Do State SNAP Policies Influence Program Participation among Seniors?

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Abstract

Senior participation in the Supplemental Nutrition Assistance Program (SNAP) has traditionally been lower than other groups among those eligible, with historical estimates below 50 percent. We examine the impacts of state SNAP policies on program participation among low-income senior (age 60 and older) and non-senior households using data from the 2001-2014 December Current Population Survey Food Security Supplement. Our results suggest that policies designed to expand SNAP eligibility modestly increased participation among seniors but led to larger increases among non-seniors. In contrast, we find little evidence of effects of policies related to transaction costs, stigma, or outreach on either group.

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ABSTRACT

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Introduction

Among those eligible to receive benefits, participation in the Supplemental Nutrition Assistance Program (SNAP) has traditionally been well below 100 percent, especially among seniors (Haider et al. 2003; Currie 2006). In 2014, 83 percent of eligible individuals of all ages participated in SNAP, but only 42 percent of eligible seniors (60 years and older) (Gray and Cunnyngham 2016). Despite this low participation rate, there is a persistent need for nutrition assistance among millions of seniors. In 2016, 13.6 percent of seniors in the United States were marginally food insecure, 7.7 percent were food insecure, and 2.9 percent had very low food security (Ziliak and Gundersen 2018). Existing research suggests that seniors are particularly vulnerable to food insecurity and may experience severe health consequences (Leroux et al. 2020). Relative to food secure seniors, food insecure seniors have lower nutrient intakes and are at a higher risk of a wide variety of adverse health conditions, including diabetes, depression, activities of daily living (ADL) limitations, high blood pressure, congestive heart failure, heart attack, and asthma (Gundersen and Ziliak 2017).

Although SNAP is thought of primarily as a federal program, states have been given the latitude to implement a number of policies beginning with welfare reform in 1996. These policies can increase SNAP eligibility by loosening the income and asset restrictions on households – and often do so more generously for households with seniors than without. Alternately, they can introduce or remove aspects of program administration that influence transaction costs or stigma, or they can increase program awareness through outreach. Ultimately, these state policies may substantially impact SNAP participation.

The purpose of this paper is to examine the impact of these policy changes on the SNAP participation of low-income senior households as compared to low-income non-senior

households. To our knowledge, ours is the first paper to investigate the roles of several state SNAP policies in senior household participation decisions. Our primary dataset is the December Current Population Survey Food Security Supplement between 2001 and 2014. We collect detailed information on eleven state policies and estimate their impacts on the probability of household SNAP participation using a model with state and year fixed effects as well as controls for household characteristics. Then, in an effort to obtain more precise estimates, we re-estimate the models with a single "simulated eligibility" measure representing overall generosity of eligibility criteria in place of individual eligibility variables, the six policies related to transaction costs combined into a single count variable, and single stigma and outreach policies.

We find that expanding SNAP eligibility leads to statistically significant increases in participation for both seniors and non-seniors, but the effects are larger for non-seniors. For each 10-percentage point increase in simulated eligibility, participation increases by 4.4 percentage points for non-seniors but just 1.4 percentage points for seniors. We find little evidence that policies related to transaction costs or outreach increase participation for either age group. Our results suggest that existing policy levers are insufficient to address the low SNAP takeup rate among seniors.

Literature Review

There is a large literature on the determinants of the take up of transfer programs, including multiple comprehensive reviews (Currie 2006; Nicoll 2015). Categories of determinants typically include transaction cost levels, information availability, and perceptions of stigma (Daponte et al. 1999; Currie 2006). These participation determinants may be influenced by programmatic features, as well as household characteristics such as age or immigration status. Evaluating the relative impact of these different determinants requires

accurate information about eligibility and take up, both of which are often subject to measurement error (Meyer et al. 2015). In this section, we review the literature on the determinants of SNAP participation with a special focus on seniors, whose participation has traditionally been lower than that of non-seniors (Haider et al. 2003; Currie 2006; Nicoll 2015).

Programmatic features of SNAP have been shown to generally influence SNAP participation through increases in generosity (Nicoll 2015), expansions in eligibility (Jones 2020), reductions in transaction costs (Currie 2006), and increases in outreach (Ratcliffe et al. 2008). As an example of the relationship between program generosity and participation, Nord and Prell (2011) find that SNAP participation increased as a result of increases in benefits due to the American Recovery and Reinvestment Act of 2009. In terms of the relationship between eligibility expansions and enrollment, Capps et al. (2004) find that expanding eligibility to immigrants led to an increase in SNAP enrollment. Ganong and Liebman (2018) find that SNAP policy changes meant to reduce transaction costs, such as longer time intervals between recertification periods and simplified income change reporting, increased SNAP enrollment between 2001 and 2007. Dickert-Conlin et al. (2020) find that SNAP policies affecting eligibility and the costs of participation increased the SNAP caseload over the last two decades. Finally, Bartlett et al. (2004) find that outreach spending increases awareness of eligibility, which could lead to subsequent enrollment increases.

Several studies have investigated the role of stigma in welfare participation, as some eligible individuals may view participating in a means-tested transfer program such as SNAP as an outward sign of personal failure (Nicoll 2015). These studies find different results that depend partly on the definition of stigma being used. Ranney and Kushman (1987) find potentially large impact of stigma on SNAP participation. On the other hand, Bartlett et al. (2004) reported

feelings of stigma among SNAP non-participants, but neither those feelings nor prior perceptions about eligibility was found to be associated with whether households would apply for benefits if they were told they were eligible.

Turning our attention to seniors, Haider et al. (2003) uses data from the 1998 wave of the Health and Retirement Survey to do a comprehensive examination of the determinants of SNAP participation of individuals aged 50 and older. They consider whether the differences in SNAP participation by age can be explained by the factors described above, including mismeasurement of eligibility and a host of behavioral factors that might influence how responsive seniors are to SNAP policy changes. These behavioral factors include imperfect information about eligibility (Issar 2010), beliefs that the expected benefit of SNAP participation is low (Daponte et al. 1999), the cost of applying and renewing coverage is high, or that participation is associated with some sort of stigma (Nicoll 2015). It could also be the case that seniors do not perceive a personal need for SNAP benefits. Haider et al. (2003) find that measurement error in eligibility does not explain the differentially low take up of SNAP among seniors. Their results also suggest that behavioral factors only account for a modest fraction of the relatively lower take up rate among seniors. They find suggestive evidence that eligible seniors who do not enroll appear to be less needy relative to those who do.

Other papers have also examined different aspects of the age gradient in SNAP participation. Cunnyngham (2010) presents descriptive evidence suggesting that the characteristics of the elderly SNAP eligible population often appear to vary from those of the elderly SNAP-participating population. Further, the characteristics of both populations frequently varied by state, and also occasionally over time. This variation appeared to be related to state SNAP eligibility policies as well as state demographics and economic climates. Lim

(2011) finds that low participation rates among seniors are more likely associated with age effects than cohort effects. Wu (2009) found that lower average benefit levels, lack of information about SNAP eligibility, and a preference for other types of nutrition assistance contribute to low elderly SNAP participation. This lower participation rate did not negatively affect elderly nutritional well-being on average. According to focus group results described in Gabor et al. (2002), elderly SNAP nonparticipation was associated with stigma, the belief that the benefits would not be worth the effort, and perceptions of an overly complicated and intrusive application process. Finally, Wilde and Dagata (2002) found that seniors also reported difficulties with transportation and the use of electronic benefit transfer cards.

