REPORT

# Empirical Bayes Shrinkage Estimates of State Supplemental Nutrition Assistance Program Participation Rates in Fiscal Year 2013 to Fiscal Year 2015 for All Eligible People and Working Poor People

## Final Report

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# EXECUTIVE SUMMARY

The Supplemental Nutrition Assistance Program (SNAP) is a central component of U.S. policy to alleviate hunger and poverty. SNAP is the largest of the domestic food and nutrition assistance programs administered by the U.S. Department of Agriculture's Food and Nutrition Service. During fiscal year 2017, the program served 42 million people in an average month at a total annual cost of $64 billion in benefits.

This report presents estimates that measure the need for SNAP and the program's effectiveness at reaching its target population in each state and the District of Columbia for fiscal years 2013 to 2015. Need for the program is measured by estimated numbers of people eligible for SNAP. The program's performance is measured by estimated SNAP participation rates. In addition to estimates that pertain to all eligible people, we derived estimates for "working poor" people, that is, people who were eligible for SNAP and lived in households in which someone earned income from a job.

The estimates for all eligible people and for working poor people were derived jointly using empirical Bayes shrinkage estimation methods and data from the Current Population Survey Annual Social and Economic Survey (CPS ASEC), the American Community Survey, and administrative records. The shrinkage estimator averaged direct estimates of participation rates in each state with predictions from a regression model. The regression predictions were based on observed indicators of socioeconomic conditions in the states, such as the percentage of the total state population receiving SNAP benefits. The shrinkage estimates derived are substantially more precise than direct estimates from the Current Population Survey, the best source of current data on household incomes used to model program eligibility. Shrinkage estimators improve precision by "borrowing strength," that is, by using data for multiple years from all the states to derive each state's estimates for a given year and by using data from multiple sources, including sample surveys and administrative data. This report describes our shrinkage estimator in detail.

Final shrinkage estimates for FY 2013 and FY 2014 presented in this report differ slightly from the estimates presented in Cunnyngham (January 2017) and Cunnyngham et al. (January 2017) because of annual data updates. As a result, the estimates presented in this report should not be compared to those published in earlier reports.

# I. INTRODUCTION

The Supplemental Nutrition Assistance Program (SNAP) is a central component of U.S. policy to alleviate hunger and poverty. The program's main purpose is "to permit low-income households to obtain a more nutritious diet . . . by increasing their purchasing power" (Food and Nutrition Act of 2008). SNAP is the largest of the domestic food and nutrition assistance programs administered by the U.S. Department of Agriculture's Food and Nutrition Service. During fiscal year (FY) 2017, the program served 42 million people in an average month at a total annual cost of $64 billion in benefits.

This report presents estimates that measure the need for SNAP and the program's effectiveness at reaching its target population in each state and the District of Columbia for FY 2013 to FY 2015. The estimates presented here are also reported and compared with one another in Cunnyngham (December 2017). Need for the program is measured by estimated numbers of people eligible for SNAP. The program's performance is measured by estimated SNAP participation rates, the percentage of eligible people who actually participate in the program. In addition to presenting estimates that pertain to all eligible people, we present estimates for "working poor" people, that is, people who are eligible for SNAP and live in households in which someone earned income from a job or self-employment.

We derived estimates for all eligible people and working poor people for each state in each of the three fiscal years using empirical Bayes shrinkage estimation methods. Specifically, we used a shrinkage estimator that optimally averaged direct estimates of SNAP participation rates with predictions from a regression model. We obtained the direct estimates by applying SNAP eligibility rules to households in the Current Population Survey Annual Social and Economic Supplement (CPS ASEC) to estimate numbers of eligible people and using SNAP

Quality Control (QC) data to estimate numbers of participating people. The regression predictions drew on data from the American Community Survey (ACS), individual tax returns, population estimates, and administrative records.

The remainder of this introductory chapter provides an overview of indirect estimation and our shrinkage estimator. Chapter II describes, step by step, how we derived the shrinkage estimates presented here, and Chapter III presents state estimates for all eligible people and working poor people. Technical details and additional information about our estimation methods are provided in Appendix A. Appendix B contains data for the figures presented in Cunnyngham (December 2017).

**U.S. Census Bureau Data**

The **Current Population Survey (CPS)** is conducted monthly for the Bureau of Labor Statistics and is the primary source of current information on the labor force characteristics of the U.S. population. The CPS Annual Social and Economic Supplement (ASEC) includes additional data on work experience, income, and noncash benefits, and has a sample size of just under 100,000 households.

The **American Community Survey (ACS)** is conducted monthly in every county, American Indian and Alaska Native Area, Hawaiian Home Land, and Puerto Rico. Designed to replace the decennial census long form, it collects economic, social, demographic, and housing information on about three million households annually.

The Census Bureau develops annual **population estimates** using decennial census population estimates and administrative records and other data on births, deaths, net domestic migration, and net international migration.

More information on these data sources is available at http://www.census.gov.

**Direct estimates.** The principal challenge in deriving state estimates like those presented in this report is the small sample size of the CPS ASEC. The optimal survey for estimating state SNAP eligibility would (1) have a large sample for all states, (2) be representative at the state level, and (3) contain the detail on household relationships and income sources needed to estimate program eligibility. Among the three leading surveys, the CPS ASEC comes closest to meeting these standards despite its small sample sizes for most states. Another national household survey, the Survey of Income and Program Participation (SIPP), contains more detail on relationships and income than the CPS ASEC, but is not representative at the state level (and has even smaller state samples). The third candidate, the ACS, is much larger than the CPS

ASEC but has fewer details on relationships and income sources. Additionally, unlike the CPS ASEC's fixed reference period of the prior calendar year for all households, the ACS reference period is the prior 12 months and so varies across households by up to a year, depending on when respondents complete the survey. For these reasons, we use the CPS ASEC to estimate SNAP eligibility.

However, estimates of SNAP eligibility and participation rates based only on the CPS ASEC sample for the state and time period in question, or "direct" estimates, are imprecise for many states. For example, to directly estimate Idaho's FY 2015 SNAP participation rate, we used only FY 2015 CPS ASEC data on households from Idaho. Because of the potential errors introduced by the CPS ASEC surveying a small number of families in Idaho, we can be confident—by a commonly used standard—only that Idaho's SNAP participation rate in FY 2015 was between about 71 and 86 percent. This range is wide, although typical, reflecting our substantial uncertainty about what Idaho's participation rate actually was.

**Indirect estimators.** To improve precision, statisticians have developed indirect estimators, which borrow strength by using data from additional states, time periods, or data sources. The assumption underlying indirect estimation is that what happened in other states and in other years is relevant to estimating what happened in a particular state in a particular year.

One type of indirect estimator is the shrinkage estimator, which averages estimates obtained from different methods. Fay and Herriott (1979) developed a shrinkage estimator that combined direct sample and regression estimates of per capita income for small places that were used to allocate funds under the General Revenue Sharing Program. In another application of shrinkage methods, shrinkage estimates of poor school-aged children by state and county were used in allocating Title I compensatory education funds for disadvantaged youth (National Research Council 2000). Shrinkage estimators have also been used to develop state estimates of income-

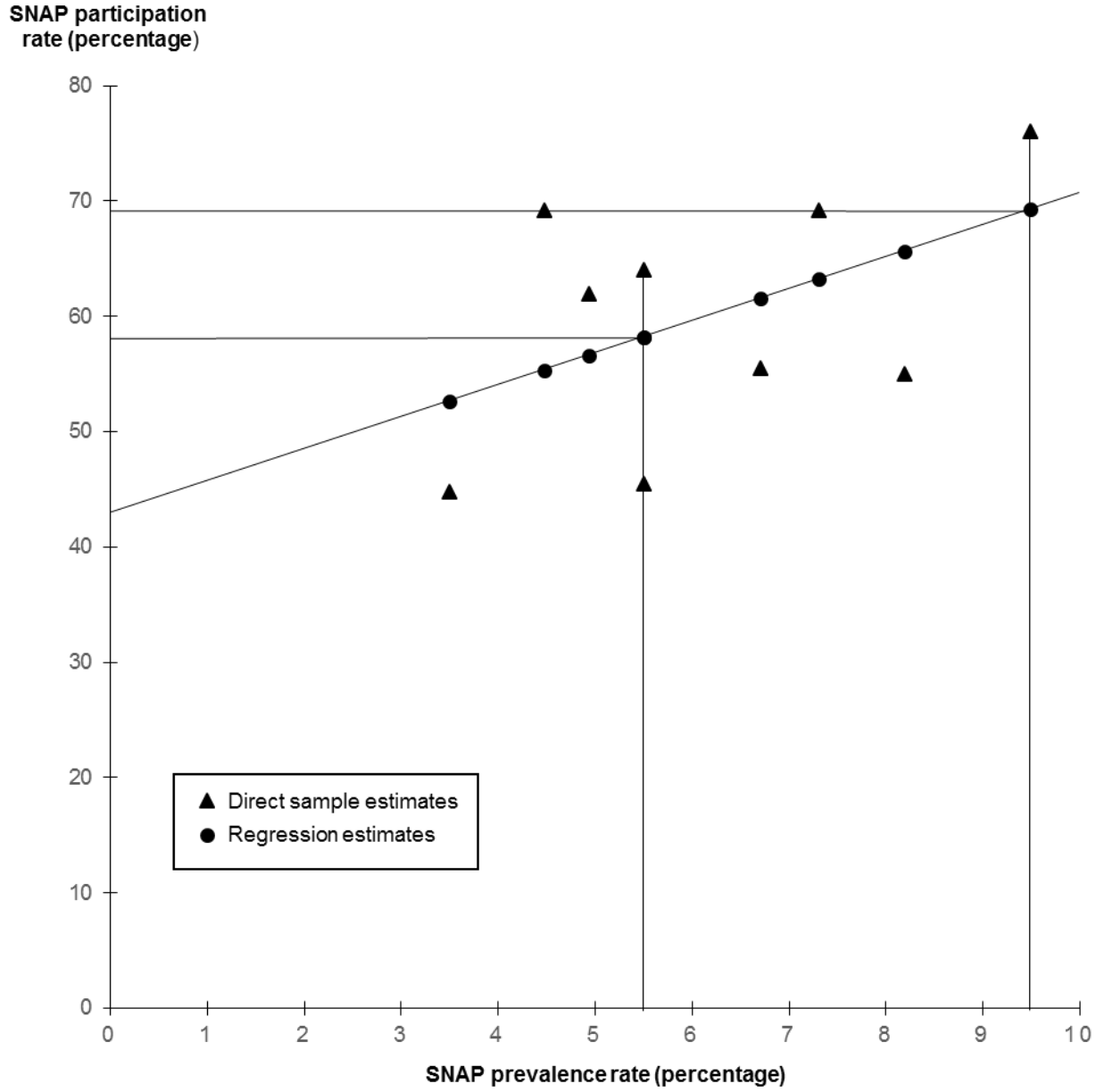
eligible infants and children for allocating funds under the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) (Schirm 2000). The WIC eligibles estimator used several years of CPS ASEC data and combined direct estimates with predictions from a regression model.

In these and other applications of shrinkage estimation, the gain in precision from borrowing strength via a shrinkage estimator can be substantial. For example, the confidence intervals for the shrinkage estimates of WIC eligibles in 1992 were, on average, 61 percent narrower than the corresponding confidence intervals for the direct estimates (Schirm 1995). To obtain that same gain in precision with a direct estimator would require—according to rough calculations— more than a six-fold increase in sample size. The gain in precision from using shrinkage estimation for another application might not be the same as for the 1992 WIC estimates. In addition, shrinkage estimates derived for any one application are not guaranteed to be more accurate than estimates obtained using some other method. However, they have good statistical properties in general and we have found that for our specific application, shrinkage estimation can greatly improve precision.

**Regression estimates.** The first step of our shrinkage estimator is to use data from outside the CPS ASEC to estimate a regression model and formulate a prediction for each group (all eligible people and working poor people) in each state in each year.

Regression estimates are predictions based either on nonsample or on highly precise sample data. Figure I.1 illustrates how a regression estimator works. The simple example in the figure has only nine states and data for just one year on one predictor—the SNAP "prevalence" rate—that will be used to predict each state's SNAP participation rate for eligible people. The SNAP prevalence rate is measured by the percentage of all people (eligible and ineligible combined)

**Figure I.1. An illustrative regression estimator**




who received SNAP benefits, in contrast to the SNAP participation rate, which is measured by the percentage of eligible people who received SNAP benefits. The triangles in the figure correspond to direct sample estimates; a triangle shows the prevalence rate in a state (horizontal axis) and the sample estimate of the participation rate in that state (vertical axis). Not surprisingly, the graph suggests that prevalence and participation rates are systematically associated. States with higher percentages of all people participating in the program tend to have

higher percentages of eligible people participating, although the relationship is far from perfect. To measure this relationship between prevalence and participation rates and derive predictions, we can use a technique called "least squares regression" to draw a line through the triangles. Regression estimates of participation rates are points on that line, the circles in Figure I.1. The predicted participation rate for a particular state is obtained by moving up or down from the state's direct sample estimate (the triangle) to the regression line (where there is a circle) and reading the value from the vertical axis. For example, the regression estimator predicts a participation rate of just under 60 percent for both states with prevalence rates of about 5.5 percent. In contrast, for the state with about 9.5 percent of people receiving SNAP benefits, the predicted participation rate is nearly 70 percent.

**Comparison of direct and regression estimators.** Comparing how the direct and regression estimators use data reveals how the regression estimator borrows strength to improve precision. To derive direct estimates, we used only one year's CPS ASEC sample data from Idaho to estimate the state's participation rate in that year. To derive regression estimates, we estimated a regression line from sample, administrative, and ACS data for multiple years and all the states and used the estimated line (with administrative and ACS data for Idaho) to predict Idaho's participation rate in a given year. In other words, the regression estimator not only uses the direct estimates from every state for multiple years to develop a regression estimate for a single state in a single year, but also incorporates data from outside the sample, namely, data in administrative records systems and the ACS. To improve precision even further, the estimator borrows strength across groups—all eligible people and working poor people—by deriving estimates for the groups jointly.

The regression estimator can improve precision by using additional data to identify states with direct estimates that seem too high or too low because of sampling error (error from

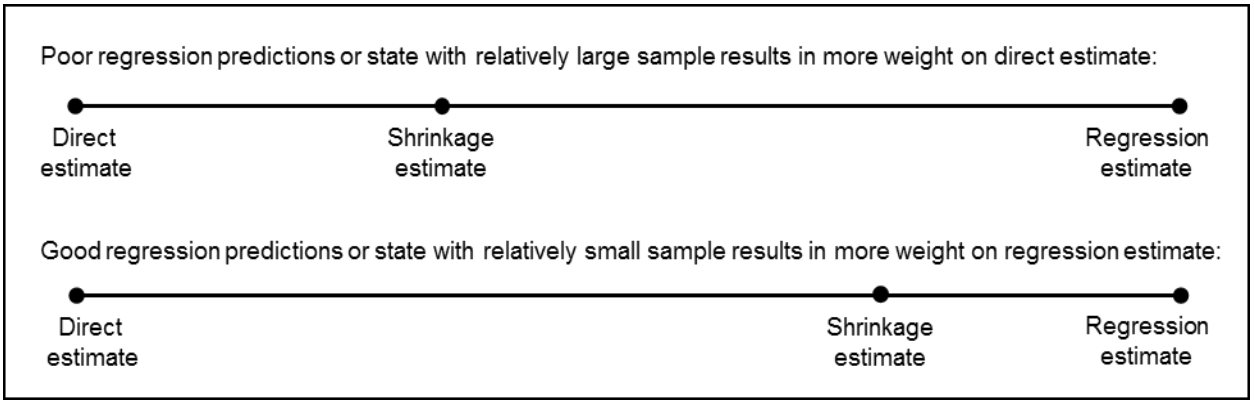
drawing a sample of the population that has a higher or lower participation rate than the entire state population has.) For example, when a state has a low SNAP prevalence rate and values for other predictors that are consistent with a low SNAP participation rate, our regression estimator will predict a low participation rate for that state. If the direct estimate for that state is high, the regression estimate will be lower than the direct estimate. On the other hand, if the sample data for a state show a lower participation rate than expected in light of the SNAP prevalence rate and the other predictors, the regression estimate for that state will be higher than the direct estimate.

A limitation of the regression estimator is "bias." Some states really have higher or lower participation rates than predicted with the regression estimator. Such errors in regression estimates reflect bias. Although the regression estimator borrows strength, using data from all the states and multiple years as well as administrative and ACS data, it makes no further use of the sample data after estimating the regression line. It treats the entire difference between the sample and regression estimates as sampling error, that is, error in the direct estimate. No allowance is made for prediction error, that is, error in the regression estimate. Although not all, if any, true state participation rates lie on the regression line, the assumption underlying the regression estimator is that they do.

**Shrinkage estimator.** The shrinkage estimator strikes a compromise between the limitations of the direct estimator (imprecision) and the regression estimator (bias) by combining the two estimates. As illustrated in Figure I.2, the shrinkage estimator takes a weighted average of the direct and regression estimates, weighting them according to their relative accuracy. When the direct estimate is more precise than the regression estimate, the estimator gives more weight to the direct estimate. On the other hand, when the regression estimate is more precise than the direct estimate, the estimator gives more weight to the regression estimate. The larger samples drawn in large states support more precise direct estimates, so shrinkage estimates tend to be

closer to the direct estimates for large states. The weight given to the regression estimate depends on how well the regression line "fits." If we find good predictors reflecting why some states have higher participation rates than other states, we say that the regression line "fits well." The shrinkage estimate will be closer to the regression estimate when the regression line fits well than when the line fits poorly.

**Figure I.2. Shrinkage estimation**




The direct and regression estimates are optimally weighted to improve accuracy by minimizing a measure of error that reflects both imprecision and bias. By accepting a little bias, the shrinkage estimator may be substantially more precise than the direct sample estimator. By sacrificing a little precision, the shrinkage estimator may be substantially less biased than the regression estimator. The shrinkage estimator optimizes the tradeoff between imprecision and bias.

# II. A STEP-BY-STEP GUIDE TO DERIVING STATE ESTIMATES

This chapter describes our procedure for estimating state SNAP participation rates for all eligible people and working poor people and the numbers of people eligible for SNAP benefits for FY 2013 to FY 2015. This procedure, summarized by the flow chart in Figure II.1, has the following four steps:

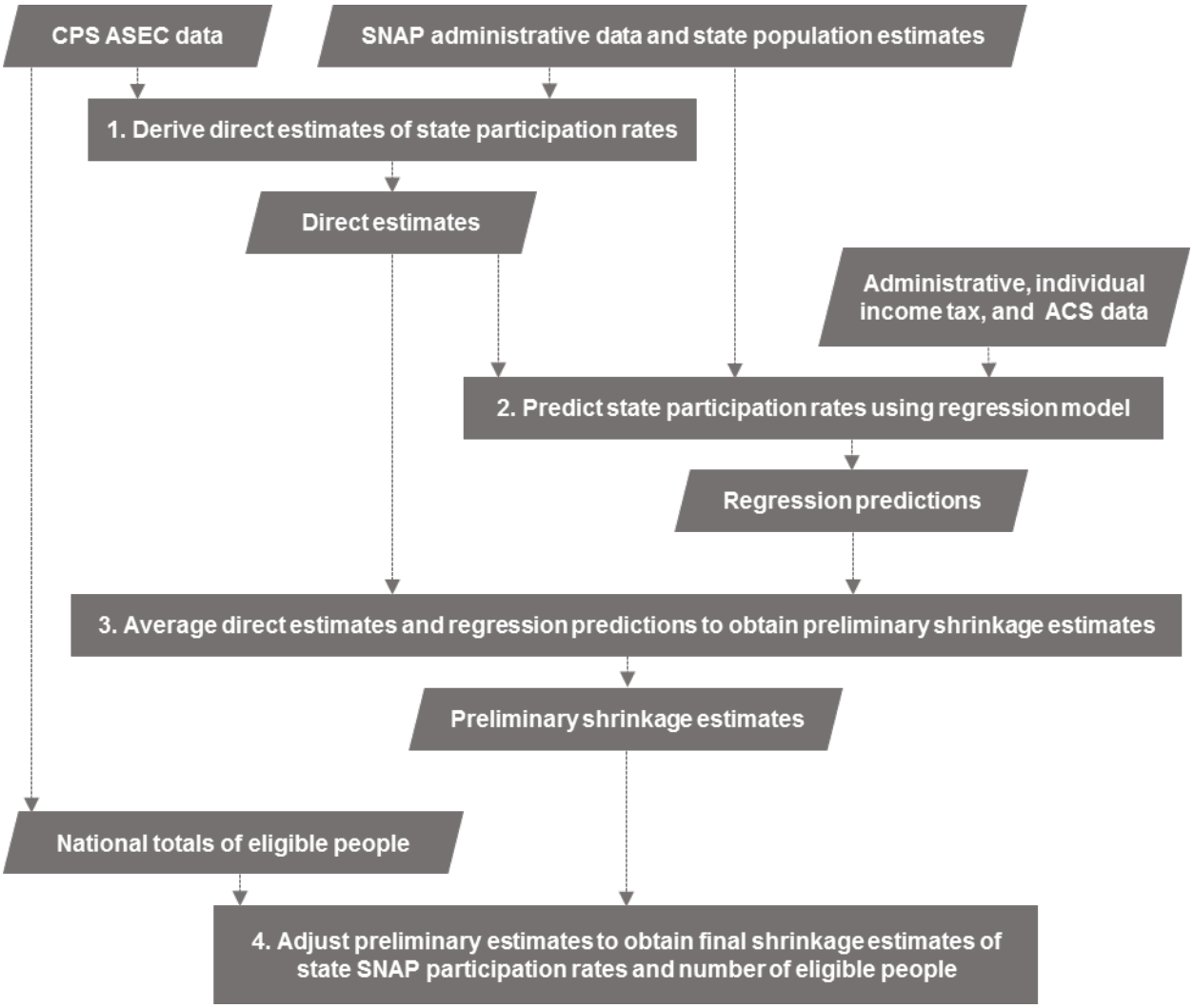
1. From CPS ASEC data, SNAP administrative data, and population estimates, derive direct estimates of state SNAP participation rates.
2. Using a regression model and the direct estimates derived in Step 1, predict state SNAP participation rates based on SNAP administrative, individual income tax, and ACS data and population estimates.
3. Using a shrinkage estimator, average the direct estimates from Step 1 and the regression predictions from Step 2 to obtain preliminary shrinkage estimates of state SNAP participation rates.
4. Adjust the preliminary shrinkage estimates from Step 3 using national estimates of eligible people derived from the CPS ASEC to obtain final shrinkage estimates of state SNAP participation rates.

Each step is described in the remainder of this chapter. Additional technical details are provided in Appendix A.

## A. From CPS ASEC data and SNAP administrative data, derive direct estimates of state SNAP participation rates

A SNAP participation rate is obtained by dividing an estimate of the number of people participating in SNAP by an estimate of the number of people eligible for SNAP, with the resulting ratio expressed as a percentage. We used SNAP QC data to estimate numbers of participants in an average month in the fiscal year and CPS ASEC data to estimate numbers of eligible people in an average month. Because the CPS ASEC collects income data for the prior calendar year, we obtained estimates of eligible people in FY 2015 (October 2014 through September 2015) from the 2015 and 2016 CPS ASEC. To derive a participation rate for working poor people, we divided the number of working poor participants by the number of

**Figure II.2. The estimation procedure**




eligible working poor people. Appendix A presents direct estimates and their standard errors for each group (all eligible people and working poor people) in each state for each of the three fiscal years.

## B. Using a regression model, predict state SNAP participation rates based on administrative, ACS, and other data

To derive regression estimates for the three fiscal years and for all eligible people and working poor people, we included all of the states, not just nine as in our illustrative example in Chapter 1, and we used seven predictors, not just one. The seven predictors used for the estimates in this report measure the following:

- Percentage of the population receiving SNAP benefits according to administrative data and population estimates
- Percentage of renter occupied housing units that spent 50 percent or more of household income on rent and utilities according to ACS one-year estimates
- Percentage of children under age 18 with household income under 50 percent of the federal poverty level according to ACS one-year estimates
- Percentage of civilian employed people age 16 and older who were in service occupations according to ACS one-year estimates
- Median household income according to ACS one-year estimates
- Percentage of people age 65 and older not claimed on tax returns or claimed on tax returns with adjusted gross income under the federal poverty level according to individual income tax data and population estimates
- Percentage of all people not claimed on tax returns according to individual income tax data and population estimates

These seven predictors were selected as the best from a longer list described in Table A.13, which provides complete definitions and sources for the predictors. All but the fifth predictor listed above were included in last year's model. The one predictor used in the previous model but not this year's model was the percentage of occupied housing units that are owner-occupied according to ACS one-year estimates.

The regression equations do not express causal relationships. Rather, they imply only statistical associations. For this reason, predictors are often called "symptomatic indicators." They are symptomatic of differences among states in conditions associated with having higher or lower participation rates.

Appendix A presents the regression estimates and their standard errors. The standard errors tend to be fairly equal across the states and much smaller than the largest standard errors for direct estimates, reflecting substantial gains in precision from regression for the states with the most error-prone direct estimates.

