 American Community Survey (ACS) three-year estimates, and the 2018 ACS five-year estimates accessed via the Integrated Public Use Mi-

³OAA was the precursor to SSI.

crodata Series (IPUMS) USA (Ruggles et al., 2020). IPUMS supplies harmonized versions of many survey questions across the decennial census and ACS surveys. This analysis requires comparable nationally representative data for very low income institutionalized and community-dwelling older adults and details about their living arrangements. The decennial census and ACS are the only data products that include both institutionalized and community-dwelling populations in the sampling frame and offer sufficient sample size to study financially vulnerable adults separate from higher-income adults. Although administrative Medicare or Medicaid data or the Medicare Beneficiary Survey (MCBS) can provide richer information about health conditions, they lack details about household composition or home ownership.

Census and ACS data do have some important limitations which I overview here and document in greater detail in Hamman (2020). First, neither the census nor the ACS consistently identify assisted living facility residents. Though assisted living communities are generally not considered to be group quarters, some units within an assisted living community (like a memory care ward) may be classified as group quarters. Second, the group quarters sampling methodology in the ACS differs from the decennial census, but estimated frequencies of living arrangements in the 2010 decennial census and 2010 ACS are comparable, thus the impact of this change on results is likely minimal. Third, in the ACS and 2010 decennial census, the Census Bureau generated partially synthetic data for the group quarters population to protect data privacy (McKenna and Haubach, 2019). While census publications indicate estimates are representative at the state level, analysis of more detailed community-based drivers of residence like housing costs or availability and costs of community-based care is not feasible. Fourth, until 1990 the decennial census only measured disabilities that limit the ability to work. The additional measures introduced in 1990 appear to overstate disability relative to estimates I construct from the National Health Interview Survey (NHIS) from the same period. Nonetheless, NHIS data do not indicate any systematic increase or reduction in disability prevalence over the study period. Fifth, race measures are more detailed in the later decennial census and the ACS but comparable measures across the full study period are only possible for five single-race categories: white, American Indian or Alaskan Native, Asian, Black, and Other. IPUMS provides this harmonization through the 2010 ACS. I use an algorithm to construct the single race measure for 2014-18 ACS data (Liebler and Halpern-Manners, 2008). Sixth, same-sex and unmarried partners of household heads are not consistently identified as couples across all years. To navigate changes in coding schemes I include both unmarried partners and roommates of the household head in the definition of unmarried partners. This may overstate the incidence of potential holding out relationships.

Despite these limitations, the census and ACS have significant advantages for studying population trends in institutional and community-dwelling residence among older adults. In addition to including both institutionalized and community-dwelling persons in the sampling frame, the surveys include valuable information about housing characteristics, which I use to distinguish between older adults who likely live in assisted living communities and those who live in independent households. Also, because these are household surveys, the data includes information about coresident persons and their relationship to older adults (with the caveats noted above). This advantage is especially relevant for SSI program implications because benefit determinations depend in part on coresidence and whether the older

adult resides in their own or another person's home. In total, I construct six different living arrangement measures. The next section explains each.

3.1 Measuring Living Arrangements

The census defines group quarters as:

“... a place where people live or stay in a group living arrangement. These places are owned or managed by a third party that provides residents with housing and/or services.”

Group quarters include nursing facilities and skilled nursing facilities, as well as inpatient hospice facilities.⁴ IPUMS provides a harmonized group quarters type variable. I include all group quarters identified as institutions, but not correctional or mental institutions, in my measure of institutional residence. In 1990 and later, the variable simply distinguishes between institutional and non-institutional group quarters. Rates of institutional residence for very low-income adults are highly similar from 1980 to 1990, indicating comparability despite this change.

Census and ACS surveys do not distinguish assisted living facilities from other households, but they do collect information about the housing unit. I use this information to identify individuals likely living in assisted living communities. First, I identify housing units that are not single-family detached structures or group quarters. Next, I identify units that do not have a kitchen based on the assumption that meals happen in communal spaces in assisted living communities. Finally, I include group quarters that are categorized as non-institutional or rooming houses as assisted living facilities. Published estimates indicate the assisted living population represents about 2 percent of the older adult population and my coding scheme produces estimates consistent with this statistic for the most recent years (Pray et al., 2010).

In some states, older adults and people with disabilities can receive Supplemental Security Income (SSI) and Medicaid support while living in adult-care foster homes (sometimes referred to as residential care homes). While definitions differ across states, adult-care foster homes are most commonly distinguished from assisted living facilities as single-family detached homes rather than multiple-unit structures. Residents have their own bedrooms in a home owned by an unrelated person with a live-in caregiver, who may be the homeowner. Some states offer Medicaid coverage for care in these settings, and the legal definition of adult foster care often includes resident limits (four or fewer is common). The key feature that distinguishes adult-care foster homes from other coresident arrangements is coresidence with unrelated individuals in a home not owned by the care recipient where the older adult's relationship to the household head is roomer, boarder, or lodger.

Using detailed information about relationships between household members, I create two separate types of coresidence: coresiding in one's own home and coresiding in another's

⁴They also include dorms, correctional facilities, military quarters, residential treatment centers, psychiatric hospitals, and other group homes.

home.⁵ In both cases, coresidence is defined by living with persons other than a spouse or unmarried partner.⁶

The final living arrangement is living in one's own household alone. To meet this definition, there must be no more than two persons in the household and one must be identified as the household head. If there are two persons, the relationship between them must be either spouse or unmarried partner or roommate.

For those living in their own homes, including those with coresident relatives and non-relatives, I am able to also distinguish older adults by their marital status as single, married, or in a "possible holding out" relationship. The definition of possible holding out relationship is broad and includes all unmarried partner and roommate relationships. Nonetheless, this may be useful as these are cases where holding out determinations may be necessary and a rise in these arrangements may increase administrative costs.

3.2 Measuring SSI Eligibility

I use an income eligibility measure rather than reported SSI receipt because living arrangement decisions directly affect federal and state SSI payment maximums. Individuals with countable income close to the threshold may qualify for payments under one living arrangement but would not if they changed living arrangements. This is especially likely for nursing home residence because maximum monthly payments are so low.

To identify income-eligible persons, I use the reported total personal income, income from welfare or supplemental security, and wage measures in the census and ACS to compute countable income following SSI benefit formulas. First, I deduct any SSI received from total income. Next, I deduct reported wage income. This residual amount is my proxy for unearned income, absent SSI. Reported wage income is my measure of earned income. For married couples, countable income is summed across the partners. Following SSA formulas, countable income is computed as unearned monthly income, less \$20, plus one-half of earned monthly income less \$65 for persons who have both earned and unearned income. For persons with only unearned income, countable income is computed as unearned monthly

⁵I investigated more detailed measures of who the coresident persons are when the individual lives in another person's home including: (1) living with a younger relative (child, grandchild, niece or nephew) in the younger relative's home (2) living with a peer relative (sibling or cousin) in the peer's home (3) living with an older relative (parent, aunt, or uncle) in the older relative's home (4) living with an unrelated householder. Notably, the younger, peer, and older definitions are based on familial relationships, not on actual age differences. So, a cousin, sibling, niece, nephew, aunt or uncle, and any step or in-law relatives may be older or younger than the older adult. I also provide more detailed measures of who lives with the older adult when living in their own home. These measures distinguish between coresident relatives and non-relatives. These definitions all exclude persons who are classified as a roomer or boarder in the household and unrelated to the household head. As noted above, these persons are assumed to live in adult foster care settings unless they meet the definition of assisted living. Important differences from the overall results for coresidence in another's household are noted in the text.

⁶As noted above, unmarried partners did include roommates in 1980 and I continue to include roommates in subsequent years for comparability, but unless there is more than one person classified as a partner or roommate in the household, an individual living with a partner or roommate would not be considered coresiding.

income minus \$20, and for persons with only earned income countable income is computed as half of monthly income less \$85 (which includes the \$20 disregard and an additional \$65 exclusion applied to earned income). This formula has not changed since 1980.

I intend to measure countable income without any SSI individuals may be receiving. This data-driven method assumes other sources of income, earned and unearned, are not sensitive to SSI receipt, which is likely a strong assumption. If, for example, individuals reduce other income to stay under SSI income thresholds then measured countable income will be lower than true counterfactual countable absent the SSI. However, the goal of this analysis is to describe living patterns in the population likely to be eligible for SSI and not to estimate the causal effects of participation or benefit amounts on living arrangements. Some misclassification around the threshold used for likely eligibility is unlikely to substantially bias the results, and I check for discontinuities in the probability of each living arrangement around the SSI income limits to verify.

Next, I determine whether countable income is below the relevant maximum federal SSI benefit rate (single or couple) for the calendar year for living in one's own household alone. I use the same maximum benefit rate regardless of where individuals are actually living to ensure the sample is not selected on living arrangements. This method of inferring eligibility ignores state-specific eligibility criteria that may grant state supplemental payments to persons ineligible for federal benefits. It also ignores deeming and resource limits because census and ACS data lack sufficient information to support a more nuanced calculation. As shown previously in Table 1, the real maximum monthly federal benefit has fallen by \$9 from 1980 to 2018. This means persons I classify as SSI eligible in 2018 will be slightly poorer than those who are eligible in 1980, all else equal.

3.3 Capturing Changes in Prevalence of Disability

To understand trends in nursing home use over time and isolate the component attributable to increasing diversity and longevity, the analysis must control for changes in long-term care needs. Studies that use survey data generally rely on self-reported difficulties with activities of daily living (ADLs) and instrumental activities of daily living (iADLs) found in surveys like the Health and Retirement Study or National Health Interview Survey. Unfortunately, detailed questions about disability were not included in the 1980 census. In that year, respondents were only asked about disabilities that preclude or limit paid employment.

Using the available disability measures in each year, I construct a binary measure equal to 1 for respondents who do not report any disability. In more recent years with multiple survey items capturing disability, this means my indicator is only equal to 1 for persons who consistently indicate they do not have any disability across all items in the survey. Though blunt, in all years except 2000, the means of this measure are within four percentage points of one another. From 1980 to 1990, when the scope of the survey question broadened from work-specific to more general disability, the proportion of respondents reporting no disability declined by only two percentage points. Furthermore, in the institutionalized population, only 6.5 percent of persons in 1980 report no disability, and this proportion gradually falls through 2010, mirroring national trends of increasing acuity in the nursing home population

(Feng et al., 2006). These comparisons are reported in greater detail and relative to NHIS estimates over the same period in Hamman (2020).

3.4 Measuring Race and Ethnicity

To measure race consistently over the nearly 40-year study period, I chose to trade-off detail for historical comparability. Over time, Census Bureau has developed more detailed measures of race, especially for multi-racial persons. This information is not available in 1980, so I opt to use more comparable measures that constrain individuals to a single race designation. IPUMS provides a harmonized variable that assigns a single race for multi-racial persons based on their “most likely” single race. IPUMS uses age, sex, Hispanic origin, region, and demographics of the community to infer the most likely single race. However, this variable is not available for the 2018 ACS 5-year estimates. I use a bridging algorithm from Liebler and Halpern-Manners (2008) to assign likely single race responses based on sex, age, ethnicity, responses to race questions, and state of residence.

It is important to preface the results with a brief discussion of what additional unmeasured factors the measures of race and ethnicity may capture that I cannot measure separately using census or ACS data. Differences in living arrangements may reflect differential rates of mortality and morbidity which in turn shape the need for and duration of institutional levels of long-term care. Availability of kin outside the household and financial resources within kinship networks may also underlie racial and ethnic differences in living arrangements, and coresidence in particular. The ACS and census data do not contain measures of wealth and given well-documented differences in wealth by race and ethnicity, the inability to apply SSA’s asset limit in determining SSI eligibility may lead to the inclusion of more financially advantaged white older adults in the analysis and misattribute unmeasured differences in wealth to race and ethnicity. Systematic differences in the availability of Medicaid covered HCBS living arrangements, including assisted living, across more and less diverse neighborhoods may be reflected in race and ethnicity-based differences in living arrangements because state-level is the lowest level of aggregation at which I can control for geographical differences.

In short, there are many unobserved variables that may drive the associations between race and living arrangements estimated in the analysis. These differences should not be assumed to be due to “preferences” or unrelated to policy. Instead, race and ethnicity should be considered “endogenous variables” (Spriggs, 2020). This also does not mean examining the extent to which changing demographics are associated with changes in living arrangements is without merit. Finding demographic factors to be important should help to inform future studies that attempt to understand the impact of the SSI program or study the well-being of participants. I return to these considerations and provide specific examples of how future research could be informed by the results in the conclusion.

4 Empirical Strategy

To assess the potential role of demographic changes in shaping trends in living arrangements, I estimate the following equation for each of the 6 living arrangements L_{ist} described in Section 3.1 and using data pooled across all periods.

$$L_{ist} = \beta_0 + \beta_1 Male_{ist} + Marital'_{ist}\gamma_1 + Race'_{ist}\gamma_2 + Hispanic'_{ist}\gamma_{ist} + \beta_2 NoDisability_{ist} + X'_{ist}\gamma_4 + age'_{ist}\gamma_5 + State'_{st}\gamma_6 + \tau_t + \phi_s + \epsilon_{ist} \quad (1)$$

L_{ist} equal to 1 if individual i living in state s at time t is residing in the living arrangement considered and is 0 for individuals in all other living arrangements. $Male_{ist}$ is a binary indicator for biological sex and $Marital_{ist}$ is a vector of mutually exclusive dummy variables for marital status separated, divorced, widowed, and never married (married is the reference category). $Race_{ist}$ is a vector of single race dummies as described above for categories Black, American Indian or Alaskan Native, Asian or Pacific Islander, and other non-Hispanic race (White is the reference category). $Hispanic_{ist}$ includes separate dummy variables for Hispanic ethnicities of Mexican, Puerto Rican, Cuban and other Hispanic (non-Hispanic is the reference category). $NoDisability_{ist}$ is the binary indicator equal to 1 for persons who do not indicate any disability as described above. The vector of individual-level control variables, X_{ist} , in my preferred specification includes only educational attainment because income will be endogenous if it includes SSI and may be endogenous if it measures only countable income. I conduct robustness checks with and without countable income. Age is captured with a set of age dummy variables age_{ist} . Equation 1 also includes several measures of state policies, $State_{st}$, that may influence long-term care options and cost measures, including state average wages for home health occupations, nursing home industry employees, and labor force participation and full-time employment rates for men and women, separately. I discuss these measures in more detail below. Finally, τ_t is a vector of time dummy variables, one for each 1990, 2000, 2008—10 and 2014—18, with 1980 as the omitted category. ϕ_s are state dummy variables intended to capture time-constant cross-state differences in living arrangements.