Unlike the previous literature, we focus specifically on differential responses to SNAP policies on SNAP participation by age. The closest paper in the previous literature is Haider et al. (2003). In contrast to their focus on individual beliefs and behaviors, we analyze the comprehensive set of state SNAP policies that have been implemented over the past two decades in a quasi-experimental econometric framework. We also construct distinct versions of the policy variables for seniors and non-seniors and consider composite measures that combine related policies together to improve precision. We also study a broader range of ages, comparing policy responses of non-seniors (those aged under 60) to seniors (those aged 60 and older).

Data

This section starts by describing the Current Population Survey Food Security Supplement (CPS-FSS) from which we construct our household sample. We then describe recent SNAP policy changes. Finally, we describe how we use these policy changes to construct composite measures of policies related to eligibility and transaction costs.

CPS-FSS data

Our primary dataset is the CPS-FSS between 2001 and 2014 (Flood et al. 2020). The CPS-FSS is a December supplement to the CPS monthly labor force survey of roughly 50,000 households, administered since 1995. The CPS-FSS serves as the main instrument for measuring national and state-level food insecurity in the United States based on its 18-item food security module that asks questions regarding various degrees of food-related hardships. The CPS-FSS also contains an indicator of household SNAP receipt over the past year that we use as the outcome of interest, as well as publicly available information on state of residence, allowing us to study the effects of changing state policies.

We restrict the sample in several ways. We exclude households living in Alaska and Hawaii due to differences in state benefit formulas complicating analyses employing the simulated eligibility variable (SEV). We exclude households living in California due to the likely impact on senior SNAP participation from the state's Supplemental Security Income (SSI) "cashout" policy during the sample period in which SSI recipients were excluded from SNAP. We restrict the sample to low-income households with income at or below 185 percent of the federal poverty level (FPL). The CPS-FSS screens out higher-income households indicating no food hardship from questions about SNAP, so this restriction limits our sample to households asked about SNAP participation who are also more likely to be affected by income eligibility expansions. Finally, we exclude households with any missing characteristics used as controls.

The full analysis sample includes 170,929 households. We define two additional subsamples: a "senior" sample of households with respondents aged 60 or older and a "non-senior" sample of households with respondents aged 59 or younger. The senior sample makes up about 34 percent of the full sample, and the non-senior sample makes up about 66 percent. Alternatively, we could have defined the senior sample as households with *any* senior, but this

distinction is of minimal consequence, as it would only re-classify 3 percent of the sample. Control variables for our analysis include the household respondent's age in years, gender (indicator for female), race/ethnicity (indicators for non-Hispanic black, non-Hispanic American Indian or Alaskan, non-Hispanic other, and Hispanic), nativity (indicator for foreign born), marital status (indicators for married, divorced, widowed, and separated), educational attainment (indicators for high school, associate, bachelor's, and advanced degrees), and employment status (indicators for employed and unemployed) as well as the household's size (number of people and indicators for single-person household and presence of children) and family income (indicators for under $5,000, $2,500 increments up to $15,000, $5,000 increments up to $40,000, $10,000 increments up to $60,000, and $15,000 increments up to $100,000).

State SNAP policy changes

Although SNAP is a federal program, states have been given the latitude to implement a number of policies in recent decades targeting SNAP participation. Following Stacy et al. (2018), we classify these policies as primarily impacting one of four factors affecting the participation decision: eligibility to receive benefits; transaction costs involved in applying, enrolling, or maintaining benefits; stigma associated with participation; and outreach efforts in spreading information related to eligibility criteria and how to receive benefits. We gather information on policies affecting eligibility, transaction costs, and stigma from the USDA, Economic Research Service's (ERS) SNAP Policy Database (2021a) and additional information on a policy affecting outreach from ERS's SNAP Policy Index (2021b). We gather additional details on state policies related to SNAP eligibility and benefit determination from 2001 to 2014 from the USDA SNAP Policy Database (2021a), various Mathematica Policy Research and other reports (Aussenberg and Falk 2019; Horng and Dean 2002; Laird and Trippe 2014; Cronquist et al. 2019; Trippe and

Gillooly 2010), state SNAP policy manuals/reports, and direct contact with state SNAP administrators. Unless otherwise specified, we construct annual policy measures for each policy described below representing the percentage of the year that policy was in place in each state.

Policies increasing SNAP eligibility may increase SNAP participation through extending eligibility to previously ineligible households or by inducing a "woodwork effect" among already-eligible households. Households are typically eligible for SNAP if they meet a gross income test of 130 percent of the FPL (households with senior or disabled members need not meet the gross income test), a net income test of 100 percent of the FPL, and a countable resource test of $2,250 (households with senior or disabled members may have up to $3,500 in countable resources) or if they are determined to be categorically eligible through their participation in another qualifying welfare program. Since 1996, states have been permitted to extend SNAP eligibility beyond the federal criteria in various ways. First, states can implement a policy termed broad-based categorical eligibility (BBCE) to directly expand categorical eligibility to households with income or assets above the federal limits. Second, states can align their vehicle valuation rules to exclude one or more vehicles from the resource test. Last, states can make legal noncitizens eligible for SNAP or similar state-funded food assistance. The SNAP Policy Database (2021a) provides separate information on whether states extended eligibility to legal noncitizen adults and seniors (age 65+), which we incorporate separately in analyses of the full/non-senior or senior samples, respectively.

Policies reducing transaction costs may increase SNAP participation by making it easier for households to apply for SNAP, enroll in SNAP, and/or maintain SNAP benefits. States can alter their policies affecting how SNAP is administered in several ways affecting transaction costs. First, states can use simplified reporting, which reduces requirements for households with

earnings to report changes in their circumstances. Second, states can allow households to submit SNAP applications online instead of requiring in-person application. Third, states can operate SNAP call centers. Fourth, states can conduct recertification interviews over the phone instead of requiring in-person certification. Fifth, states can operate a Combined Application Project, streamlining the SNAP application process for SSI recipients. Sixth, states can change how frequently households must recertify to continue receiving SNAP. The SNAP Policy Database (2021a) provides monthly information on the proportions of SNAP units of various type with recertification periods of 1-3 or 4-6 months. We separately construct the monthly proportion of SNAP units with "short" recertification periods of 6 months or less for SNAP units with earnings and for senior SNAP units and use the annual average of these monthly proportions in analyses of the full/non-senior or senior samples, respectively.