### C. Using shrinkage methods, average the direct estimates and regression predictions to obtain preliminary shrinkage estimates of state SNAP participation rates

To derive preliminary estimates of state SNAP participation rates, we averaged the direct estimates calculated in Step 1 and the regression predictions from Step 2 using an empirical Bayes shrinkage estimator. (See Appendix A for a description of the empirical Bayes methods we used.) We call the estimates from this step "preliminary" because we make some fairly small adjustments to them in the next step. Appendix A presents the preliminary shrinkage estimates of state SNAP participation rates for all eligible people and working poor people for all three fiscal years.

### D. Adjust the preliminary shrinkage estimates to obtain final shrinkage estimates of state SNAP participation rates and numbers of eligible people

We adjusted the preliminary shrinkage estimates of participation rates in two ways. First, we adjusted the rates so that the counts of eligible people implied by the rates sum to the national count of eligible people estimated directly from the CPS ASEC. Second, we adjusted the rates so that no state's estimated rate was greater than 100 percent. These adjustments were carried out separately for each year and for the two groups (all eligible people and working poor people). The following description of the adjustments will focus on the FY 2015 estimates for all eligible people. In Appendix A, we describe the results of the adjustments for other years and for working poor people and discuss our adjustment method in more detail.

To implement the first adjustment, we calculated preliminary estimates of the numbers of eligible people from the preliminary estimates of participation rates derived in Step 3 and the administrative estimates of the numbers of SNAP participants obtained in Step 1. For FY 2015, the state estimates of eligible people summed to 50,928,055 while the national total estimated directly from the CPS ASEC was 50,036,073. To obtain estimated numbers of eligible people for

states that sum (aside from rounding error) to the direct estimate of the national total, we multiplied each of the state preliminary estimates of eligible people by $50{,}036{,}073 / 50{,}928{,}055$ ($\approx 0.9825$). Such benchmarking of estimates for smaller areas to a relatively precise estimated total for a larger area is common practice.

After carrying out this first adjustment, six states, Delaware, Illinois, Michigan, New Mexico, Oregon, and Washington had fewer estimated eligible people than estimated eligible participants in FY 2015, incorrectly implying participation rates over 100 percent. To cap participation rates at 100 percent, we performed a second adjustment. Specifically, we increased the number of eligible people in Delaware, Illinois, Michigan, New Mexico, Oregon, and Washington so that the number of eligible people in those states equaled the number of participants. We reduced the number of eligible people in the other 44 states and the District of Columbia by an equivalent number and in proportion to their numbers of eligible people. This adjustment, which moved small numbers of eligible people among states, did not change the national total. Moreover, except for the states with participation rates initially over 100 percent, this adjustment did not change any state's participation rate by more than four tenths of a percentage point. The rounded participation rates for some states did increase by one percentage point, however.

Applying this adjustment, we obtained our final shrinkage estimates of the numbers of people eligible for SNAP. From those estimates and our administrative estimates of the numbers of SNAP participants, we derived final shrinkage estimates of participation rates. Our final shrinkage estimates are presented in the next chapter.

# III. STATE ESTIMATES OF SNAP PARTICIPATION RATES AND NUMBER OF ELIGIBLE PEOPLE

Tables III.1 and III.2 present our final shrinkage estimates of SNAP participation rates and the number of people eligible, respectively, in each state for FY 2013 to FY 2015 for all eligible people and for working poor people. These shrinkage estimates are relatively precise; they have much smaller standard errors and narrower confidence intervals than the CPS ASEC direct estimates. Tables III.3 to III.8 display approximate 90 percent confidence intervals showing the uncertainty remaining after using shrinkage estimation to derive the estimates in Tables III.1 and III.2. One interpretation of a 90 percent confidence interval is that there is a 90 percent chance that the true value—that is, the true participation rate or the true number of eligible people—falls within the estimated bounds. For example, although our best estimate is that Idaho's participation rate for all eligible people was 75 percent in FY 2015 (see Table III.1), the true rate may have been higher or lower. However, according to Table III.5, the chances are 90 in 100 that the true rate was between 75 and 85 percent, an interval that is 62 percent as wide as the interval (71 and 86 percent, as cited in Chapter I) around the direct estimate. A narrower interval means that we are less uncertain about the true value. According to our calculations, a shrinkage confidence interval for a participation rate is, on average, only about 61 percent as wide as the corresponding direct confidence interval. Thus, shrinkage substantially improves precision and reduces our uncertainty.

Despite the impressive gains in precision, however, substantial uncertainty about the true participation rates for some states remains even after the application of shrinkage methods. Nevertheless, as discussed in Cunnyngham (December 2017), the shrinkage estimates are sufficiently precise to show, for example, whether a state's SNAP participation rate was

probably near the top, near the bottom, or in the middle of the distribution of rates in a given year. That is enough information for many important purposes, such as guiding an initiative to improve program performance.

Final shrinkage estimates for FY 2013 and FY 2014 presented in this report differ slightly from the estimates presented in Cunnyngham (January 2017) and Cunnyngham et al. (January 2017) for three reasons.

1. **The shrinkage estimator uses data from three years to estimate participation rates for each year.** Annually, data for the most recent year are added and data for the oldest year are dropped. As a result, the estimates for 2013 and 2014 presented in this report are based on 2013 to 2015 data, and the corresponding estimates published in Cunnyngham et al. (January 2017) are based on 2012 to 2014 data.
2. **The shrinkage estimator incorporates a regression model that is updated each year.** Each year we choose a regression model that best predicts participation rates for all three years and both groups (all eligible people and eligible working poor.) Although we place a premium on maintaining consistency in regression predictors from year to year, differences between 2012 data (used in the previous estimates) and 2015 data (used in the current estimates) resulted in the use of a different regression model. Different regression models lead to slight differences in predicted participation rates, which in turn lead to slight differences in estimated participation rates.

Because of these updates, the estimates presented in this report should not be compared to those published in earlier reports.

## Table III.1. Final shrinkage estimates of SNAP participation rates

| | All eligible people | | | Working poor people | | |
|---|---|---|---|---|---|---|
| | FY 2013 | FY 2014 | FY 2015 | FY 2013 | FY 2014 | FY 2015 |
| Alabama | 87 | 85 | 85 | 77 | 70 | 74 |
| Alaska | 83 | 85 | 87 | 69 | 72 | 70 |
| Arizona | 76 | 68 | 70 | 67 | 56 | 62 |
| Arkansas | 76 | 73 | 72 | 69 | 61 | 64 |
| California | 68 | 67 | 70 | 54 | 52 | 57 |
| Colorado | 81 | 77 | 76 | 75 | 69 | 63 |
| Connecticut | 89 | 92 | 94 | 72 | 72 | 69 |
| Delaware | 99 | 100 | 100 | 89 | 86 | 85 |
| District of Columbia | 98 | 95 | 98 | 67 | 53 | 62 |
| Florida | 92 | 90 | 92 | 76 | 73 | 77 |
| Georgia | 93 | 87 | 86 | 80 | 73 | 74 |
| Hawaii | 75 | 84 | 84 | 64 | 73 | 74 |
| Idaho | 90 | 84 | 80 | 86 | 82 | 80 |
| Illinois | 100 | 100 | 100 | 83 | 83 | 82 |
| Indiana | 90 | 88 | 83 | 86 | 82 | 74 |
| Iowa | 95 | 96 | 92 | 93 | 90 | 83 |
| Kansas | 81 | 77 | 71 | 78 | 72 | 64 |
| Kentucky | 87 | 84 | 77 | 75 | 71 | 70 |
| Louisiana | 88 | 76 | 80 | 79 | 66 | 72 |
| Maine | 100 | 100 | 90 | 97 | 87 | 79 |
| Maryland | 91 | 93 | 92 | 73 | 75 | 74 |
| Massachusetts | 86 | 84 | 82 | 65 | 63 | 62 |
| Michigan | 100 | 100 | 100 | 100 | 93 | 85 |
| Minnesota | 87 | 88 | 83 | 79 | 81 | 72 |
| Mississippi | 84 | 82 | 83 | 75 | 68 | 74 |
| Missouri | 94 | 88 | 89 | 81 | 72 | 73 |
| Montana | 84 | 79 | 78 | 82 | 77 | 73 |
| Nebraska | 80 | 78 | 76 | 77 | 77 | 71 |
| Nevada | 64 | 65 | 81 | 54 | 59 | 77 |
| New Hampshire | 83 | 81 | 75 | 75 | 73 | 65 |
| New Jersey | 75 | 73 | 74 | 65 | 65 | 65 |
| New Mexico | 92 | 90 | 100 | 87 | 83 | 97 |
| New York | 87 | 86 | 87 | 76 | 77 | 79 |
| North Carolina | 82 | 80 | 83 | 75 | 68 | 74 |
| North Dakota | 69 | 63 | 62 | 70 | 64 | 57 |
| Ohio | 93 | 88 | 87 | 86 | 79 | 77 |
| Oklahoma | 79 | 78 | 78 | 67 | 59 | 64 |
| Oregon | 100 | 100 | 100 | 100 | 98 | 93 |
| Pennsylvania | 90 | 88 | 90 | 81 | 79 | 78 |
| Rhode Island | 96 | 96 | 99 | 78 | 81 | 83 |
| South Carolina | 85 | 78 | 82 | 81 | 69 | 75 |
| South Dakota | 88 | 93 | 90 | 94 | 94 | 85 |
| Tennessee | 100 | 100 | 95 | 82 | 82 | 79 |
| Texas | 76 | 73 | 70 | 66 | 66 | 67 |
| Utah | 76 | 72 | 69 | 70 | 67 | 63 |
| Vermont | 100 | 100 | 99 | 99 | 94 | 85 |
| Virginia | 80 | 78 | 75 | 74 | 70 | 67 |
| Washington | 100 | 100 | 100 | 89 | 86 | 82 |
| West Virginia | 78 | 80 | 85 | 72 | 72 | 83 |
| Wisconsin | 100 | 100 | 96 | 98 | 99 | 90 |
| Wyoming | 57 | 60 | 59 | 55 | 60 | 55 |
| United States | 85 | 83 | 83 | 74 | 70 | 72 |

## Table III.2. Final shrinkage estimates of number of people eligible for SNAP

| | All eligible people | | | Working poor people | | |
|---|---|---|---|---|---|---|
| | FY 2013 | FY 2014 | FY 2015 | FY 2013 | FY 2014 | FY 2015 |
| Alabama | 1,018 | 1,020 | 1,018 | 429 | 444 | 464 |
| Alaska | 109 | 103 | 93 | 57 | 50 | 44 |
| Arizona | 1,253 | 1,317 | 1,247 | 720 | 784 | 656 |
| Arkansas | 650 | 657 | 632 | 293 | 319 | 283 |
| California | 5,694 | 5,909 | 5,736 | 3,113 | 3,398 | 3,420 |
| Colorado | 582 | 609 | 611 | 287 | 316 | 347 |
| Connecticut | 404 | 394 | 407 | 188 | 179 | 187 |
| Delaware | 128 | 123 | 125 | 58 | 60 | 60 |
| District of Columbia | 135 | 133 | 133 | 42 | 47 | 49 |
| Florida | 3,543 | 3,624 | 3,584 | 1,599 | 1,577 | 1,612 |
| Georgia | 1,932 | 1,951 | 1,987 | 911 | 956 | 1,005 |
| Hawaii | 225 | 204 | 199 | 128 | 108 | 114 |
| Idaho | 235 | 230 | 226 | 143 | 127 | 131 |
| Illinois | 1,858 | 1,809 | 1,854 | 850 | 843 | 927 |
| Indiana | 1,008 | 998 | 977 | 460 | 500 | 513 |
| Iowa | 370 | 364 | 361 | 212 | 189 | 201 |
| Kansas | 384 | 378 | 384 | 201 | 201 | 207 |
| Kentucky | 934 | 911 | 950 | 399 | 380 | 380 |
| Louisiana | 1,026 | 1,106 | 1,067 | 453 | 495 | 490 |
| Maine | 209 | 198 | 191 | 81 | 88 | 82 |
| Maryland | 738 | 729 | 741 | 350 | 327 | 347 |
| Massachusetts | 904 | 900 | 842 | 324 | 326 | 318 |
| Michigan | 1,549 | 1,503 | 1,402 | 634 | 700 | 622 |
| Minnesota | 525 | 498 | 490 | 257 | 275 | 275 |
| Mississippi | 767 | 769 | 735 | 337 | 325 | 296 |
| Missouri | 970 | 966 | 949 | 444 | 439 | 437 |
| Montana | 138 | 141 | 137 | 70 | 61 | 58 |
| Nebraska | 212 | 210 | 217 | 110 | 106 | 113 |
| Nevada | 476 | 504 | 442 | 234 | 244 | 227 |
| New Hampshire | 117 | 118 | 122 | 50 | 54 | 56 |
| New Jersey | 1,039 | 1,089 | 1,091 | 506 | 516 | 464 |
| New Mexico | 439 | 445 | 413 | 224 | 217 | 207 |
| New York | 3,320 | 3,262 | 3,201 | 1,488 | 1,500 | 1,465 |
| North Carolina | 1,834 | 1,780 | 1,730 | 918 | 742 | 873 |
| North Dakota | 65 | 67 | 67 | 30 | 32 | 30 |
| Ohio | 1,777 | 1,818 | 1,736 | 714 | 814 | 838 |
| Oklahoma | 753 | 729 | 731 | 372 | 364 | 376 |
| Oregon | 654 | 663 | 650 | 252 | 279 | 300 |
| Pennsylvania | 1,771 | 1,790 | 1,822 | 661 | 737 | 801 |
| Rhode Island | 159 | 160 | 155 | 59 | 69 | 62 |
| South Carolina | 968 | 1,011 | 934 | 392 | 457 | 440 |
| South Dakota | 117 | 106 | 107 | 58 | 50 | 54 |
| Tennessee | 1,333 | 1,303 | 1,284 | 547 | 575 | 591 |
| Texas | 4,797 | 4,833 | 4,706 | 2,742 | 2,723 | 2,539 |
| Utah | 327 | 313 | 321 | 174 | 177 | 199 |
| Vermont | 77 | 77 | 71 | 31 | 32 | 31 |
| Virginia | 1,170 | 1,163 | 1,123 | 525 | 585 | 537 |
| Washington | 854 | 872 | 885 | 333 | 378 | 443 |
| West Virginia | 405 | 420 | 397 | 142 | 153 | 149 |
| Wisconsin | 702 | 695 | 699 | 347 | 335 | 362 |
| Wyoming | 66 | 58 | 54 | 31 | 30 | 30 |
| United States | 50,716 | 51,026 | 50,036 | 23,979 | 24,682 | 24,709 |

## Table III.3. Approximate 90 percent confidence intervals for final shrinkage estimates for FY 2013, all eligible people

| | Participation rate (percent) | | Number of eligible people (thousands) | |
|---|---|---|---|---|
| | Lower bound | Upper bound | Lower bound | Upper bound |
| Alabama | 82 | 91 | 965 | 1,071 |
| Alaska | 77 | 89 | 101 | 117 |
| Arizona | 71 | 80 | 1,180 | 1,326 |
| Arkansas | 71 | 81 | 607 | 692 |
| California | 66 | 71 | 5,482 | 5,906 |
| Colorado | 76 | 87 | 543 | 621 |
| Connecticut | 84 | 94 | 380 | 428 |
| Delaware | 93 | 100 | 121 | 135 |
| District of Columbia | 91 | 100 | 125 | 144 |
| Florida | 88 | 96 | 3,393 | 3,693 |
| Georgia | 89 | 97 | 1,849 | 2,014 |
| Hawaii | 70 | 81 | 209 | 240 |
| Idaho | 84 | 95 | 221 | 249 |
| Illinois | 95 | 100 | 1,775 | 1,942 |
| Indiana | 86 | 95 | 954 | 1,062 |
| Iowa | 91 | 100 | 351 | 389 |
| Kansas | 77 | 85 | 363 | 405 |
| Kentucky | 83 | 92 | 886 | 981 |
| Louisiana | 84 | 93 | 972 | 1,079 |
| Maine | 94 | 100 | 198 | 221 |
| Maryland | 86 | 96 | 696 | 780 |
| Massachusetts | 81 | 91 | 851 | 957 |
| Michigan | 94 | 100 | 1,476 | 1,622 |
| Minnesota | 82 | 91 | 497 | 552 |
| Mississippi | 79 | 88 | 724 | 809 |
| Missouri | 88 | 100 | 907 | 1,032 |
| Montana | 78 | 89 | 128 | 147 |
| Nebraska | 74 | 85 | 197 | 226 |
| Nevada | 59 | 69 | 438 | 513 |
| New Hampshire | 78 | 88 | 110 | 125 |
| New Jersey | 71 | 80 | 975 | 1,103 |
| New Mexico | 86 | 98 | 410 | 468 |
| New York | 83 | 90 | 3,191 | 3,449 |
| North Carolina | 79 | 86 | 1,754 | 1,914 |
| North Dakota | 64 | 74 | 60 | 70 |
| Ohio | 88 | 97 | 1,692 | 1,862 |
| Oklahoma | 74 | 83 | 707 | 800 |
| Oregon | 94 | 100 | 627 | 681 |
| Pennsylvania | 86 | 94 | 1,687 | 1,856 |
| Rhode Island | 91 | 100 | 149 | 168 |
| South Carolina | 81 | 89 | 921 | 1,015 |
| South Dakota | 80 | 95 | 107 | 127 |
| Tennessee | 94 | 100 | 1,261 | 1,405 |
| Texas | 73 | 79 | 4,596 | 4,998 |
| Utah | 71 | 81 | 305 | 349 |
| Vermont | 94 | 100 | 73 | 81 |
| Virginia | 75 | 85 | 1,097 | 1,243 |
| Washington | 95 | 100 | 815 | 894 |
| West Virginia | 73 | 83 | 378 | 431 |
| Wisconsin | 95 | 100 | 667 | 736 |
| Wyoming | 52 | 62 | 60 | 71 |
| United States | 84 | 86 | 50,061 | 51,371 |

## Table III.4. Approximate 90 percent confidence intervals for final shrinkage estimates for FY 2014, all eligible people

| | Participation rate (percent) | | Number of eligible people (thousands) | |
|---|---|---|---|---|
| | Lower bound | Upper bound | Lower bound | Upper bound |
| Alabama | 81 | 89 | 967 | 1,073 |
| Alaska | 80 | 90 | 96 | 109 |
| Arizona | 64 | 71 | 1,240 | 1,393 |
| Arkansas | 68 | 77 | 615 | 699 |
| California | 64 | 70 | 5,678 | 6,141 |
| Colorado | 72 | 82 | 568 | 649 |
| Connecticut | 87 | 98 | 370 | 419 |
| Delaware | 95 | 100 | 116 | 129 |
| District of Columbia | 89 | 100 | 124 | 143 |
| Florida | 86 | 94 | 3,472 | 3,775 |
| Georgia | 83 | 91 | 1,858 | 2,045 |
| Hawaii | 78 | 90 | 189 | 219 |
| Idaho | 79 | 89 | 215 | 244 |
| Illinois | 95 | 100 | 1,726 | 1,891 |
| Indiana | 83 | 92 | 946 | 1,051 |
| Iowa | 91 | 100 | 344 | 384 |
| Kansas | 73 | 82 | 355 | 401 |
| Kentucky | 80 | 89 | 864 | 957 |
| Louisiana | 72 | 80 | 1,047 | 1,164 |
| Maine | 95 | 100 | 187 | 209 |
| Maryland | 88 | 99 | 686 | 773 |
| Massachusetts | 79 | 89 | 846 | 954 |
| Michigan | 95 | 100 | 1,430 | 1,576 |
| Minnesota | 83 | 93 | 470 | 526 |
| Mississippi | 78 | 86 | 732 | 806 |
| Missouri | 82 | 94 | 898 | 1,033 |
| Montana | 74 | 85 | 131 | 150 |
| Nebraska | 72 | 83 | 196 | 224 |
| Nevada | 60 | 71 | 461 | 547 |
| New Hampshire | 76 | 87 | 110 | 125 |
| New Jersey | 68 | 77 | 1,020 | 1,157 |
| New Mexico | 84 | 96 | 416 | 474 |
| New York | 83 | 90 | 3,121 | 3,403 |
| North Carolina | 76 | 84 | 1,694 | 1,867 |
| North Dakota | 57 | 68 | 61 | 74 |
| Ohio | 84 | 92 | 1,730 | 1,906 |
| Oklahoma | 74 | 83 | 684 | 773 |
| Oregon | 94 | 100 | 633 | 693 |
| Pennsylvania | 84 | 92 | 1,706 | 1,874 |
| Rhode Island | 90 | 100 | 150 | 170 |
| South Carolina | 74 | 83 | 954 | 1,068 |
| South Dakota | 86 | 100 | 98 | 114 |
| Tennessee | 95 | 100 | 1,234 | 1,372 |
| Texas | 70 | 76 | 4,648 | 5,018 |
| Utah | 67 | 78 | 290 | 336 |
| Vermont | 94 | 100 | 73 | 81 |
| Virginia | 74 | 83 | 1,089 | 1,237 |
| Washington | 95 | 100 | 829 | 915 |
| West Virginia | 74 | 85 | 390 | 449 |
| Wisconsin | 95 | 100 | 659 | 730 |
| Wyoming | 55 | 65 | 53 | 63 |
| United States | 82 | 84 | 50,372 | 51,680 |

## Table III.5. Approximate 90 percent confidence intervals for final shrinkage estimates for FY 2015, all eligible people

| | Participation rate (percent) | | Number of eligible people (thousands) | |
|---|---|---|---|---|
| | Lower bound | Upper bound | Lower bound | Upper bound |
| Alabama | 80 | 89 | 963 | 1,072 |
| Alaska | 82 | 92 | 88 | 98 |
| Arizona | 66 | 74 | 1,177 | 1,317 |
| Arkansas | 68 | 76 | 597 | 667 |
| California | 67 | 72 | 5,493 | 5,979 |
| Colorado | 71 | 81 | 569 | 654 |
| Connecticut | 88 | 100 | 381 | 432 |
| Delaware | 94 | 100 | 119 | 132 |
| District of Columbia | 92 | 100 | 125 | 141 |
| Florida | 88 | 95 | 3,435 | 3,733 |
| Georgia | 82 | 90 | 1,896 | 2,079 |
| Hawaii | 78 | 90 | 185 | 213 |
| Idaho | 75 | 85 | 212 | 240 |
| Illinois | 95 | 100 | 1,773 | 1,934 |
| Indiana | 79 | 88 | 923 | 1,030 |
| Iowa | 88 | 97 | 341 | 380 |
| Kansas | 67 | 76 | 359 | 408 |
| Kentucky | 73 | 82 | 898 | 1,003 |
| Louisiana | 76 | 84 | 1,013 | 1,122 |
| Maine | 85 | 95 | 180 | 203 |
| Maryland | 86 | 97 | 696 | 786 |
| Massachusetts | 78 | 87 | 794 | 891 |
| Michigan | 95 | 100 | 1,329 | 1,475 |
| Minnesota | 78 | 88 | 460 | 519 |
| Mississippi | 79 | 88 | 697 | 774 |
| Missouri | 83 | 95 | 884 | 1,014 |
| Montana | 73 | 83 | 128 | 146 |
| Nebraska | 71 | 81 | 202 | 231 |
| Nevada | 74 | 88 | 404 | 481 |
| New Hampshire | 70 | 80 | 113 | 130 |
| New Jersey | 70 | 79 | 1,022 | 1,159 |
| New Mexico | 94 | 100 | 390 | 436 |
| New York | 83 | 91 | 3,068 | 3,333 |
| North Carolina | 79 | 86 | 1,654 | 1,805 |
| North Dakota | 57 | 67 | 62 | 73 |
| Ohio | 83 | 92 | 1,651 | 1,821 |
| Oklahoma | 73 | 82 | 687 | 776 |
| Oregon | 94 | 100 | 619 | 680 |
| Pennsylvania | 86 | 94 | 1,737 | 1,907 |
| Rhode Island | 93 | 100 | 145 | 164 |
| South Carolina | 78 | 86 | 887 | 980 |
| South Dakota | 83 | 97 | 99 | 116 |
| Tennessee | 89 | 100 | 1,211 | 1,357 |
| Texas | 68 | 73 | 4,513 | 4,900 |
| Utah | 65 | 74 | 299 | 342 |
| Vermont | 93 | 100 | 67 | 75 |
| Virginia | 70 | 79 | 1,053 | 1,194 |
| Washington | 95 | 100 | 841 | 929 |
| West Virginia | 80 | 91 | 370 | 424 |
| Wisconsin | 91 | 100 | 663 | 736 |
| Wyoming | 53 | 64 | 49 | 59 |
| United States | 82 | 84 | 49,373 | 50,699 |