To determine the extent to which changes in the racial and ethnic composition of the older adult population explain the decline in nursing home residence over the study period, I use estimates of Equation 1 with institutional residence as the dependent variable on the pooled sample of all four study years to conduct a regression decomposition analysis. Unlike studies where decomposition is used in a cross-section to analyzes differences in an outcome across two groups, I decompose differences in outcomes across two time periods into the components attributable to changes in the racial, ethnic, and gender composition of the population and other covariates.⁷ Conceptually, I decompose changes in residence across each pair of years as follows:

⁷Other studies using this same technique to understand trends in outcomes over time include Hayford (2013) and Birkmeyer et al. (2013)

$$r_2 - r_1 = (d_2 - d_1)\widehat{\beta}_p + d_1(\widehat{\beta}_2 - \widehat{\beta}_1) \quad (2)$$

Where $r_2 - r_1$ is the change in the share of persons living in a given living arrangement from time 1 to time 2. $d_2 - d_1$ represents the portion of the overall change attributable to the change in the prevalence of a particular demographic group, for example the share of Black persons from time 1 to time 2. The term $(d_2 - d_1)\widehat{\beta}_p$ then represents the change in living arrangements that would have occurred if only the prevalence and not the behavior of that demographic group (e.g. Black persons) changed from time 1 to time 2. Specifically, the observed changes in each covariate are multiplied by the coefficients derived from the estimation of Equation 1 on the pooled, β_p . The portion is sometimes called the “explained” difference. Variations on this method sometimes instead use the coefficients from separate regressions in time 2 or time 1 in place of the pooled coefficients, β_p . Because I have multiple pairs of periods to compare, I opt to use the pooled coefficients so that the coefficient vector in the first term of Equation 2 does not change across comparisons.

The second term in Equation 2, $d_1(\widehat{\beta}_2 - \widehat{\beta}_1)$, is an estimate of the change in living arrangements attributable to changes in the association between being in the demographic group and the probability of a given living arrangement from time 1, β_1 , to time 2, β_2 , while holding the prevalence of the demographic group in the overall population constant at time 1 levels, d_1 . This is sometimes called the “unexplained” component of the difference. However, it is sensitive to the choice of omitted categories so, following the convention in the literature, I do not interpret these results.

For ease of exposition I have expressed both Equations 1 and 2 linearly, but the outcomes I study are binary, some living arrangements are quite rare, and the differences in covariates across years are sometimes large. This means linear models are likely to perform poorly. Applying Blinder-Oaxaca decomposition to logistic regressions is invalid (Fairlie, 1999).⁸ For this reason, I estimate Equation 1 using weighted logistic regression with person-level survey weights, and I decompose trends in nursing home residence using nonlinear regression decomposition. In nonlinear decomposition, unlike linear decomposition, results are sensitive to the order of the covariates in the regression. This problem is known as “path dependence” (Fairlie, 2017). To address this problem I randomize the order of the covariates across 1000 replications (Fairlie, 2017; Jann, 2006). Estimates are reported with heteroskedasticity robust standard errors clustered at the state level to account for correlation due to common institutional context, which I briefly discuss before presenting results.

4.1 Addressing Differences in State Policy Environments

Because communities of color are very unevenly dispersed across states, gains in male longevity are unequal, and there are long-standing differences in marital patterns, analyses of the demographic drivers of institutional residence must account for the policy environments

⁸In a linear decomposition the average of the dependent variable is equal to the predicted value at the means of the covariates. This is not necessarily true in logistic regression. Instead, the average value of the dependent variable is equal to the average of the predicted probabilities.

in which older adults make choices about long-term care. For example, in 2000, over 60 percent of the Black population resided in ten states (Office, 2001). The four border states (Arizona, California, New Mexico, and Texas) were home to over 50 percent of Hispanics in 2019, and in Illinois, Connecticut, West Virginia, and Vermont where overall populations fell from 2010 to 2019 Hispanics grew as a share of the overall population (Krogstad, 2020). Even the reduction in mortality risk for males differs by state. In D.C., New York, California and New Jersey, mortality risk for males aged 65 to 85 fell by more than 30 percent between 1980 and 2014, but in Oklahoma and Mississippi mortality among same-aged males fell by less than 5 percent (Uni, 2017). The period 1980 through 2018 encompasses important changes in public programs that support living expenses and medical care for financially vulnerable older adults, most of which vary across states.

Supplemental Security Income (SSI) payments themselves vary by state due to state supplementation and how states treat living arrangements when setting supplemental payment amounts. These payments also changed over time. To illustrate, Figure 2 illustrates inflation-adjusted maximum monthly SSI payments, including state supplementation, for individuals living in their own households, in another person's household, in non-institutional care settings, and in Medicaid covered institutional care for four states: Indiana, Maryland, Ohio and Utah.⁹ Notably, the data series ends in 2010 because SSA stopped collecting information about states that administer their own SSI supplemental payment programs (32 of 44 states with programs) in 2011 due to a lack of resources (Sta, 2011). As shown in Figure 2, Indiana did not distinguish between adult foster care and other non-institutional residential care but Maryland did. Utah did not provide any additional supplementation for residential care or foster care settings and did not reduce payments to persons residing in another person's home until 2000. In addition to the variation shown in Figure 2, most states' supplemental payments are lower for couples than they would be for two individuals, mirroring the pattern in federal payments, but the amount of the "marriage penalty" does vary across states.

Medicaid policies also vary dramatically across states and the study period encompasses many policy initiatives and demonstration projects aimed at reducing the "institutional bias" in Medicaid long-term care services and supports by expanding coverage and access to home and community-based options. The Medicaid long-term care policy landscape changed dramatically in the 1990s with all 50 states adopting 1915(c) Home and Community-Based Care waiver programs as shown in Figure 3. States also regulate the supply of nursing home care through Certificate of Need (CON) laws and moratoriums, and provider reimbursement rates. Many states manage waitlists for home and community-based care. Some of this information is not reported for Arizona and so Arizona is excluded from the analysis.

To isolate the demographic trends that are the focus of this study from changes in state policies, I control for whether the individual's state participants in Medicaid long-term care programs¹⁰, whether the state has a CON law or moratorium, and state Medicaid nursing

⁹Corresponding graphs for all states can be explored in the interactive visual summary published with the final report

¹⁰Medicaid program information is inferred from the Centers for Medicare and Medicaid Services (CMS) Form 64 Long-Term Services and Supports Expenditure tables and include separate dummy variables for

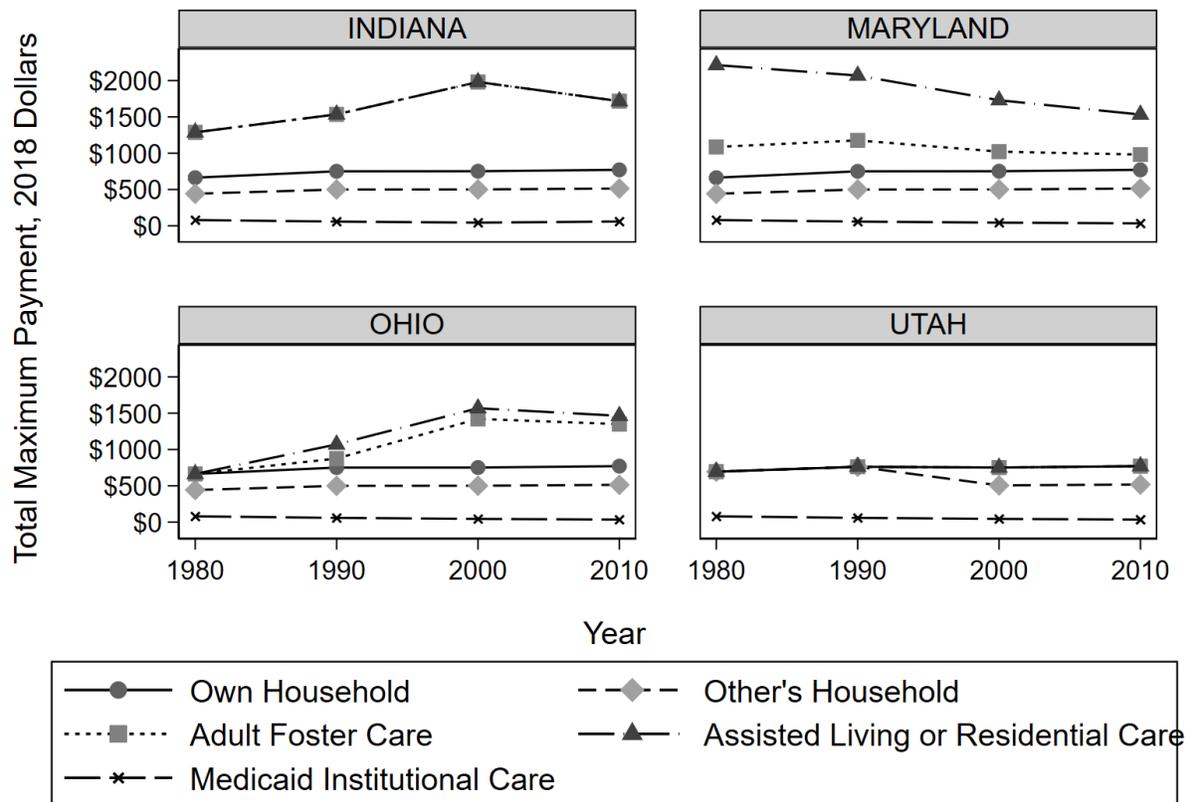


Figure 2: Example of SSI state supplemental payment variation across states

Notes: Figure plots the maximum monthly SSI payments, including state supplementation, by living arrangement in 2018 dollars.

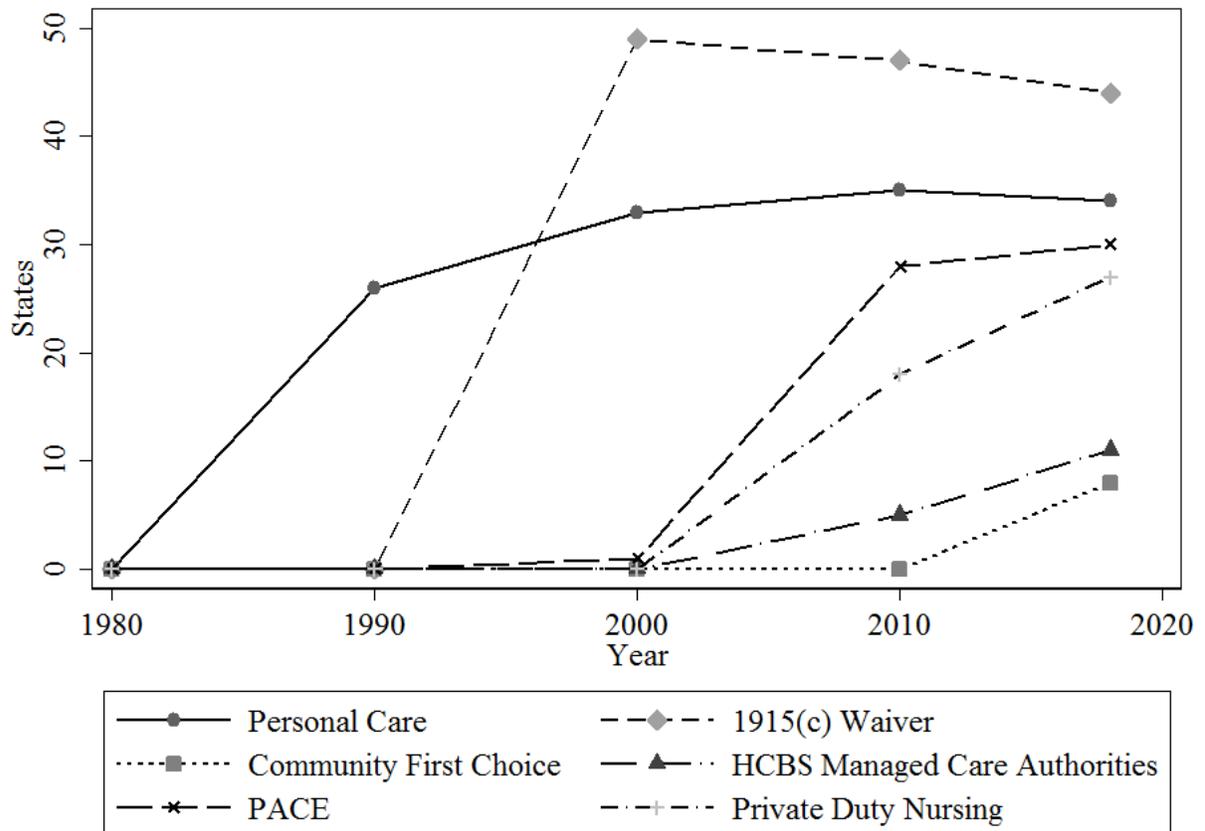


Figure 3: Timing of State Medicaid Long-Term Care Programs

Notes: Figure plots the count of states reporting any long-term care spending by program in each year according to CMS Form 64.

home expenditures per bed. Importantly, I do not use total expenditures or expenditures per capita to measure program extent because both are a function of how many people use the programs, which in turn is determined by living arrangements. I also control for whether the state extends Medicaid coverage to medically needy persons who would otherwise not meet the income criteria for Medicaid coverage. Though persons eligible for SSI are generally also Medicaid eligible, living in a state with medically needy coverage may shape the supports and services available for long-term care and influence the behavior of all covered persons.

5 Results

5.1 Descriptive Trends

Table 2 summarizes the living arrangements for persons with countable income low enough to qualify for Supplemental Security Income (SSI) payments as of 1980. Again, it is only possible to identify unmarried partnerships when older adults reside in their own homes. For other settings, statistics for these individuals cannot be separated from those for single persons. Though a plurality of older adults were single and lived alone in 1980, over 70 percent lived in other settings. Just under half lived in their own homes either alone or with a spouse or partner. Assisted living was rare in 1980 (only 1.48 percent of all SSI eligible older adults) and less common among married couples than single or unmarried partners. Institutional care was also relatively uncommon among married couples, but constituted 15.94 percent of living arrangements, overall.