Policies increasing the stigma of SNAP participation may disincentivize and decrease participation. We consider only one such policy: whether states require fingerprinting of SNAP applicants. Policies raising awareness of SNAP may increase participation among eligible nonparticipants who previously were unaware of the program or thought themselves ineligible. We consider only one such policy: whether states had federally funded TV or radio ad campaigns intended to raise awareness of SNAP among eligible nonparticipants.

Two policies are more applicable to non-senior than senior households: the proportion of SNAP units with earnings with short recertification periods and/or the state making legal noncitizen adults (18-64) eligible for SNAP or similar state-funded food assistance. We therefore create senior-specific versions of these variables for use in the senior sample: the proportion of senior SNAP units with short recertification periods and/or the state making legal noncitizen seniors (65+) eligible for SNAP or similar state-funded food assistance. The left panel of Figure

1 illustrates state variation in the sum of the eleven measures described above (using the non-senior versions where applicable and adding two minus the fingerprinting and short recertification period measures due to their negative expected effect on participation). States tend to adopt more SNAP policies over time expected to increase participation, though there is substantial variation in when these policies are adopted. Appendix Figure 1 similarly illustrates variation in the sum of the policies described above using the senior versions where applicable.

SNAP policy summary measures

Several studies construct index measures of state SNAP policies to summarize overall policy generosity (e.g., Ganong and Liebman 2018; Stacy et al. 2018; Dickert-Conlin et al. 2020). Such an approach is likely to improve the precision of econometric estimates, at the cost of being unable to disentangle the distinct roles of different types of policies. We aim to balance these considerations by consolidating the eleven policy variables into four measures reflecting the categories of eligibility, transaction costs, stigma, and outreach. Since there is only one stigma variable and one outreach variable, the overall measure for those categories is simply equal to the lone variable. Composite measures are only needed for eligibility, which has three corresponding policies, and transaction costs, which have six.

We combine information on two of the policies related to eligibility (BBCE and vehicle exemptions as well as additional information on standard medical expense deductions) into a "simulated eligibility" variable (SEV) that computes the proportion of a fixed national sample eligible for SNAP under a given state's SNAP policy environment in a given year. Using a fixed national sample circumvents potential endogeneity issues from the composition of states' populations changing over time. Instead, the identifying variation comes only from plausibly exogenous changes in state policies related to the generosity of the SNAP program. Simulated

eligibility strategies were first introduced by Cutler and Gruber (1996) and Currie and Gruber (1996) in studies on the effects of Medicaid. Han (2016, 2020) and Jones (2020) developed SEVs for SNAP. Our novel contribution is to construct separate SEVs for seniors and non-seniors.

We use an SEV rather than a simple count of eligibility-related policies since the policies each expand SNAP eligibility in differing and potentially interacting ways. States can alter how vehicles are applied to the countable resource test by aligning to the rule they use under a Temporary Assistance for Needy Families (TANF) or state maintenance of effort (MOE) funded assistance program if the rule they transition to is less restrictive than the federal minimum. States can also use BBCE to directly expand categorical eligibility to households if they qualify for a non-cash TANF/MOE-funded benefit. BBCE expansions effectively extend SNAP eligibility to households that would not be eligible under the federal rules through eliminating or loosening some combination of the gross income, net income, or asset tests. Some states' BBCE expansions also target different subcategories of households – like those with senior or disabled members – in different ways. In particular, many states' BBCE policies expanded eligibility for households with seniors more than for households without. Some states have additionally implemented standard medical expense deductions for senior households, which increases the deduction for households with low out-of-pocket medical expenses and reduces their net income. Variation in the extent to which eligibility is altered along these various dimensions, the combination of ways in which it is altered, and the groups targeted means that the nature of SNAP eligibility expansion in any given state and year can differ greatly from others that have similar policies in place.

Formally, the SEV for state s in year t is computed as

$$SEV_{st} = \frac{\text{\# individuals simulated as eligible for a positive benefit}}{\text{Total \# individuals}} \qquad (1)$$

where the individuals are from the national sample but the policy variation is by state. A higher proportion simulated as eligible in a state and year indicates a more generous policy set and should predict a subsequently higher likelihood of SNAP participation.

For the constant national sample, we pool all available waves of the Survey of Income and Program Participation (SIPP) from 1996 to 2013, which together contain around 340,000 household-year observations. The SIPP provides information on household size, income, assets, expenses, and other characteristics like member age and disabilities necessary to determine SNAP eligibility. Household financial variables are adjusted for inflation to each year before application of the combined eligibility criteria in each state and year resulting from the policies described above. In analyses of the full sample, we use an SEV calculated using the full sample of individuals in SIPP households following Jones (2020). Additionally, we are the first to use the simulated eligibility method to study the SNAP participation of senior households as opposed to non-senior households, so we also construct new versions of the SEV specific to each group. Specifically, the *non-senior SEV* is the fraction of individuals simulated eligible in the 230,000 SIPP households with respondents under age 60, and the *senior SEV* is the fraction of individuals simulated eligible in the 110,000 SIPP households with respondents age 60 or older.

The right panel of Figure 1 illustrates state variation in the full-sample version of the SEV across three years spanning the sample period. The SEV tends to increase or stay constant over time as most states only expand SNAP eligibility during the sample period, although a few states reverse expansions or change their policies such that the SEV falls. There is also a slight decline in the SEV in later years in many states due to the 2013 expiration of the ARRA temporary benefit increase, which made some higher-income SIPP households lose eligibility.

Appendix Figure 2 similarly illustrates variation in the non-senior and senior versions of the SEV.

Since it is less obvious how to parameterize the composite measure of transaction costs, for that category we simply use the total number of policies in place out of the six possibilities:

$$Transaction\ Cost\ Policy\ Index_{st} = \sum_{i=1}^{6} Policy_{ist} \qquad (2)$$

where s indicates state, t indicates year, and i indicates a policy contributing to the index. Each policy variable $Policy_{ist}$ is an annual average of a monthly indicator equal to 1 if a policy is in place in a given month and therefore represents the percentage of the year that a policy was in place (except for the policy variable indicating the proportion of SNAP units with a recertification period of 6 months or less, though that variable also ranges from 0 to 1). Proportion of SNAP units with short recertification periods enters the index as $(1 - Policy_{ist})$ so that a value of 1 indicates the more generous possibility. A higher value of the index therefore unambiguously means lower transaction costs.

Summary statistics and descriptive figures

Table 1 provides summary statistics for the outcome and policy variables for our full sample of households, as well as stratified by senior vs. non-senior households, while Appendix Table 1A does the same for the control variables. About 23 percent of the full sample reported receiving SNAP benefits in the past year. Only 14 percent of senior households received benefits, about half the percentage of non-senior households that did (28 percent). The senior and non-senior samples differ in other noticeable ways. Predictably, the average age of senior respondents is higher. Senior respondents are more frequently female, white, native-born, widowed, less educated, and not in the labor force. Senior households are also on average

smaller, more likely to contain just one member, and much less likely to include children. Table 1 also shows the average value of the policy variables and summary measures described above.