## Table III.6. Approximate 90 percent confidence intervals for final shrinkage estimates for FY 2013, working poor people

| | Participation rate (percent) | | Number of eligible people (thousands) | |
|---|---|---|---|---|
| | Lower bound | Upper bound | Lower bound | Upper bound |
| Alabama | 70 | 84 | 391 | 467 |
| Alaska | 61 | 78 | 50 | 64 |
| Arizona | 60 | 73 | 650 | 791 |
| Arkansas | 62 | 76 | 262 | 324 |
| California | 50 | 58 | 2,869 | 3,357 |
| Colorado | 68 | 82 | 259 | 315 |
| Connecticut | 65 | 79 | 170 | 206 |
| Delaware | 81 | 97 | 53 | 63 |
| District of Columbia | 56 | 79 | 35 | 49 |
| Florida | 70 | 83 | 1,464 | 1,733 |
| Georgia | 74 | 86 | 842 | 979 |
| Hawaii | 57 | 72 | 114 | 143 |
| Idaho | 79 | 93 | 131 | 155 |
| Illinois | 77 | 89 | 787 | 913 |
| Indiana | 79 | 93 | 425 | 496 |
| Iowa | 86 | 100 | 195 | 229 |
| Kansas | 71 | 84 | 185 | 217 |
| Kentucky | 69 | 81 | 366 | 432 |
| Louisiana | 73 | 86 | 418 | 488 |
| Maine | 86 | 100 | 72 | 89 |
| Maryland | 65 | 81 | 313 | 386 |
| Massachusetts | 59 | 72 | 290 | 358 |
| Michigan | 92 | 100 | 582 | 686 |
| Minnesota | 73 | 85 | 236 | 278 |
| Mississippi | 67 | 83 | 300 | 374 |
| Missouri | 73 | 88 | 405 | 483 |
| Montana | 75 | 89 | 64 | 76 |
| Nebraska | 70 | 85 | 99 | 120 |
| Nevada | 46 | 61 | 202 | 266 |
| New Hampshire | 68 | 82 | 45 | 55 |
| New Jersey | 57 | 73 | 447 | 565 |
| New Mexico | 79 | 94 | 203 | 244 |
| New York | 70 | 82 | 1,368 | 1,607 |
| North Carolina | 69 | 81 | 848 | 988 |
| North Dakota | 63 | 78 | 27 | 33 |
| Ohio | 80 | 92 | 662 | 765 |
| Oklahoma | 60 | 73 | 336 | 408 |
| Oregon | 91 | 100 | 231 | 274 |
| Pennsylvania | 75 | 87 | 609 | 712 |
| Rhode Island | 71 | 86 | 53 | 65 |
| South Carolina | 74 | 87 | 361 | 423 |
| South Dakota | 84 | 100 | 52 | 64 |
| Tennessee | 75 | 89 | 501 | 594 |
| Texas | 61 | 71 | 2,539 | 2,944 |
| Utah | 63 | 77 | 157 | 191 |
| Vermont | 91 | 100 | 29 | 34 |
| Virginia | 67 | 82 | 470 | 579 |
| Washington | 81 | 96 | 306 | 360 |
| West Virginia | 65 | 79 | 128 | 157 |
| Wisconsin | 90 | 100 | 319 | 375 |
| Wyoming | 47 | 62 | 26 | 35 |
| United States | 72 | 76 | 23,376 | 24,581 |

## Table III.7. Approximate 90 percent confidence intervals for final shrinkage estimates for FY 2014, working poor people

| | Participation rate (percent) | | Number of eligible people (thousands) | |
|---|---|---|---|---|
| | Lower bound | Upper bound | Lower bound | Upper bound |
| Alabama | 64 | 77 | 402 | 486 |
| Alaska | 64 | 80 | 45 | 56 |
| Arizona | 50 | 61 | 707 | 860 |
| Arkansas | 54 | 68 | 283 | 355 |
| California | 48 | 56 | 3,127 | 3,669 |
| Colorado | 62 | 75 | 285 | 347 |
| Connecticut | 65 | 79 | 161 | 197 |
| Delaware | 78 | 94 | 55 | 66 |
| District of Columbia | 43 | 62 | 39 | 56 |
| Florida | 67 | 80 | 1,439 | 1,714 |
| Georgia | 67 | 79 | 877 | 1,035 |
| Hawaii | 66 | 81 | 97 | 119 |
| Idaho | 75 | 89 | 115 | 138 |
| Illinois | 77 | 89 | 780 | 905 |
| Indiana | 76 | 88 | 463 | 538 |
| Iowa | 82 | 98 | 172 | 206 |
| Kansas | 65 | 80 | 182 | 221 |
| Kentucky | 64 | 77 | 346 | 413 |
| Louisiana | 60 | 71 | 453 | 536 |
| Maine | 79 | 94 | 80 | 96 |
| Maryland | 66 | 83 | 291 | 363 |
| Massachusetts | 56 | 70 | 291 | 361 |
| Michigan | 85 | 100 | 641 | 759 |
| Minnesota | 74 | 88 | 252 | 298 |
| Mississippi | 62 | 75 | 294 | 356 |
| Missouri | 65 | 79 | 396 | 481 |
| Montana | 70 | 84 | 56 | 67 |
| Nebraska | 70 | 84 | 96 | 116 |
| Nevada | 51 | 67 | 212 | 277 |
| New Hampshire | 66 | 81 | 49 | 60 |
| New Jersey | 57 | 72 | 459 | 572 |
| New Mexico | 76 | 90 | 198 | 235 |
| New York | 70 | 83 | 1,375 | 1,626 |
| North Carolina | 63 | 74 | 681 | 803 |
| North Dakota | 55 | 73 | 27 | 36 |
| Ohio | 73 | 85 | 750 | 877 |
| Oklahoma | 54 | 65 | 330 | 398 |
| Oregon | 89 | 100 | 254 | 303 |
| Pennsylvania | 72 | 85 | 680 | 795 |
| Rhode Island | 73 | 89 | 62 | 76 |
| South Carolina | 63 | 76 | 414 | 499 |
| South Dakota | 85 | 100 | 45 | 55 |
| Tennessee | 75 | 89 | 526 | 624 |
| Texas | 62 | 71 | 2,534 | 2,911 |
| Utah | 60 | 74 | 159 | 196 |
| Vermont | 86 | 100 | 29 | 35 |
| Virginia | 62 | 78 | 519 | 650 |
| Washington | 78 | 93 | 346 | 410 |
| West Virginia | 63 | 80 | 135 | 171 |
| Wisconsin | 91 | 100 | 308 | 363 |
| Wyoming | 52 | 67 | 26 | 34 |
| United States | 69 | 72 | 24,066 | 25,298 |

## Table III.8. Approximate 90 percent confidence intervals for final shrinkage estimates for FY 2015, working poor people

| | Participation rate (percent) | | Number of eligible people (thousands) | |
|---|---|---|---|---|
| | Lower bound | Upper bound | Lower bound | Upper bound |
| Alabama | 67 | 81 | 421 | 507 |
| Alaska | 62 | 77 | 39 | 49 |
| Arizona | 56 | 67 | 596 | 715 |
| Arkansas | 58 | 71 | 255 | 311 |
| California | 53 | 62 | 3,148 | 3,692 |
| Colorado | 56 | 70 | 309 | 384 |
| Connecticut | 62 | 77 | 167 | 206 |
| Delaware | 77 | 93 | 54 | 66 |
| District of Columbia | 53 | 72 | 41 | 56 |
| Florida | 71 | 84 | 1,477 | 1,747 |
| Georgia | 68 | 79 | 925 | 1,084 |
| Hawaii | 67 | 82 | 102 | 125 |
| Idaho | 73 | 87 | 120 | 143 |
| Illinois | 76 | 89 | 857 | 997 |
| Indiana | 68 | 80 | 473 | 554 |
| Iowa | 76 | 91 | 183 | 219 |
| Kansas | 58 | 71 | 186 | 229 |
| Kentucky | 63 | 76 | 345 | 415 |
| Louisiana | 66 | 78 | 447 | 532 |
| Maine | 72 | 87 | 74 | 89 |
| Maryland | 66 | 82 | 309 | 385 |
| Massachusetts | 55 | 68 | 285 | 351 |
| Michigan | 77 | 92 | 567 | 677 |
| Minnesota | 65 | 79 | 248 | 302 |
| Mississippi | 67 | 81 | 267 | 324 |
| Missouri | 66 | 80 | 396 | 479 |
| Montana | 67 | 79 | 53 | 63 |
| Nebraska | 64 | 78 | 102 | 123 |
| Nevada | 67 | 86 | 199 | 255 |
| New Hampshire | 57 | 73 | 49 | 62 |
| New Jersey | 58 | 72 | 414 | 514 |
| New Mexico | 90 | 100 | 191 | 223 |
| New York | 73 | 85 | 1,349 | 1,581 |
| North Carolina | 68 | 80 | 806 | 939 |
| North Dakota | 49 | 65 | 26 | 34 |
| Ohio | 71 | 83 | 773 | 903 |
| Oklahoma | 58 | 70 | 342 | 410 |
| Oregon | 85 | 100 | 274 | 325 |
| Pennsylvania | 72 | 85 | 737 | 864 |
| Rhode Island | 75 | 91 | 56 | 69 |
| South Carolina | 68 | 81 | 402 | 478 |
| South Dakota | 76 | 94 | 48 | 60 |
| Tennessee | 72 | 86 | 540 | 642 |
| Texas | 62 | 72 | 2,353 | 2,725 |
| Utah | 56 | 69 | 178 | 219 |
| Vermont | 76 | 93 | 28 | 34 |
| Virginia | 60 | 74 | 478 | 595 |
| Washington | 74 | 90 | 403 | 484 |
| West Virginia | 76 | 90 | 136 | 162 |
| Wisconsin | 82 | 98 | 331 | 393 |
| Wyoming | 47 | 62 | 26 | 34 |
| United States | 70 | 74 | 24,094 | 25,323 |

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# APPENDIX A

# THE ESTIMATION PROCEDURE: ADDITIONAL TECHNICAL DETAILS

This appendix provides additional information and technical details about our four-step procedure to estimate state SNAP participation rates for all eligible people and working poor people. Each step is discussed in turn.

**1. From CPS ASEC data and SNAP administrative data, derive direct estimates of state SNAP participation rates for each of the three fiscal years 2013 to 2015**

We derived direct estimates of participation rates for all eligible people for a given fiscal year according to:

$$(1) \quad Y_{1,i} = 100 \frac{P_i(\varepsilon_{1,i}/100)}{(E_{1,i}/100)T_i},$$

where $Y_{1,i}$ is the estimated participation rate for all eligible people for state $i$ ($i = 1, \ldots, 51$); $P_i$ is the number of people participating in SNAP according to adjusted SNAP Program Operations data; $\varepsilon_{1,i}$ is the percentage of participating people who are correctly receiving benefits and eligible under federal SNAP rules according to SNAP Quality Control (SNAP QC) data; $E_{1,i}$ is the estimated number of people who are eligible for SNAP according to a microsimulation model based on CPS ASEC data, expressed as a percentage of the CPS ASEC population; and $T_i$ is the estimated resident population according to decennial census and administrative records (mainly vital statistics) data.

We estimated $P_i$ by adjusting SNAP program operations data to exclude people who received SNAP benefits only because of a natural disaster. Participant figures, including counts of participants eligible only through disaster assistance, were provided by USDA's Food and Nutrition Service. SNAP Program Operations data include the full population of SNAP cases, so participant counts are not subject to sampling error.

We estimated $\varepsilon_{1,i}$ (the correctly-eligible rate) from the SNAP QC sample data as follows:

$$(2) \quad \varepsilon_{1,i} = 100 \frac{\sum_h m_{i,h} \varepsilon_{1,i,h}}{\sum_h m_{i,h}},$$

where *h* indexes households in a state's SNAP QC sample; $m_{i,h}$ equals the number of people in household *h* times the weight for household *h*; and $\varepsilon_{1,i,h}$ is an indicator that household *h* is eligible to receive SNAP benefits. We excluded from our estimates of participants two groups that are not included in our estimates of eligible people: (1) ineligible participants who received SNAP benefits in error, and (2) participants who were eligible through state expanded categorical eligibility policies but would not meet federal SNAP income and asset criteria.

We estimated the percentage of people who were eligible for SNAP according to:

$$(3) \quad E_{1,i} = 100 \frac{Z_{1,i}}{N_i},$$

where $Z_{1,i}$ is the CPS ASEC estimate of the number of eligible people and $N_i$ is the CPS ASEC estimate of the population. Estimated percentages are more precise than estimated counts because the sampling errors in the numerators and denominators of percentages tend to be positively correlated and, therefore, partially cancel each other out.

We derived SNAP eligibility estimates ( $Z_{1,i}$ ) by applying SNAP rules to CPS ASEC households. However, some key information needed to determine whether a household is eligible for SNAP is not collected in the CPS ASEC. For example, there are no data on asset balances or expenses deductible from gross income. Also, it is not possible to ascertain directly which members of a dwelling unit purchase and prepare food together or which members may be categorically ineligible for SNAP. Yet another limitation is that only annual, rather than monthly, income amounts are recorded.

We have developed methods to address these data limitations. These methods—including procedures for identifying the members of the SNAP household within the (potentially) larger CPS ASEC household, taking account of the restrictions on participation by noncitizens, distributing annual amounts across months, and imputing net income—are described in Farson Gray and Cunnyngham (2017) and earlier reports in that series. Those reports also describe how we applied SNAP gross and net income tests and calculated the benefits for which an eligible household would qualify.

Because our focus in this document is on participation among people who are eligible for SNAP, these estimates of SNAP eligibility counts and participation rates do not include people who are not legally entitled to receive SNAP benefits, such as Supplemental Security Income (SSI) recipients in California who receive cash in lieu of SNAP benefits. It might be useful in other contexts, however, to consider participation rates among those eligible for SNAP or a cash substitute.

To derive fiscal year estimates of eligibility, we combined two years of the CPS ASEC. For example, to estimate $Z_{1,i}$ for FY 2015, we used data from the 2014 CPS ASEC (simulating October through December 2014) and the 2016 CPS ASEC (simulating January through September 2015). To estimate $N_i$, we used a weighted average of population estimates from the two CPS ASEC files.

The Census Bureau derives population estimates ($T_i$) by subtracting from decennial census counts people "exiting" the population (due to death or net out-migration) and adding people "entering" the population (due to birth or net in-migration).

**SNAP participation rates for working poor people.** We derived sample estimates of participation rates for working poor people for a given year according to:

$$(4) \quad Y_{2,i} = 100 \frac{P_i(\varepsilon_{2,i}/100)}{(E_{2,i}/100)T_i},$$

$$(5) \quad \varepsilon_{2,i} = 100 \frac{\sum_h m_{i,h}\varepsilon_{2,i,h}}{\sum_h m_{i,h}},$$

and

$$(6) \quad E_{2,i} = 100 \frac{Z_{2,i}}{N_i},$$

where $Y_{2,i}$ is the estimated participation rate for working poor people for state *i*; $\varepsilon_{2,i}$ is the percentage of SNAP participants who are working poor, correctly receiving SNAP benefits, and eligible under federal SNAP rules according to SNAP QC data; $E_{2,i}$ is the percentage of people who are working poor and eligible for SNAP according to the CPS ASEC; $Z_{2,i}$ is the CPS ASEC estimate of the number of eligible working poor people, and $P_i$, $T_i$, $h$, $m_{i,h}$ and $N_i$ are as defined above.

We defined as working poor any person who was eligible for SNAP and lived in a household in which a member earned money from a job. Working poor people were identified slightly differently in the SNAP QC data than in the CPS ASEC. Specifically, a participant household was identified as working poor if the household had earnings according to the edited SNAP QC datafile or, prior to editing, had multiple indicators of earnings that suggested a household was very likely to have a member who worked. Figure A.1 describes the algorithm that identified working poor households and Vigil et al. (2016) describe the procedure for editing the SNAP QC data. An eligible household was identified as working poor only on the basis of earnings.

**Figure A.1. Algorithm to identify working poor households**

A household is identified as working poor if it meets one of the following criteria:

1) Earnings in the edited SNAP QC data
2) Multiple indicators of earnings in the unedited SNAP QC data
   a) At least one person with earned income AND
      i) An earned income deduction or a workforce participation variable indicating employment OR
      ii) Earned and unearned income that sum to total income, or earned income with the earned income deduction already subtracted and unearned income that sum to the total income (some states subtract the earned income deduction from income deemed by an ineligible member before recording it on the file)
   b) An earned income deduction AND
      i) At least one person with a workforce participation variable indicating employment OR
      ii) Earnings implied by the earned income deduction and unearned income that sum to total income OR
      iii) Gross income that is more than the earned income implied by the earned income deduction and both unearned and earned income equal zero (to account for household records that have no recorded individual income amounts but do have what appear to be consistent household-level indicators)

**Sampling variances.** In addition to our point estimates of participation rates, we need estimates of their sampling variability. We estimated the variances of $Y_{1,i}$ and $Y_{2,i}$ as follows:

$$(7)\quad \text{var}(Y_{1,i}) = \text{variance due to } E_{1,i} \text{ when } \varepsilon_{1,i} \text{ is fixed} + \text{variance due to } \varepsilon_{1,i} \text{ when } E_{1,i} \text{ is fixed}$$
$$= \text{var}_{E_1|\varepsilon_1}(Y_{1,i}) + \text{var}_{\varepsilon_1|E_1}(Y_{1,i})$$

and

$$(8)\quad \text{var}(Y_{2,i}) = \text{variance due to } E_{2,i} \text{ when } \varepsilon_{2,i} \text{ is fixed} + \text{variance due to } \varepsilon_{2,i} \text{ when } E_{2,i} \text{ is fixed}$$
$$= \text{var}_{E_2|\varepsilon_2}(Y_{2,i}) + \text{var}_{\varepsilon_2|E_2}(Y_{2,i}).$$

When a variable is held fixed, we fix it at its point estimate. Note that covariance terms are not needed because the estimates of $E_{1,i}$ and $\varepsilon_{1,i}$, and the estimates of $E_{2,i}$ and $\varepsilon_{2,i}$, are based on independent samples.

For a given year, we estimated $\text{var}_{E_1|\varepsilon_1}(Y_{1,i})$ and $\text{var}_{E_2|\varepsilon_2}(Y_{2,i})$ using a replication method called the Successive Difference Replication Method (SDRM) with 160 replicate weights developed by the U.S. Census Bureau for the CPS ASEC; that is

$$(9) \quad \text{var}_{E_1|\varepsilon_1}(Y_{1,i}) = \frac{4}{160}\sum_{r=1}^{160}(Y_{1,i(r)} - Y_{1,i})^2$$

and

$$(10) \quad \text{var}_{E_2|\varepsilon_2}(Y_{2,i}) = \frac{4}{160}\sum_{r=1}^{160}(Y_{2,i(r)} - Y_{2,i})^2,$$

where is the *r*th ($r = 1,\ldots,160$) replicate estimate with the same form as $Y_{1,i}$ and $Y_{2,i}$, respectively, and calculated using the *r*th set of replicate weights. The replicate estimates $Y_{1,i(r)}$ are obtained by replicating $E_{1,i}$; that is,

$$(11) \quad E_{1,i(r)} = 100\frac{Z_{1,i(r)}}{N_{i(r)}}$$

and

$$(12) \quad Y_{1,i(r)} = 100\frac{P_i(\varepsilon_{1,i}/100)}{(E_{1,i(r)}/100)T_i}.$$

Similarly, the replicate estimates $Y_{2,i(r)}$ are obtained by replicating $E_{2,i}$; that is,

$$(13) \quad E_{2,i(r)} = 100\frac{Z_{2,i(r)}}{N_{i(r)}}$$

and

$$(14) \quad Y_{2,i(r)} = 100\frac{P_i(\varepsilon_{2,i}/100)}{(E_{2,i(r)}/100)T_i}.$$

Correctly-eligible rates for all eligible participants and eligible working poor participants are also subject to sampling error, although it is small relative to other sources of error in the estimated participation rates. Based on Equation (1) and Equation (4), respectively, we can estimate $\text{var}_{\varepsilon_1|E_1}(Y_{1,i})$ and $\text{var}_{\varepsilon_2|E_2}(Y_{2,i})$ according to:

$$(15) \quad \text{var}_{\varepsilon_1|E_1}(Y_{1,i}) = \left(100\frac{P_i}{T_iE_{1,i}}\right)^2 \text{var}(\varepsilon_{1,i})$$

and

$$(16) \quad \mathrm{var}_{\varepsilon_2|E_2}(Y_{2,i}) = \left(100\frac{P_i}{T_i E_{2,i}}\right)^2 \mathrm{var}(\varepsilon_{2,i}),$$

because $P_{1,i}$ and $T_i$ are constants (or, at least, subject to negligible sampling variability) and $E_{1,i}$ and $E_{2,i}$ are held fixed at their point estimates.

To calculate $\mathrm{var}(\varepsilon_{1,i})$ and $\mathrm{var}(\varepsilon_{2,i})$, we constructed 500 bootstrap replicate weights for the SNAP QC sample. The estimates $\varepsilon_{1,i}$ and $\varepsilon_{2,i}$ are then replicated 500 times, each using a set of bootstrap replicate weights. That is,

$$(17) \quad \varepsilon_{1,i(r)} = 100\frac{\sum_h m_{i,h(r)}\varepsilon_{1,i,h}}{\sum_h m_{i,h(r)}}, \left(r = 1, 2, \ldots, 500\right)$$

and

$$(18) \quad \varepsilon_{2,i(r)} = 100\frac{\sum_h m_{i,h(r)}\varepsilon_{2i,h}}{\sum_h m_{i,h(r)}}, \left(r = 1, 2, \ldots, 500\right),$$

where $m_{i,h(r)}$ is the number of people in household $h$ times the $r$th replicate weight for household $h$. Then:

$$(19) \quad \mathrm{var}(\varepsilon_{1,i}) = \frac{1}{499}\sum_{r=1}^{500}\left(\varepsilon_{1,i(r)} - \bar{\varepsilon}^*_{1,i}\right)^2,$$

where

$$(20) \quad \bar{\varepsilon}^*_{1,i} = \frac{1}{500}\sum_{r=1}^{500}\varepsilon_{1,i(r)}$$

and

$$(21) \quad \mathrm{var}(\varepsilon_{2,i}) = \frac{1}{499}\sum_{r=1}^{500}\left(\varepsilon_{2,i(r)} - \bar{\varepsilon}^*_{2,i}\right)^2,$$

where

$$(22) \quad \bar{\varepsilon}^*_{2,i} = \frac{1}{500}\sum_{r=1}^{500}\varepsilon_{2,i(r)}.$$

Summing the estimates from Equations (9) and (15)—as indicated by Equation (7)—and taking the square root of the sum provides an estimated standard error of the participation rate for all eligible people. Similarly, summing the estimates from Equations (10) and (16)—as indicated by Equation (8)—and taking the square root of the sum provides an estimated standard error of the participation rate for working poor people.

**Covariances.** We estimated the covariance between the estimates of participation rates for all eligible people and working poor people, for a given year, according to:

$$\begin{aligned}(23)\quad \operatorname{cov}(Y_{1,i}, Y_{2,i}) &= \text{covariance due to } E_{1,i} \text{ and } E_{2,i} \text{ when } \varepsilon_{1,i} \text{ and } \varepsilon_{2,i} \text{ are fixed} \\ &\quad + \text{covariance due to } \varepsilon_{1,i} \text{ and } \varepsilon_{2,i} \text{ when } E_{1,i} \text{ and } E_{2,i} \text{ are fixed} \\ &= \operatorname{cov}_{E_1E_2|\varepsilon_1\varepsilon_2}(Y_{1,i}, Y_{2,i}) + \operatorname{cov}_{\varepsilon_1\varepsilon_2|E_1E_2}(Y_{1,i}, Y_{2,i}).\end{aligned}$$

Note that we do not need to include additional terms because the CPS ASEC and SNAP QC samples are independent. To derive an estimate of the first term in this expression, we obtained an SDRM estimate of the covariance due to $E_{1,i}$ and $E_{2,i}$ according to:

$$(24)\quad \operatorname{cov}_{E_1E_2|\varepsilon_1\varepsilon_2}(Y_{1,i}, Y_{2,i}) = \frac{4}{160}\sum_{r=1}^{160}(Y_{1,i(r)} - Y_{1,i})(Y_{2,i(r)} - Y_{2,i}).$$

For the second term, we estimated the covariance due to $\varepsilon_{1,i}$ and $\varepsilon_{2,i}$ according to:

$$(25)\quad \operatorname{cov}_{\varepsilon_1\varepsilon_2|E_1E_2}(Y_{1,i}, Y_{2,i}) = \left(100\frac{P_i}{T_iE_{1,i}}\right)\left(100\frac{P_i}{T_iE_{2,i}}\right)\operatorname{cov}(\varepsilon_{1,i}, \varepsilon_{2,i})$$

where

$$(26)\quad \operatorname{cov}(\varepsilon_{1,i}, \varepsilon_{2,i}) = \frac{1}{(\sum_h m_{i,h})^2}\left(\frac{n_i}{n_i - 1}\right)\sum_h m_{i,h}{}^2\left(\varepsilon_{1,i,h} - \varepsilon_{1,i}\right)\left(\varepsilon_{2,i,h} - \varepsilon_{2,i}\right).$$

CPS ASEC samples from different years are not independent, so participation rates for different years are correlated. (SNAP QC samples from different years are independent, so sampling variability in estimates from the CPS ASEC is the only source of intertemporal

covariation between participation rates.) We derived a preliminary SDRM estimate of the correlation between $Y_{1,i,t}$ and $Y_{2,i,t-g}$, the sample estimate for all eligible people for one year (year *t*) and the sample estimate for working poor people for *g* years earlier, as follows:

$$(27) \quad \text{cov}(Y_{1,i,t}, Y_{2,i,t-g}) = \frac{4}{160}\sum_{r=1}^{160}(Y_{1,i(r),t} - Y_{1,i,t})(Y_{2,i(r),t-g} - Y_{2,i,t-g}).$$

The correlation between $Y_{1,i,t}$ and $Y_{2,i,t-g}$ is:

$$(28) \quad \text{corr}(Y_{1,i,t}, Y_{2,i,t-g}) = \frac{\text{cov}(Y_{1,i,t}, Y_{2,i,t-g})}{\sqrt{\text{var}(Y_{1,i,t})\,\text{var}(Y_{2,i,t-g})}}.$$

To improve the precision of estimated correlations (and covariances), we used a simple smoothing technique in which we "replaced" the state-specific correlation from Equation (28) by the average correlation between $Y_{1,i,t}$ and $Y_{2,i,t-g}$ across states:

$$(29) \quad \overline{\text{corr}}(Y_{1,t}, Y_{2,t-g}) = \frac{\sum_{i=1}^{51}(n_{i,t} + n_{i,t-g})\,\text{corr}(Y_{1,i,t}, Y_{2,i,t-g})}{\sum_{i=1}^{51}(n_{i,t} + n_{i,t-g})},$$

where $n_{i,t}$ and $n_{i,t-g}$ are the (unweighted) number of households in the CPS ASEC samples for one year and *g* years earlier, respectively. Using this average correlation, we obtained as our final estimate of the covariance between $Y_{1,i,t}$ and $Y_{2,i,t-g}$:

$$(30) \quad \text{cov}(Y_{1,i,t}, Y_{2,i,t-g}) = \overline{\text{corr}}(Y_{1,t}, Y_{2,t-g})\sqrt{\text{var}(Y_{1,i,t})\,\text{var}(Y_{2,i,t-g})}.$$

Other intertemporal covariances—such as the covariance between the participation rates for working poor people in two different years—are similarly estimated. All interstate covariances equal zero because state samples are independent in both the CPS ASEC and the SNAP QC. As described under Step 3, the variances and covariances obtained in this step are the elements of a variance-covariance matrix used in deriving shrinkage estimates of participation rates.