Table 2: Distribution of Living Arrangements of the SSI Eligible Population by Marital Status in 1980

	Married	Possible Holding Out	Single	Single or Holding Out	Total
Own Household, Alone	19.20%	0.50%	27.32%		47.02%
Own Household, With Co-residents	10.50%	0.13%	7.52%		18.14%
Other's Home	2.03%	n/a	n/a	14.50%	16.53%
Medicaid Institution	1.99%	n/a	n/a	13.95%	15.94%
Assisted Living	0.08%	n/a	n/a	1.40%	1.48%
Foster Care	0.05%	n/a	n/a	0.85%	0.89%
Total	33.85%		66.16%		100%

Source: Author's calculation using 1980 decennial census data.

Table 3 provides the percentage changes in each living arrangement from the baseline rates displayed in Table 2 to 2018. The decline in institutional residence discussed previously is

states with any personal care, 1915(c), Home Health, Community First Choice, HCBS managed care, PACE, private duty nursing, Money Follows the Person, and case management specifically for older adults.

clear. Rates fell by nearly 60 percent among single persons and by 55.35 percent overall. Interestingly, the incidence of independent living without coresidents fell, too. Assisted living did become more common, increasing by 47.77 percent overall. However, this is in part because the baseline rates for assisted living were low. When expressed in percentage point terms, there was a 14.65 percentage point increase in coresidency of any type, and a 0.71 percentage point increase in assisted living. The large percentage increases in possible holding out relationships when expressed in percentage-point terms amount to a gain of only 2.39 percentage points in total, though unmarried partners cannot be identified when living in another's home, institutions, assisted living or foster care. In summary, as rates of institutional residence declined coresidence rose most and living with a spouse or in an unmarried partner (including roommates) became more common.

Table 3: Estimated Percentage Change in SSI Eligible Population by Living Arrangement and Marital Status: 2018 Relative to 1980 Baseline

	Married	Possible Holding Out	Single	Single or Holding Out	Total
Own Household, Alone	-24.64%	+329.98%	-11.68%		-13.36%
Own Household, With Co-residents	+27.14%	+592.06%	-3.38%		+18.42%
Other's Home	+340.58%	n/a	n/a	+30.34%	+68.41%
Medicaid Institution	-24.12%	n/a	n/a	-59.80%	-55.35%
Assisted Living	+144.80%	n/a	n/a	+42.10%	+47.77%
Foster Care	+106.77%	n/a	n/a	-35.92%	-28.62%
Total	+13.93%		-7.13%		

Source: Author's calculation using 1980 decennial census and 2014-18 American Community Survey data.

Notes: It is not possible to determine unmarried partnerships unless one partner is the household head so these persons are reported with rates for singles in all coresident settings and in institutional, assisted living and adult foster care. Assisted living and foster care are reported separately but in most states the federal benefit maximum rates for living in one's own household would apply.

The changes summarized in Table 3 may not necessarily coincide with the decrease in institutional residence. Figure 4 displays age specific rates of institutional residence by year for the SSI income-eligible population and those with higher income. This dis-aggregation reveals the decline shown in Table 3 is driven by behavior of the oldest-old, and is much larger in the SSI eligible population than among higher income older adults. The difference in rates exceeds 15 percentage points for those 85 and older and SSI eligible.

Figure 5 summarizes geographical variation in the decline in institutional residency. While most states experienced at least a small decline, four states experienced an increase (Arkansas, Alabama, Mississippi, and West Virginia). Arizona is omitted from the analysis because of missing data for some state policies, and Alaska for insufficient observations. Twenty states experienced declines of more than 10 percentage points, with the largest declines of 19 percentage points in Wisconsin, Connecticut and Washington.

Table 2 suggests the declines in Figure 4 coincide with increases in in assisted living res-

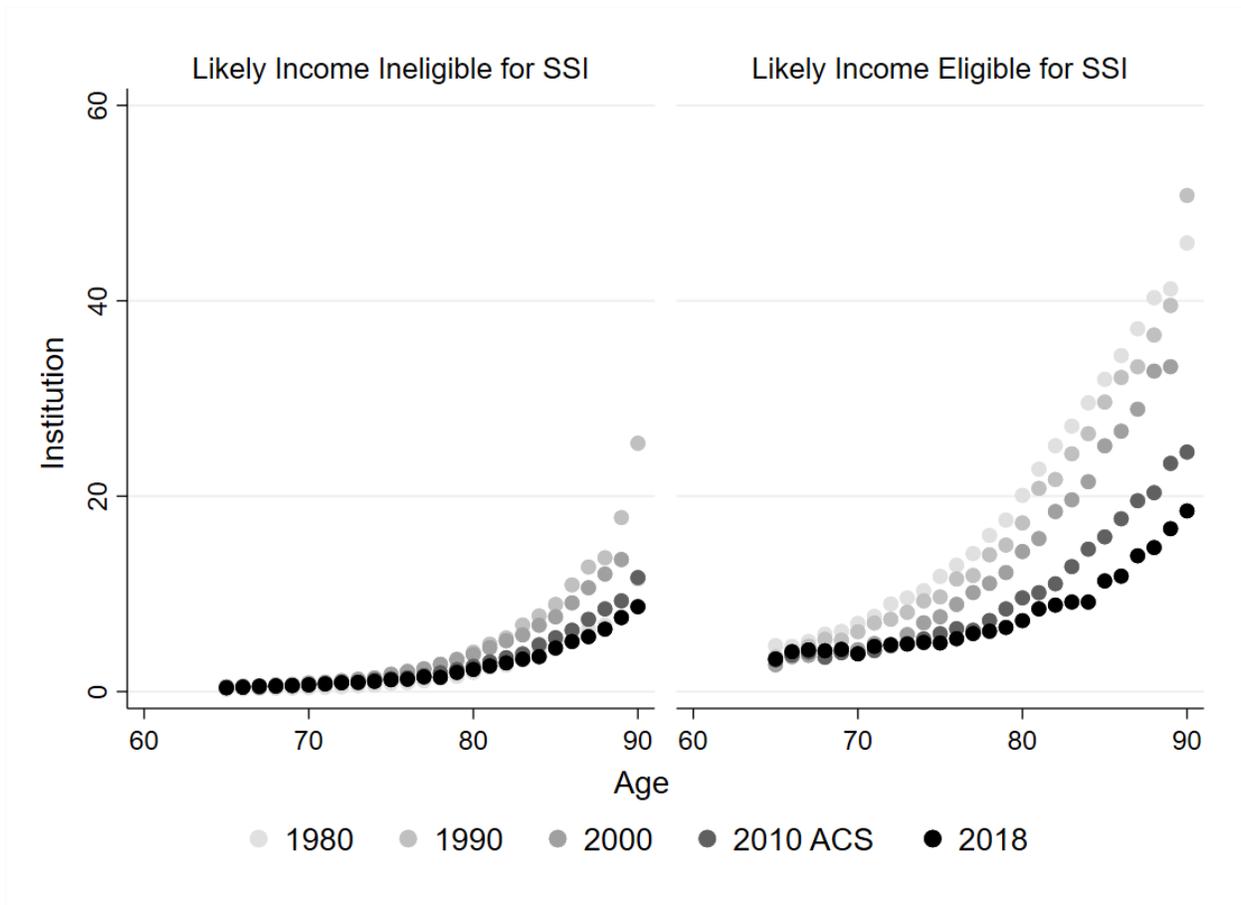


Figure 4: Trends in age-specific rates of institutional residence by SSI income eligibility

Notes: Figure plots estimated age-specific rates based on ACS and decennial census data using individual survey weights.

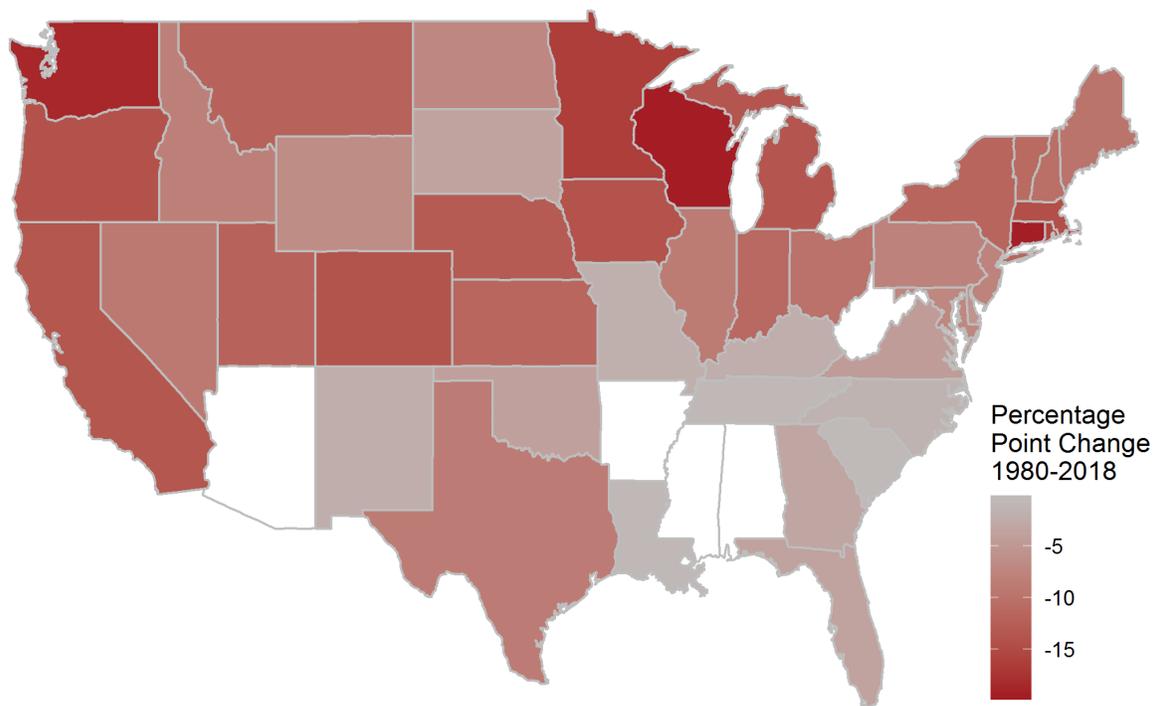


Figure 5: Trends in state rates of institutional residence among SSI eligible persons

Notes: Figure plots the percentage point change in rates of institutional residence based on ACS and decennial census data using individual survey weights. Data are missing for Arizona due to incomplete policy data required for the multivariate analysis.

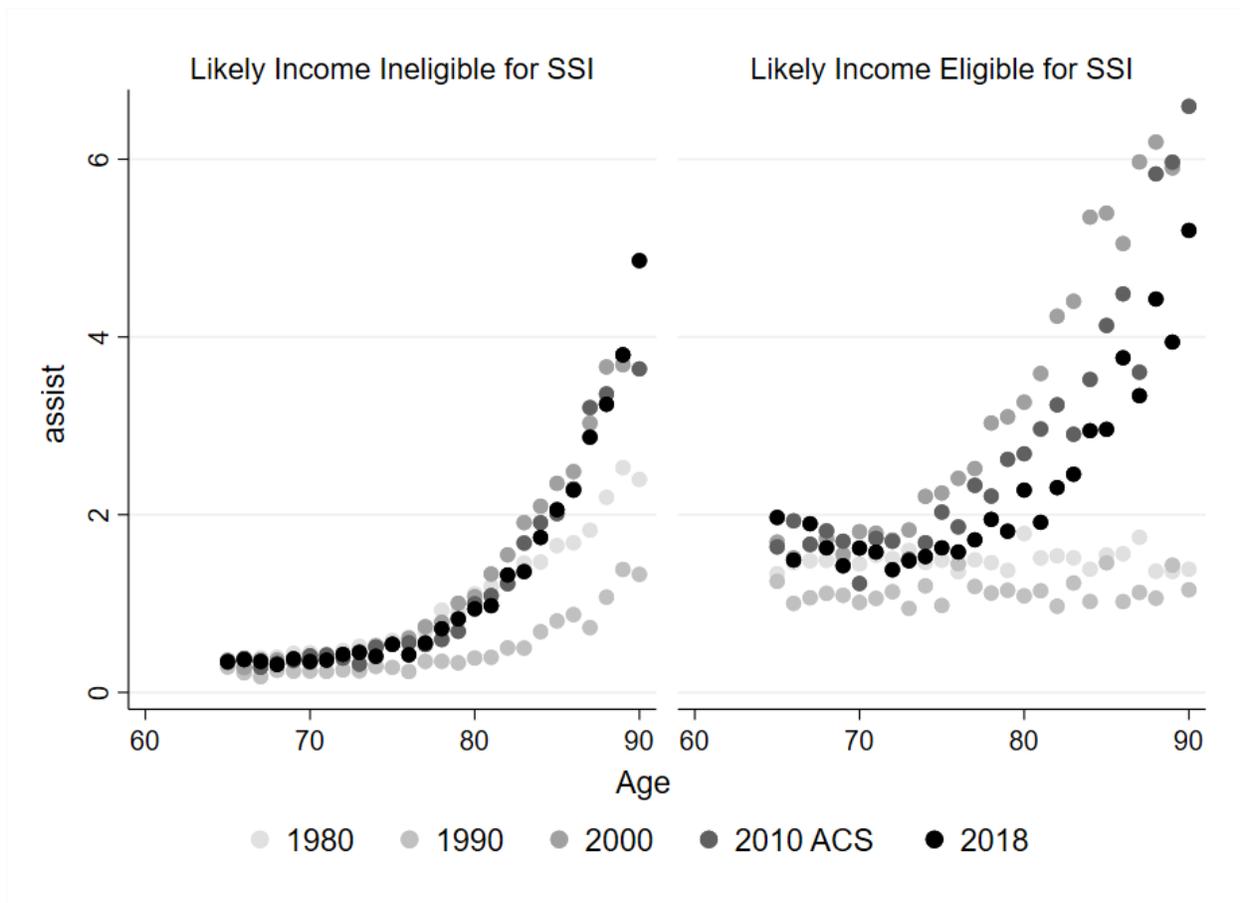


Figure 6: Trends in age-specific rates of assisted living by SSI income eligibility

Notes: Figure plots estimated age-specific rates based on ACS and decennial census data using individual survey weights.

idence. To investigate further, Figure 6 provides age-specific rates by year. Increases are similarly sized or smaller in the SSI eligible population, and are far smaller than the declines in institutional residence shown in 4. The y-axis in Figure 6 extends to only 6 percentage points to allow for a closer view of the differences in trends across years in the two panels. Interestingly, rates are higher among the lower-income group at younger ages, perhaps reflecting a higher incidence of disability or deteriorating health. Also, there is a clearer break in trends between 1990 and 2000 in the lower-income group, perhaps reflecting the introduction of state Medicaid HCBS waiver programs shown in Figure 3. Nonetheless, these gains are too small to account for the entire decline in institutional residence and do not mirror the differences by SSI eligibility.