Methods

We estimate how state SNAP policy changes related to eligibility, transaction costs, stigma, and outreach affect SNAP participation using linear probability models of the form

$$SNAP_{jst} = \beta_0 + \boldsymbol{\beta_1 Policy_{st}} + \boldsymbol{\beta_2 X_{jt}} + \boldsymbol{\beta_3 SFE_s} + \boldsymbol{\beta_4 YFE_t} + \epsilon_{jst} \qquad (3)$$

where $SNAP_{jst}$ is an indicator for self-reported receipt of SNAP benefits in the past year for household j in state s and year t, $\boldsymbol{Policy_{st}}$ is a vector of either the eleven policy variables or the four summary measures, $\boldsymbol{X_{jt}}$ is a vector of the control variables, $\boldsymbol{SFE_s}$ is a vector of state fixed effects, $\boldsymbol{YFE_t}$ is a vector of year fixed effects, and ϵ_{jst} is the error term. We cluster robust standard errors by state in all regressions.[1]

We are interested in estimating $\boldsymbol{\beta_1}$, which represents the average treatment effects of various state policies on low-income household SNAP participation under the assumption that policy adoption is uncorrelated with unobserved time-varying state-level characteristics. Because we are interested in how $\boldsymbol{\beta_1}$ differs between senior and non-senior households, we estimate equation (3) for each of three samples: the full sample including all households, the non-senior

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[1] We elect not to utilize the sampling weights in our main analysis since our focus is on age-based subsamples rather than obtaining population-level estimates. Moreover, we are able to control for all the characteristics (age, race, and gender) that the CPS uses to construct the sampling weights. In such cases, Solon et al. (2015) argue against the use of weights, showing that they do not improve the reliability of coefficient estimates but likely inflate their standard errors. We present weighted tables in the appendix for the interested reader.

sample including the two-thirds of the full sample with respondents aged under 60, and the senior sample including the third of the sample with respondents aged 60 or older. We then present and compare the estimates of β_1 side by side to determine whether senior households respond differently to state SNAP policies. For each policy variable, we also conduct t-tests of the equality of its coefficient for seniors and non-seniors.

We are aware of the well-known problem of SNAP misreporting and the growing literature on how such measurement error biases the estimated causal effects of the program (Meyer et al. 2015; Nguimkeu et al. 2019). However, we do not address SNAP's misreporting in this paper because the consequences of measurement error in the dependent variable of binary choice models may be less severe and methods to address them are an active area of research (e.g., Meyer and Mittag 2017).[2]

Results

Table 2 reports the results from regressions of household SNAP participation on the set of eleven separate state SNAP policy variables for each of the analysis samples. The senior sample regression uses senior-specific versions of the two variables indicated in the table by ^. Each policy variable ranges from zero to one, with one indicating that the relevant policy was in place all year or that all SNAP units had a short recertification period during the year. The policy variables are categorized as primarily targeting eligibility, transaction costs, stigma, or outreach.

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[2] Recently, a literature has emerged identifying potential problems with two-way fixed-effects models with staggered treatment time. See Cunningham (2021, pp. 461-510) for a detailed discussion. While some solutions have been proposed for settings with single, binary treatments, we are unaware of any that are applicable with multiple, non-binary treatments like ours.

All of the policies are expected to increase SNAP participation except two expected to decrease it: the proportion of SNAP units with short recertification periods and requiring that applicants be fingerprinted.

For most policy variables we consider, we find no evidence of effects on SNAP participation among the full, non-senior, or senior samples. We do find evidence that shorter recertification periods of six months or less for SNAP units with earnings reduce the probability of household SNAP participation. Our estimates indicate that households in both the full and non-senior samples are about 2.1 percentage points less likely to have received benefits in the last year in states in which all households with earnings are subject to a short recertification period. The effect of a short recertification period for senior SNAP units is larger in magnitude but statistically insignificant because of a larger standard error. Living in states with applicant fingerprinting requirements reduces SNAP participation by about 2.9 percentage points in all three samples, though the estimate for seniors is again insignificant because of a larger standard error. Only one policy variable is marginally statistically significant (10 percent level) for seniors: senior households are 1.3 percentage points more likely to participate if their state streamlines the SNAP application process for SSI recipients through a Combined Application Project (CAP). Note that, with eleven policy variables, we would expect roughly one to be rejected at the 10 percent level or better by chance alone in each of the three regressions. This is exactly the number we find for the senior sample, and the full and non-senior samples only revealed two significant effects. Moreover, we find no evidence that any of the effects statistically differ for seniors and non-seniors. Therefore, our results are perhaps best interpreted as providing little evidence that expansionary SNAP policies are effective at boosting participation for either age group.

That said, including eleven separate policy variables in a single regression is quite demanding of the data, so the relative lack of statistical significance in Table 2 could simply reflect insufficient statistical power to detect plausible effect sizes. Table 3 therefore presents the results from the specification that consolidates the eleven policies into four variables: the SEV representing the extent of state eligibility policy, the transaction cost index that incorporates all six associated policies, and the lone stigma and outreach policies.

The first row in the table shows that the SEV is statistically significant at the 5 percent level or better for all three samples. Each ten-percentage point increase in eligibility raises participation by 3.1 percentage points for the full sample, 4.4 for non-seniors, and 1.4 for seniors. The effect for seniors is therefore less than a third as large as that for non-seniors, and the difference is statistically significant at the 1 percent level. The estimates appear to imply that take-up rates for newly eligible households are much smaller than the overall takeup rates mentioned in the introduction (44 percent for non-seniors and 14 percent for seniors compared to 83 percent and 42 percent, respectively). While we caution that our estimates cannot be strictly interpreted as take-up rates (e.g. simulated eligibility based on a national sample is not exactly the same as actual eligibility in the state, woodwork effects could mean that some of the new enrollees are not newly eligible, and some of the newly eligible may not be included in our sample of under 185 percent of the FPL), the magnitudes of those differences are nonetheless striking.

The subsequent rows in Table 3 provide little evidence that SNAP policies related to transaction costs or outreach are effective in increasing participation among either non-seniors or seniors. We do find a 3 percentage point reduction in participation among non-seniors from fingerprinting requirements, suggesting that reducing stigma is another effective way of

increasing participation. We estimate an effect of similar magnitude among seniors, though it is not significantly different from zero or the non-senior effect.

Conclusion

We examine the impact of eleven different state SNAP policies related to eligibility, transaction costs, stigma, or outreach on the probability of SNAP participation among households with senior or non-senior respondents. Consolidating several eligibility-related policies into a single SEV, we find that expanding SNAP eligibility increases participation among both seniors and non-seniors. However, the effect for non-seniors is more than three times as large as that for seniors, and both effects imply marginal take-up rates that are smaller than the overall take-up rates for the program. We find some evidence that lengthening the recertification period and eliminating fingerprinting requirements would modestly increase participation among non-seniors, but there is little evidence that policies related to transaction costs or outreach meaningfully impact participation rates among eligible seniors.