Table A.1 presents estimates of the number of people participating in SNAP (values of $P_i$); Table A.2 presents the percentages of all and working poor participants who are income eligible and correctly receiving SNAP benefits (values of $\varepsilon_{1,i}$ and $\varepsilon_{2,i}$); and Tables A.3 and A.4 show payment error-adjusted numbers of, respectively, all people and working poor people receiving SNAP benefits under normal program eligibility rules (values of $P_i(\varepsilon_{1,i}/100)$ and $P_i(\varepsilon_{2,i}/100)$). Tables A.5, A.6, A.7, and A.8 present CPS ASEC estimates of SNAP eligibility percentages for all eligible people and working poor people (values of $E_{1,i}$ and $E_{2,i}$), the number of eligible people (values of $Z_{1,i}$), the number of eligible working poor people (values of $Z_{2,i}$), and the population (values of $N_i$), respectively, and Table A.9 presents the population totals (values of $T_i$). Table A.10 shows the percentage of working poor participants in Table A.4 that are in households without reported earned income, but are identified as working poor through the other indicators described in Figure A.1. Table A.11 displays direct estimates of participation rates for all eligible people and working poor people (values of $Y_{1,i}$ and $Y_{2,i}$), and Table A.12 presents standard errors for the direct estimates.

**2. Using a regression model, predict state SNAP participation rates based on administrative, ACS, and other data**

Our regression model consisted of six equations, with three predicting SNAP participation rates for all eligible people in fiscal years 2013, 2014, and 2015, and three predicting SNAP participation rates for working poor people in fiscal years 2013, 2014, and 2015. The six equations were estimated jointly, and the values of the regression coefficients could vary from equation to equation. The predictors used were (in addition to an intercept):

- the percentage of the population receiving SNAP benefits according to administrative data and population estimates
- the percentage of renter occupied housing units that spent 50 percent or more of household income on rent and utilities according to ACS one-year estimates

- the percentage of children under age 18 with household income under 50 percent of the federal poverty level according to ACS one-year estimates
- the percentage of civilian employed individuals age 16 and older who were in service occupations according to ACS one-year estimates
- median household income according to ACS one-year estimates
- the percentage of people age 65 and older not claimed on tax returns or claimed on tax returns with adjusted gross income under the federal poverty level according to individual income tax data and population estimates
- the percentage of all people not claimed on tax returns according to individual income tax data and population estimates

For all the predictors, we used 2013 values in both equations for predicting FY 2013 rates, 2014 values in both equations for predicting FY 2014 rates, and 2015 values in both equations for predicting FY 2015 rates. Because prediction errors were allowed to be correlated and intergroup and intertemporal correlations among direct estimates were taken into account as specified in the next step, the shrinkage estimates for a group (all eligible people or working poor people) in any one year were determined by the predictions and sample estimates for all three years and both groups.

In addition to the predictors that we selected for our model, we considered many other potential predictors, including one used to produce the estimates in Cunnyngham et al. (January 2017), the percentage of occupied housing units that are owner-occupied according to ACS one-year estimates. All of the predictors considered had three characteristics: (1) it is plausible that they are good indicators of differences among states in SNAP participation rates; (2) they could be defined and measured uniformly across states; and (3) they could be obtained from nonsample or highly precise sample data—such as the ACS or administrative records data—and, thus, measured with little or no sampling error. In addition, all but the fifth predictor listed above (median household income according to ACS one-year estimates) were used to produce the estimates in Cunnyngham et al. (January 2017).

The regression equations do not express causal relationships. Rather, they imply only statistical associations. For this reason, predictors are often called "symptomatic indicators." They are symptomatic of differences among states in conditions associated with having higher or lower participation rates.

As shown in the next step, where we describe the regression estimation procedure in more detail, we do not have to calculate regression estimates as a separate step, although we do have to select a best regression model before we can calculate shrinkage estimates. We selected our best model on the basis of its strong relative performance in predicting participation rates. We judged performance by examining functions of the regression residuals, such as mean squared error. In addition to assessing the predictive fit of alternative specifications, we checked for potential biases as part of our extensive model evaluation. To check for biases, we looked for a persistent tendency to under- or overpredict the number of eligible people for certain types of states categorized by, for example, population size, region, and percentage of the population that is black or Hispanic. We found no evidence of correctable bias.

Predictors considered are listed in Table A.13 and definitions and data sources for the predictors in our chosen regression model are given in Table A.14. The values for the 2013, 2014, and 2015 predictors listed above are displayed in Tables A.15, A.16, and A.17, respectively.

**3. Using shrinkage methods, average the direct estimates and regression predictions to obtain preliminary shrinkage estimates of state SNAP participation rates**

To average the direct estimates and the regression predictions, we used an empirical Bayes shrinkage estimator. A state's shrinkage estimate for either all eligible people or working poor people in a given year does not have to be between the direct and regression estimates for the group and year in question. It may be above both of those estimates if, for example, they seem

too low based on data from other years. In most cases, the shrinkage estimates presented in this report are between the direct and regression estimates. In the remaining cases, the shrinkage estimate is usually close to either the direct or regression estimate, and it is often close to both because the sample and regression estimates are close to each other.

The shrinkage estimator does not have a closed-form expression from which we can calculate shrinkage estimates. Instead, we must numerically integrate over six scalar parameters—$\sigma_1$, $\sigma_2$, $\rho$, $\eta_1$, $\eta_2$, and $\eta_{1,2}$—that measure the lack of fit of the regression model and the correlations among regression prediction errors. To perform the numerical integration, we specified a grid of 6,272,000 equally-spaced points, starting with $\sigma_1 = 0.001$, $\sigma_2 = 0.001$, $\rho = -0.993$, $\eta_1 = 0.000$, $\eta_2 = 0.000$, and $\eta_{1,2} = -0.996$ and incrementing $\sigma_1$, $\sigma_2$, $\rho$, $\eta_1$, $\eta_2$, and $\eta_{1,2}$ by 0.300, 0.500, 0.498, 0.450, 0.550, and 0.133, respectively, up to $\sigma_1 = 3.901$, $\sigma_2 = 6.501$, $\rho = 0.999$, $\eta_1 = 8.550$, $\eta_2 = 10.450$, and $\eta_{1,2} = 0.999$. For combination *k* of $\sigma_1$, $\sigma_2$, $\rho$, $\eta_1$, $\eta_2$, and $\eta_{1,2}$ ($k = 1,\ldots,6272000$), we calculated a vector of shrinkage estimates:

$$(31) \quad \theta_k = (\Sigma_k^{-1} + V^{-1})^{-1}(\Sigma_k^{-1} X\hat{B}_k + V^{-1}Y),$$

a variance-covariance matrix:

$$(32) \quad U_k = (\Sigma_k^{-1} + V^{-1})^{-1} + (\Sigma_k^{-1} + V^{-1})^{-1}\Sigma_k^{-1}X(X'(\Sigma_k + V)^{-1}X)^{-1}X'\Sigma_k^{-1}(\Sigma_k^{-1} + V^{-1})^{-1},$$

and a probability:

$$(33) \quad p_k^* = |\Sigma_k + V|^{-1/2}|X'(\Sigma_k + V)^{-1}X|^{-1/2}\exp\left(-1/2(Y - X\hat{B}_k)'(\Sigma_k + V)^{-1}(Y - X\hat{B}_k)\right).$$

In these expressions, *Y* is a column vector of direct estimates (from Step 1) with 306 elements, six sample estimates for each of the 50 states and the District of Columbia. The first six elements of *Y* pertain to the first state, the next six to the second state, and so forth. For a given state, the first two elements are the FY 2013 sample estimates for all eligible people and working poor

people, respectively; the second two elements are the FY 2014 estimates; and the final two elements are the FY 2015 estimates. The vector of shrinkage estimates, $\theta_k$, has the same structure as the vector of sample estimates, $Y$. $V$ is the $(306 \times 306)$ variance-covariance matrix for the sample estimates. Because state samples are independent in the CPS ASEC, $V$ is block-diagonal with 51 $(6 \times 6)$ blocks. We described under Step 1 how we derived estimates for the elements of $V$. $X$ is a $(306 \times 48)$ matrix containing values for each of the seven predictors (plus an intercept) for every state, every fiscal year (2013, 2014, and 2015), and both groups (all eligible people and working poor people). The first six rows of $X$ pertain to the first state, the next six rows pertain to the second state, and so forth. The six rows for state $i$ are given by:

$$(34) \quad X_i = \begin{pmatrix} x'_{i,1,1} & \underline{0} & \underline{0} & \underline{0} & \underline{0} & \underline{0} \\ \underline{0} & x'_{i,1,2} & \underline{0} & \underline{0} & \underline{0} & \underline{0} \\ \underline{0} & \underline{0} & x'_{i,2,1} & \underline{0} & \underline{0} & \underline{0} \\ \underline{0} & \underline{0} & \underline{0} & x'_{i,2,2} & \underline{0} & \underline{0} \\ \underline{0} & \underline{0} & \underline{0} & \underline{0} & x'_{i,3,1} & \underline{0} \\ \underline{0} & \underline{0} & \underline{0} & \underline{0} & \underline{0} & x'_{i,3,2} \end{pmatrix},$$

Where $x'_{i,t,1}$ is a row vector for fiscal year $t$ ($t = 1$ for 2013, $t = 2$ for 2014, and $t = 3$ for 2015) with eight elements (an intercept plus the seven predictors listed under Step 2) to predict participation rates for all eligible people. $x'_{i,t,2}$ is a row vector for year $t$ with eight elements to predict participation rates for working poor people. $\underline{0}$ is a row vector with eight zeros. In a given year, the values of the predictors are the same for the equations for all eligible people and for working poor people. Thus, $x'_{i,t,1} = x'_{i,t,2}$. $\hat{B}_k$ is a $(48 \times 1)$ vector of regression coefficients, and is given by:

$$(35) \quad \hat{B}_k = (X'(\Sigma_k + V)^{-1} X)^{-1} X'(\Sigma_k + V)^{-1} Y .$$

Finally, $\Sigma_k$ is a block-diagonal matrix with 51 $(6 \times 6)$ blocks, and every block equals:

$$(36)\quad \Sigma_k^* = \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix} \otimes \begin{pmatrix} \sigma_{1,k}^2 & \sigma_{1,k}\sigma_{2,k}\rho_k \\ \sigma_{1,k}\sigma_{2,k}\rho_k & \sigma_{2,k}^2 \end{pmatrix} + \begin{pmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{pmatrix} \otimes \begin{pmatrix} \eta_{1,k}^2 & \eta_{1,k}\eta_{2,k}\eta_{1,2,k} \\ \eta_{1,k}\eta_{2,k}\eta_{1,2,k} & \eta_{2,k}^2 \end{pmatrix}.$$

After calculating $\theta_k$, $U_k$, and $p_k^*$ 6,272,000 times (once for each combination of $\sigma_1$, $\sigma_2$, $\rho$, $\eta_1$, $\eta_2$, and $\eta_{1,2}$), we calculated the probability of ($\sigma_{1,k}, \sigma_{2,k}, \rho_k, \eta_{1,k}, \eta_{2,k}, \eta_{1,2,k}$):

$$(37)\quad p_k = \frac{p_k^*}{\sum_{k=1}^{6,272,000} p_k^*},$$

which is also an estimate of the probability that the shrinkage estimates $\theta_k$ are the true values. As Equation (37) suggests, the $p_k$ are obtained by normalizing the $p_k^*$ to sum to one.

To complete the numerical integration over $\sigma_1$, $\sigma_2$, $\rho$, $\eta_1$, $\eta_2$, and $\eta_{1,2}$ and obtain a single set of shrinkage estimates, we calculated a weighted sum of the 6,272,000 sets of shrinkage estimates, weighting each set $\theta_k$ by its associated probability $p_k$. Thus, our shrinkage estimates are:

$$(38)\quad \theta = \sum_{k=1}^{6,272,000} p_k \theta_k .$$

We call these estimates "preliminary" because we make some fairly small adjustments to them in the next step to derive our "final" estimates. The variance-covariance matrix for our preliminary shrinkage estimates is:

$$(39)\quad U = \sum_{k=1}^{6,272,000} p_k U_k + \sum_{k=1}^{6,272,000} p_k (\theta_k - \theta)(\theta_k - \theta)' .$$

The first term on the right side of this expression reflects the error from sampling variability and the lack of fit of the regression model. The second term captures how the shrinkage estimates vary as $\sigma_1$, $\sigma_2$, $\rho$, $\eta_1$, $\eta_2$, and $\eta_{1,2}$ vary. Thus, the second term accounts for the variability from not knowing and, thus, having to estimate $\sigma_1$, $\sigma_2$, $\rho$, $\eta_1$, $\eta_2$, and $\eta_{1,2}$. As described later,

standard errors of the final shrinkage estimates for states are calculated as functions of the square roots of the diagonal elements of *U*.

Regression estimates can be similarly obtained. They are:

$$(40) \quad R = \sum_{k=1}^{6,272,000} p_k R_k ,$$

where $R_k = X\hat{B}_k$ is the vector of regression estimates obtained when $\sigma_1 = \sigma_{1,k}$; $\sigma_2 = \sigma_{2,k}$; $\rho = \rho_k$; $\eta_1 = \eta_{1,k}$; $\eta_2 = \eta_{2,k}$; and $\eta_{1,2} = \eta_{1,2,k}$. The variance-covariance matrix is:

$$(41) \quad G = \sum_{k=1}^{6,272,000} p_k G_k + \sum_{k=1}^{6,272,000} p_k (R_k - R)(R_k - R)' ,$$

where $G_k = X(X'(\Sigma_k + V)^{-1} X)^{-1} X' + \Sigma_k$. We can estimate the regression coefficient vector by:

$$(42) \quad \hat{B} = \sum_{k=1}^{6,272,000} p_k \hat{B}_k .$$

Regression estimates of participation rates for all eligible people and working poor people are in Table A.18, and the standard errors for the regression estimates are in Table A.19. Preliminary shrinkage estimates of SNAP participation rates are displayed in Table A.20.

**4. Adjust the preliminary shrinkage estimates to obtain final shrinkage estimates of state SNAP participation rates and numbers of eligible people**

We adjusted the preliminary shrinkage estimates of participation rates in two ways. First, we adjusted the rates so that the number of eligible people implied by the rates sum to the national number of eligible people estimated directly from the CPS ASEC. Second, we adjusted the rates so that no state's estimated rate was greater than 100 percent. These adjustments were carried out separately for each year and for the two groups of eligible people (all eligible people and working poor people).

To implement the first adjustment, we calculated preliminary estimates of counts for all eligible people according to:

$$(43) \quad \psi_{1,i} = \frac{P_i(\varepsilon_{1,i}/100)}{(\theta_{1,i}/100)},$$

where $\psi_{1,i}$ is the preliminary count of all eligible people for state $i$, $P_i$ and $\varepsilon_{1,i}$ are the participant count and correctly-eligible rate figures used in Equation (1), and $\theta_{1,i}$ is the preliminary participation rate derived in Equation (38). Using the FY 2015 estimates for all eligible people as an example, the state eligible people counts from Equation (43) summed to 50,928,055, while the national total estimated directly from the CPS ASEC was 50,036,073. To obtain estimated eligible people counts for states that sum (aside from rounding error) to the direct estimate of the national total, we multiplied each of the eligible people counts from Equation (43) by $50{,}036{,}073/50{,}928{,}055$ ($\approx 0.9825$). Figure A.2 shows the direct estimates of national totals and adjustment factors for all three years and both groups.

**Figure A.2. Direct estimates of national totals and adjustment factors**

| | All eligible people | | Eligible working poor | |
|---|---|---|---|---|
| | Direct estimate | Adjustment factor | Direct estimate | Adjustment factor |
| FY 2013 | 50,716,212 | 0.9773 | 23,978,839 | 0.9782 |
| FY 2014 | 51,025,996 | 0.9794 | 24,681,803 | 0.9750 |
| FY 2015 | 50,036,055 | 0.9825 | 24,708,657 | 0.9763 |

From the final shrinkage estimates of the numbers of eligible people, we calculated final shrinkage estimates of participation rates according to:

$$(44) \quad \theta_{F,1,i} = 100\frac{P_i(\varepsilon_{1,i}/100)}{\psi_{F,1,i}}$$

where $\theta_{F,1,i}$ is the final shrinkage estimate of the participation rate for all eligible people in state $i$, and $\psi_{F,1,i}$ is the final shrinkage estimate of the number of all eligible people. $P_i$ and $\varepsilon_{1,i}$ are the participant count and correctly-eligible rate figures used in Equations (1) and (38). We derived final shrinkage participation rates for eligible working poor people in the same way.

After calculating the final shrinkage participation rates, there were twenty-four instances where a state had an implied participation rate over 100 percent because the estimated number of eligible people was less than the number of participants. Figure A.3 shows the estimated participation rates over 100 percent by state, year, and group. (There were no estimated participation rates for working poor people over 100 percent in FY 2014 or FY 2015.) To cap participation rates at 100 percent, we increased the number of eligible people in states with estimated participation rates of over 100 percent so that the number of eligible people in that state equaled the number of participants each year. We reduced the number of eligible people in the other states and the District of Columbia by an equivalent number and in proportion to their numbers of eligible people. These adjustments, which were carried out separately for the three years and two groups, moved small numbers of eligible people among states but did not change the national totals. Except for the states with participation rates initially over 100 percent, the adjustments did not change any state's participation rate by more than eight tenths of a percentage point.

**Figure A.3. Estimated participation rates over 100 percent**

| | All eligible people | | | Eligible working poor |
|---|---|---|---|---|
| | FY 2013 | FY 2014 | FY 2015 | FY 2013 |
| Delaware | | 100.9 | 102.1 | |
| Illinois | 100.8 | 101.1 | 103.5 | |
| Maine | 107.6 | | | |
| Michigan | 109.2 | 104.1 | 100.4 | 100.8 |
| New Mexico | | | 102.9 | |
| Oregon | 118.4 | 117.7 | 114.8 | 103.3 |
| Tennessee | 101.6 | 101.4 | | |
| Vermont | 111.4 | 104.3 | | |
| Washington | 106.9 | 105.6 | 104.4 | |
| Wisconsin | 100.2 | 100.7 | | |

In Tables III.3 to III.8 of Chapter III, we reported approximate 90 percent confidence intervals for our final shrinkage estimates for all eligible people and eligible working poor. The upper and lower bounds of the confidence intervals were calculated according to:

$$(45) \quad \text{Upper Bound}_i = F_i + 1.645\, e_i$$

and:

$$(46) \quad \text{Lower Bound}_i = F_i - 1.645\, e_i ,$$

where $F_i$ is the final shrinkage estimate for state *i* and $e_i$ is the standard error of that estimate. For participation rates and eligible people counts, the standard errors are, respectively:

$$(47) \quad e_i = \frac{1}{r}\sqrt{U(6i-1,6i-1)}$$

and

$$(48) \quad e_i = \frac{\psi_{F,1,i}}{\theta_{F,1,i}}\; r\sqrt{U(6i-1,6i-1)} ,$$

where *r* is the ratio used to adjust preliminary estimates of state eligible people counts to the direct estimate of the national total ($\approx 0.9825$ for all eligible people for FY 2015), and $\mathrm{U}(6i-1,6i-1)$ is the $(6i-1,6i-1)$ diagonal element of *U* for all eligible people for FY 2015, which was derived according to Equation (39). To derive standard error estimates for all eligible people for 2013 and 2014, we used the $(6i-5,6i-5)$ and $(6i-3,6i-3)$ diagonal elements of *U*, respectively. To derive estimates for working poor people for 2013, 2014, and 2015, we used the $(6i-4,6i-4)$, $(6i-2,6i-2)$, and $(6i,6i)$ diagonal elements of *U*, respectively. Our estimate of $e_i$ does not take account of the correlation between *r* and our preliminary shrinkage estimates for states, which were summed to obtain the denominator of *r*. Instead, *r* is treated as a constant.

Table A.21 presents final shrinkage estimates of participation rates for all eligible people and working poor people (values of $\theta_{F,1,i}$ and $\theta_{F,2,i}$), and Table A.22 presents standard errors for

the rates. Tables A.23 and A.24 display final shrinkage estimates of the numbers of all eligible people and eligible working poor people (values of $\psi_{F,1,i}$ and $\psi_{F,2,i}$), respectively, and Tables A.25 and A.26 present the standard errors for those estimated counts. (The rates in Table A.21 and counts in Tables A.23 and A.24 are the same as those in Table III.1 and Table III.2 except for the number of digits displayed.)