Figures 7 and 8 show changes in coresidence in their own and other's homes by age. Interestingly, the incidence of living in one's own home with coresident persons fell among the youngest old from 2010 to 2018. Some of the high rates in 2010 were likely due to the recession but rates were high in 2000, too. The increase from 1980 to 2018 is concentrated among adults ages 70 and older - which is the age range at which declines in institutional

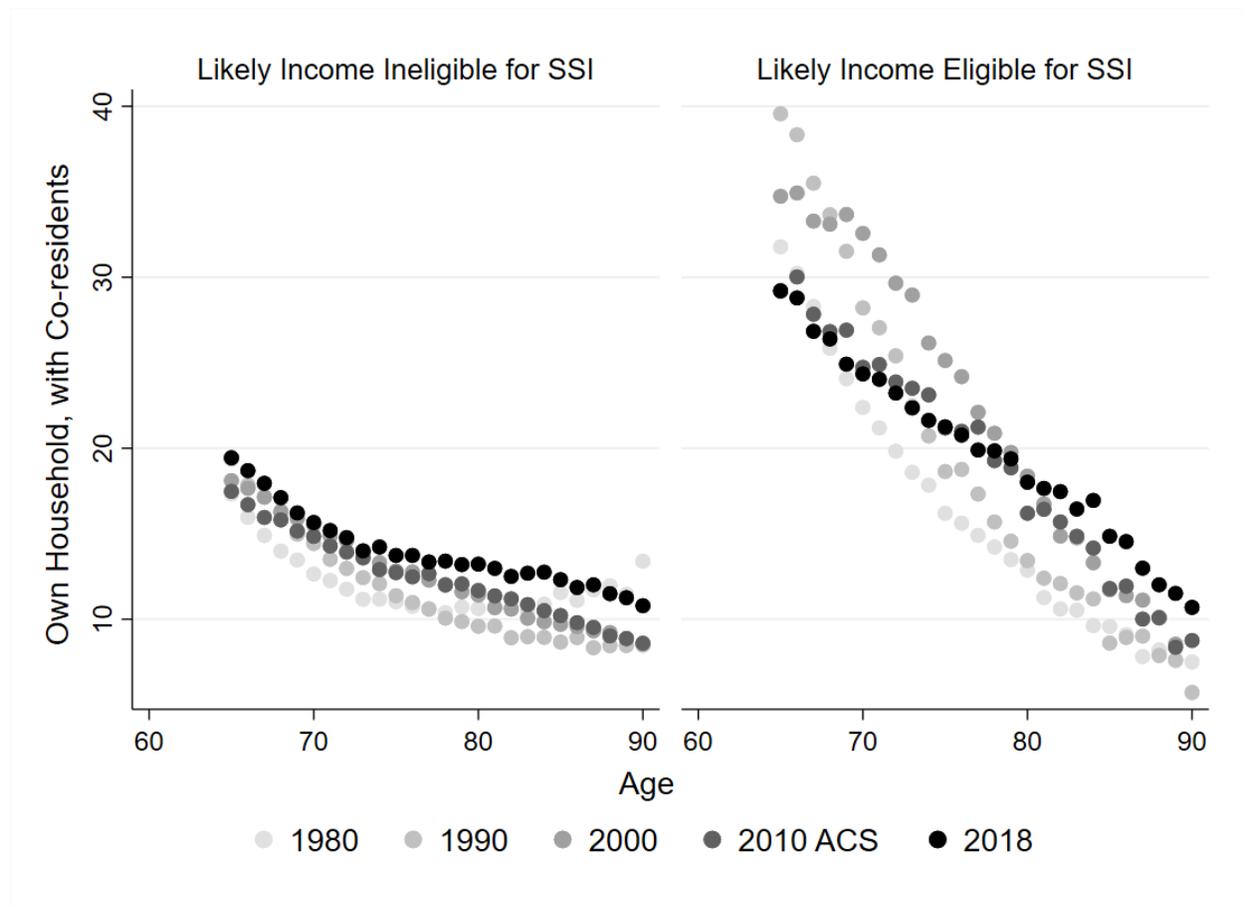


Figure 7: Trends in Age-Specific Rates of Coresidence in Own Home by SSI Income Eligibility

Notes: Figure plots estimated age-specific rates based on ACS and decennial census data using individual survey weights.

residence are first apparent - but rates in each decade and the change in rates across decades falls with age whereas the decline in institutional residence was largest among the oldest-old. Coresidence in another's home rose more dramatically and at every age. This trend was specific to the lower-income group.

In summary, the decline in institutional residence is not accompanied by a clear offsetting increase in one type of community-based living arrangement. Gains appear to be spread across coresident and assisted living arrangements.

5.2 Multivariate Analysis

Next I present the results of multivariate analyses as a first step towards explaining the trends in living arrangements highlighted in Table 2 and Figures 4, 6, 7, and 8. To facilitate comparisons across living arrangements with very different baseline rates, I summarize the estimated associations between race, ethnicity and sex and each of the 6 living arrangements as percentage differences in probability, using the pooled sample of all years. These estimates

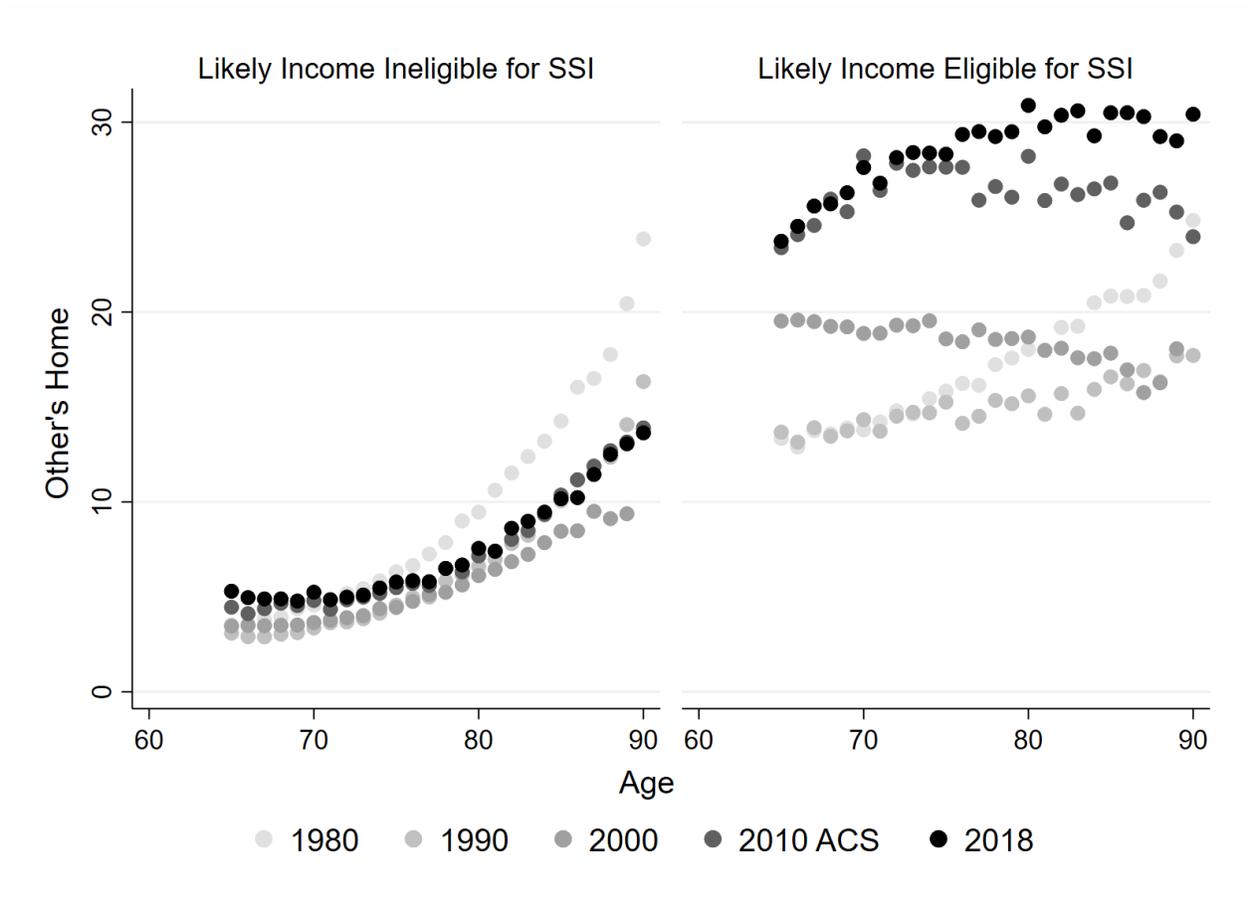


Figure 8: Trends in age-specific rates of coresidence in another’s home by SSI income eligibility

Notes: Figure plots estimated age-specific rates based on ACS and decennial census data using individual survey weights.

are the coefficients used to hold “behavior” constant in regression decomposition estimates.

Figure 9 summarizes associations between race and living arrangements. Bars appearing in the same row derived from the same regression (Equation 1) with the living arrangement reported on the far left as the dependent variable. Red bars extending to the left represent lower probabilities of a living arrangement among persons of a given race relative to whites, white bars extending to the right represent higher probabilities. The length of the bar represents the percentage difference in probabilities (i.e. the percentage point difference estimated in Equation 1 divided by the baseline rate). A systematic pattern is evident. Probabilities of assisted living and independent living in one’s own home are lower among all persons of color than among whites, and rates of institutional residence are lower among American Indians or Alaskan Natives, Asians, and Blacks. Coresident relationships appear somewhat more common among persons of color, but the largest differences are in the rates of coresidence with others among Asians.

The associations between living arrangements and ethnicity are reported in Figure 10 and they exhibit an even more systematic pattern. All coresident relationships are more common among Hispanics than non-Hispanic whites. Rates of institutional residence and assisted living are lower, as are independent living situations.

Finally, Figure 11 reports the results for sex. These regressions do control for marital status, so the estimated association will not capture any differences in living arrangements due to differential marital patterns. When controlling for marital status, institutional residency, assisted living, and adult foster care are more common among men than women. The difference for adult foster care is large, and there is also a large gender difference in the incidence of independent living without coresidents. Living in one’s own home with coresidents is much less common among male older adults than female. Based on these results, a rise in the share of males over time will not explain the decline in institutional residency.

5.3 Decomposition of Changes in Institutional Residence

To better understand the role of covariates examined in section 5.2 in explaining the trends in institutional residence discussed in Section 5.1, this section presents the nonlinear regression decomposition results. Figure 13 presents the percentage of the total 56 percent (9 percentage point) decline in institutional residence from 1980 to 2018 explained by each covariate, or covariate group. In total, changes in covariates explain 99 percent of the observed decline. Bars extending to the left indicate changes in covariates contributed to the decline, whereas bars to the right indicate covariate changes would have increased the rate of institutional residence, all else equal.

Interestingly changes in Medicaid waiver programs explain over 60 percent of the overall decline. This is somewhat surprising given the inconclusive results of studies that attempt to measure their causal effects (Hamman et al., 2019; Hoerger et al., 1996; Grabowski and Gruber, 2007; Wiener and Anderson, 2009). It could be that these effects are slow to materialize and are captured in the longer study horizon, but it is less feasible to compare pretrends or model dynamic effects with a periodicity of 10 years between surveys. So, it is also possible

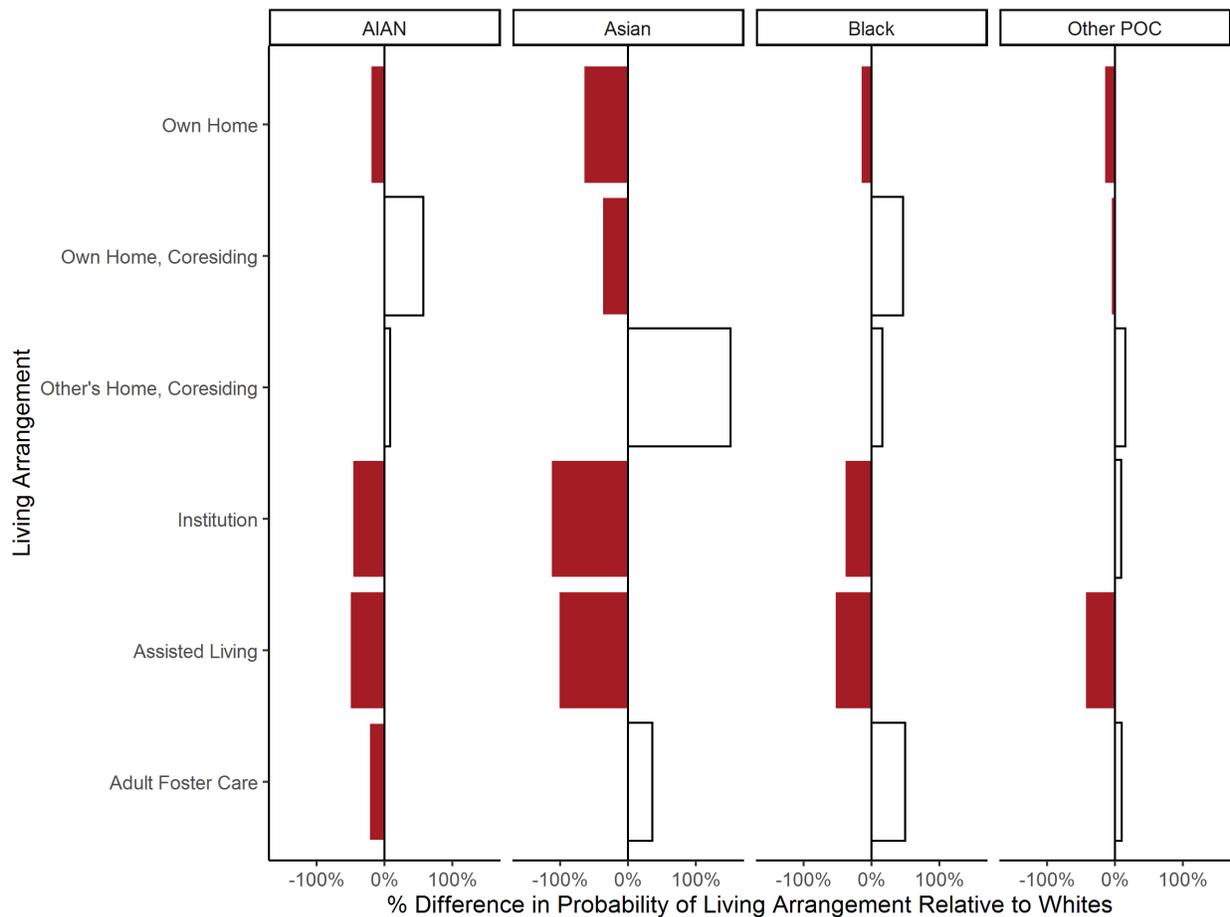


Figure 9: Summary of regression results for race

Notes: Figure summarizes the results of 6 separate regressions. Bars represent estimated percentage differences in the probability of each living arrangement between the race shown and whites. These differences are computed as the ratio of the estimated regression-adjusted percentage point change, given by the marginal effects after logit estimation of Equation 1, divided by the estimated mean for each living arrangement. A full tabular reporting of all coefficients and standard errors is provided in the Appendix. Confidence intervals are omitted here for clarity; nearly all coefficient estimates are statistically significant at the 1% level