Our findings are of interest to policymakers and researchers interested in the factors explaining low senior SNAP participation and take-up rates relative to non-seniors. While some existing policy levers might modestly increase participation, there does not appear to be any feasible policy combination that would make meaningful progress toward closing this gap. Given that many eligible seniors do not participate relative to non-seniors, it makes sense that eligibility expansions would not strongly increase senior participation. However, we do not find evidence that policies reducing transaction costs or stigma increase senior participation. This could indicate that it is not high participation costs driving lower senior participation, but lower benefits. As Haider et al. (2003) find, eligible seniors appear to have relatively low unmet need despite their low take-up of SNAP.

Additionally, our findings may be relevant for researchers interested in using SNAP policy instruments in instrumental variables (IV) frameworks. Several studies have employed state-level policies as instruments for SNAP participation but have frequently had difficulty obtaining precise estimates (e.g., Meyerhoefer and Pylypchuk 2008; Yen et al. 2008; Ratcliffe et al. 2011; Almada et al. 2016; Denteh 2017). Tables 2 and 3 include F-statistics for the policy variables in each regression to show those variables' potential as instruments for SNAP participation. In no specification do the policy variables jointly meet the common rule of thumb that the first stage F-statistic exceed 10. However, the F-statistic for the SEV alone in Table 3 is about 13 for the full sample and 22 for the non-senior sample, consistent with the values found by Jones (2020) in state panel analyses of the effects of SNAP on food retail establishments and Medicaid expenditures.[3] Unfortunately, the SEV has less promise as an instrument for analyses focused on seniors, as the F-statistic is just 5.5.

We encourage researchers to continue to investigate other policy levers that could meaningfully influence SNAP participation among seniors. Perhaps some qualitative work with seniors would be useful to help identify policy levers that may potentially work. Not only would this inform efforts to close the participation gap, but it would also provide a plausible pathway to identifying how participation affects food security and other health outcomes of this important and understudied population.

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[3] One can compute F-statistics for individual variables in our tables by squaring the t-statistic, which in turn is given by dividing the coefficient estimate by the standard error.

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Figure 1. Policy Variation Illustrations

Total Number of Policies, Non-Senior Version
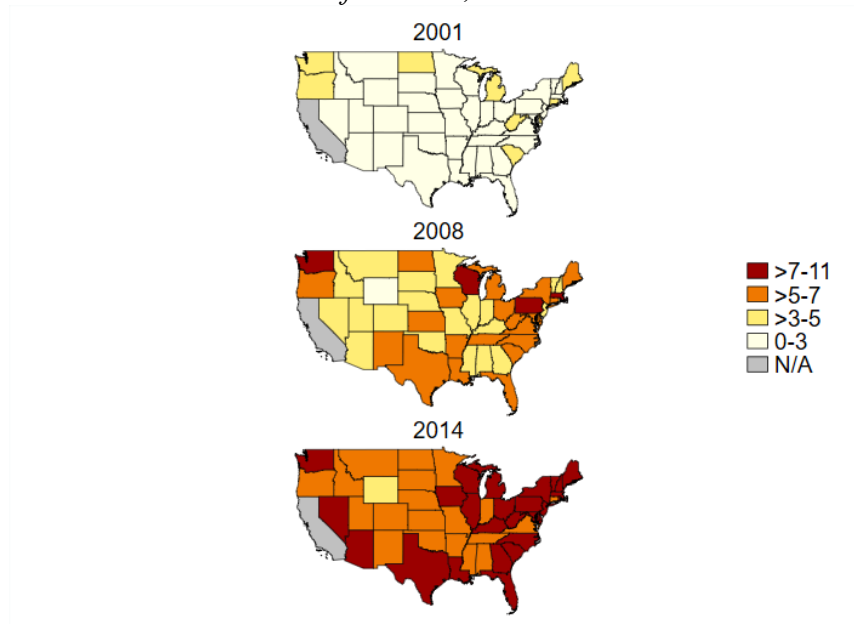
Simulated Eligibility Variable, Full Sample
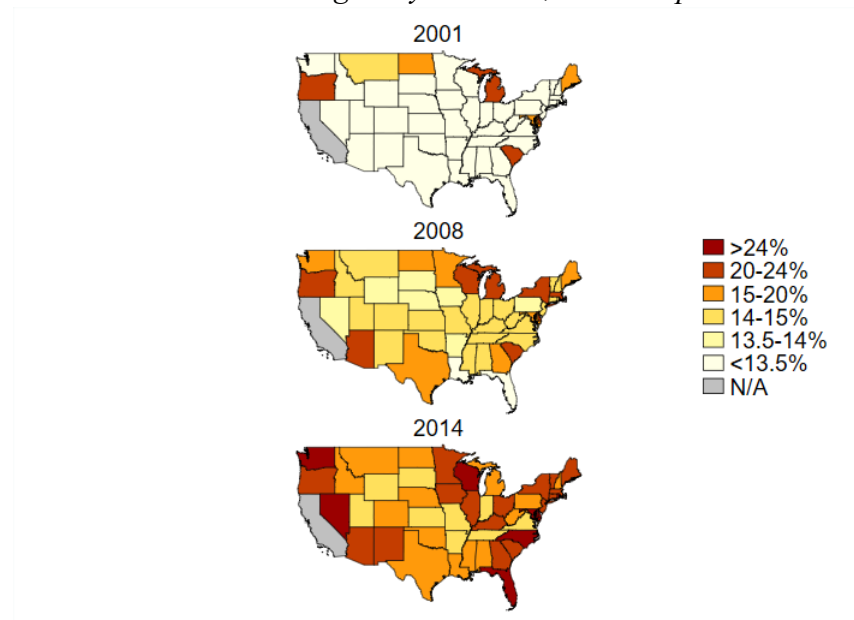
Notes: The top panel shows state variation in the sum of the eleven policy measures included in Table 2 using the non-senior versions where applicable and adding two minus the fingerprinting and short recertification period measures due to their negative expected effect on participation. The bottom panel shows state variation in the simulated eligibility variable calculated using the full SIPP sample including both senior and non-senior households. Related figures are presented in the appendix.

Table 1. Sample means for SNAP receipt and state policies

Sample:	Full	Non-senior	Senior
Outcome: Received SNAP in the past year	0.233	0.282	0.140
State uses BBCE	0.462	0.463	0.461
State excludes one or more vehicles from asset test	0.786	0.780	0.795
State has eligibility for all legal noncitizens aged 18-64/65+^	0.0906	0.0874	0.125
State has simplified reporting for households with earnings	0.811	0.813	0.806
Online applications accepted statewide	0.377	0.373	0.383
Call centers operated statewide	0.297	0.297	0.298
Telephone recertification in at least part of state	0.476	0.478	0.472
State operates a combined application project for SSI recipients	0.288	0.289	0.287
% with earnings/seniors with 1-6 month recertifications^	0.530	0.537	0.0743
Fingerprinting of applicants required statewide	0.0828	0.0902	0.0689
State has federally funded TV or radio ad outreach campaign	0.107	0.108	0.105
Simulated eligibility variable^	0.175	0.172	0.186
Transaction costs policy count (0 to 6)^	2.719	2.714	3.172
Total policy count (0 to 11)^	5.082	5.062	6.561
Number of households	170,929	112,184	58,745

Notes: Analysis samples include households with income less than 185 percent of the federal poverty level. Full sample includes all such households, non-senior sample includes households with respondents aged under 60, and senior sample includes households with respondents aged 60 or older. ^ indicates that a variable is defined differently for different samples as described in the data section.