## Table A.1. Number of people receiving SNAP benefits, monthly average

| | FY 2013 | FY 2014 | FY 2015 |
|---|---|---|---|
| Alabama | 915,322 | 902,073 | 889,380 |
| Alaska | 91,364 | 87,486 | 81,121 |
| Arizona | 1,111,105 | 1,044,310 | 999,401 |
| Arkansas | 504,621 | 491,918 | 468,904 |
| California | 4,159,031 | 4,349,634 | 4,417,549 |
| Colorado | 507,848 | 505,169 | 495,134 |
| Connecticut | 425,320 | 438,559 | 442,161 |
| Delaware | 153,137 | 150,232 | 149,981 |
| District of Columbia | 144,889 | 142,707 | 141,845 |
| Florida | 3,556,473 | 3,526,311 | 3,656,169 |
| Georgia | 1,948,189 | 1,815,871 | 1,800,531 |
| Hawaii | 189,350 | 194,264 | 188,895 |
| Idaho | 227,006 | 211,781 | 196,872 |
| Illinois | 2,031,217 | 2,015,283 | 2,042,306 |
| Indiana | 926,011 | 892,699 | 831,740 |
| Iowa | 420,344 | 408,070 | 391,224 |
| Kansas | 316,983 | 293,456 | 273,974 |
| Kentucky | 872,439 | 828,076 | 768,882 |
| Louisiana | 940,100 | 877,340 | 859,738 |
| Maine | 249,119 | 230,536 | 202,579 |
| Maryland | 770,922 | 787,597 | 781,035 |
| Massachusetts | 887,619 | 863,412 | 785,778 |
| Michigan | 1,775,646 | 1,679,421 | 1,571,344 |
| Minnesota | 552,928 | 533,743 | 496,023 |
| Mississippi | 668,624 | 656,770 | 636,322 |
| Missouri | 929,943 | 858,416 | 844,597 |
| Montana | 128,531 | 124,906 | 119,082 |
| Nebraska | 179,711 | 173,530 | 174,092 |
| Nevada | 360,953 | 383,622 | 420,413 |
| New Hampshire | 117,315 | 111,701 | 106,296 |
| New Jersey | 875,143 | 883,434 | 905,728 |
| New Mexico | 440,362 | 431,494 | 453,146 |
| New York | 3,168,831 | 3,122,879 | 3,039,108 |
| North Carolina | 1,703,700 | 1,575,676 | 1,646,202 |
| North Dakota | 56,523 | 53,753 | 53,148 |
| Ohio | 1,824,675 | 1,752,135 | 1,676,263 |
| Oklahoma | 621,672 | 608,492 | 598,257 |
| Oregon | 817,575 | 802,190 | 779,749 |
| Pennsylvania | 1,784,790 | 1,796,154 | 1,826,667 |
| Rhode Island | 179,925 | 178,518 | 175,025 |
| South Carolina | 875,866 | 834,511 | 804,572 |
| South Dakota | 104,052 | 100,938 | 98,553 |
| Tennessee | 1,342,089 | 1,312,505 | 1,229,391 |
| Texas | 4,041,891 | 3,852,675 | 3,724,688 |
| Utah | 251,626 | 229,911 | 225,603 |
| Vermont | 100,536 | 93,000 | 84,994 |
| Virginia | 940,932 | 918,902 | 860,375 |
| Washington | 1,113,441 | 1,095,551 | 1,070,933 |
| West Virginia | 350,485 | 362,501 | 367,908 |
| Wisconsin | 856,730 | 841,533 | 805,540 |
| Wyoming | 38,046 | 35,871 | 32,605 |
| United States | 47,550,950 | 46,461,516 | 45,691,823 |

Source: USDA, Food and Nutrition Service

## Table A.2. Estimated percentage of participants who are correctly receiving benefits and eligible under federal SNAP rules

| | All participants | | | Working poor participants | | |
|---|---|---|---|---|---|---|
| | FY 2013 | FY 2014 | FY 2015 | FY 2013 | FY 2014 | FY 2015 |
| Alabama | 96.37 | 96.08 | 96.75 | 36.03 | 34.54 | 38.76 |
| Alaska | 99.32 | 99.56 | 99.71 | 43.17 | 41.44 | 37.94 |
| Arizona | 85.29 | 85.23 | 87.36 | 43.41 | 41.92 | 40.51 |
| Arkansas | 98.12 | 96.86 | 97.20 | 39.95 | 39.69 | 38.89 |
| California | 93.64 | 91.06 | 90.31 | 40.43 | 40.36 | 44.19 |
| Colorado | 92.99 | 92.64 | 93.62 | 42.21 | 42.88 | 44.32 |
| Connecticut | 84.51 | 83.06 | 86.25 | 32.00 | 29.36 | 29.29 |
| Delaware | 82.38 | 81.65 | 83.51 | 33.86 | 34.55 | 33.99 |
| District of Columbia | 91.02 | 89.01 | 91.68 | 19.59 | 17.52 | 21.43 |
| Florida | 91.86 | 92.38 | 89.84 | 34.33 | 32.85 | 34.11 |
| Georgia | 92.15 | 93.23 | 94.61 | 37.38 | 38.19 | 41.10 |
| Hawaii | 89.56 | 87.77 | 88.22 | 43.59 | 40.88 | 44.82 |
| Idaho | 92.75 | 91.11 | 92.03 | 54.18 | 49.01 | 53.11 |
| Illinois | 91.50 | 89.75 | 90.77 | 34.73 | 34.68 | 37.37 |
| Indiana | 98.49 | 98.22 | 97.60 | 42.69 | 45.87 | 45.51 |
| Iowa | 84.11 | 85.75 | 85.28 | 47.12 | 41.86 | 42.71 |
| Kansas | 98.05 | 99.78 | 99.70 | 49.16 | 49.73 | 48.50 |
| Kentucky | 93.61 | 92.88 | 95.71 | 34.33 | 32.41 | 34.45 |
| Louisiana | 96.35 | 96.13 | 99.37 | 38.33 | 37.15 | 40.87 |
| Maine | 83.95 | 85.91 | 84.80 | 31.33 | 32.93 | 31.88 |
| Maryland | 86.87 | 86.16 | 86.81 | 33.15 | 30.98 | 32.94 |
| Massachusetts | 87.62 | 87.55 | 88.22 | 23.90 | 23.74 | 24.94 |
| Michigan | 87.24 | 89.51 | 89.21 | 35.69 | 38.79 | 33.56 |
| Minnesota | 82.39 | 82.40 | 81.79 | 36.75 | 41.78 | 40.13 |
| Mississippi | 96.21 | 95.96 | 96.41 | 37.64 | 33.80 | 34.43 |
| Missouri | 98.47 | 99.06 | 99.49 | 38.44 | 36.76 | 37.69 |
| Montana | 89.79 | 89.46 | 89.71 | 44.90 | 37.77 | 35.46 |
| Nebraska | 93.85 | 93.97 | 94.69 | 47.28 | 46.92 | 45.65 |
| Nevada | 84.11 | 85.47 | 85.38 | 34.91 | 37.53 | 41.52 |
| New Hampshire | 83.00 | 85.72 | 85.91 | 31.68 | 35.55 | 34.01 |
| New Jersey | 89.49 | 89.73 | 89.71 | 37.60 | 37.64 | 33.07 |
| New Mexico | 91.46 | 92.79 | 91.11 | 44.02 | 41.76 | 44.47 |
| New York | 90.84 | 90.26 | 91.58 | 35.49 | 36.88 | 37.97 |
| North Carolina | 88.55 | 90.11 | 87.07 | 40.36 | 32.07 | 39.19 |
| North Dakota | 79.41 | 78.49 | 78.70 | 37.17 | 37.73 | 32.44 |
| Ohio | 90.18 | 91.27 | 90.61 | 33.51 | 36.70 | 38.39 |
| Oklahoma | 95.42 | 93.73 | 94.83 | 39.95 | 35.47 | 40.30 |
| Oregon | 79.98 | 82.62 | 83.33 | 30.86 | 34.10 | 35.82 |
| Pennsylvania | 89.03 | 87.99 | 89.78 | 29.94 | 32.26 | 34.35 |
| Rhode Island | 85.02 | 86.23 | 87.35 | 25.73 | 31.15 | 29.56 |
| South Carolina | 94.13 | 95.10 | 95.16 | 36.07 | 37.93 | 40.86 |
| South Dakota | 98.57 | 97.65 | 98.32 | 52.41 | 46.83 | 46.94 |
| Tennessee | 99.32 | 99.31 | 98.84 | 33.33 | 35.76 | 38.03 |
| Texas | 90.10 | 91.89 | 89.05 | 44.80 | 46.71 | 45.48 |
| Utah | 98.40 | 98.46 | 98.66 | 48.53 | 51.86 | 55.37 |
| Vermont | 76.49 | 82.51 | 82.77 | 30.96 | 32.19 | 30.58 |
| Virginia | 99.64 | 99.30 | 97.65 | 41.44 | 44.61 | 41.79 |
| Washington | 76.73 | 79.56 | 82.62 | 26.53 | 29.61 | 33.93 |
| West Virginia | 90.20 | 92.40 | 92.16 | 29.18 | 30.22 | 33.69 |
| Wisconsin | 81.89 | 82.55 | 83.60 | 39.85 | 39.40 | 40.57 |
| Wyoming | 98.04 | 97.20 | 97.38 | 44.03 | 49.63 | 50.90 |

Source: SNAP QC database

**Table A.3. Estimated number of participants who are correctly receiving benefits and income eligible under federal SNAP rules, monthly average**

| | FY 2013 | FY 2014 | FY 2015 |
|---|---|---|---|
| Alabama | 882,105 | 866,730 | 860,502 |
| Alaska | 90,739 | 87,100 | 80,883 |
| Arizona | 947,706 | 890,086 | 873,127 |
| Arkansas | 495,124 | 476,472 | 455,775 |
| California | 3,894,641 | 3,960,733 | 3,989,268 |
| Colorado | 472,222 | 467,973 | 463,544 |
| Connecticut | 359,442 | 364,245 | 381,377 |
| Delaware | 126,159 | 122,670 | 125,242 |
| District of Columbia | 131,875 | 127,029 | 130,036 |
| Florida | 3,267,154 | 3,257,677 | 3,284,775 |
| Georgia | 1,795,334 | 1,692,864 | 1,703,500 |
| Hawaii | 169,574 | 170,504 | 166,645 |
| Idaho | 210,546 | 192,960 | 181,181 |
| Illinois | 1,858,462 | 1,808,696 | 1,853,883 |
| Indiana | 912,065 | 876,836 | 811,762 |
| Iowa | 353,560 | 349,904 | 333,628 |
| Kansas | 310,808 | 292,802 | 273,155 |
| Kentucky | 816,716 | 769,092 | 735,928 |
| Louisiana | 905,777 | 843,404 | 854,339 |
| Maine | 209,145 | 198,060 | 171,787 |
| Maryland | 669,669 | 678,562 | 677,993 |
| Massachusetts | 777,750 | 755,909 | 693,253 |
| Michigan | 1,549,020 | 1,503,283 | 1,401,859 |
| Minnesota | 455,557 | 439,815 | 405,707 |
| Mississippi | 643,290 | 630,263 | 613,478 |
| Missouri | 915,696 | 850,338 | 840,315 |
| Montana | 115,403 | 111,735 | 106,828 |
| Nebraska | 168,655 | 163,071 | 164,849 |
| Nevada | 303,605 | 327,889 | 358,940 |
| New Hampshire | 97,366 | 95,750 | 91,323 |
| New Jersey | 783,174 | 792,661 | 812,547 |
| New Mexico | 402,751 | 400,366 | 412,857 |
| New York | 2,878,439 | 2,818,586 | 2,783,306 |
| North Carolina | 1,508,609 | 1,419,779 | 1,433,299 |
| North Dakota | 44,885 | 42,188 | 41,826 |
| Ohio | 1,645,474 | 1,599,244 | 1,518,929 |
| Oklahoma | 593,168 | 570,333 | 567,309 |
| Oregon | 653,896 | 662,769 | 649,726 |
| Pennsylvania | 1,589,052 | 1,580,454 | 1,640,000 |
| Rhode Island | 152,974 | 153,943 | 152,879 |
| South Carolina | 824,470 | 793,595 | 765,639 |
| South Dakota | 102,559 | 98,567 | 96,894 |
| Tennessee | 1,333,003 | 1,303,409 | 1,215,142 |
| Texas | 3,641,784 | 3,540,107 | 3,316,686 |
| Utah | 247,590 | 226,375 | 222,580 |
| Vermont | 76,901 | 76,735 | 70,347 |
| Virginia | 937,554 | 912,470 | 840,139 |
| Washington | 854,366 | 871,598 | 884,783 |
| West Virginia | 316,130 | 334,955 | 339,046 |
| Wisconsin | 701,542 | 694,711 | 673,464 |
| Wyoming | 37,298 | 34,867 | 31,750 |
| United States | 43,230,788 | 42,300,166 | 41,554,029 |

Source: SNAP QC database

## Table A.4. Estimated number of working poor participants who are correctly receiving benefits and eligible under federal SNAP rules, monthly average

| | FY 2013 | FY 2014 | FY 2015 |
|---|---|---|---|
| Alabama | 329,791 | 311,576 | 344,733 |
| Alaska | 39,438 | 36,257 | 30,780 |
| Arizona | 482,308 | 437,775 | 404,817 |
| Arkansas | 201,621 | 195,262 | 182,343 |
| California | 1,681,496 | 1,755,338 | 1,952,292 |
| Colorado | 214,358 | 216,637 | 219,438 |
| Connecticut | 136,090 | 128,757 | 129,522 |
| Delaware | 51,848 | 51,901 | 50,985 |
| District of Columbia | 28,378 | 25,007 | 30,397 |
| Florida | 1,221,008 | 1,158,287 | 1,247,156 |
| Georgia | 728,233 | 693,409 | 740,054 |
| Hawaii | 82,534 | 79,423 | 84,667 |
| Idaho | 123,001 | 103,785 | 104,567 |
| Illinois | 705,523 | 699,001 | 763,128 |
| Indiana | 395,342 | 409,499 | 378,566 |
| Iowa | 198,075 | 170,806 | 167,080 |
| Kansas | 155,835 | 145,947 | 132,888 |
| Kentucky | 299,508 | 268,379 | 264,872 |
| Louisiana | 360,359 | 325,967 | 351,409 |
| Maine | 78,044 | 75,911 | 64,576 |
| Maryland | 255,591 | 243,998 | 257,265 |
| Massachusetts | 212,132 | 205,017 | 195,934 |
| Michigan | 633,710 | 651,515 | 527,390 |
| Minnesota | 203,223 | 223,019 | 199,054 |
| Mississippi | 251,637 | 222,001 | 219,111 |
| Missouri | 357,461 | 315,545 | 318,286 |
| Montana | 57,713 | 47,174 | 42,226 |
| Nebraska | 84,958 | 81,420 | 79,482 |
| Nevada | 126,020 | 143,966 | 174,555 |
| New Hampshire | 37,169 | 39,715 | 36,157 |
| New Jersey | 329,045 | 332,516 | 299,497 |
| New Mexico | 193,839 | 180,192 | 201,496 |
| New York | 1,124,555 | 1,151,687 | 1,154,010 |
| North Carolina | 687,613 | 505,335 | 645,064 |
| North Dakota | 21,007 | 20,281 | 17,241 |
| Ohio | 611,540 | 643,069 | 643,434 |
| Oklahoma | 248,352 | 215,826 | 241,104 |
| Oregon | 252,336 | 273,579 | 279,275 |
| Pennsylvania | 534,277 | 579,475 | 627,515 |
| Rhode Island | 46,293 | 55,605 | 51,737 |
| South Carolina | 315,934 | 316,530 | 328,716 |
| South Dakota | 54,534 | 47,269 | 46,261 |
| Tennessee | 447,359 | 469,326 | 467,488 |
| Texas | 1,810,605 | 1,799,739 | 1,694,100 |
| Utah | 122,114 | 119,234 | 124,912 |
| Vermont | 31,122 | 29,934 | 25,993 |
| Virginia | 389,932 | 409,959 | 359,559 |
| Washington | 295,440 | 324,360 | 363,368 |
| West Virginia | 102,275 | 109,551 | 123,959 |
| Wisconsin | 341,373 | 331,547 | 326,832 |
| Wyoming | 16,751 | 17,803 | 16,597 |
| United States | 17,708,698 | 17,395,109 | 17,731,888 |

Source: SNAP QC database

## Table A.5. Estimated percentage of people eligible for SNAP

| | All eligible people | | | Working poor people | | |
|---|---|---|---|---|---|---|
| | FY 2013 | FY 2014 | FY 2015 | FY 2013 | FY 2014 | FY 2015 |
| Alabama | 20.59 | 20.44 | 21.09 | 8.56 | 8.81 | 8.58 |
| Alaska | 14.84 | 14.99 | 13.75 | 7.85 | 6.90 | 6.92 |
| Arizona | 19.24 | 20.11 | 18.65 | 9.62 | 11.22 | 10.42 |
| Arkansas | 22.33 | 22.67 | 21.05 | 9.37 | 10.29 | 9.77 |
| California | 15.33 | 15.78 | 14.72 | 8.48 | 9.20 | 8.55 |
| Colorado | 10.70 | 11.49 | 11.75 | 5.18 | 5.88 | 6.71 |
| Connecticut | 10.73 | 10.16 | 10.77 | 4.61 | 4.33 | 5.64 |
| Delaware | 14.76 | 13.84 | 12.01 | 6.65 | 6.76 | 5.66 |
| District of Columbia | 21.38 | 20.39 | 20.49 | 7.07 | 7.38 | 7.66 |
| Florida | 18.23 | 18.78 | 19.19 | 8.76 | 8.37 | 8.97 |
| Georgia | 19.52 | 18.73 | 21.44 | 9.45 | 9.10 | 10.82 |
| Hawaii | 17.47 | 15.50 | 14.99 | 9.33 | 8.87 | 8.48 |
| Idaho | 15.34 | 12.67 | 13.92 | 8.50 | 6.76 | 8.44 |
| Illinois | 14.70 | 14.57 | 13.51 | 6.90 | 7.20 | 7.38 |
| Indiana | 14.96 | 15.72 | 15.65 | 6.31 | 7.60 | 8.62 |
| Iowa | 11.67 | 11.07 | 11.58 | 5.87 | 5.49 | 6.34 |
| Kansas | 14.84 | 13.59 | 12.69 | 7.99 | 7.03 | 6.91 |
| Kentucky | 22.72 | 21.58 | 21.83 | 10.16 | 8.72 | 8.44 |
| Louisiana | 23.04 | 25.13 | 23.51 | 9.75 | 11.31 | 10.42 |
| Maine | 14.25 | 14.84 | 14.11 | 5.69 | 6.01 | 6.17 |
| Maryland | 12.35 | 11.84 | 11.84 | 5.32 | 5.03 | 5.56 |
| Massachusetts | 13.27 | 14.02 | 12.95 | 5.11 | 5.37 | 5.17 |
| Michigan | 14.53 | 15.02 | 14.03 | 6.44 | 6.78 | 6.59 |
| Minnesota | 10.20 | 9.12 | 8.44 | 5.41 | 5.19 | 3.73 |
| Mississippi | 26.83 | 26.90 | 25.68 | 9.80 | 10.99 | 11.63 |
| Missouri | 15.56 | 14.43 | 13.00 | 7.47 | 6.73 | 6.09 |
| Montana | 14.78 | 13.81 | 13.03 | 6.87 | 6.04 | 5.84 |
| Nebraska | 10.83 | 11.55 | 11.56 | 5.76 | 5.67 | 6.01 |
| Nevada | 17.48 | 18.36 | 15.26 | 9.15 | 9.09 | 7.88 |
| New Hampshire | 9.14 | 8.84 | 8.40 | 3.64 | 3.98 | 3.76 |
| New Jersey | 12.55 | 12.63 | 12.29 | 5.62 | 5.57 | 5.48 |
| New Mexico | 22.75 | 21.52 | 20.42 | 11.29 | 10.25 | 9.80 |
| New York | 17.33 | 16.09 | 16.33 | 7.56 | 6.77 | 7.28 |
| North Carolina | 19.25 | 18.63 | 17.47 | 9.04 | 8.39 | 8.48 |
| North Dakota | 10.02 | 9.14 | 9.71 | 4.13 | 4.63 | 4.93 |
| Ohio | 15.98 | 16.42 | 15.23 | 6.65 | 7.56 | 7.01 |
| Oklahoma | 19.98 | 19.30 | 18.77 | 9.53 | 10.59 | 9.77 |
| Oregon | 14.82 | 14.28 | 13.39 | 6.33 | 7.25 | 7.63 |
| Pennsylvania | 14.29 | 14.32 | 13.63 | 5.48 | 5.77 | 5.57 |
| Rhode Island | 14.05 | 12.85 | 13.06 | 5.26 | 4.18 | 5.31 |
| South Carolina | 20.83 | 21.00 | 19.63 | 8.47 | 9.74 | 8.24 |
| South Dakota | 11.31 | 12.91 | 14.63 | 5.23 | 5.90 | 7.12 |
| Tennessee | 20.92 | 20.32 | 18.45 | 9.78 | 9.54 | 8.57 |
| Texas | 18.38 | 18.63 | 17.89 | 10.37 | 10.54 | 9.73 |
| Utah | 11.29 | 11.79 | 11.70 | 6.75 | 7.03 | 6.90 |
| Vermont | 10.77 | 10.47 | 11.90 | 5.05 | 4.14 | 5.56 |
| Virginia | 12.70 | 11.88 | 13.56 | 5.17 | 4.87 | 6.03 |
| Washington | 12.00 | 12.16 | 11.48 | 5.58 | 6.22 | 5.96 |
| West Virginia | 21.79 | 22.58 | 21.75 | 7.26 | 7.58 | 7.87 |
| Wisconsin | 11.99 | 12.15 | 12.51 | 5.38 | 5.51 | 6.21 |
| Wyoming | 11.52 | 9.90 | 10.10 | 5.75 | 4.94 | 5.64 |

Source: CPS ASEC

## Table A.6. Directly estimated number of people eligible for SNAP

| | FY 2013 | FY 2014 | FY 2015 |
|---|---|---|---|
| Alabama | 983,508 | 974,428 | 1,015,802 |
| Alaska | 104,263 | 104,503 | 96,681 |
| Arizona | 1,272,584 | 1,335,894 | 1,253,003 |
| Arkansas | 649,079 | 657,038 | 618,750 |
| California | 5,845,734 | 6,085,933 | 5,743,044 |
| Colorado | 563,415 | 615,796 | 635,660 |
| Connecticut | 382,636 | 363,588 | 384,902 |
| Delaware | 133,970 | 127,939 | 114,293 |
| District of Columbia | 138,405 | 133,691 | 137,669 |
| Florida | 3,530,928 | 3,690,432 | 3,836,664 |
| Georgia | 1,908,989 | 1,859,037 | 2,158,953 |
| Hawaii | 236,858 | 211,200 | 206,930 |
| Idaho | 245,044 | 203,677 | 229,291 |
| Illinois | 1,875,308 | 1,863,328 | 1,719,482 |
| Indiana | 963,346 | 1,018,241 | 1,017,785 |
| Iowa | 357,171 | 340,845 | 358,381 |
| Kansas | 418,642 | 386,413 | 362,088 |
| Kentucky | 997,173 | 935,757 | 953,149 |
| Louisiana | 1,040,485 | 1,143,460 | 1,079,527 |
| Maine | 188,149 | 193,551 | 187,905 |
| Maryland | 732,257 | 703,171 | 699,789 |
| Massachusetts | 879,468 | 932,855 | 874,730 |
| Michigan | 1,432,064 | 1,487,151 | 1,384,944 |
| Minnesota | 548,272 | 493,347 | 459,916 |
| Mississippi | 778,457 | 793,385 | 758,290 |
| Missouri | 928,326 | 860,279 | 775,253 |
| Montana | 147,080 | 138,810 | 132,356 |
| Nebraska | 200,591 | 216,340 | 215,557 |
| Nevada | 482,628 | 515,887 | 435,997 |
| New Hampshire | 120,355 | 116,670 | 109,209 |
| New Jersey | 1,102,538 | 1,125,179 | 1,098,433 |
| New Mexico | 472,782 | 440,485 | 416,580 |
| New York | 3,368,678 | 3,158,088 | 3,215,559 |
| North Carolina | 1,858,463 | 1,823,413 | 1,727,107 |
| North Dakota | 71,034 | 66,572 | 73,437 |
| Ohio | 1,823,867 | 1,888,737 | 1,747,626 |
| Oklahoma | 741,258 | 720,418 | 725,147 |
| Oregon | 584,025 | 565,750 | 537,500 |
| Pennsylvania | 1,822,525 | 1,813,223 | 1,718,186 |
| Rhode Island | 146,452 | 134,613 | 136,592 |
| South Carolina | 975,407 | 996,758 | 939,812 |
| South Dakota | 93,996 | 108,922 | 124,028 |
| Tennessee | 1,340,380 | 1,315,711 | 1,215,425 |
| Texas | 4,837,486 | 4,957,965 | 4,875,277 |
| Utah | 325,466 | 344,226 | 349,465 |
| Vermont | 66,733 | 64,712 | 72,765 |
| Virginia | 1,035,884 | 979,924 | 1,115,670 |
| Washington | 824,453 | 854,793 | 822,730 |
| West Virginia | 396,144 | 411,969 | 392,399 |
| Wisconsin | 676,511 | 695,007 | 718,343 |
| Wyoming | 66,943 | 56,886 | 57,990 |
| United States | 50,716,210 | 51,025,994 | 50,036,072 |

Source: CPS ASEC

## Table A.7. Directly estimated number of working poor people eligible for SNAP

| | FY 2013 | FY 2014 | FY 2015 |
|---|---|---|---|
| Alabama | 408,832 | 420,147 | 413,321 |
| Alaska | 55,122 | 48,085 | 48,626 |
| Arizona | 636,069 | 745,199 | 699,987 |
| Arkansas | 272,410 | 298,083 | 287,060 |
| California | 3,232,588 | 3,548,324 | 3,334,330 |
| Colorado | 272,458 | 315,047 | 362,976 |
| Connecticut | 164,301 | 154,813 | 201,532 |
| Delaware | 60,326 | 62,475 | 53,838 |
| District of Columbia | 45,778 | 48,411 | 51,438 |
| Florida | 1,697,198 | 1,645,248 | 1,793,111 |
| Georgia | 923,917 | 903,221 | 1,089,427 |
| Hawaii | 126,420 | 120,848 | 117,121 |
| Idaho | 135,761 | 108,656 | 138,995 |
| Illinois | 879,937 | 921,020 | 939,211 |
| Indiana | 406,317 | 491,920 | 560,386 |
| Iowa | 179,675 | 169,241 | 196,348 |
| Kansas | 225,599 | 199,910 | 197,230 |
| Kentucky | 445,896 | 378,356 | 368,412 |
| Louisiana | 440,223 | 514,813 | 478,651 |
| Maine | 75,172 | 78,298 | 82,122 |
| Maryland | 315,556 | 298,826 | 328,688 |
| Massachusetts | 338,758 | 357,138 | 349,049 |
| Michigan | 634,466 | 671,815 | 650,998 |
| Minnesota | 290,915 | 280,734 | 203,289 |
| Mississippi | 284,226 | 324,271 | 343,414 |
| Missouri | 445,801 | 401,076 | 363,288 |
| Montana | 68,343 | 60,660 | 59,308 |
| Nebraska | 106,723 | 106,311 | 112,086 |
| Nevada | 252,515 | 255,258 | 224,955 |
| New Hampshire | 47,956 | 52,474 | 48,836 |
| New Jersey | 493,743 | 495,801 | 490,003 |
| New Mexico | 234,500 | 209,817 | 199,973 |
| New York | 1,468,908 | 1,328,434 | 1,434,335 |
| North Carolina | 872,207 | 821,359 | 837,981 |
| North Dakota | 29,270 | 33,704 | 37,238 |
| Ohio | 759,366 | 869,254 | 804,691 |
| Oklahoma | 353,589 | 395,286 | 377,548 |
| Oregon | 249,243 | 287,307 | 306,464 |
| Pennsylvania | 699,124 | 730,426 | 702,418 |
| Rhode Island | 54,837 | 43,812 | 55,527 |
| South Carolina | 396,857 | 462,029 | 394,622 |
| South Dakota | 43,472 | 49,778 | 60,382 |
| Tennessee | 626,335 | 617,924 | 564,595 |
| Texas | 2,728,024 | 2,804,903 | 2,651,353 |
| Utah | 194,582 | 205,175 | 206,030 |
| Vermont | 31,280 | 25,593 | 34,019 |
| Virginia | 421,711 | 401,382 | 495,922 |
| Washington | 383,295 | 437,007 | 426,943 |
| West Virginia | 131,995 | 138,385 | 141,939 |
| Wisconsin | 303,801 | 315,369 | 356,247 |
| Wyoming | 33,443 | 28,382 | 32,391 |
| United States | 23,978,838 | 24,681,802 | 24,708,657 |