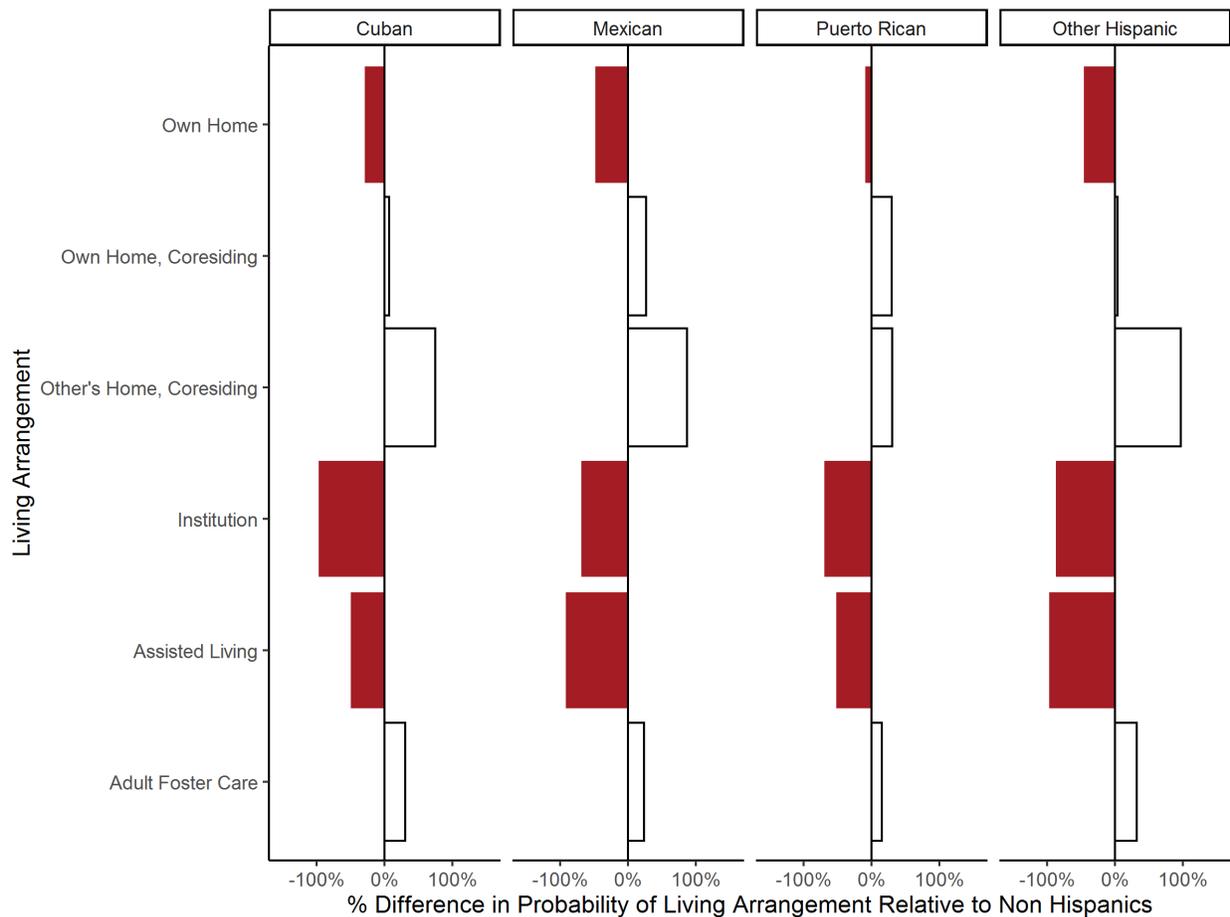


Figure 10: Summary of regression results for ethnicity

Notes: This figure summarizes the results of 6 separate regressions. Bars represent the estimated percentage differences in the probability of each living arrangement between the ethnicity shown and non-Hispanics. These differences are computed as the ratio of the estimated regression-adjusted percentage point change, given by the marginal effects after logit estimation of Equation 1, divided by the estimated mean for each living arrangement. A full tabular reporting of all coefficients and standard errors is provided in the Appendix. Confidence intervals are omitted here for clarity; nearly all coefficient estimates are statistically significant at the 1 percent level

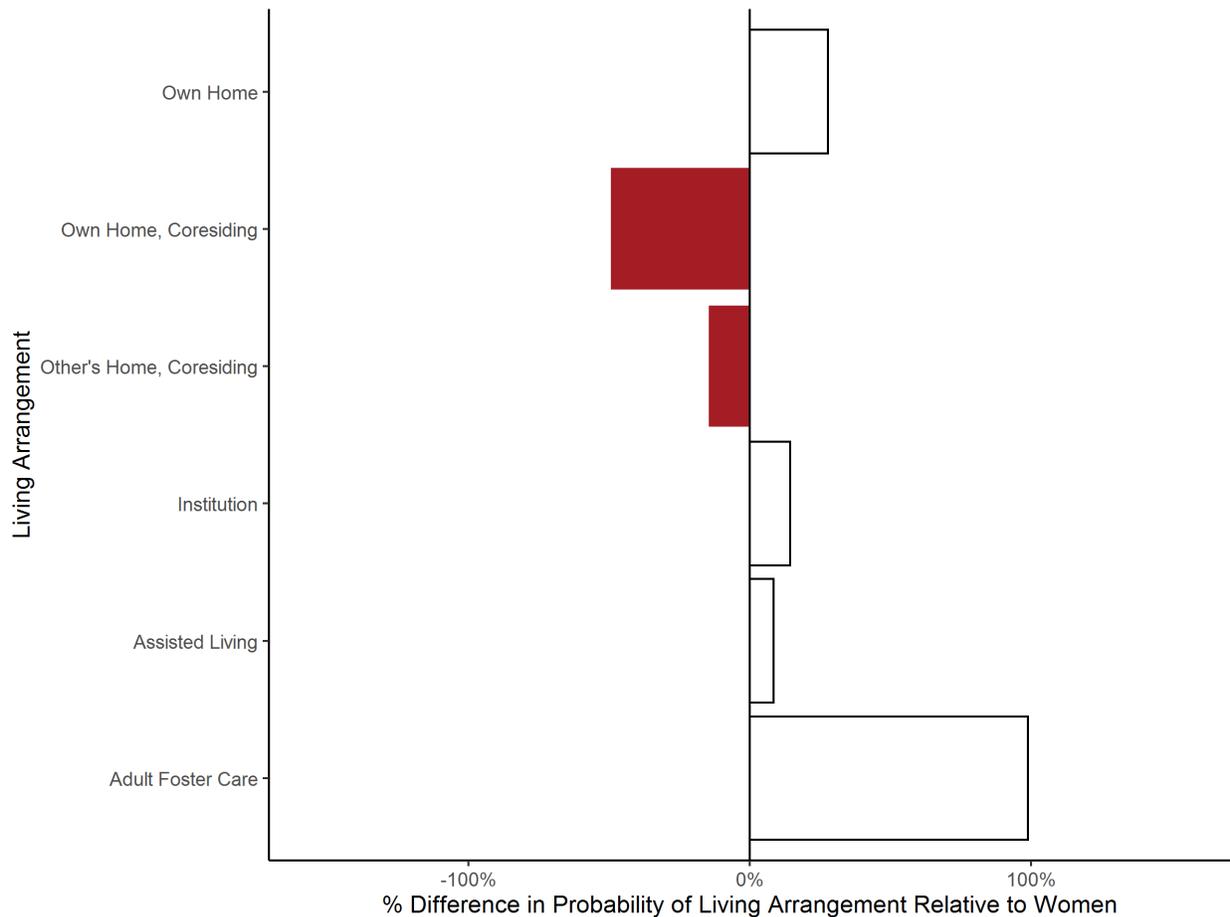


Figure 11: Summary of regression results for men

Notes: The figure summarizes the results of 6 separate regressions. Bars represent estimated percentage differences in the probability of each living arrangement between men and women. These differences are computed as the ratio of the estimated regression-adjusted percentage point change, given by the marginal effects after logit estimation of Equation 1, divided by the estimated mean for each living arrangement. A full tabular reporting of all coefficients and standard errors is provided in the Appendix. Confidence intervals are omitted here for clarity; nearly all coefficient estimates are statistically significant at the 1 percent level

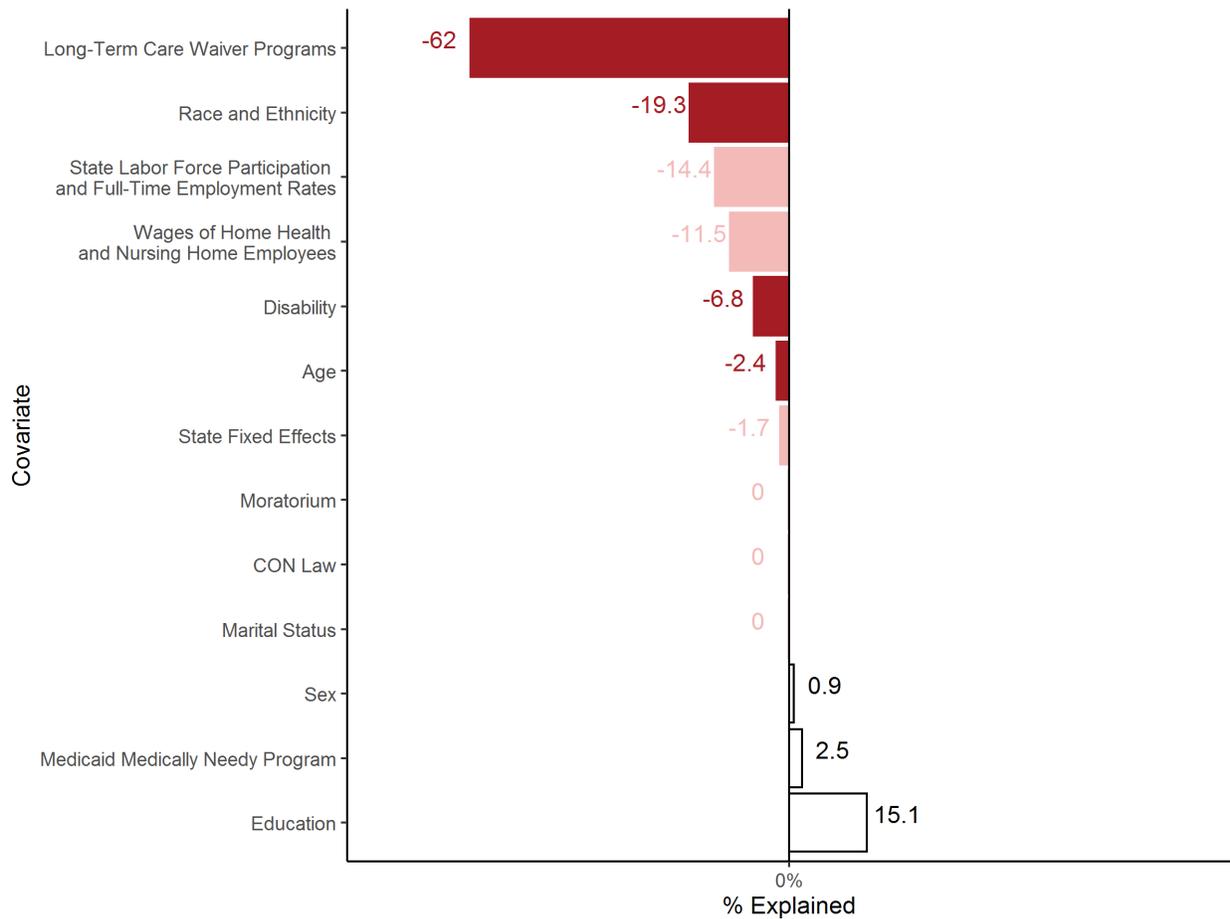


Figure 12: Summary of nonlinear regression decomposition of decline in institutional residence, 1980—2018

Notes: Figure summarizes the results of nonlinear regression decomposition using the pooled regression of Equation 1 with institutional residence as the dependent variable as reported in Appendix Table 6, random ordering of covariates, and 1,000 replications. Results are reported as percentage of the total 6 percentage point decline from 1980 to 2018 explained by each covariate. Dark red and black outlined bars are based on estimates that are statistically significant at the 5 percent level using heteroskedasticity robust standard errors clustered by state.

these estimates do not satisfy assumptions for causal interpretation as well as prior studies.