Table 2. Regressions of SNAP participation on state SNAP policies

Sample:	Full	Non-senior	Senior
Eligibility			
Uses BBCE	0.00881	0.0105	0.00411
	(0.00653)	(0.00730)	(0.00771)
Excludes one or more vehicles from asset test	-0.00199	0.00331	-0.0124
	(0.00856)	(0.0107)	(0.00986)
Eligibility for all legal noncitizens aged 18-64/65+^	-0.00295	0.00390	-0.0133
	(0.0191)	(0.0248)	(0.0145)
Transaction costs			
Simplified reporting for households with earnings	0.00647	0.00969	-0.00388
	(0.00685)	(0.00854)	(0.00879)
Online SNAP applications accepted statewide	0.00448	-0.0000285	0.0115
	(0.00624)	(0.00715)	(0.00741)
Operates call centers statewide	-0.00473	-0.00236	-0.0110
	(0.00613)	(0.00660)	(0.00710)
Telephone recertification in at least part of state	-0.00378	-0.00316	-0.00452
	(0.00536)	(0.00694)	(0.00611)
Operates a Combined Application Project for SSI recipients	0.0123	0.0120	0.0128*
	(0.00748)	(0.00921)	(0.00725)
% with earnings/seniors with 1-6 month recertifications^	-0.0210**	-0.0214**	-0.0406
	(0.00789)	(0.00845)	(0.0373)
Stigma			
Requires fingerprinting of applicants statewide	-0.0294*	-0.0290**	-0.0291
	(0.0151)	(0.0111)	(0.0300)
Outreach			
Has federally funded TV or radio ad outreach campaign	0.00757	-0.00292	0.0224
	(0.0157)	(0.0176)	(0.0185)
Number of observations	170,929	112,184	58,745
F-statistic from test of joint significance of policies	2.526	3.309	2.231
Mean of outcome	0.233	0.282	0.140

Notes: Asterisks indicate statistically significant at *=p<0.10, **=p<0.05, and ***=p<0.01. Plus signs indicate that the non-senior and senior estimates are statistically different at +=p<0.10, ++=p<0.05, and +++=p<0.01. Standard errors, in parentheses, are heteroskedasticity-robust and clustered by state. ^ indicates that a variable is defined differently for different samples. Each regression includes individual-level and household-level controls and state and year fixed effects.

Table 3. Regressions of SNAP participation on composite policy measures

Sample:	Full	Non-senior	Senior
Simulated eligibility variable^	0.313***	0.443***	0.139**+++
	(0.0827)	(0.0940)	(0.0591)
Transaction costs^	0.00350	0.00310	0.00147
	(0.00264)	(0.00303)	(0.00295)
Fingerprinting of applicants required statewide	-0.0281	-0.0302**	-0.0261
	(0.0170)	(0.0139)	(0.0284)
Has federally funded TV or radio ad outreach campaign	0.00628	-0.00680	0.0262+
	(0.0152)	(0.0168)	(0.0181)
Number of observations	170,929	112,184	58,745
F-statistic from test of joint significance of policies	5.480	7.558	2.873
Mean of outcome	0.233	0.282	0.140

Notes: See notes from Table 2.

Appendix Figure 1. Variation in total number of policies, senior version
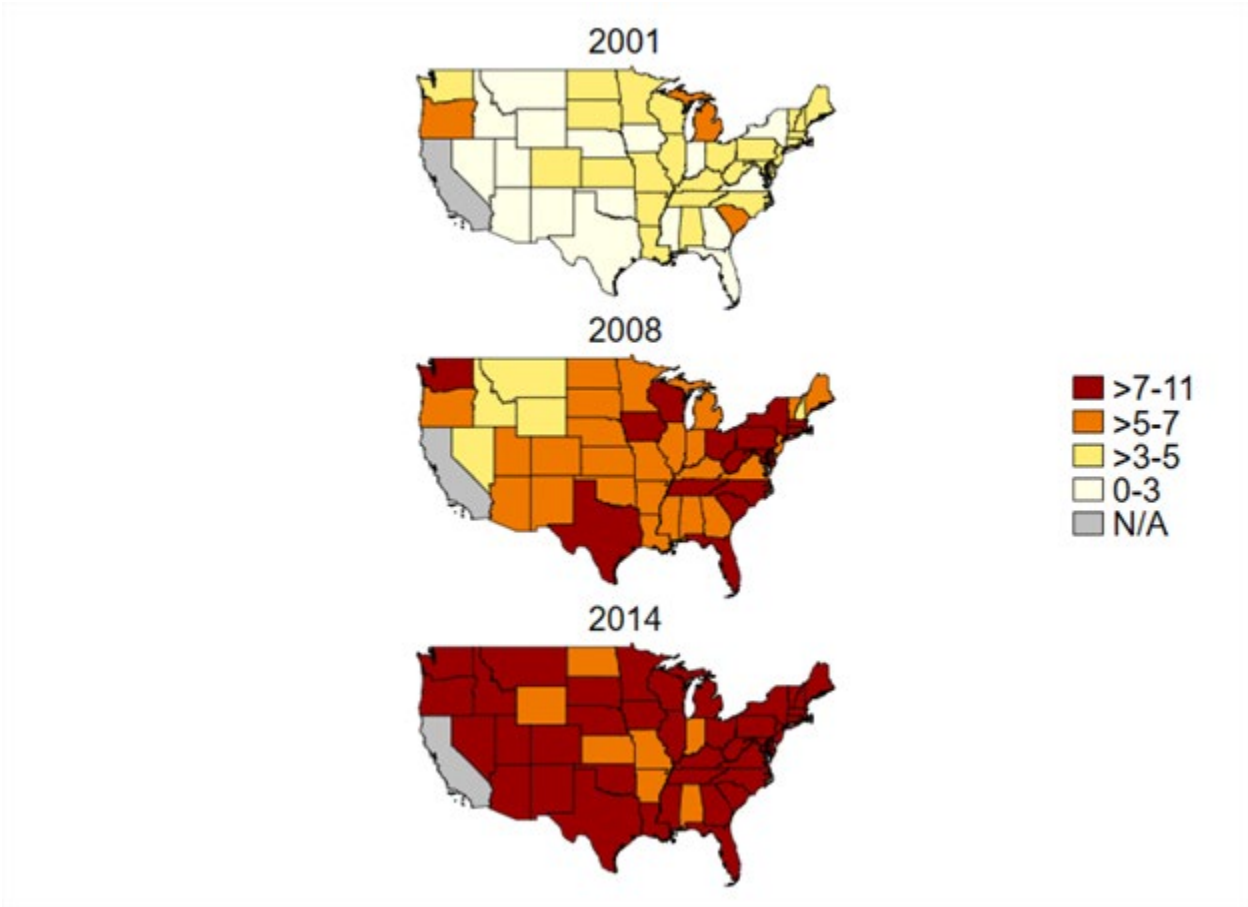
Notes: The sum of the eleven policy measures displayed uses the senior versions of policies where applicable, adding two minus the fingerprinting and short recertification period measures due to their negative expected effect on participation.