Source: CPS ASEC

## Table A.8. CPS ASEC population estimate

| | FY 2013 | FY 2014 | FY 2015 |
|---|---|---|---|
| Alabama | 4,777,017 | 4,766,973 | 4,817,427 |
| Alaska | 702,507 | 697,249 | 702,912 |
| Arizona | 6,613,354 | 6,643,658 | 6,718,940 |
| Arkansas | 2,907,079 | 2,898,172 | 2,938,774 |
| California | 38,128,514 | 38,570,108 | 39,010,767 |
| Colorado | 5,263,441 | 5,357,535 | 5,410,329 |
| Connecticut | 3,564,415 | 3,578,118 | 3,573,237 |
| Delaware | 907,398 | 924,411 | 951,675 |
| District of Columbia | 647,319 | 655,676 | 671,832 |
| Florida | 19,367,703 | 19,655,571 | 19,996,744 |
| Georgia | 9,777,816 | 9,927,098 | 10,069,934 |
| Hawaii | 1,355,709 | 1,362,970 | 1,380,835 |
| Idaho | 1,597,851 | 1,607,764 | 1,647,156 |
| Illinois | 12,761,371 | 12,790,827 | 12,725,860 |
| Indiana | 6,440,439 | 6,475,980 | 6,503,426 |
| Iowa | 3,061,345 | 3,079,947 | 3,095,675 |
| Kansas | 2,821,986 | 2,844,118 | 2,852,522 |
| Kentucky | 4,388,459 | 4,336,830 | 4,366,487 |
| Louisiana | 4,515,835 | 4,550,462 | 4,592,316 |
| Maine | 1,320,351 | 1,303,867 | 1,331,327 |
| Maryland | 5,930,569 | 5,939,391 | 5,910,076 |
| Massachusetts | 6,629,472 | 6,655,516 | 6,753,784 |
| Michigan | 9,854,616 | 9,902,914 | 9,873,147 |
| Minnesota | 5,375,214 | 5,409,212 | 5,451,875 |
| Mississippi | 2,901,561 | 2,949,887 | 2,952,783 |
| Missouri | 5,967,901 | 5,963,321 | 5,962,367 |
| Montana | 995,033 | 1,005,093 | 1,015,809 |
| Nebraska | 1,851,573 | 1,873,772 | 1,865,136 |
| Nevada | 2,760,252 | 2,809,353 | 2,856,405 |
| New Hampshire | 1,316,376 | 1,319,380 | 1,299,542 |
| New Jersey | 8,786,870 | 8,906,333 | 8,941,033 |
| New Mexico | 2,077,848 | 2,046,733 | 2,039,570 |
| New York | 19,435,425 | 19,627,344 | 19,691,085 |
| North Carolina | 9,652,668 | 9,789,985 | 9,885,497 |
| North Dakota | 709,265 | 728,680 | 755,923 |
| Ohio | 11,412,994 | 11,505,058 | 11,472,076 |
| Oklahoma | 3,710,579 | 3,733,659 | 3,862,624 |
| Oregon | 3,939,598 | 3,961,837 | 4,015,201 |
| Pennsylvania | 12,752,570 | 12,663,467 | 12,603,728 |
| Rhode Island | 1,042,174 | 1,047,213 | 1,045,660 |
| South Carolina | 4,683,702 | 4,745,424 | 4,787,104 |
| South Dakota | 831,216 | 843,475 | 848,009 |
| Tennessee | 6,407,193 | 6,476,527 | 6,587,859 |
| Texas | 26,315,752 | 26,611,406 | 27,247,660 |
| Utah | 2,883,498 | 2,920,442 | 2,985,747 |
| Vermont | 619,860 | 618,104 | 611,545 |
| Virginia | 8,155,798 | 8,245,129 | 8,227,631 |
| Washington | 6,867,718 | 7,030,210 | 7,167,254 |
| West Virginia | 1,818,023 | 1,824,653 | 1,804,535 |
| Wisconsin | 5,643,489 | 5,720,889 | 5,740,395 |
| Wyoming | 581,205 | 574,509 | 574,108 |
| United States | 312,829,918 | 315,476,246 | 318,193,342 |

Source: CPS ASEC

## Table A.9. Population on July 1

| | FY 2013 | FY 2014 | FY 2015 |
|---|---|---|---|
| Alabama | 4,833,996 | 4,846,411 | 4,853,875 |
| Alaska | 737,259 | 737,046 | 737,709 |
| Arizona | 6,634,997 | 6,728,783 | 6,817,565 |
| Arkansas | 2,958,765 | 2,966,835 | 2,977,853 |
| California | 38,431,393 | 38,792,291 | 38,993,940 |
| Colorado | 5,272,086 | 5,355,588 | 5,448,819 |
| Connecticut | 3,599,341 | 3,594,762 | 3,584,730 |
| Delaware | 925,240 | 935,968 | 944,076 |
| District of Columbia | 649,111 | 659,836 | 670,377 |
| Florida | 19,600,311 | 19,905,569 | 20,244,914 |
| Georgia | 9,994,759 | 10,097,132 | 10,199,398 |
| Hawaii | 1,408,987 | 1,420,257 | 1,425,157 |
| Idaho | 1,612,843 | 1,634,806 | 1,652,828 |
| Illinois | 12,890,552 | 12,882,189 | 12,839,047 |
| Indiana | 6,570,713 | 6,597,880 | 6,612,768 |
| Iowa | 3,092,341 | 3,109,481 | 3,121,997 |
| Kansas | 2,895,801 | 2,902,507 | 2,906,721 |
| Kentucky | 4,399,583 | 4,412,617 | 4,424,611 |
| Louisiana | 4,629,284 | 4,648,990 | 4,668,960 |
| Maine | 1,328,702 | 1,330,256 | 1,329,453 |
| Maryland | 5,938,737 | 5,975,346 | 5,994,983 |
| Massachusetts | 6,708,874 | 6,755,124 | 6,784,240 |
| Michigan | 9,898,193 | 9,916,306 | 9,917,715 |
| Minnesota | 5,422,060 | 5,457,125 | 5,482,435 |
| Mississippi | 2,992,206 | 2,993,443 | 2,989,390 |
| Missouri | 6,044,917 | 6,063,827 | 6,076,204 |
| Montana | 1,014,864 | 1,023,252 | 1,032,073 |
| Nebraska | 1,868,969 | 1,882,980 | 1,893,765 |
| Nevada | 2,791,494 | 2,838,281 | 2,883,758 |
| New Hampshire | 1,322,616 | 1,327,996 | 1,330,111 |
| New Jersey | 8,911,502 | 8,938,844 | 8,935,421 |
| New Mexico | 2,086,895 | 2,085,567 | 2,080,328 |
| New York | 19,695,680 | 19,748,858 | 19,747,183 |
| North Carolina | 9,848,917 | 9,940,387 | 10,035,186 |
| North Dakota | 723,857 | 740,040 | 756,835 |
| Ohio | 11,572,005 | 11,596,998 | 11,605,090 |
| Oklahoma | 3,853,118 | 3,879,610 | 3,907,414 |
| Oregon | 3,928,068 | 3,971,202 | 4,024,634 |
| Pennsylvania | 12,781,296 | 12,793,767 | 12,791,904 |
| Rhode Island | 1,053,354 | 1,054,907 | 1,055,607 |
| South Carolina | 4,771,929 | 4,829,160 | 4,894,834 |
| South Dakota | 845,510 | 853,304 | 857,919 |
| Tennessee | 6,497,269 | 6,547,779 | 6,595,056 |
| Texas | 26,505,637 | 26,979,078 | 27,429,639 |
| Utah | 2,902,787 | 2,944,498 | 2,990,632 |
| Vermont | 626,855 | 626,767 | 626,088 |
| Virginia | 8,270,345 | 8,328,098 | 8,367,587 |
| Washington | 6,973,742 | 7,063,166 | 7,160,290 |
| West Virginia | 1,853,595 | 1,848,751 | 1,841,053 |
| Wisconsin | 5,742,953 | 5,759,432 | 5,767,891 |
| Wyoming | 583,223 | 584,304 | 586,555 |
| United States | 316,497,531 | 318,907,401 | 320,896,618 |

Source: U.S. Census Bureau, Population Division

## Table A.10. Percentage of working poor participants without reported earned income but with other indicators of earnings

| | FY 2013 | FY 2014 | FY 2015 |
|---|---|---|---|
| Alabama | 0.0 | 0.0 | 0.0 |
| Alaska | 0.0 | 0.0 | 0.0 |
| Arizona | 0.0 | 0.0 | 0.0 |
| Arkansas | 0.4 | 0.6 | 0.0 |
| California | 0.0 | 0.3 | 0.2 |
| Colorado | 0.0 | 0.0 | 0.0 |
| Connecticut | 2.3 | 1.2 | 0.0 |
| Delaware | 0.0 | 0.0 | 0.0 |
| District of Columbia | 1.0 | 0.0 | 1.9 |
| Florida | 0.0 | 0.0 | 0.3 |
| Georgia | 0.0 | 0.0 | 0.0 |
| Hawaii | 0.2 | 1.2 | 0.0 |
| Idaho | 0.0 | 0.0 | 0.0 |
| Illinois | 0.0 | 0.0 | 0.0 |
| Indiana | 0.0 | 0.0 | 0.0 |
| Iowa | 0.3 | 0.1 | 0.0 |
| Kansas | 0.0 | 0.0 | 0.0 |
| Kentucky | 0.0 | 0.0 | 0.0 |
| Louisiana | 0.0 | 0.0 | 0.0 |
| Maine | 0.0 | 0.0 | 0.0 |
| Maryland | 0.4 | 0.0 | 0.0 |
| Massachusetts | 0.0 | 0.2 | 0.4 |
| Michigan | 0.9 | 0.0 | 0.0 |
| Minnesota | 4.7 | 4.4 | 4.7 |
| Mississippi | 0.0 | 0.4 | 0.0 |
| Missouri | 0.3 | 0.3 | 0.1 |
| Montana | 0.2 | 0.0 | 0.5 |
| Nebraska | 0.0 | 0.0 | 0.1 |
| Nevada | 0.0 | 0.0 | 0.0 |
| New Hampshire | 0.0 | 0.0 | 0.0 |
| New Jersey | 0.0 | 0.0 | 0.7 |
| New Mexico | 0.0 | 0.0 | 0.0 |
| New York | 0.0 | 0.0 | 0.1 |
| North Carolina | 0.0 | 0.0 | 0.1 |
| North Dakota | 0.0 | 0.0 | 0.0 |
| Ohio | 0.0 | 0.0 | 0.0 |
| Oklahoma | 0.0 | 0.0 | 0.0 |
| Oregon | 0.2 | 0.0 | 0.0 |
| Pennsylvania | 0.8 | 0.8 | 0.0 |
| Rhode Island | 1.4 | 1.4 | 0.0 |
| South Carolina | 0.0 | 0.0 | 0.0 |
| South Dakota | 0.0 | 0.9 | 0.0 |
| Tennessee | 0.0 | 0.0 | 0.0 |
| Texas | 0.0 | 0.4 | 0.0 |
| Utah | 0.3 | 0.0 | 0.0 |
| Vermont | 0.0 | 0.0 | 0.0 |
| Virginia | 0.0 | 0.0 | 0.0 |
| Washington | 0.0 | 0.0 | 0.0 |
| West Virginia | 0.0 | 0.5 | 0.0 |
| Wisconsin | 0.4 | 0.3 | 0.2 |
| Wyoming | 0.0 | 0.0 | 0.0 |

Source: SNAP QC database

## Table A.11. Direct estimates of SNAP participation rates

| | All eligible people | | | Working poor people | | |
|---|---|---|---|---|---|---|
| | FY 2013 | FY 2014 | FY 2015 | FY 2013 | FY 2014 | FY 2015 |
| Alabama | 88.63 | 87.49 | 84.08 | 79.72 | 72.94 | 82.78 |
| Alaska | 82.93 | 78.85 | 79.71 | 68.18 | 71.33 | 60.31 |
| Arizona | 74.23 | 65.79 | 68.67 | 75.58 | 58.00 | 57.00 |
| Arkansas | 74.95 | 70.84 | 72.69 | 72.72 | 63.99 | 62.69 |
| California | 66.10 | 64.71 | 69.49 | 51.61 | 49.19 | 58.58 |
| Colorado | 83.68 | 76.02 | 72.41 | 78.55 | 68.79 | 60.03 |
| Connecticut | 93.03 | 99.72 | 98.77 | 82.03 | 82.79 | 64.06 |
| Delaware | 92.35 | 94.70 | 110.46 | 84.29 | 82.05 | 95.46 |
| District of Columbia | 95.02 | 94.42 | 94.66 | 61.82 | 51.33 | 59.22 |
| Florida | 91.43 | 87.16 | 84.57 | 71.09 | 69.52 | 68.70 |
| Georgia | 92.01 | 89.53 | 77.90 | 77.11 | 75.48 | 67.07 |
| Hawaii | 68.89 | 77.48 | 78.03 | 62.82 | 63.07 | 70.04 |
| Idaho | 85.12 | 93.17 | 78.75 | 89.76 | 93.94 | 74.97 |
| Illinois | 98.11 | 96.38 | 106.87 | 79.38 | 75.36 | 80.54 |
| Indiana | 92.80 | 84.52 | 78.44 | 95.37 | 81.71 | 66.44 |
| Iowa | 98.00 | 101.68 | 92.31 | 109.14 | 99.97 | 84.38 |
| Kansas | 72.35 | 74.25 | 74.03 | 67.32 | 71.54 | 66.12 |
| Kentucky | 81.70 | 80.78 | 76.20 | 67.00 | 69.72 | 70.95 |
| Louisiana | 84.92 | 72.20 | 77.84 | 79.85 | 61.98 | 72.21 |
| Maine | 110.46 | 100.30 | 91.55 | 103.17 | 95.03 | 78.74 |
| Maryland | 91.33 | 95.92 | 95.51 | 80.89 | 81.16 | 77.16 |
| Massachusetts | 87.39 | 79.84 | 78.90 | 61.88 | 56.56 | 55.88 |
| Michigan | 107.69 | 100.95 | 100.77 | 99.44 | 96.85 | 80.65 |
| Minnesota | 82.37 | 88.37 | 87.72 | 69.25 | 78.74 | 97.37 |
| Mississippi | 80.13 | 78.28 | 79.91 | 85.85 | 67.47 | 63.02 |
| Missouri | 97.38 | 97.21 | 106.36 | 79.16 | 77.37 | 85.97 |
| Montana | 76.93 | 79.07 | 79.44 | 82.80 | 76.39 | 70.08 |
| Nebraska | 83.30 | 75.01 | 75.32 | 78.87 | 76.21 | 69.84 |
| Nevada | 62.20 | 62.91 | 81.55 | 49.35 | 55.83 | 76.86 |
| New Hampshire | 80.52 | 81.54 | 81.70 | 77.14 | 75.19 | 72.33 |
| New Jersey | 70.04 | 70.19 | 74.02 | 65.71 | 66.82 | 61.16 |
| New Mexico | 84.82 | 89.20 | 97.17 | 82.30 | 84.28 | 98.79 |
| New York | 84.32 | 88.70 | 86.31 | 75.55 | 86.16 | 80.23 |
| North Carolina | 79.56 | 76.69 | 81.75 | 77.27 | 60.59 | 75.83 |
| North Dakota | 61.92 | 62.40 | 56.89 | 70.33 | 59.25 | 46.24 |
| Ohio | 88.98 | 84.00 | 85.92 | 79.43 | 73.39 | 79.04 |
| Oklahoma | 77.06 | 76.19 | 77.34 | 67.64 | 52.55 | 63.13 |
| Oregon | 112.29 | 116.87 | 120.60 | 101.54 | 95.00 | 90.91 |
| Pennsylvania | 86.99 | 86.28 | 94.05 | 76.25 | 78.53 | 88.02 |
| Rhode Island | 103.34 | 113.53 | 110.87 | 83.52 | 125.99 | 92.30 |
| South Carolina | 82.96 | 78.24 | 79.67 | 78.14 | 67.32 | 81.46 |
| South Dakota | 107.27 | 89.45 | 77.22 | 123.32 | 93.87 | 75.73 |
| Tennessee | 98.07 | 97.99 | 99.87 | 70.43 | 75.13 | 82.71 |
| Texas | 74.74 | 70.43 | 67.58 | 65.90 | 63.29 | 63.47 |
| Utah | 75.57 | 65.23 | 63.59 | 62.34 | 57.64 | 60.53 |
| Vermont | 113.95 | 116.94 | 94.43 | 98.38 | 115.35 | 74.63 |
| Virginia | 89.25 | 92.19 | 74.04 | 91.18 | 101.12 | 71.29 |
| Washington | 102.05 | 101.49 | 107.65 | 75.91 | 73.88 | 85.19 |
| West Virginia | 78.27 | 80.25 | 84.69 | 76.00 | 78.13 | 85.60 |
| Wisconsin | 101.90 | 99.29 | 93.31 | 110.42 | 104.43 | 91.31 |
| Wyoming | 55.52 | 60.26 | 53.59 | 49.92 | 61.68 | 50.15 |

## Table A.12. Standard errors of direct estimates of SNAP participation rates

| | All eligible people | | | Working poor people | | |
|---|---|---|---|---|---|---|
| | FY 2013 | FY 2014 | FY 2015 | FY 2013 | FY 2014 | FY 2015 |
| Alabama | 4.160 | 3.949 | 4.624 | 7.037 | 6.782 | 7.975 |
| Alaska | 5.794 | 5.065 | 4.426 | 7.454 | 9.181 | 7.964 |
| Arizona | 6.961 | 3.266 | 3.144 | 12.857 | 4.643 | 4.637 |
| Arkansas | 5.702 | 3.780 | 2.984 | 8.006 | 5.853 | 5.375 |
| California | 1.598 | 1.666 | 1.966 | 2.771 | 2.722 | 3.125 |
| Colorado | 6.993 | 6.169 | 7.233 | 9.410 | 8.257 | 9.418 |
| Connecticut | 5.347 | 8.756 | 9.299 | 8.434 | 10.482 | 8.608 |
| Delaware | 5.188 | 5.578 | 7.964 | 9.208 | 8.588 | 12.183 |
| District of Columbia | 4.827 | 4.840 | 4.169 | 8.696 | 6.740 | 6.934 |
| Florida | 2.995 | 2.601 | 2.742 | 5.592 | 4.968 | 5.168 |
| Georgia | 3.703 | 4.082 | 3.552 | 6.601 | 6.470 | 5.630 |
| Hawaii | 4.017 | 5.240 | 5.516 | 5.996 | 6.377 | 6.640 |
| Idaho | 8.051 | 6.988 | 4.678 | 9.044 | 9.407 | 7.704 |
| Illinois | 4.250 | 4.167 | 4.605 | 6.101 | 5.978 | 6.289 |
| Indiana | 5.364 | 5.891 | 4.356 | 7.940 | 8.081 | 5.269 |
| Iowa | 5.195 | 7.252 | 6.113 | 10.236 | 11.345 | 9.585 |
| Kansas | 3.685 | 4.628 | 5.140 | 5.238 | 8.076 | 7.522 |
| Kentucky | 3.614 | 4.485 | 4.285 | 5.003 | 7.009 | 7.887 |
| Louisiana | 5.749 | 3.330 | 3.378 | 7.161 | 4.688 | 6.116 |
| Maine | 6.612 | 6.815 | 7.036 | 11.466 | 11.847 | 12.660 |
| Maryland | 4.647 | 5.684 | 7.126 | 7.968 | 9.709 | 9.782 |
| Massachusetts | 7.236 | 5.341 | 4.610 | 9.493 | 7.620 | 6.508 |
| Michigan | 5.948 | 5.052 | 5.381 | 9.462 | 8.545 | 8.124 |
| Minnesota | 4.355 | 6.160 | 7.271 | 6.610 | 7.984 | 11.409 |
| Mississippi | 4.307 | 2.975 | 3.329 | 10.548 | 5.666 | 5.781 |
| Missouri | 5.926 | 6.008 | 6.832 | 8.380 | 8.198 | 8.034 |
| Montana | 7.579 | 6.917 | 6.345 | 9.733 | 8.696 | 6.839 |
| Nebraska | 6.970 | 5.946 | 5.270 | 9.227 | 9.102 | 7.325 |
| Nevada | 3.240 | 3.715 | 5.236 | 4.829 | 5.331 | 7.089 |
| New Hampshire | 5.868 | 6.834 | 6.729 | 10.202 | 10.332 | 9.715 |
| New Jersey | 3.959 | 3.931 | 4.485 | 7.713 | 6.870 | 7.139 |
| New Mexico | 7.000 | 6.398 | 6.003 | 8.427 | 7.181 | 6.936 |
| New York | 2.537 | 3.070 | 3.033 | 5.416 | 6.226 | 5.907 |
| North Carolina | 3.377 | 3.515 | 3.589 | 6.776 | 5.188 | 6.458 |
| North Dakota | 4.607 | 5.666 | 5.374 | 8.991 | 9.501 | 7.586 |
| Ohio | 4.623 | 3.782 | 4.237 | 6.885 | 6.376 | 6.123 |
| Oklahoma | 5.001 | 4.458 | 4.713 | 6.986 | 4.511 | 5.348 |
| Oregon | 6.041 | 8.361 | 7.353 | 11.351 | 9.866 | 7.584 |
| Pennsylvania | 4.658 | 3.838 | 4.705 | 8.013 | 7.259 | 8.100 |
| Rhode Island | 6.178 | 8.938 | 9.157 | 9.935 | 18.455 | 13.077 |
| South Carolina | 3.839 | 4.063 | 3.899 | 7.100 | 5.961 | 6.999 |
| South Dakota | 14.039 | 10.354 | 7.741 | 13.973 | 13.741 | 9.326 |
| Tennessee | 6.047 | 5.082 | 5.193 | 7.127 | 6.869 | 6.641 |
| Texas | 2.213 | 1.859 | 1.950 | 3.491 | 3.242 | 3.575 |
| Utah | 6.559 | 6.187 | 4.243 | 9.071 | 7.551 | 6.337 |
| Vermont | 7.957 | 9.076 | 7.251 | 12.259 | 16.460 | 10.477 |
| Virginia | 5.712 | 5.550 | 4.321 | 8.654 | 10.959 | 7.009 |
| Washington | 5.684 | 6.212 | 5.841 | 7.703 | 8.160 | 8.791 |
| West Virginia | 5.219 | 5.028 | 9.462 | 9.252 | 8.626 | 6.988 |
| Wisconsin | 5.458 | 6.189 | 5.489 | 11.576 | 11.378 | 8.796 |
| Wyoming | 3.790 | 4.570 | 5.056 | 6.471 | 7.301 | 7.118 |

## Table A.13. Potential predictors

| Predictor | Data source(s) |
|---|---|
| Number of people who received SNAP benefits | Administrative data |
| Estimated population on July 1; Change in July 1 estimated population | Census Bureau |
| Percentages of population that 1) received SNAP benefits, 2) correctly received regular SNAP benefits, 3) correctly received regular SNAP benefits under federal eligibility rules | Administrative data; population estimates |
| Percentage of children ages 5 to 17 approved to receive free lunches under the National School Lunch Program | |
| Percentage of elderly people that received Supplemental Security Income | |
| Percentage of population that received unemployment | |
| Per capita personal income | Commerce Bureau; population estimates |
| Mean adjusted gross income (AGI); Median AGI | Individual income tax data |
| Percentages of exemptions for (1) people, (2) elderly people, and (3) children claimed on tax returns with AGI below the federal poverty level (FPL) | |
| Percentages of (1) people, (2) elderly people, and (3) nonelderly people not claimed on tax returns | Individual income tax data; population estimates |
| Percentages of (1) people, (2) elderly people, and (3) nonelderly people, not claimed on tax returns or claimed on returns with AGI below the FPL | |
| Four measures of state eligibility policy expansiveness; Four measures of state eligibility policy expansiveness in the previous year | State SNAP eligibility policies |
| Percentages of population that were (1) foreign-born and entered the U.S. in 2000 or later, and (2) noncitizens | American Community Survey one-year estimates |
| Percentage of foreign-born people who entered the U.S. in 2000 or later | |
| Percentages of households that (1) were married-couple families, (2) were nonfamily households, and (3) had one or more children under age 18 | |
| Percentages of households and families that had a female householder, no husband present, and related children under age18 | |
| Percentages of adults age 25 and older who had (1) completed high school or equivalent and (2) completed a bachelor's degree | |
| Employment/population ratio for the civilian population ages 16 to 64 | |
| Percentages of civilian employed population age 16 and older who were (1) in service occupations and (2) private wage and salary workers | |
| Percentage of households that had earnings | |
| Percentage of occupied housing units that were owner occupied | |
| Percentages of renter occupied housing units that spent (1) 30 percent or more and (2) 50 percent or more of household income on rent and utilities | |
| Lower rent quartile among renter occupied housing units paying cash rent | |
| Median monthly housing costs among occupied housing units with cost | |
| Median household income; Median family income | |
| Percentages of population with income under (1) 100 percent and (2) 200 percent of the FPL | |
| Percentages of children with income under (1) 50 percent and (2) 100 percent of the FPL | |
| Percentages of adults ages 18 to 64 under (1) 100 percent and (2) 125 percent of the FPL | |
| Percentage of adults age 65 and older under (1) 125 percent and 200 percent of the FPL | |
| Percentage of families with income under 130 percent of the FPL | |

## Table A.14. Predictors in current model

| Predictor | Rate numerator | Rate denominator |
|---|---|---|
| SNAP prevalence rate | People receiving SNAP benefits according to SNAP Program Operations data | Resident population[a] |
| Elderly combined poverty and tax non-filer rate | People age 65 and older not claimed on tax returns or claimed on tax returns with adjusted gross income under the federal poverty level[b] | Resident population age 65 and older[a] |
| Tax non-filer rate | People not claimed on tax returns[b] | Resident population[a] |
| Service occupation employment rate | People age 16 and over employed in service occupations according to ACS one-year estimates[c] | Total civilian employed people age 16 and older according to ACS one-year estimates[c] |
| Very high rent rate | Renter occupied housing units that spent 50 percent or more of household income on rent and utilities according to ACS one-year estimates[c] | Total renter occupied housing units according to ACS one-year estimates[c] |
| Median household income | Median household income according to ACS one-year estimates[c] | 10,000 |
| Rate of children with income under 50 percent of poverty | Children under age 18 with income under 50 percent of the poverty level according to ACS one-year estimates[c] | Total children under age 18 according to ACS one-year estimates[c] |

[a] Estimates of the resident population are from the annual July 1 population estimates released in June 2017, available at http://www.census.gov/popest/.