Race and ethnicity together explain 19 percent of the decline and are the second most important predictor. Labor force participation and full-time employment rates rose over the study period, especially among women, and together explain 14 percent of the decline but this estimate is less precisely measured. As noted, the change in disability incidence during the study period is very small but accounts for approximately 7 percent of the decline. Increases in the male population share alone would have resulted in a small (0.9 percent) increase in the rate of institutionalization, and changes in marital status alone would not have changed rates of institutional residence.

After adjusting for other factors, population aging explains very little of change in institutional residence, and the impact is negative. This is likely because the oldest of the baby boom cohorts (those born in 1946) are only 72 years old in 2018 and more baby boomers were born in the later years of the cohort (peaking around 1959) than in the earliest years (Colby and Ortman, 2014). Changes in educational attainment alone would have resulted in a large increase in nursing home use. Medicaid coverage of medically-needy persons alone also would increase the rate of institutional residence according to estimates.

Though these estimates do not control for countable income because income and living arrangements may be simultaneously determined, robustness checks that include income as a control yield highly similar results. Long-term care waiver programs and changes in racial and ethnic composition of the population are still the most important predictors of the decline, explaining 58.2 percent and 19.7 percent respectively. Income itself explains only 2.9 percent of the decline.

These estimates do not account for cross-state differences in supplemental SSI payments, except through state-fixed effects, however, state fixed-effects explain very little of the change. Nonetheless, state supplements did change over the study period. Using data through 2010 when state supplemental payments are observed produces similar results for race and ethnicity but not long-term care policies. Figure ?? shows race and ethnicity combined explain 21.5 percent of the decline in institutional residence from 1980 to 2010, more than any other predictors. SSI benefit rates, including state supplementation, explain nearly as much (18.8 percent). Controlling for changes in SSI benefits, and truncating the study period at 2010 completely reverses the findings for Medicaid long-term care waiver programs. However, as shown in Figure 3, aside from Personal Care and 1915(c) waivers, most other programs were relatively new in 2010. Over this horizon, changes in marital arrangements do contribute to the decline in institutional residence but their role is small.

Figure 14 summarizes the age-specific changes in disability, monthly countable income, educational attainment and race and ethnicity; and it indicates which were key drivers of the decline institutional residency. In total, from 1980 to 2018, more older adults of all ages did not report a disability, but the difference over time is quite small. Changes in educational attainment and demographics were much larger. In total, the population became more educated but countable income, adjusted for inflation, remains at or below 1980 levels as expected given income thresholds that determine eligibility did not keep pace with inflation.

Relative to socioeconomic and demographic drivers, state policies appear to play a less

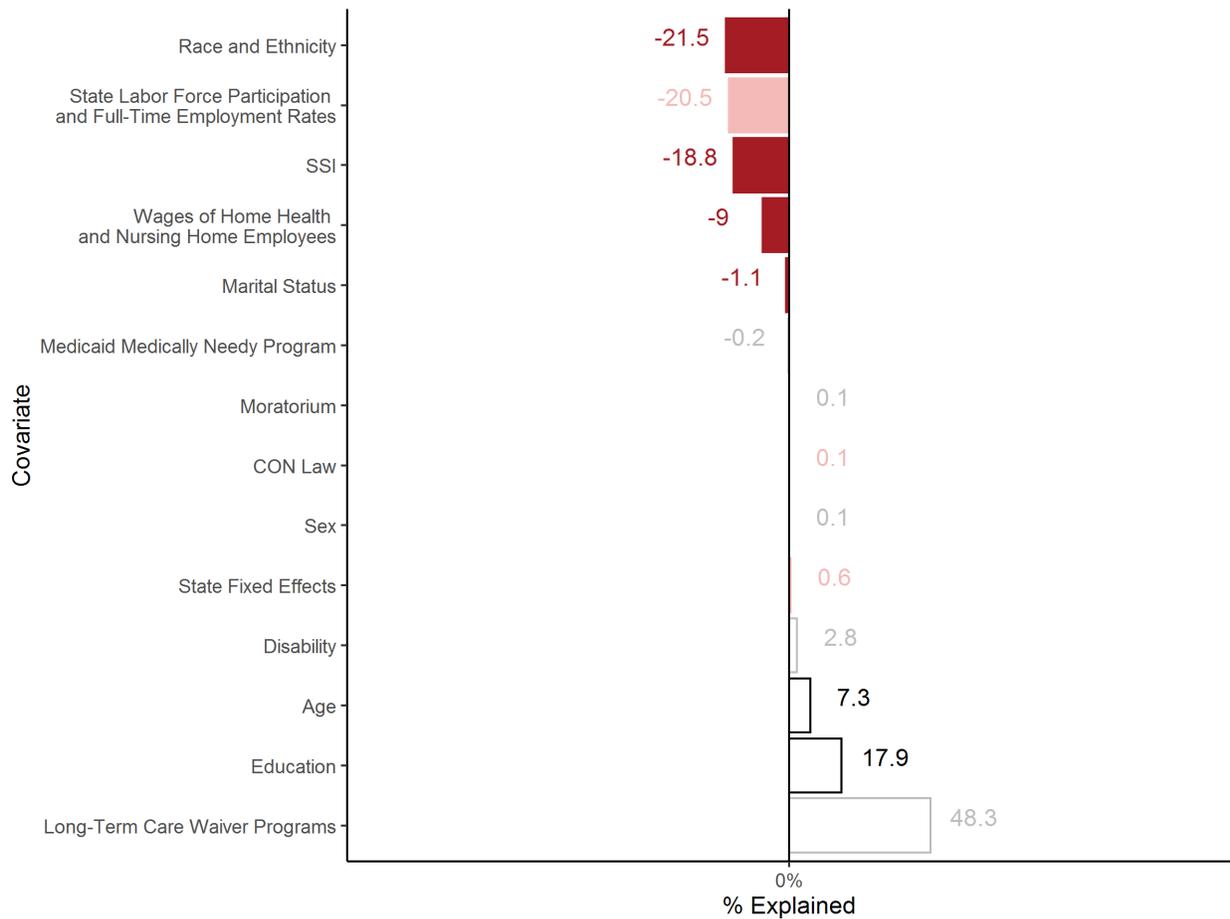


Figure 13: Summary of nonlinear regression decomposition of decline in institutional residence, 1980—2010

Notes: Figure summarizes the results of nonlinear regression decomposition using the pooled regression of Equation 1 with institutional residence as the dependent variable as reported in Appendix Table 6, random ordering of covariates, and 1,000 replications. Results are reported as percentage of the total 4 percentage point decline from 1980 to 2010 explained by each covariate. Dark red and black outlined bars are based on estimates that are statistically significant at the 5 percent level using heteroskedasticity robust standard errors clustered by state.

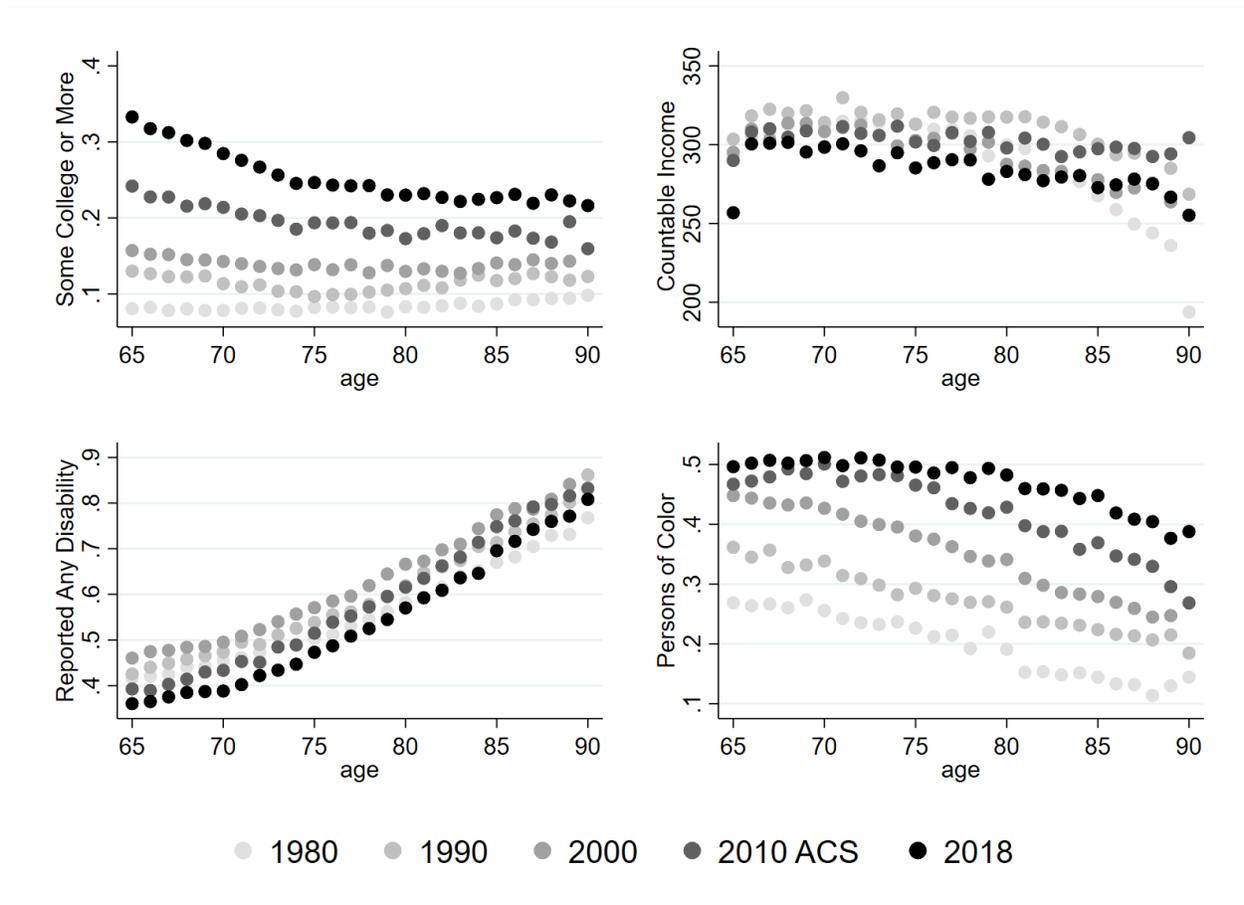


Figure 14: Changes in key covariates, 1980–2018

Notes: Figure plots estimated age-specific means for key covariates based on ACS and decennial census data using individual survey weights.

consistent role in the decline in living arrangements. Medicaid waiver programs appear very important over the full 38 year study period, but when accounting for SSI payments are not. Unfortunately without information about state SSI supplements, it is not possible to disentangle the effect of the shorter study period from the effect of controlling for SSI payments.

As presented in Section 5.1, not all states experienced a decline in institutional residence and there was substantial heterogeneity in the size of the decline. Among those that did experience a decline, the role of race and ethnicity in explaining the decline may vary. All states except Hawaii and Arkansas had an increase in the share of very low-income persons age 65 and older who identify as either non-White or Hispanic (or both). Yet the change in the share of persons of color from 1980 to 2018 varies from about 0.5 percentage points in West Virginia to 34 percentage points in Nevada. Figure 15 summarizes the percentage of each state's decline in institutional residence, among those that had any decline, explained by changes in race and ethnicity from 1980 to 2018. These estimates use the same pooled regression as the full-sample results but state values for covariates in 1980 and 2018 to produce the decomposition. States that experienced an increase in institutional residence and Arizona and Alaska, which are omitted from all analyses due to missing or insufficient data, are left blank. In all but seven states, race and ethnicity explain more the 5 percent of the decline in institutional residence and explain more than 30 percent in eight states.

6 Conclusion

This paper analyzed living arrangements among financially vulnerable older adults over a nearly 40 year period from 1980 to 2018. During this period, rates of institutional residence in this population fell by nearly 50 percent - a substantially larger decline than the reduction among higher-income older adults. Also, this population had much higher growth in coresidence with persons other than a spouse or partner. Assisted living became more common in this population, but changes were similar in size to the higher income population and do not fully offset the decline in institutional residence.

Using pooled cross-sections of decennial census and ACS data, I find large differences in institutional residence by race and ethnicity. Race and ethnicity alone explain about 20 percent of the total decline in institutional residence. In some states, increasing diversity accounts for more than 50 percent of the state's decline.