Appendix Figure 2. Simulated eligibility variable, non-senior and senior samples

Non-senior sample
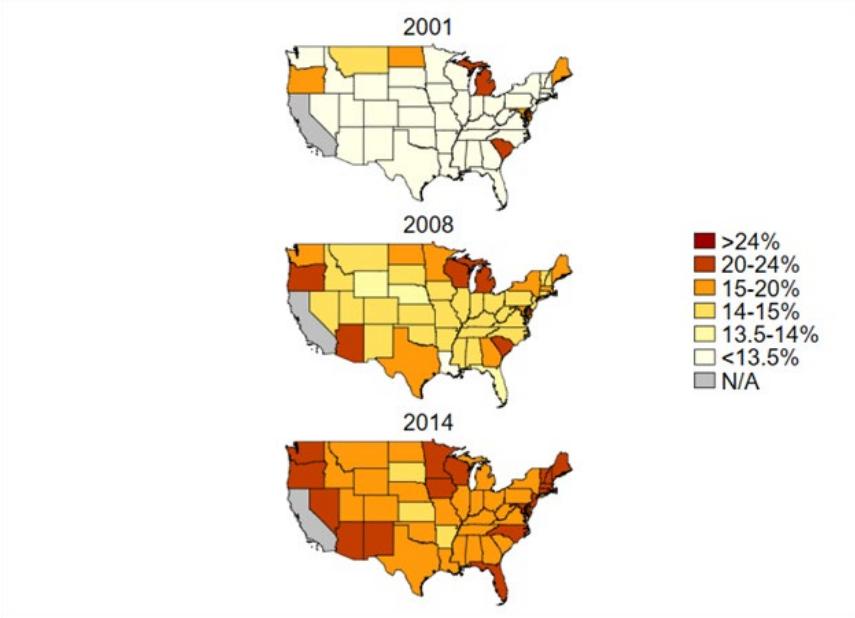
Senior sample
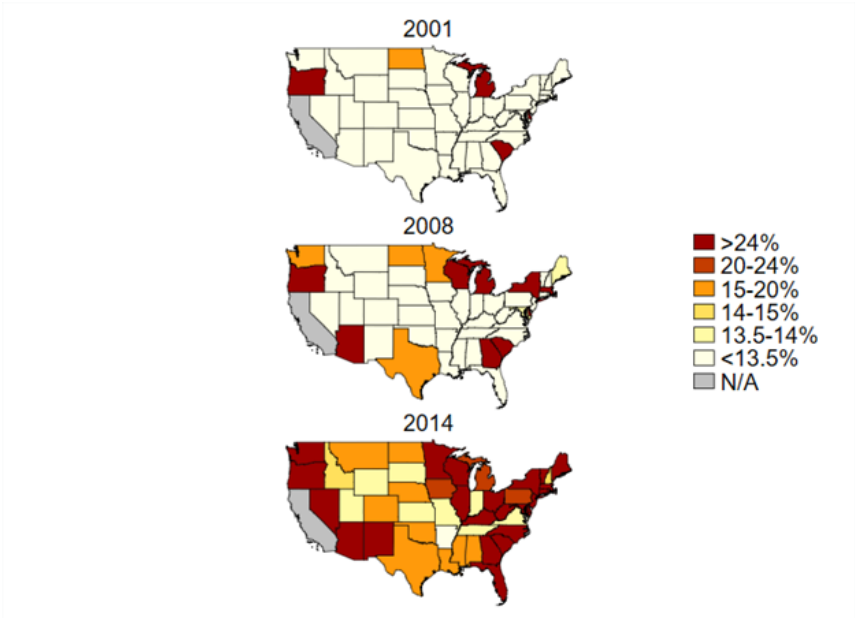
Notes: The top panel displays variation in the simulated eligibility variable calculated using the SIPP sample of households with respondents aged 59 or younger. The bottom panel displays variation in the simulated eligibility variable calculated using the SIPP sample of households with respondents aged 60 or older.

Appendix Table 1A. Sample means for household control variables

Sample:	Full	Non-senior	Senior
Respondent characteristics			
Age (Years)	50.17	38.41	72.63
Female	0.579	0.561	0.612
Black, non-Hispanic	0.150	0.165	0.122
American Indian or Alaska Native, non-Hispanic	0.0152	0.0174	0.0110
Asian or Pacific Islander, non-Hispanic	0.0195	0.0248	0.00955
Other race, non-white, non-Hispanic	0.0129	0.0145	0.00981
Hispanic	0.129	0.166	0.0605
Foreign-born	0.137	0.165	0.0839
Married	0.364	0.385	0.323
Divorced	0.185	0.188	0.180
Widowed	0.160	0.0297	0.408
Separated	0.0443	0.0562	0.0215
High school degree	0.569	0.590	0.527
Associate degree	0.0774	0.0900	0.0533
Bachelor's degree	0.0797	0.0921	0.0560
Advanced degree	0.0259	0.0259	0.0259
Employed	0.455	0.621	0.137
Unemployed	0.0627	0.0871	0.0163
Household characteristics			
Number of people	2.552	3.032	1.636
Single person household	0.341	0.226	0.560
Any children in household	0.386	0.558	0.0573
Family income			
Under $5,000	0.0857	0.106	0.0462
$5,000-7,499	0.0715	0.0710	0.0724
$7,500-9,999	0.0860	0.0728	0.111
$10,000-12,499	0.111	0.0905	0.151
$12,500-14,999	0.101	0.0801	0.142
$15,000-19,999	0.155	0.133	0.196
$20,000-24,999	0.153	0.144	0.171
$25,000-29,999	0.0942	0.105	0.0743
$30,000-34,999	0.0537	0.0717	0.0194
$35,000-39,999	0.0323	0.0458	0.00637
$40,000-49,999	0.0383	0.0551	0.00645
$50,000-59,999	0.0132	0.0190	0.00235
$60,000-74,999	0.00383	0.00543	0.000783
$75,000-99,999	0.000725	0.000998	0.000204
Number of households	170,929	112,184	58,745

Note: Analysis samples include households with income less than 185 percent of the federal poverty level. Full sample includes all such households, non-senior sample includes households with respondents aged under 60, and senior sample includes households with respondents aged 60 or older. Variables represent binary indicators unless otherwise specified.