[b] Counts of people claimed on tax returns are from individual income tax data provided by the Census Bureau Small Area Estimates Branch.

[c] ACS one-year estimates available at http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml.

Note: All rates expressed as percentages.

## Table A.15. Values for FY 2013 predictors

| | SNAP prevalence rate | Tax non-filer rate | Elderly combined poverty and non-filer rate | Service sector employment rate | Very high rent rate | Median household income | Child 50 percent of poverty rate |
|---|---|---|---|---|---|---|---|
| Alabama | 18.935 | 20.515 | 51.593 | 17.1 | 22.3 | 4.3 | 13.2 |
| Alaska | 12.392 | 13.600 | 32.625 | 16.2 | 17.2 | 7.2 | 5.7 |
| Arizona | 16.746 | 20.527 | 48.051 | 20.2 | 23.2 | 4.9 | 12.7 |
| Arkansas | 17.055 | 20.732 | 52.290 | 17.1 | 20.9 | 4.1 | 12.7 |
| California | 10.822 | 17.101 | 46.504 | 18.9 | 28.4 | 6.0 | 9.8 |
| Colorado | 9.633 | 13.642 | 37.320 | 17.8 | 24.4 | 5.9 | 6.5 |
| Connecticut | 11.817 | 14.646 | 37.470 | 18.7 | 25.4 | 6.7 | 6.5 |
| Delaware | 16.551 | 16.042 | 36.362 | 19.4 | 22.1 | 5.8 | 9.2 |
| District of Columbia | 22.321 | 25.974 | 44.506 | 15.5 | 25.0 | 6.8 | 16.2 |
| Florida | 18.145 | 18.041 | 49.287 | 20.8 | 27.6 | 4.6 | 11.0 |
| Georgia | 19.492 | 17.653 | 48.853 | 17.7 | 23.8 | 4.8 | 12.4 |
| Hawaii | 13.439 | 14.563 | 40.538 | 22.4 | 24.5 | 6.8 | 6.4 |
| Idaho | 14.075 | 13.315 | 43.173 | 17.3 | 21.1 | 4.7 | 7.0 |
| Illinois | 15.757 | 13.699 | 40.631 | 17.5 | 24.2 | 5.6 | 9.2 |
| Indiana | 14.093 | 13.514 | 41.819 | 17.3 | 23.2 | 4.8 | 10.1 |
| Iowa | 13.593 | 12.863 | 36.950 | 17.1 | 20.7 | 5.2 | 7.2 |
| Kansas | 10.946 | 12.786 | 37.605 | 16.4 | 20.0 | 5.1 | 7.1 |
| Kentucky | 19.830 | 19.294 | 51.350 | 16.6 | 20.3 | 4.3 | 11.4 |
| Louisiana | 20.308 | 21.100 | 51.367 | 19.4 | 25.3 | 4.4 | 13.5 |
| Maine | 18.749 | 16.690 | 45.235 | 19.1 | 24.6 | 4.7 | 7.1 |
| Maryland | 12.981 | 14.077 | 37.363 | 17.3 | 24.3 | 7.3 | 6.8 |
| Massachusetts | 13.231 | 15.342 | 39.450 | 18.0 | 24.3 | 6.7 | 8.0 |
| Michigan | 17.939 | 15.131 | 40.159 | 18.2 | 26.2 | 4.8 | 11.6 |
| Minnesota | 10.198 | 10.742 | 35.083 | 17.0 | 22.1 | 6.1 | 5.7 |
| Mississippi | 22.346 | 21.564 | 55.278 | 18.4 | 23.0 | 3.8 | 16.9 |
| Missouri | 15.384 | 16.404 | 44.240 | 18.2 | 22.4 | 4.7 | 9.8 |
| Montana | 12.665 | 14.374 | 40.730 | 19.8 | 23.6 | 4.7 | 8.9 |
| Nebraska | 9.615 | 10.980 | 37.903 | 16.5 | 20.5 | 5.1 | 7.7 |
| Nevada | 12.930 | 17.087 | 43.690 | 27.7 | 22.4 | 5.1 | 9.6 |
| New Hampshire | 8.870 | 10.694 | 35.566 | 15.8 | 22.1 | 6.4 | 5.1 |
| New Jersey | 9.820 | 12.632 | 39.885 | 17.3 | 28.0 | 7.0 | 7.6 |
| New Mexico | 21.101 | 19.624 | 47.716 | 20.9 | 23.8 | 4.4 | 15.1 |
| New York | 16.089 | 16.797 | 46.516 | 20.5 | 27.8 | 5.7 | 10.4 |
| North Carolina | 17.298 | 18.367 | 47.932 | 18.4 | 21.8 | 4.6 | 11.6 |
| North Dakota | 7.809 | 10.708 | 35.238 | 17.0 | 18.4 | 5.6 | 5.3 |
| Ohio | 15.768 | 15.217 | 41.996 | 17.9 | 23.2 | 4.8 | 11.0 |
| Oklahoma | 16.134 | 19.121 | 47.268 | 18.0 | 19.9 | 4.6 | 10.9 |
| Oregon | 20.814 | 17.669 | 41.482 | 18.6 | 25.9 | 5.0 | 9.4 |
| Pennsylvania | 13.964 | 14.910 | 43.445 | 17.6 | 24.8 | 5.2 | 8.8 |
| Rhode Island | 17.081 | 16.657 | 44.723 | 20.2 | 24.8 | 5.6 | 9.2 |
| South Carolina | 18.355 | 19.715 | 47.044 | 19.2 | 22.6 | 4.4 | 13.1 |
| South Dakota | 12.306 | 10.645 | 32.611 | 17.8 | 15.8 | 4.9 | 7.9 |
| Tennessee | 20.656 | 17.219 | 49.884 | 17.0 | 22.2 | 4.4 | 12.1 |
| Texas | 15.249 | 15.127 | 47.666 | 17.8 | 21.2 | 5.2 | 10.5 |
| Utah | 8.668 | 11.331 | 36.238 | 15.7 | 20.5 | 6.0 | 5.6 |
| Vermont | 16.038 | 12.090 | 39.263 | 17.9 | 25.9 | 5.3 | 7.0 |
| Virginia | 11.377 | 14.874 | 38.996 | 17.4 | 22.5 | 6.3 | 6.9 |
| Washington | 15.966 | 13.481 | 36.450 | 17.5 | 22.9 | 5.8 | 7.9 |
| West Virginia | 18.908 | 20.957 | 53.344 | 18.9 | 21.9 | 4.1 | 13.2 |
| Wisconsin | 14.918 | 11.626 | 38.634 | 17.2 | 22.3 | 5.2 | 7.3 |
| Wyoming | 6.523 | 11.388 | 35.460 | 18.3 | 15.6 | 5.9 | 6.0 |

## Table A.16. Values for FY 2014 predictors

| | SNAP prevalence rate | Tax non-filer rate | Elderly combined poverty and non-filer rate | Service sector employment rate | Very high rent rate | Median household income | Child 50 percent of poverty rate |
|---|---|---|---|---|---|---|---|
| Alabama | 18.613 | 21.007 | 51.126 | 17.1 | 23.4 | 4.3 | 13.1 |
| Alaska | 11.870 | 14.225 | 31.576 | 18.6 | 19.7 | 7.2 | 5.7 |
| Arizona | 15.520 | 21.028 | 47.724 | 20.0 | 22.7 | 5.0 | 12.1 |
| Arkansas | 16.581 | 20.999 | 51.681 | 17.9 | 19.6 | 4.1 | 11.1 |
| California | 11.213 | 17.285 | 46.018 | 18.7 | 28.0 | 6.2 | 9.3 |
| Colorado | 9.433 | 13.623 | 36.657 | 17.7 | 23.1 | 6.1 | 6.7 |
| Connecticut | 12.200 | 15.107 | 36.689 | 17.5 | 26.7 | 7.0 | 6.9 |
| Delaware | 16.051 | 16.503 | 35.927 | 18.0 | 22.9 | 6.0 | 7.8 |
| District of Columbia | 21.628 | 26.041 | 44.391 | 15.5 | 24.3 | 7.2 | 12.4 |
| Florida | 17.715 | 18.299 | 49.064 | 20.8 | 27.7 | 4.8 | 10.3 |
| Georgia | 17.984 | 18.257 | 48.613 | 17.0 | 23.9 | 4.9 | 11.9 |
| Hawaii | 13.678 | 14.989 | 39.975 | 23.0 | 27.4 | 7.0 | 6.0 |
| Idaho | 12.954 | 13.537 | 42.226 | 18.4 | 19.8 | 4.8 | 7.1 |
| Illinois | 15.644 | 13.977 | 39.943 | 17.3 | 24.0 | 5.7 | 9.0 |
| Indiana | 13.530 | 13.753 | 41.122 | 17.0 | 22.5 | 4.9 | 9.2 |
| Iowa | 13.123 | 13.121 | 36.123 | 16.2 | 20.0 | 5.4 | 6.6 |
| Kansas | 10.110 | 13.034 | 36.910 | 16.7 | 21.0 | 5.3 | 7.6 |
| Kentucky | 18.766 | 19.655 | 50.874 | 17.2 | 22.3 | 4.3 | 11.9 |
| Louisiana | 18.872 | 21.334 | 50.607 | 19.6 | 23.9 | 4.5 | 14.2 |
| Maine | 17.330 | 16.882 | 44.487 | 18.6 | 24.8 | 5.0 | 9.1 |
| Maryland | 13.181 | 14.614 | 37.074 | 17.3 | 23.7 | 7.4 | 5.8 |
| Massachusetts | 12.782 | 15.541 | 38.659 | 17.8 | 23.3 | 6.9 | 7.3 |
| Michigan | 16.936 | 15.510 | 39.556 | 17.9 | 25.7 | 5.0 | 10.6 |
| Minnesota | 9.781 | 10.809 | 33.991 | 16.5 | 23.2 | 6.2 | 6.2 |
| Mississippi | 21.940 | 21.960 | 54.843 | 17.7 | 22.1 | 4.0 | 15.4 |
| Missouri | 14.156 | 16.709 | 43.532 | 17.7 | 21.8 | 4.8 | 9.7 |
| Montana | 12.207 | 14.533 | 39.704 | 18.8 | 19.8 | 4.6 | 8.4 |
| Nebraska | 9.216 | 11.130 | 36.802 | 17.1 | 19.0 | 5.3 | 6.7 |
| Nevada | 13.516 | 17.502 | 44.116 | 27.6 | 22.1 | 5.2 | 10.2 |
| New Hampshire | 8.411 | 11.143 | 35.048 | 16.0 | 22.2 | 6.7 | 4.8 |
| New Jersey | 9.883 | 13.100 | 39.382 | 16.9 | 26.0 | 7.2 | 7.0 |
| New Mexico | 20.690 | 19.764 | 47.132 | 21.0 | 22.9 | 4.5 | 13.9 |
| New York | 15.813 | 16.958 | 45.684 | 20.4 | 28.0 | 5.9 | 10.2 |
| North Carolina | 15.851 | 18.610 | 47.456 | 17.7 | 23.1 | 4.7 | 10.5 |
| North Dakota | 7.264 | 10.685 | 34.028 | 17.1 | 17.6 | 5.9 | 7.9 |
| Ohio | 15.109 | 15.608 | 41.233 | 17.3 | 22.6 | 4.9 | 11.1 |
| Oklahoma | 15.684 | 19.443 | 46.430 | 17.1 | 19.6 | 4.8 | 10.2 |
| Oregon | 20.200 | 17.586 | 40.712 | 19.0 | 26.1 | 5.1 | 8.9 |
| Pennsylvania | 14.039 | 15.204 | 42.435 | 17.7 | 24.3 | 5.3 | 9.1 |
| Rhode Island | 16.923 | 16.868 | 43.878 | 20.8 | 24.2 | 5.5 | 9.1 |
| South Carolina | 17.281 | 20.082 | 46.582 | 18.6 | 22.9 | 4.5 | 13.5 |
| South Dakota | 11.829 | 11.478 | 31.452 | 16.4 | 17.2 | 5.1 | 7.0 |
| Tennessee | 20.045 | 17.501 | 49.293 | 17.3 | 23.1 | 4.4 | 11.8 |
| Texas | 14.280 | 15.327 | 47.094 | 17.8 | 21.9 | 5.3 | 10.3 |
| Utah | 7.808 | 11.421 | 35.285 | 15.3 | 19.2 | 6.1 | 5.2 |
| Vermont | 14.838 | 12.313 | 38.280 | 17.0 | 23.4 | 5.4 | 7.6 |
| Virginia | 11.034 | 15.174 | 38.452 | 17.0 | 22.6 | 6.5 | 7.2 |
| Washington | 15.511 | 13.489 | 35.751 | 17.6 | 22.3 | 6.1 | 7.7 |
| West Virginia | 19.608 | 21.218 | 52.663 | 19.9 | 19.3 | 4.1 | 11.5 |
| Wisconsin | 14.611 | 12.012 | 37.500 | 17.3 | 22.2 | 5.3 | 7.5 |
| Wyoming | 6.139 | 11.970 | 34.998 | 18.3 | 17.2 | 5.7 | 5.8 |

## Table A.17. Values for FY 2015 predictors

| | SNAP prevalence rate | Tax non-filer rate | Elderly combined poverty and non-filer rate | Service sector employment rate | Very high rent rate | Median household income | Child 50 percent of poverty rate |
|---|---|---|---|---|---|---|---|
| Alabama | 18.323 | 21.303 | 51.197 | 16.3 | 21.6 | 4.5 | 12.7 |
| Alaska | 10.996 | 14.080 | 30.926 | 17.7 | 19.9 | 7.3 | 5.6 |
| Arizona | 14.659 | 21.063 | 48.071 | 19.8 | 21.7 | 5.2 | 11.2 |
| Arkansas | 15.746 | 21.283 | 52.021 | 16.7 | 20.4 | 4.2 | 11.3 |
| California | 11.329 | 16.938 | 45.981 | 18.7 | 27.3 | 6.5 | 8.9 |
| Colorado | 9.087 | 13.690 | 36.692 | 16.8 | 22.5 | 6.4 | 6.2 |
| Connecticut | 12.335 | 14.874 | 36.792 | 17.0 | 26.4 | 7.1 | 6.9 |
| Delaware | 15.886 | 16.489 | 35.955 | 18.9 | 22.2 | 6.1 | 7.7 |
| District of Columbia | 21.159 | 25.794 | 44.914 | 15.7 | 22.6 | 7.6 | 13.0 |
| Florida | 18.060 | 18.180 | 49.171 | 20.1 | 26.9 | 4.9 | 9.5 |
| Georgia | 17.653 | 18.567 | 48.664 | 16.4 | 23.6 | 5.1 | 11.2 |
| Hawaii | 13.254 | 15.008 | 39.919 | 22.9 | 28.3 | 7.4 | 6.9 |
| Idaho | 11.911 | 12.806 | 41.974 | 19.1 | 20.7 | 4.8 | 6.5 |
| Illinois | 15.907 | 13.870 | 39.815 | 17.5 | 23.5 | 6.0 | 8.4 |
| Indiana | 12.578 | 13.757 | 40.947 | 16.5 | 21.8 | 5.1 | 9.3 |
| Iowa | 12.531 | 13.225 | 36.053 | 16.8 | 20.6 | 5.5 | 6.6 |
| Kansas | 9.426 | 13.340 | 37.429 | 17.0 | 18.4 | 5.4 | 7.2 |
| Kentucky | 17.377 | 19.707 | 50.665 | 16.7 | 19.8 | 4.5 | 11.9 |
| Louisiana | 18.414 | 22.255 | 50.937 | 19.1 | 24.1 | 4.6 | 13.9 |
| Maine | 15.238 | 16.534 | 44.037 | 17.8 | 21.7 | 5.2 | 7.8 |
| Maryland | 13.028 | 14.578 | 37.283 | 17.6 | 23.2 | 7.6 | 6.2 |
| Massachusetts | 11.582 | 15.254 | 38.396 | 17.8 | 23.9 | 7.1 | 7.1 |
| Michigan | 15.844 | 15.511 | 39.374 | 18.0 | 24.2 | 5.1 | 10.1 |
| Minnesota | 9.047 | 10.538 | 33.895 | 16.3 | 21.6 | 6.4 | 5.4 |
| Mississippi | 21.286 | 22.117 | 54.845 | 17.6 | 22.3 | 4.1 | 16.5 |
| Missouri | 13.900 | 16.744 | 43.496 | 17.6 | 20.8 | 5.0 | 8.8 |
| Montana | 11.538 | 14.640 | 39.783 | 18.7 | 19.5 | 5.0 | 7.6 |
| Nebraska | 9.193 | 10.934 | 37.029 | 16.6 | 18.6 | 5.5 | 7.4 |
| Nevada | 14.579 | 17.427 | 44.762 | 27.4 | 22.2 | 5.2 | 9.0 |
| New Hampshire | 7.992 | 11.008 | 34.832 | 15.9 | 20.1 | 7.0 | 5.3 |
| New Jersey | 10.136 | 12.764 | 39.290 | 16.6 | 25.9 | 7.2 | 7.1 |
| New Mexico | 21.782 | 19.822 | 47.143 | 21.5 | 23.3 | 4.5 | 13.0 |
| New York | 15.390 | 16.646 | 45.463 | 20.2 | 27.5 | 6.1 | 10.0 |
| North Carolina | 16.404 | 18.608 | 47.390 | 17.1 | 21.9 | 4.8 | 10.5 |
| North Dakota | 7.022 | 12.675 | 34.242 | 16.9 | 16.4 | 6.1 | 6.6 |
| Ohio | 14.444 | 15.614 | 41.125 | 17.3 | 21.4 | 5.1 | 10.3 |
| Oklahoma | 15.311 | 19.943 | 47.021 | 17.6 | 19.0 | 4.9 | 9.6 |
| Oregon | 19.374 | 17.160 | 40.540 | 18.7 | 24.9 | 5.4 | 8.0 |
| Pennsylvania | 14.280 | 15.264 | 42.129 | 17.5 | 23.5 | 5.6 | 8.6 |
| Rhode Island | 16.580 | 16.628 | 43.477 | 18.9 | 22.8 | 5.8 | 7.6 |
| South Carolina | 16.437 | 20.142 | 46.302 | 17.9 | 21.6 | 4.7 | 10.7 |
| South Dakota | 11.487 | 11.296 | 31.562 | 17.9 | 17.7 | 5.3 | 9.1 |
| Tennessee | 18.641 | 17.477 | 49.208 | 17.0 | 20.7 | 4.7 | 11.0 |
| Texas | 13.579 | 15.521 | 47.306 | 17.4 | 20.9 | 5.6 | 9.5 |
| Utah | 7.544 | 10.866 | 35.289 | 15.4 | 19.0 | 6.3 | 5.1 |
| Vermont | 13.575 | 12.203 | 37.916 | 17.1 | 22.9 | 5.7 | 4.6 |
| Virginia | 10.282 | 15.163 | 38.615 | 16.8 | 21.7 | 6.6 | 7.1 |
| Washington | 14.957 | 12.970 | 35.817 | 16.9 | 21.1 | 6.4 | 7.0 |
| West Virginia | 19.984 | 21.509 | 52.420 | 19.8 | 19.9 | 4.2 | 12.8 |
| Wisconsin | 13.966 | 11.904 | 37.240 | 16.9 | 20.6 | 5.6 | 6.8 |
| Wyoming | 5.559 | 12.539 | 35.312 | 17.4 | 15.9 | 6.0 | 3.8 |

## Table A.18. Regression estimates of SNAP participation rates

| | All eligible people | | | Working poor people | | |
|---|---|---|---|---|---|---|
| | FY 2013 | FY 2014 | FY 2015 | FY 2013 | FY 2014 | FY 2015 |
| Alabama | 81.79 | 80.49 | 80.75 | 72.00 | 65.41 | 68.89 |
| Alaska | 83.04 | 85.35 | 87.75 | 68.85 | 71.12 | 69.24 |
| Arizona | 73.69 | 66.26 | 68.63 | 64.66 | 53.41 | 60.25 |
| Arkansas | 71.73 | 68.69 | 68.04 | 65.31 | 57.59 | 61.42 |
| California | 64.96 | 64.25 | 66.40 | 53.24 | 50.89 | 55.23 |
| Colorado | 77.99 | 74.32 | 73.64 | 72.46 | 66.26 | 61.29 |
| Connecticut | 83.21 | 87.04 | 88.74 | 70.00 | 69.34 | 67.76 |
| Delaware | 96.60 | 99.96 | 101.11 | 86.28 | 83.17 | 82.12 |
| District of Columbia | 94.60 | 92.40 | 95.40 | 67.47 | 52.78 | 62.29 |
| Florida | 90.37 | 88.69 | 91.45 | 80.05 | 76.76 | 81.01 |
| Georgia | 92.31 | 86.20 | 86.64 | 79.64 | 71.66 | 73.37 |
| Hawaii | 78.32 | 86.16 | 86.78 | 62.84 | 72.76 | 73.03 |
| Idaho | 86.96 | 81.32 | 78.27 | 82.76 | 78.44 | 76.88 |
| Illinois | 95.82 | 96.63 | 98.69 | 84.53 | 84.59 | 83.83 |
| Indiana | 87.71 | 85.78 | 81.45 | 83.56 | 79.79 | 72.62 |
| Iowa | 92.36 | 93.25 | 90.24 | 87.86 | 85.03 | 78.17 |
| Kansas | 80.59 | 77.26 | 71.29 | 79.25 | 73.16 | 65.30 |
| Kentucky | 86.92 | 84.27 | 77.68 | 75.96 | 70.76 | 69.95 |
| Louisiana | 88.25 | 77.07 | 80.93 | 76.33 | 63.36 | 68.69 |
| Maine | 103.34 | 95.78 | 85.94 | 93.10 | 83.04 | 76.21 |
| Maryland | 86.46 | 89.05 | 87.89 | 68.42 | 70.02 | 69.72 |
| Massachusetts | 82.40 | 81.01 | 79.57 | 67.28 | 64.60 | 63.55 |
| Michigan | 106.33 | 101.74 | 98.15 | 98.23 | 90.06 | 82.59 |
| Minnesota | 84.49 | 86.18 | 81.35 | 78.24 | 79.69 | 70.23 |
| Mississippi | 85.15 | 83.51 | 85.08 | 74.10 | 67.97 | 74.68 |
| Missouri | 84.48 | 78.67 | 79.27 | 78.74 | 70.00 | 70.62 |
| Montana | 81.57 | 77.38 | 76.43 | 80.22 | 75.12 | 71.37 |
| Nebraska | 75.97 | 74.60 | 73.27 | 75.62 | 74.63 | 68.95 |
| Nevada | 59.29 | 60.98 | 76.85 | 56.39 | 60.86 | 78.40 |
| New Hampshire | 79.38 | 78.28 | 72.15 | 71.58 | 70.00 | 61.78 |
| New Jersey | 76.60 | 74.26 | 75.99 | 61.57 | 60.82 | 61.47 |
| New Mexico | 91.89 | 90.38 | 104.17 | 81.89 | 78.22 | 91.86 |
| New York | 84.49 | 84.00 | 85.34 | 69.84 | 70.07 | 72.73 |
| North Carolina | 81.22 | 79.06 | 82.42 | 72.98 | 67.33 | 71.98 |
| North Dakota | 70.30 | 63.82 | 63.96 | 70.38 | 64.48 | 58.08 |
| Ohio | 90.39 | 86.42 | 86.20 | 84.34 | 77.60 | 74.91 |
| Oklahoma | 74.99 | 74.89 | 74.46 | 68.55 | 62.30 | 66.08 |
| Oregon | 115.27 | 114.70 | 112.04 | 102.22 | 96.93 | 92.52 |
| Pennsylvania | 85.68 | 84.86 | 86.54 | 77.62 | 75.01 | 74.49 |
| Rhode Island | 89.30 | 89.81 | 92.53 | 75.76 | 77.71 | 80.13 |
| South Carolina | 84.41 | 78.07 | 82.29 | 76.82 | 65.81 | 70.36 |
| South Dakota | 86.82 | 92.21 | 90.27 | 89.00 | 89.37 | 80.87 |
| Tennessee | 96.13 | 96.31 | 89.16 | 84.18 | 83.51 | 80.74 |
| Texas | 75.42 | 73.67 | 71.21 | 65.44 | 65.79 | 66.43 |
| Utah | 75.20 | 72.46 | 70.07 | 70.55 | 67.30 | 62.47 |
| Vermont | 107.79 | 100.88 | 96.03 | 98.64 | 92.21 | 84.17 |
| Virginia | 76.72 | 75.12 | 72.44 | 66.44 | 61.96 | 59.34 |
| Washington | 102.34 | 101.36 | 100.35 | 91.30 | 88.29 | 84.05 |
| West Virginia | 75.80 | 77.82 | 83.56 | 66.90 | 66.14 | 77.43 |
| Wisconsin | 99.31 | 100.11 | 95.67 | 92.89 | 93.32 | 84.91 |
| Wyoming | 54.95 | 58.18 | 57.29 | 55.37 | 59.44 | 55.24 |