Policy also appears to play an important role, though the analysis is limited by lack of information about state SSI supplements after 2010. From 1980 to 2018, Medicaid waiver programs explain 62 percent of the overall decline in institutional residence, but these estimates cannot account for differences in state SSI supplemental payments. From 1980 to 2010 when SSI supplements can be measured, variation in total SSI benefit maximums, including state supplements, explain 18.8 percent of the decline and Medicaid waiver programs are associated with *higher* rates of institutional residence, all else equal. There were important changes in Medicaid coverage from 2010 to 2018, and the states that adopted programs often did so because they had high rates of institutional care (Hamman et al., 2019). So,

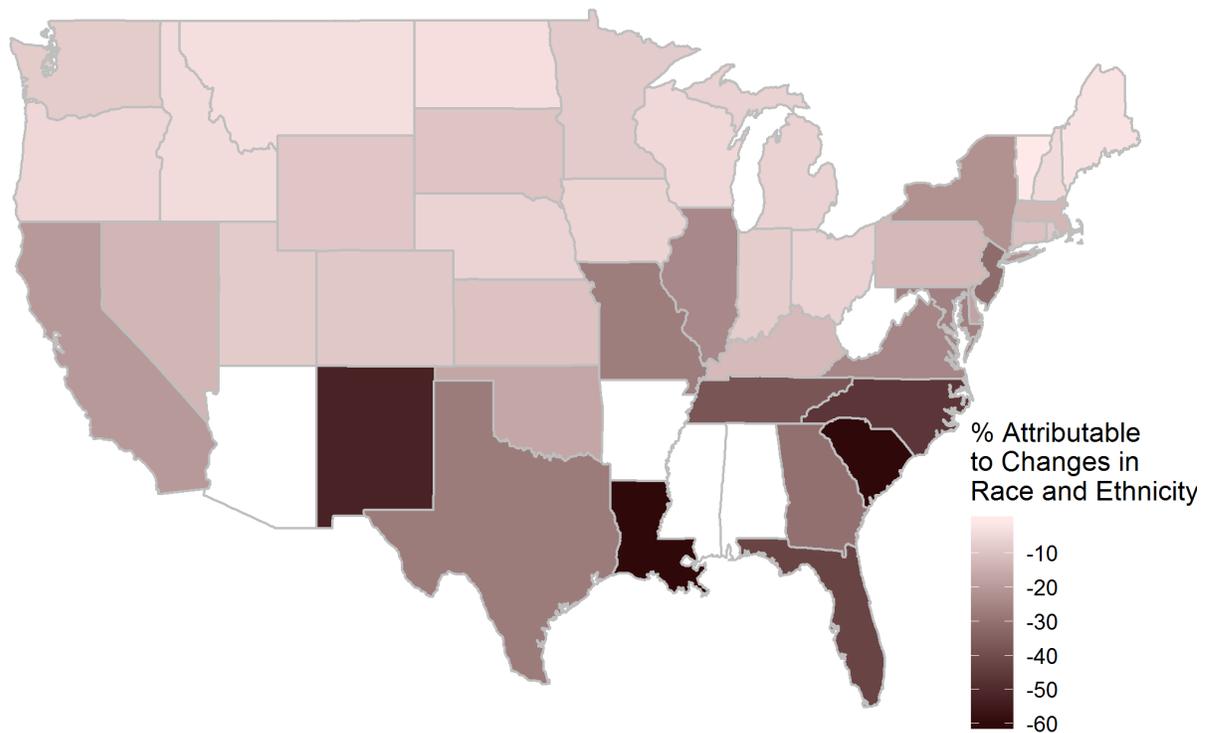


Figure 15: Percentage of decline in institutional residence explained by changes in racial and ethnic diversity, state decompositions

Notes: Figure summarizes the results of nonlinear regression decomposition using the pooled regression of Equation 1 with institutional residence as the dependent variable as reported in Appendix Table 6, random ordering of covariates, for each state based on 100 replications per state. Results are reported as the percentage of a state's total decline from 1980 to 2018 explained by changes in race and ethnicity of the population.

a pattern of positive and then negative policy effects is possible, but analysis through 2018 that controls for SSI benefit maximums would better determine the relative importance of these two programs in shaping living arrangements.

These findings provide several useful insights for federal and state SSI programs. First, the older adult population is projected to continue to grow in size and diversity in the coming decade. The findings in this study suggest these trends may further reduce the use of institutional care. Community-dwelling older adults may be more reliant on social programs like SSI to cover basic living expenses and may rely on coresidence to pool resources and obtain informal care. This study also found increased rates of unmarried partnerships, though was unable, due to limitations, to identify such partnerships between persons who are not the household head or partner of the household head. The true rate of unmarried partnerships may be higher. More complex family structures may increase the costs and challenges of equitably administering SSI payments due to an increase in the need to apply holding out provisions in benefit determinations.

Findings also point to possible changes in homeownership. Although rates of independent living in one's own home declined by approximately 13 percent, coresidence in one's own home increased by 18 percent relative to the 1980 baseline rate. However, due to the difference in baseline rates, the overall shares of financially vulnerable older adults identified as heads of households, spouses or partners declined by 4.5 percent. Though this rate includes renters, it may reflect important underlying changes in homeownership. Homeownership can be an important source of financial security for older adults and a residence does not count against the SSI asset limit.

Though the populations studied represent a small share of the total older adult population, they are important for state and federal SSI programs and for Medicaid. To illustrate the connection between SSI, Medicaid, and living arrangements, consider a simple hypothetical scenario. As mentioned previously, SSA reports indicate the proportion of SSI recipients who lived in nursing homes fell from 5 percent to 1.3 percent between 1980 and 2018 (Social Security Administration, 2019c). What if instead of falling the percentage of institutional resident SSI recipients had remained at 5 percent as in 1980? There would be approximately 43,000 more institutionalized SSI aged recipients, and, assuming the maximum federal payments in both settings, payments to each of these institutionalized persons would be \$720 per month lower. This means maintaining 1980 rates of institutional residence would have reduced total SSI aged payments in 2018 by \$357 million, or approximately 6 percent. The analogous calculations for all disabled recipients yield an increase of 247,000 additional institutional residents and a reduction in payments of \$2.4 billion, which is 4 percent of total SSI disabled payments. Medicaid expenditures, conversely, would increase because Medicaid long-term care in institutional settings is generally more expensive than in community settings. Using median annual costs of nursing facility care, the increase in costs to Medicaid would be approximately \$13.2 billion (Kaiser Family Foundation, 2017). The seemingly larger estimated savings in this simple example is a prominent point in policy discussions of rebalancing Medicaid long-term care expenditures by increasing home-and-community-based care.

The foregoing calculations make strong assumptions, but they help to illustrate the potential interplay between institutional residency, SSI, and Medicaid for the older adult population, and they show the potentially large financial impact of a small population. Yet, the actual costs and savings depend upon where people who would have lived in nursing homes are living instead. So, in analyzing the demographic drivers of declining nursing home residence, the paper also investigates where people are living instead of institutions.

This study also highlighted the challenges of identifying assisted living arrangements in publicly available data. As more care moves outside of nursing homes, a lack of data for the assisted living population will present further challenges. Some information is available in HCBS Medicaid claims, and quality indicators are evolving, but basic estimates of the size and characteristics of this population are lacking. Lack of data also creates difficulty for assessing the adequacy of federal benefits and the well-being of the SSI aged population because there is no comprehensive database of state supplemental programs encompassing years after 2011.

Finally, though this study aimed to provide a detailed descriptive analysis of living arrange-

ments and determine whether changes in the racial and ethnic composition of the older adult population explain the decline in institutional residence, it is limited in its ability to infer the reasons for racial and ethnic differences in living arrangements. Finding race and ethnicity to be among the most important predictors of falling institutional residence raises the need for future research to investigate why. Do race and ethnicity proxy for differences in economic advantages, even within this select group of financially vulnerable older adults? I do not find evidence of changes in the coefficients on race and ethnicity variables over time in the regression decomposition analysis. This means, despite policies aimed at promoting access to HCBS, racial and ethnic disparities in institutional residence do not fall over the study period. In fact, other studies have raised concerns about the rate of growth in institutional residence among persons of color and pointed to long-standing segregation in the residential long-term care industry (Bishop, 1999; Feng et al., 2011; Mor et al., 2004; Smith et al., 2007, 2008). To these concerns I add one final visual summary of differences in living arrangements.

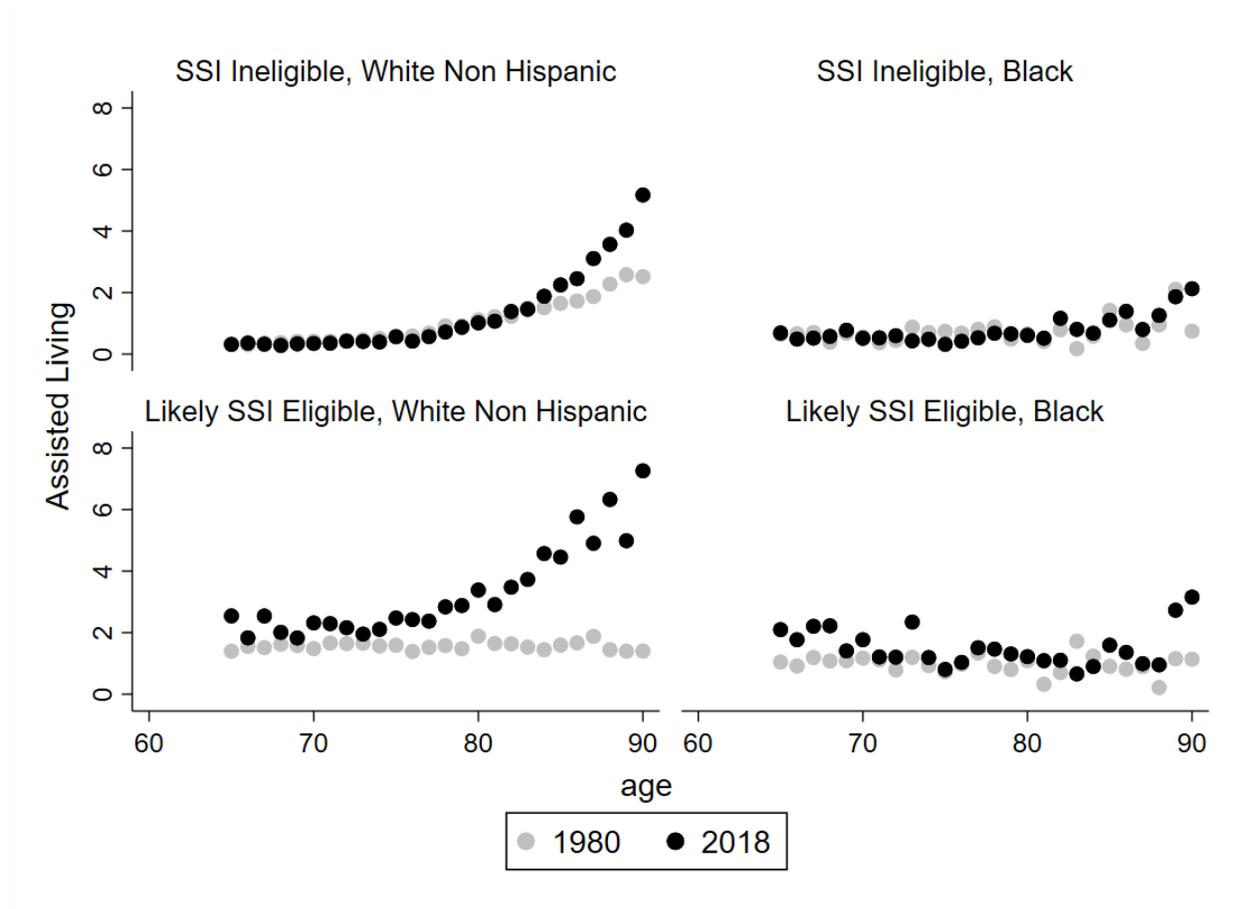


Figure 16: Age-specific rates of assisted living, 1980 and 2018 by race and SSI eligibility

Notes: Figure plots estimated age-specific rates of assisting living residence among non-Hispanic white and Black older adults based on ACS and decennial census data using individual survey weights.

Figure 16 displays changes in age-specific rates of assisted living from 1980 to 2018 as presented earlier, but separately for non-Hispanic white and Black populations across low and high-income groups. These graphs reveal the increase in assisted living in the SSI-eligible population is driven nearly entirely by changes in residency among non-Hispanic whites, and among non-Hispanic whites in 2018 are similar across high and low-income groups. In the Black population, there is no discernible increase in assisted living in either the high or low-income group. The striking differences by race regardless of income suggest that there is more than just economic need driving differences in living arrangements.

Analyses of access to assisted living and other forms of HCBS that specifically account for differences by race are needed to understand these patterns. This will require access to more granular data on the locations and capacity of assisted living communities while maintaining enough statistical power for separate analyses by race. Current group quarters sampling methodology limits researchers' ability to conduct such analyses using census data, even with access to restricted-use data. Given the implications of living arrangements in this population for both state and federal budgets, the need for understanding trends is high, and given the disparities apparent in Figure 16, the need to investigate differential access to long-term care by race should be a research priority, but the inability to study local drivers of living arrangements is a major barrier to producing more policy- and socially-relevant analyses.

References

- (2011, January). State Assistance Programs for SSI Recipients. Technical Report 13-11975, Social Security Administration, Washington, D.C.
- (2017). United States Life Expectancy and Age Specific Mortality Risk by County 1980-2014. Institute for Health Metrics and Evaluation (IHME).
- Aughinbaugh, A., O. Robles, and H. Sun (2013). Marriage and divorce: patterns by gender, race, and educational attainment. *Monthly Lab. Rev.* 136, 1.
- Birkmeyer, J. D., J. F. Finks, A. O'Reilly, M. Oerline, A. M. Carlin, A. R. Nunn, J. Dimick, M. Banerjee, and N. J. Birkmeyer (2013). Surgical skill and complication rates after bariatric surgery. *New England Journal of Medicine* 369(15), 1434–1442.
- Bishop, C. E. (1999, July). Where Are The Missing Elders? The Decline In Nursing Home Use, 1985 And 1995. *Health Affairs* 18(4), 146–155.
- Chevan, A. (1996). As Cheaply as One: Cohabitation in the Older Population. *Journal of Marriage and Family* 58(3), 656–667.
- Colby, S. L. and J. M. Ortman (2014). The baby boom cohort in the United States: 2012 to 2060. *Population Estimates Program May*.
- Costa, D. L. (1999). A house of her own: old age assistance and the living arrangements of older nonmarried women. *Journal of Public Economics* 72(1), 39–59.
- Fairlie, R. W. (1999). The absence of the African-American owned business: An analysis of the dynamics of self-employment. *Journal of Labor Economics* 17(1), 80–108.
- Fairlie, R. W. (2017). Addressing path dependence and incorporating sample weights in the nonlinear blinder-oaxaca decomposition technique for logit, probit and other nonlinear models. *Stanford Institute for Economic Policy Research, Working Paper (17-013)*.
- Favreault, M. M. and D. A. Wolf (2004). Living arrangements and supplemental security income receipt among the aged.
- Feng, Z., M. L. Fennell, D. A. Tyler, M. Clark, and V. Mor (2011, July). Growth Of Racial And Ethnic Minorities In US Nursing Homes Driven By Demographics And Possible Disparities In Options. *Health Affairs* 30(7), 1358–1365.
- Feng, Z., D. C. Grabowski, O. Intrator, and V. Mor (2006). The Effect of State Medicaid Case-Mix Payment on Nursing Home Resident Acuity. *Health Services Research* 41(4p1), 1317–1336.
- Freedman, V. A. (1996, March). Family Structure and the Risk of Nursing Home Admission. *The Journals of Gerontology: Series B* 51B(2), S61–S69.
- Gaugler, J. E., S. Duval, K. A. Anderson, and R. L. Kane (2007, June). Predicting nursing home admission in the U.S: A meta-analysis. *BMC Geriatrics* 7(1), 13.