Appendix Table 1B. Weighted sample means for SNAP receipt and state policies

Sample:	Full	Non-senior	Senior
Outcome: Received SNAP in the past year	0.249	0.294	0.152
State uses BBCE	0.505	0.510	0.495
State excludes one or more vehicles from asset test	0.770	0.765	0.782
State has eligibility for all legal noncitizens aged 18-64/65+^	0.0624	0.0611	0.0864
State has simplified reporting for households with earnings	0.863	0.866	0.855
Online applications accepted statewide	0.445	0.443	0.448
Call centers operated statewide	0.349	0.348	0.352
Telephone recertification in at least part of state	0.547	0.550	0.539
State operates a combined application project for SSI recipients	0.411	0.412	0.409
% with earnings/seniors with 1-6 month recertifications^	0.568	0.575	0.0779
Fingerprinting of applicants required statewide	0.130	0.138	0.111
State has federally funded TV or radio ad outreach campaign	0.120	0.121	0.119
Simulated eligibility variable^	0.179	0.174	0.195
Transaction costs policy count (0 to 6)^	3.046	3.044	3.525
Total policy count (0 to 11)^	5.374	5.362	6.882
Number of households	170,929	112,184	58,745

Notes: Analysis samples include households with income less than 185 percent of the federal poverty level. Full sample includes all such households, non-senior sample includes households with respondents aged under 60, and senior sample includes households with respondents aged 60 or older. ^ indicates that a variable is defined differently for different samples as described in the data section. Sample means are weighted using household sample weights.

Appendix Table 1C. Weighted sample means for household control variables

Sample:	Full	Non-senior	Senior
Respondent characteristics			
Age (Years)	48.86	38.02	72.39
Female	0.578	0.564	0.610
Black, non-Hispanic	0.192	0.213	0.145
American Indian or Alaska Native, non-Hispanic	0.0102	0.0113	0.00786
Asian or Pacific Islander, non-Hispanic	0.0234	0.0280	0.0134
Other race, non-white, non-Hispanic	0.0120	0.0131	0.00979
Hispanic	0.162	0.196	0.0898
Foreign-born	0.166	0.191	0.112
Married	0.359	0.376	0.323
Divorced	0.177	0.175	0.181
Widowed	0.146	0.0286	0.401
Separated	0.0497	0.0614	0.0244
High school degree	0.563	0.585	0.515
Associate degree	0.0747	0.0851	0.0522
Bachelor's degree	0.0780	0.0885	0.0553
Advanced degree	0.0258	0.0253	0.0267
Employed	0.460	0.611	0.133
Unemployed	0.0691	0.0930	0.0173
Household characteristics			
Number of people	2.604	3.037	1.667
Single person household	0.327	0.224	0.552
Any children in household	0.405	0.563	0.0641
Family income			
Under $5,000	0.0926	0.113	0.0488
$5,000-7,499	0.0727	0.0717	0.0750
$7,500-9,999	0.0858	0.0738	0.112
$10,000-12,499	0.109	0.0904	0.149
$12,500-14,999	0.0990	0.0804	0.139
$15,000-19,999	0.150	0.131	0.191
$20,000-24,999	0.150	0.142	0.169
$25,000-29,999	0.0963	0.105	0.0768
$30,000-34,999	0.0551	0.0708	0.0211
$35,000-39,999	0.0327	0.0443	0.00748
$40,000-49,999	0.0384	0.0529	0.00701
$50,000-59,999	0.0134	0.0183	0.00276
$60,000-74,999	0.00392	0.00527	0.000989
$75,000-99,999	0.000827	0.00109	0.000252
Number of households	170,929	112,184	58,745

Note: Analysis samples include households with income less than 185 percent of the federal poverty level. Full sample includes all such households, non-senior sample includes households with respondents aged under 60, and senior sample includes households with respondents aged 60 or older. Variables represent binary indicators unless otherwise specified. Sample means are weighted using household sample weights.

Appendix Table 2. Regressions of SNAP participation on state SNAP policies

Sample:	Full	Non-senior	Senior
Eligibility			
Uses BBCE	0.00231	0.00319	0.000470
	(0.00639)	(0.00717)	(0.00710)
Excludes one or more vehicles from asset test	-0.00244	0.00435	-0.0143
	(0.00807)	(0.0105)	(0.00887)
Eligibility for all legal noncitizens aged 18-64/65+^	-0.00250	0.00162	-0.0150
	(0.0189)	(0.0225)	(0.0135)
Transaction costs			
Simplified reporting for households with earnings	0.00452	0.00718	-0.00580
	(0.00864)	(0.0107)	(0.0101)
Online SNAP applications accepted statewide	0.00346	-0.00189	0.0147
	(0.00681)	(0.00741)	(0.00885)
Operates call centers statewide	-0.00532	-0.00137	-0.0175**
	(0.00591)	(0.00625)	(0.00762)
Telephone recertification in at least part of state	-0.00992	-0.0101	-0.00723
	(0.00621)	(0.00768)	(0.00538)
Operates a Combined Application Project for SSI recipients	0.0103	0.0107	0.0114*
	(0.00721)	(0.00895)	(0.00655)
% with earnings/seniors with 1-6 month recertifications^	-0.0192**	-0.0174**	-0.00582
	(0.00781)	(0.00852)	(0.0460)
Stigma			
Requires fingerprinting of applicants statewide	-0.0283	-0.0249*	-0.0374
	(0.0169)	(0.0128)	(0.0311)
Outreach			
Has federally funded TV or radio ad outreach campaign	-0.00797	-0.0120	-0.00502
	(0.0198)	(0.0211)	(0.0212)
Number of observations	170,929	112,184	58,745
F-statistic from test of joint significance of policies	2.109	1.988	2.445
Mean of outcome	0.249	0.294	0.152

Notes: Asterisks indicate statistically significant at *=p<0.10, **=p<0.05, and ***=p<0.01. Plus signs indicate that the non-senior and senior estimates are statistically different at +=p<0.10, ++=p<0.05, and +++=p<0.01. Standard errors, in parentheses, are heteroskedasticity-robust and clustered by state. ^ indicates that a variable is defined differently for different samples. Each regression includes individual-level and household-level controls and state and year fixed effects. Regressions are weighted using household sample weights.

Appendix Table 3. Regressions of SNAP participation on composite policy measures

Sample:	Full	Non-senior	Senior
Simulated eligibility variable^	0.232***	0.354***	0.0976*
	(0.0826)	(0.0960)	(0.0571)
Transaction costs^	0.00173	0.00109	0.0000947
	(0.00231)	(0.00257)	(0.00273)
Fingerprinting of applicants required statewide	-0.0264	-0.0256**	-0.0327
	(0.0174)	(0.0126)	(0.0320)
Has federally funded TV or radio ad outreach campaign	-0.00567	-0.0118	0.00186
	(0.0197)	(0.0208)	(0.0203)
Number of observations	170,929	112,184	58,745
F-statistic from test of joint significance of policies	3.283	4.989	1.298
Mean of outcome	0.249	0.294	0.152

Notes: See notes from Appendix Table 2.