- Glick, J. E. and J. Van Hook (2002). Parents' coresidence with adult children: Can immigration explain racial and ethnic variation? *Journal of Marriage and Family* 64(1), 240–253.
- Grabowski, D. C. and J. Gruber (2007, May). Moral hazard in nursing home use. *Journal of Health Economics* 26(3), 560–577.
- Hamman, M., B. Helppie-McFall, and D. Hochfellner (2019). Incentives for Home- and Community-Based Care under the Affordable Care Act: Implications for SSI Receipt. Technical Report WI19-08, Center for Financial Security University of Wisconsin Madison Retirement and Disability Research Center, Madison, WI.
- Hamman, M. K. (2020). Methods report: The demographics of aging in place. <https://cfsrdrc.wisc.edu/projects>.
- Harrington Meyer, M. and Y. Abdul-Malak (2015, July). Single-Headed Family Economic Vulnerability and Reliance on Social Programs. *Public Policy & Aging Report* 25(3), 102–106.
- Hayford, S. R. (2013). Marriage (still) matters: The contribution of demographic change to trends in childlessness in the united states. *Demography* 50(5), 1641–1661.
- Hoerger, T. J., G. A. Picone, and F. A. Sloan (1996). Public Subsidies, Private Provision of Care and Living Arrangements of the Elderly. *The Review of Economics and Statistics* 78(3), 428–440.
- Jann, B. (2006). Fairlie: Stata module to generate nonlinear decomposition of binary outcome differentials.
- Kaiser Family Foundation (2017). Medicaid's Role in Nursing Home Care. <https://www.kff.org/infographic/medicaids-role-in-nursing-home-care/>.
- Koenig, M. and K. Rupp (2002/2003). Ssi recipients in households and families with multiple recipients: Prevalence and poverty outcomes. *Social Security Bulletin* 65(2).
- Krogstad, J. M. (2020, July). Hispanics have accounted for more than half of total U.S. population growth since 2010. *Fact Tank News in the Numbers*.
- Liebler, C. A. and A. Halpern-Manners (2008, February). A Practical Approach to Using Multiple-Race Response Data: A Bridging Method for Public-Use Microdata. *Demography* 45(1), 143–155.
- McCann, M., M. Donnelly, and D. O'Reilly (2011, May). Living arrangements, relationship to people in the household and admission to care homes for older people. *Age and Ageing* 40(3), 358–363.
- McGarry, K. and R. F. Schoeni (2000). Social security, economic growth, and the rise in elderly widows' independence in the twentieth century. *Demography* 37(2), 221–236.
- McKenna, L. and M. Haubach (2019, April). Legacy Techniques and Current Research in Disclosure Avoidance at the U.S. Census Bureau. Technical report, Research and Methodology Directorate, U.S. Census Bureau.

- Mommaerts, C. (2018). Are coresidence and nursing homes substitutes? evidence from medicaid spend-down provisions. *Journal of Health Economics* 59, 125–138.
- Mor, V., J. Zinn, J. Angelelli, J. M. Teno, and S. C. Miller (2004). Driven to Tiers: Socioeconomic and Racial Disparities in the Quality of Nursing Home Care. *The Milbank Quarterly* 82(2), 227–256.
- Noël-Miller, C. (2010). Spousal loss, children, and the risk of nursing home admission. *Journals of Gerontology Series B: Psychological Sciences and Social Sciences* 65(3), 370–380.
- Office, U. C. B. P. I. (2001, August). Majority of African Americans Live in 10 States; New York City and Chicago Are Cities With Largest Black Populations - Census 2000 - Newsroom - U.S. Census Bureau. News Release CB01-CN.176, US Census Bureau.
- Pray, L., C. Boon, E. A. Miller, and L. Pillsbury (2010). Providing healthy and safe foods as we age: Workshop summary. In *Providing Healthy and Safe Foods as We Age: Workshop Summary*. National Academies Press.
- Ruggles, S., S. Flood, R. Goeken, E. Meyer, J. Pacas, and M. Sobek (2020). IPUMS USA: Version 10.0.
- Smith, D. B., Z. Feng, M. L. Fennell, J. Zinn, and V. Mor (2008, October). Racial Disparities in Access to Long-Term Care: The Illusive Pursuit of Equity. *Journal of Health Politics, Policy and Law* 33(5), 861–881.
- Smith, D. B., Z. Feng, M. L. Fennell, J. S. Zinn, and V. Mor (2007, September). Separate And Unequal: Racial Segregation And Disparities In Quality Across U.S. Nursing Homes. *Health Affairs* 26(5), 1448–1458.
- Social Security Administration (1980). Program and Demographic Characteristics of Supplemental Security Income Beneficiaries. Technical report, U.S. Department of Health and Human Services, Washington, D.C.
- Social Security Administration (2019a). Annual Report of the SSI Program. Technical report, Social Security Administration Office of the Chief Actuary, Washington, D.C.
- Social Security Administration (2019b). Annual Report of the SSI Program, Table IV.C1. – SSI Federal Payments in Current Dollars. Technical report, Social Security Administration Office of the Chief Actuary, Washington, D.C.
- Social Security Administration (2019c, November). Annual Statistical Supplement to the Social Security Bulletin. Technical Report SSA Publication No. 13-11700.
- Social Security Administration (2020). SSI Monthly Payment Amounts, 1975–2020. <https://www.ssa.gov/oact/cola/SSIamts.html>.
- Social Security Administration (2020 Edition). *Understanding Supplemental Security Income*.
- Spriggs, W. (2020). Is now a teachable moment for economists? an open letter to economists

from bill spriggs. https://www.minneapolisfed.org/media/assets/people/william-spriggs/spriggs-letter_609b.pdf?la=en.

- Stevenson, B. and J. Wolfers (2007). Marriage and divorce: Changes and their driving forces. *Journal of Economic Perspectives* 21(2), 27–52.
- Tamborini, C. R. (2007). The Never-Married in Old Age: Projections and Concerns for the Near Future. *Social Security Bulletin* 67(2).
- Thomeer, M. B., S. Mudrazija, and J. L. Angel (2015, July). How Do Race and Hispanic Ethnicity Affect Nursing Home Admission? Evidence From the Health and Retirement Study. *The Journals of Gerontology: Series B* 70(4), 628–638.
- Thomeer, M. B., S. Mudrazija, and J. L. Angel (2016, July). Relationship Status and Long-Term Care Facility Use in Later Life. *The Journals of Gerontology: Series B* 71(4), 711–723.
- Tissue, T. and J. L. McCoy (1981). Income and living arrangements among poor aged singles. *Soc. Sec. Bull.* 44, 3.
- West, L. A., S. Cole, D. Goodkind, and W. He (2014). 65+ in the United States: 2010. Technical report, U.S. Census Bureau, Washington, D.C.
- Wiemers, E. E., V. Slanchev, K. McGarry, and V. J. Hotz (2017). Living arrangements of mothers and their adult children over the life course. *Research on aging* 39(1), 111–134.
- Wiener, J. M. and W. L. Anderson (2009). Follow the Money: Financing Home and Community-Based Services. Technical report, Pennsylvania Medicaid Policy Center.

Appendix

Table A1: Regression Analysis of Non-Relative Co-residence, Couples Alone, and Singles Alone

	Own Home	Coresiding Own Home	Others Home	Institution	Assisted Living	Adult Foster
Male	0.121** (0.005)	-0.105** (0.005)	-0.031** (0.003)	0.017** (0.001)	0.002 (0.001)	0.006** (0.000)
Separated	0.060** (0.009)	-0.197** (0.005)	0.123** (0.011)	0.026** (0.002)	0.020** (0.001)	0.013** (0.001)
Divorced	0.099** (0.009)	-0.210** (0.006)	0.108** (0.013)	0.029** (0.002)	0.013** (0.001)	0.013** (0.001)
Widowed	0.056** (0.008)	-0.180** (0.005)	0.132** (0.004)	0.023** (0.002)	0.009** (0.001)	0.009** (0.001)
Never Married	-0.089** (0.007)	-0.237** (0.004)	0.147** (0.014)	0.085** (0.003)	0.043** (0.001)	0.015** (0.001)
Black	-0.071** (0.008)	0.097** (0.006)	0.034** (0.006)	-0.048** (0.003)	-0.011** (0.001)	0.003** (0.000)
AIAN	-0.090** (0.023)	0.120** (0.017)	0.017 (0.012)	-0.057** (0.004)	-0.010** (0.003)	-0.001 (0.001)
Asian or Pacific Islander	-0.285** (0.016)	-0.081** (0.009)	0.314** (0.017)	-0.138** (0.008)	-0.021** (0.003)	0.002** (0.001)
Other Race Not White	-0.069** (0.012)	-0.013 (0.007)	0.031** (0.005)	0.011 (0.014)	-0.009** (0.002)	0.001 (0.001)
Mexican	-0.218** (0.031)	0.055** (0.014)	0.181** (0.018)	-0.095** (0.006)	-0.019** (0.002)	0.002** (0.000)
Puerto Rican	-0.046 (0.032)	0.063** (0.011)	0.064* (0.027)	-0.085** (0.004)	-0.011** (0.002)	0.001 (0.001)
Cuban	-0.135** (0.023)	0.014** (0.005)	0.154** (0.010)	-0.119** (0.006)	-0.010** (0.001)	0.002** (0.000)
Other Hispanic	-0.206** (0.016)	0.008 (0.009)	0.202** (0.008)	-0.107** (0.005)	-0.020** (0.001)	0.002** (0.001)
No Disability	0.093** (0.008)	0.036** (0.003)	0.024** (0.005)	-0.212** (0.003)	-0.011** (0.001)	0.000 (0.000)
High School	-0.020** (0.004)	0.005* (0.002)	-0.020** (0.004)	0.029** (0.002)	0.004** (0.001)	0.001** (0.000)
Some College	0.002 (0.007)	-0.003 (0.004)	-0.056** (0.005)	0.040** (0.003)	0.009** (0.001)	-0.001* (0.000)
College	-0.018* (0.008)	-0.037** (0.005)	-0.033** (0.004)	0.037** (0.005)	0.025** (0.002)	-0.001 (0.000)
Nursing Home Spending Per Bed ^a	-0.000 (0.000)	-0.000 (0.000)	0.000* (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Annual Wages Home Health Aides ^a	-0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)
Annual Wages Nursing Home Workers ^a	-0.000 (0.000)	0.000** (0.000)	0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Share Women Out of Labor Force ^b	-0.208* (0.102)	-0.097 (0.084)	0.212 (0.110)	0.026 (0.114)	-0.038* (0.019)	0.041** (0.011)
Share Men Out of Labor Force ^b	0.061 (0.132)	0.066 (0.071)	-0.024 (0.087)	-0.045 (0.096)	-0.018 (0.026)	0.007 (0.010)

continued

Table A1: Regression Analysis of Non-Relative Co-residence, Couples Alone, and Singles Alone

	Own Home	Coresiding Own Home	Others Home	Institution	Assisted Living	Adult Foster
Share Employed Women Working Full-Time ^b	0.302** (0.103)	0.114 (0.060)	-0.206** (0.066)	-0.135 (0.074)	0.053** (0.016)	0.002 (0.008)
Share Employed Men Working Full-Time ^b	-0.192 (0.100)	-0.035 (0.053)	0.053 (0.051)	0.209** (0.074)	-0.053* (0.022)	-0.006 (0.011)
Any Personal Care Medicaid Spending	-0.006 (0.007)	0.003 (0.004)	0.008* (0.003)	-0.010 (0.005)	0.001 (0.001)	0.000 (0.000)
Any 1915(c) Medicaid Spending	-0.000 (0.015)	0.021* (0.010)	0.032** (0.011)	-0.050** (0.012)	0.001 (0.002)	-0.003* (0.001)
Any Home Health Medicaid Spending	-0.005 (0.009)	-0.006 (0.004)	-0.003 (0.008)	0.005 (0.005)	0.001 (0.001)	0.001 (0.001)
Any HCBS Managed Care Medicaid Spending	0.024 (0.013)	0.001 (0.006)	-0.011 (0.011)	-0.007 (0.006)	0.001 (0.002)	0.000 (0.001)
Any PACE Medicaid Spending	0.007 (0.011)	-0.003 (0.004)	-0.006 (0.005)	0.002 (0.008)	-0.001 (0.001)	-0.001 (0.001)
Any Private Duty Nursing Medicaid Spending	-0.003 (0.010)	-0.003 (0.004)	0.006 (0.007)	0.007 (0.006)	-0.002 (0.001)	-0.001 (0.001)
Any 1915(i) Medicaid Spending	-0.010 (0.010)	0.001 (0.005)	0.062** (0.006)	-0.027** (0.006)	-0.006** (0.001)	0.003** (0.001)
Any 1915(j) Medicaid Spending	-0.030* (0.012)	-0.003 (0.004)	0.016 (0.010)	-0.007 (0.008)	-0.000 (0.002)	0.001 (0.001)
Any Case Management Medicaid Spending	0.005 (0.015)	-0.014 (0.007)	-0.007 (0.008)	0.003 (0.019)	0.002 (0.002)	0.001 (0.001)
Any Money Follows the Person Medicaid Spending	0.004 (0.010)	-0.003 (0.005)	0.007 (0.006)	-0.007 (0.007)	0.003** (0.001)	-0.001 (0.001)
Certificate of Need Law	-0.053** (0.014)	0.031** (0.007)	-0.004 (0.007)	0.029** (0.010)	0.010** (0.003)	0.000 (0.001)
Moratorium	0.018* (0.009)	-0.013* (0.005)	-0.016** (0.004)	-0.005 (0.005)	-0.002 (0.003)	-0.001 (0.001)
Medically Needy Medicaid Program	-0.015 (0.012)	-0.011* (0.005)	0.012* (0.006)	0.014* (0.006)	-0.002 (0.002)	-0.000 (0.001)
Observations	1501368	1501368	1501368	1501368	1501368	1501368

^a In thousands of inflation adjusted dollars.

^b Statewide labor market statistic.

Author calculations from 1% Decennial Census 1980, 1990, and 2000, and American Community Survey 2010 three-year estimates and 2018 five-year estimates. Estimates are marginal effects after individual survey weighted logit estimation reported with heteroskedasticity robust standard errors clustered at the state level. All regressions include state, year and age fixed effects. Detailed descriptions of the dependent variables are included in Section 3.1.

Statistical significance: **0.01, *0.05



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