## Table A.19. Standard errors of regression estimates of SNAP participation rates

| | All eligible people | | | Working poor people | | |
|---|---|---|---|---|---|---|
| | FY 2013 | FY 2014 | FY 2015 | FY 2013 | FY 2014 | FY 2015 |
| Alabama | 4.062 | 4.023 | 4.042 | 5.249 | 5.142 | 5.192 |
| Alaska | 4.789 | 4.546 | 4.431 | 6.452 | 6.059 | 5.815 |
| Arizona | 4.057 | 4.121 | 4.180 | 5.266 | 5.266 | 5.359 |
| Arkansas | 4.352 | 4.359 | 4.281 | 5.730 | 5.719 | 5.574 |
| California | 4.394 | 4.367 | 4.378 | 5.788 | 5.720 | 5.655 |
| Colorado | 4.169 | 4.004 | 4.068 | 5.453 | 5.137 | 5.176 |
| Connecticut | 4.088 | 4.160 | 4.278 | 5.324 | 5.375 | 5.481 |
| Delaware | 4.320 | 4.333 | 4.361 | 5.691 | 5.641 | 5.635 |
| District of Columbia | 5.943 | 5.773 | 5.650 | 8.604 | 7.741 | 7.825 |
| Florida | 4.137 | 4.237 | 4.279 | 5.412 | 5.612 | 5.586 |
| Georgia | 4.005 | 3.946 | 3.978 | 5.164 | 5.043 | 5.073 |
| Hawaii | 4.587 | 4.690 | 4.695 | 6.086 | 6.183 | 6.076 |
| Idaho | 4.148 | 4.178 | 4.161 | 5.460 | 5.447 | 5.397 |
| Illinois | 4.002 | 4.033 | 4.099 | 5.161 | 5.187 | 5.230 |
| Indiana | 4.109 | 3.944 | 4.078 | 5.335 | 5.040 | 5.214 |
| Iowa | 4.026 | 4.146 | 4.096 | 5.187 | 5.352 | 5.234 |
| Kansas | 4.124 | 4.119 | 4.065 | 5.327 | 5.325 | 5.159 |
| Kentucky | 4.297 | 4.003 | 4.051 | 5.641 | 5.131 | 5.185 |
| Louisiana | 3.999 | 4.044 | 4.174 | 5.166 | 5.188 | 5.451 |
| Maine | 4.836 | 4.027 | 3.991 | 6.858 | 5.242 | 5.132 |
| Maryland | 4.288 | 4.392 | 4.315 | 5.621 | 5.791 | 5.640 |
| Massachusetts | 3.995 | 4.064 | 3.987 | 5.137 | 5.240 | 5.059 |
| Michigan | 4.568 | 4.389 | 4.384 | 6.146 | 5.845 | 5.711 |
| Minnesota | 3.992 | 4.080 | 4.068 | 5.129 | 5.272 | 5.169 |
| Mississippi | 4.431 | 4.295 | 4.538 | 6.008 | 5.623 | 6.014 |
| Missouri | 3.859 | 3.854 | 3.839 | 4.906 | 4.871 | 4.850 |
| Montana | 4.150 | 4.118 | 4.039 | 5.381 | 5.294 | 5.133 |
| Nebraska | 4.248 | 4.141 | 4.218 | 5.553 | 5.322 | 5.412 |
| Nevada | 5.260 | 5.346 | 5.832 | 7.038 | 7.085 | 7.579 |
| New Hampshire | 4.096 | 4.144 | 4.190 | 5.303 | 5.330 | 5.416 |
| New Jersey | 4.456 | 4.354 | 4.336 | 5.972 | 5.698 | 5.571 |
| New Mexico | 4.439 | 4.331 | 4.546 | 5.975 | 5.638 | 5.806 |
| New York | 4.065 | 4.091 | 4.122 | 5.257 | 5.255 | 5.285 |
| North Carolina | 3.847 | 3.913 | 3.862 | 4.886 | 4.992 | 4.897 |
| North Dakota | 4.215 | 4.583 | 4.412 | 5.491 | 6.254 | 5.703 |
| Ohio | 4.023 | 4.032 | 3.998 | 5.198 | 5.240 | 5.090 |
| Oklahoma | 4.113 | 4.090 | 4.124 | 5.359 | 5.248 | 5.305 |
| Oregon | 4.639 | 4.715 | 4.679 | 6.425 | 6.366 | 6.142 |
| Pennsylvania | 3.873 | 3.823 | 3.826 | 4.934 | 4.847 | 4.822 |
| Rhode Island | 3.982 | 4.014 | 4.145 | 5.126 | 5.146 | 5.349 |
| South Carolina | 4.018 | 4.143 | 4.033 | 5.212 | 5.380 | 5.181 |
| South Dakota | 4.847 | 4.617 | 5.078 | 6.464 | 6.083 | 6.707 |
| Tennessee | 4.229 | 4.219 | 4.292 | 5.514 | 5.498 | 5.571 |
| Texas | 4.257 | 4.219 | 4.283 | 5.630 | 5.546 | 5.591 |
| Utah | 4.099 | 4.249 | 4.137 | 5.294 | 5.486 | 5.292 |
| Vermont | 4.382 | 4.169 | 4.494 | 5.904 | 5.391 | 5.966 |
| Virginia | 3.988 | 3.958 | 3.956 | 5.131 | 5.037 | 5.013 |
| Washington | 4.124 | 4.216 | 4.279 | 5.364 | 5.474 | 5.544 |
| West Virginia | 4.124 | 4.423 | 4.303 | 5.357 | 5.937 | 5.483 |
| Wisconsin | 4.139 | 4.191 | 4.177 | 5.394 | 5.421 | 5.362 |
| Wyoming | 4.589 | 4.492 | 4.631 | 6.168 | 5.889 | 6.068 |

## Table A.20. Preliminary shrinkage estimates of SNAP participation rates

| | All eligible people | | | Working poor people | | |
|---|---|---|---|---|---|---|
| | FY 2013 | FY 2014 | FY 2015 | FY 2013 | FY 2014 | FY 2015 |
| Alabama | 84.02 | 82.78 | 82.69 | 75.16 | 68.47 | 72.47 |
| Alaska | 80.68 | 82.66 | 85.08 | 67.74 | 70.30 | 67.97 |
| Arizona | 73.35 | 65.83 | 68.46 | 65.44 | 54.48 | 60.28 |
| Arkansas | 73.88 | 70.64 | 70.52 | 67.28 | 59.72 | 62.92 |
| California | 66.31 | 65.27 | 68.02 | 52.81 | 50.37 | 55.73 |
| Colorado | 78.65 | 74.87 | 74.17 | 73.09 | 66.86 | 61.81 |
| Connecticut | 86.27 | 89.99 | 91.73 | 70.72 | 70.03 | 67.71 |
| Delaware | 95.60 | 98.78 | 100.35 | 87.04 | 83.90 | 83.04 |
| District of Columbia | 94.98 | 92.90 | 95.70 | 65.86 | 51.38 | 60.79 |
| Florida | 89.40 | 87.55 | 89.65 | 74.67 | 71.62 | 75.52 |
| Georgia | 90.12 | 84.49 | 83.85 | 78.17 | 70.70 | 71.92 |
| Hawaii | 73.20 | 81.43 | 81.88 | 62.84 | 71.58 | 72.68 |
| Idaho | 86.99 | 81.84 | 78.39 | 84.28 | 79.96 | 77.80 |
| Illinois | 98.55 | 99.01 | 101.64 | 81.16 | 80.87 | 80.37 |
| Indiana | 87.73 | 85.54 | 81.27 | 83.94 | 79.83 | 72.00 |
| Iowa | 92.58 | 93.60 | 90.46 | 91.37 | 88.16 | 81.28 |
| Kansas | 78.42 | 75.40 | 69.65 | 75.85 | 70.69 | 62.57 |
| Kentucky | 84.81 | 82.26 | 75.73 | 73.35 | 68.94 | 68.08 |
| Louisiana | 85.63 | 74.28 | 78.30 | 77.69 | 64.26 | 70.08 |
| Maine | 105.13 | 97.40 | 87.74 | 94.41 | 84.45 | 77.32 |
| Maryland | 88.02 | 90.63 | 89.50 | 71.40 | 72.74 | 72.35 |
| Massachusetts | 83.45 | 81.81 | 80.48 | 63.99 | 61.27 | 60.18 |
| Michigan | 106.76 | 101.93 | 98.65 | 98.58 | 90.76 | 82.75 |
| Minnesota | 84.20 | 86.04 | 81.06 | 77.32 | 79.03 | 70.59 |
| Mississippi | 81.36 | 79.81 | 81.60 | 73.02 | 66.57 | 72.35 |
| Missouri | 91.55 | 85.74 | 86.57 | 78.72 | 70.13 | 71.04 |
| Montana | 81.33 | 77.35 | 76.39 | 80.55 | 75.18 | 71.26 |
| Nebraska | 77.27 | 75.55 | 74.46 | 75.57 | 74.73 | 68.96 |
| Nevada | 61.89 | 63.33 | 79.39 | 52.60 | 57.44 | 75.12 |
| New Hampshire | 80.40 | 79.30 | 73.39 | 73.23 | 71.51 | 63.44 |
| New Jersey | 73.08 | 70.92 | 72.85 | 63.53 | 62.89 | 63.03 |
| New Mexico | 88.87 | 87.65 | 101.10 | 84.61 | 81.13 | 95.00 |
| New York | 84.05 | 84.15 | 85.05 | 73.91 | 74.84 | 76.92 |
| North Carolina | 79.77 | 77.66 | 81.05 | 73.21 | 66.43 | 72.17 |
| North Dakota | 66.69 | 60.92 | 60.64 | 68.64 | 62.43 | 55.71 |
| Ohio | 89.79 | 85.68 | 85.58 | 83.78 | 77.06 | 74.96 |
| Oklahoma | 76.33 | 76.21 | 75.87 | 65.28 | 57.84 | 62.62 |
| Oregon | 115.71 | 115.32 | 112.77 | 101.05 | 95.61 | 91.03 |
| Pennsylvania | 86.98 | 85.98 | 88.02 | 79.06 | 76.61 | 76.49 |
| Rhode Island | 93.47 | 93.85 | 96.63 | 76.44 | 78.83 | 80.82 |
| South Carolina | 82.55 | 76.44 | 80.21 | 78.75 | 67.58 | 72.97 |
| South Dakota | 85.06 | 90.32 | 88.24 | 91.70 | 91.52 | 83.10 |
| Tennessee | 99.31 | 99.28 | 92.56 | 79.93 | 79.58 | 77.22 |
| Texas | 73.61 | 71.34 | 68.93 | 64.57 | 64.45 | 65.14 |
| Utah | 73.45 | 70.42 | 67.91 | 68.75 | 65.57 | 61.37 |
| Vermont | 108.89 | 102.19 | 97.01 | 97.26 | 91.25 | 82.62 |
| Virginia | 77.72 | 76.40 | 73.15 | 72.67 | 68.35 | 65.42 |
| Washington | 104.45 | 103.43 | 102.61 | 86.65 | 83.67 | 80.03 |
| West Virginia | 75.78 | 77.76 | 83.50 | 70.32 | 69.74 | 81.01 |
| Wisconsin | 97.93 | 98.62 | 94.17 | 96.16 | 96.43 | 88.05 |
| Wyoming | 55.10 | 58.39 | 57.22 | 53.47 | 58.16 | 53.59 |

## Table A.21. Final shrinkage estimates of SNAP participation rates

| | All eligible people | | | Working poor people | | |
|---|---|---|---|---|---|---|
| | FY 2013 | FY 2014 | FY 2015 | FY 2013 | FY 2014 | FY 2015 |
| Alabama | 86.65 | 85.00 | 84.55 | 76.88 | 70.22 | 74.23 |
| Alaska | 83.21 | 84.88 | 86.99 | 69.29 | 72.10 | 69.62 |
| Arizona | 75.66 | 67.60 | 69.99 | 66.94 | 55.87 | 61.75 |
| Arkansas | 76.19 | 72.54 | 72.10 | 68.82 | 61.25 | 64.45 |
| California | 68.39 | 67.03 | 69.55 | 54.02 | 51.66 | 57.09 |
| Colorado | 81.11 | 76.88 | 75.84 | 74.76 | 68.58 | 63.32 |
| Connecticut | 88.98 | 92.40 | 93.78 | 72.34 | 71.82 | 69.36 |
| Delaware | 98.60 | 100.00 | 100.00 | 89.03 | 86.05 | 85.06 |
| District of Columbia | 97.96 | 95.39 | 97.85 | 67.37 | 52.69 | 62.27 |
| Florida | 92.21 | 89.90 | 91.66 | 76.38 | 73.45 | 77.36 |
| Georgia | 92.95 | 86.76 | 85.73 | 79.96 | 72.51 | 73.67 |
| Hawaii | 75.49 | 83.62 | 83.72 | 64.28 | 73.42 | 74.45 |
| Idaho | 89.71 | 84.04 | 80.15 | 86.21 | 82.01 | 79.69 |
| Illinois | 100.00 | 100.00 | 100.00 | 83.01 | 82.94 | 82.32 |
| Indiana | 90.49 | 87.84 | 83.09 | 85.87 | 81.87 | 73.75 |
| Iowa | 95.49 | 96.11 | 92.50 | 93.47 | 90.42 | 83.26 |
| Kansas | 80.88 | 77.43 | 71.22 | 77.59 | 72.50 | 64.09 |
| Kentucky | 87.47 | 84.47 | 77.43 | 75.03 | 70.71 | 69.74 |
| Louisiana | 88.32 | 76.27 | 80.05 | 79.47 | 65.91 | 71.78 |
| Maine | 100.00 | 100.01 | 89.71 | 96.57 | 86.61 | 79.20 |
| Maryland | 90.78 | 93.07 | 91.51 | 73.04 | 74.60 | 74.11 |
| Massachusetts | 86.07 | 84.01 | 82.29 | 65.46 | 62.84 | 61.64 |
| Michigan | 100.00 | 100.00 | 100.00 | 100.00 | 93.08 | 84.76 |
| Minnesota | 86.84 | 88.35 | 82.88 | 79.09 | 81.05 | 72.30 |
| Mississippi | 83.91 | 81.96 | 83.43 | 74.69 | 68.28 | 74.11 |
| Missouri | 94.42 | 88.04 | 88.52 | 80.52 | 71.93 | 72.77 |
| Montana | 83.88 | 79.42 | 78.11 | 82.40 | 77.11 | 73.00 |
| Nebraska | 79.70 | 77.58 | 76.13 | 77.30 | 76.64 | 70.63 |
| Nevada | 63.83 | 65.03 | 81.17 | 53.80 | 58.91 | 76.95 |
| New Hampshire | 82.92 | 81.43 | 75.03 | 74.91 | 73.34 | 64.98 |
| New Jersey | 75.37 | 72.82 | 74.48 | 64.99 | 64.50 | 64.56 |
| New Mexico | 91.66 | 90.00 | 100.00 | 86.55 | 83.21 | 97.31 |
| New York | 86.69 | 86.41 | 86.96 | 75.60 | 76.75 | 78.79 |
| North Carolina | 82.27 | 79.74 | 82.87 | 74.89 | 68.13 | 73.92 |
| North Dakota | 68.78 | 62.56 | 62.01 | 70.21 | 64.03 | 57.07 |
| Ohio | 92.61 | 87.98 | 87.50 | 85.70 | 79.03 | 76.78 |
| Oklahoma | 78.73 | 78.26 | 77.57 | 66.78 | 59.32 | 64.14 |
| Oregon | 100.00 | 100.00 | 100.00 | 100.00 | 98.06 | 93.25 |
| Pennsylvania | 89.71 | 88.29 | 90.00 | 80.87 | 78.57 | 78.35 |
| Rhode Island | 96.40 | 96.37 | 98.80 | 78.19 | 80.85 | 82.79 |
| South Carolina | 85.14 | 78.49 | 82.01 | 80.56 | 69.32 | 74.75 |
| South Dakota | 87.73 | 92.74 | 90.22 | 93.80 | 93.87 | 85.12 |
| Tennessee | 100.00 | 100.00 | 94.64 | 81.76 | 81.62 | 79.10 |
| Texas | 75.92 | 73.25 | 70.47 | 66.04 | 66.10 | 66.73 |
| Utah | 75.76 | 72.31 | 69.43 | 70.32 | 67.25 | 62.86 |
| Vermont | 100.00 | 100.00 | 99.19 | 99.49 | 93.58 | 84.63 |
| Virginia | 80.16 | 78.45 | 74.79 | 74.34 | 70.10 | 67.01 |
| Washington | 100.00 | 100.00 | 100.00 | 88.64 | 85.82 | 81.97 |
| West Virginia | 78.15 | 79.84 | 85.38 | 71.94 | 71.52 | 82.98 |
| Wisconsin | 100.00 | 100.00 | 96.28 | 98.36 | 98.90 | 90.20 |
| Wyoming | 56.82 | 59.96 | 58.50 | 54.69 | 59.65 | 54.89 |

## Table A.22. Standard errors of final shrinkage estimates of SNAP participation rates

| | All eligible people | | | Working poor people | | |
|---|---|---|---|---|---|---|
| | FY 2013 | FY 2014 | FY 2015 | FY 2013 | FY 2014 | FY 2015 |
| Alabama | 2.702 | 2.653 | 2.728 | 4.153 | 4.042 | 4.173 |
| Alaska | 3.589 | 3.252 | 3.034 | 5.004 | 4.963 | 4.638 |
| Arizona | 2.643 | 2.364 | 2.365 | 3.959 | 3.331 | 3.404 |
| Arkansas | 2.980 | 2.766 | 2.385 | 4.373 | 4.169 | 3.867 |
| California | 1.524 | 1.578 | 1.773 | 2.567 | 2.501 | 2.762 |
| Colorado | 3.278 | 3.088 | 3.164 | 4.412 | 4.081 | 4.147 |
| Connecticut | 3.180 | 3.445 | 3.562 | 4.278 | 4.437 | 4.394 |
| Delaware | 3.141 | 3.242 | 3.376 | 4.706 | 4.658 | 4.802 |
| District of Columbia | 4.190 | 4.036 | 3.687 | 7.068 | 5.785 | 5.890 |
| Florida | 2.331 | 2.262 | 2.295 | 3.912 | 3.895 | 3.928 |
| Georgia | 2.372 | 2.498 | 2.378 | 3.656 | 3.640 | 3.536 |
| Hawaii | 3.163 | 3.676 | 3.539 | 4.426 | 4.669 | 4.495 |
| Idaho | 3.207 | 3.227 | 2.917 | 4.397 | 4.545 | 4.306 |
| Illinois | 2.763 | 2.836 | 2.828 | 3.720 | 3.741 | 3.779 |
| Indiana | 2.892 | 2.773 | 2.741 | 4.049 | 3.726 | 3.532 |
| Iowa | 2.915 | 3.191 | 3.019 | 4.610 | 4.855 | 4.546 |
| Kansas | 2.653 | 2.832 | 2.779 | 3.738 | 4.283 | 3.980 |
| Kentucky | 2.662 | 2.590 | 2.556 | 3.785 | 3.789 | 3.899 |
| Louisiana | 2.738 | 2.424 | 2.466 | 3.724 | 3.355 | 3.795 |
| Maine | 3.879 | 3.208 | 3.157 | 6.160 | 4.727 | 4.649 |
| Maryland | 3.090 | 3.339 | 3.362 | 4.623 | 5.051 | 4.909 |
| Massachusetts | 3.022 | 3.020 | 2.849 | 4.124 | 4.090 | 3.855 |
| Michigan | 3.423 | 3.188 | 3.181 | 5.048 | 4.737 | 4.532 |
| Minnesota | 2.722 | 2.969 | 2.983 | 3.845 | 4.093 | 4.280 |
| Mississippi | 2.778 | 2.381 | 2.641 | 4.947 | 3.995 | 4.334 |
| Missouri | 3.648 | 3.692 | 3.651 | 4.273 | 4.260 | 4.200 |
| Montana | 3.330 | 3.277 | 3.141 | 4.305 | 4.144 | 3.828 |
| Nebraska | 3.264 | 3.106 | 3.123 | 4.451 | 4.284 | 4.187 |
| Nevada | 3.016 | 3.355 | 4.277 | 4.480 | 4.802 | 5.798 |
| New Hampshire | 3.089 | 3.195 | 3.244 | 4.480 | 4.545 | 4.605 |
| New Jersey | 2.771 | 2.739 | 2.819 | 4.588 | 4.318 | 4.233 |
| New Mexico | 3.628 | 3.486 | 3.598 | 4.821 | 4.372 | 4.456 |
| New York | 2.013 | 2.248 | 2.168 | 3.695 | 3.906 | 3.792 |
| North Carolina | 2.149 | 2.331 | 2.191 | 3.457 | 3.414 | 3.426 |
| North Dakota | 3.010 | 3.495 | 3.228 | 4.620 | 5.338 | 4.615 |
| Ohio | 2.648 | 2.561 | 2.573 | 3.756 | 3.764 | 3.627 |
| Oklahoma | 2.895 | 2.865 | 2.853 | 3.922 | 3.388 | 3.552 |
| Oregon | 3.552 | 3.811 | 3.760 | 5.450 | 5.237 | 4.770 |
| Pennsylvania | 2.560 | 2.487 | 2.534 | 3.829 | 3.755 | 3.777 |
| Rhode Island | 3.449 | 3.608 | 3.636 | 4.670 | 4.954 | 4.992 |
| South Carolina | 2.476 | 2.667 | 2.482 | 3.905 | 3.904 | 3.914 |
| South Dakota | 4.430 | 4.161 | 4.352 | 5.879 | 5.540 | 5.622 |
| Tennessee | 3.374 | 3.302 | 3.256 | 4.228 | 4.206 | 4.182 |
| Texas | 1.904 | 1.686 | 1.747 | 2.957 | 2.778 | 2.973 |
| Utah | 3.041 | 3.156 | 2.799 | 4.170 | 4.236 | 3.942 |
| Vermont | 3.623 | 3.488 | 3.659 | 5.209 | 4.870 | 5.167 |
| Virginia | 2.989 | 2.987 | 2.836 | 4.658 | 4.786 | 4.459 |
| Washington | 3.189 | 3.339 | 3.285 | 4.368 | 4.468 | 4.582 |
| West Virginia | 3.087 | 3.354 | 3.473 | 4.459 | 5.073 | 4.379 |
| Wisconsin | 2.988 | 3.127 | 3.050 | 4.837 | 4.912 | 4.696 |
| Wyoming | 2.872 | 3.008 | 3.195 | 4.524 | 4.498 | 4.567 |

## Table A.23. Final shrinkage estimates of number of people eligible for SNAP

| | FY 2013 | FY 2014 | FY 2015 |
|---|---|---|---|
| Alabama | 1,017,995 | 1,019,665 | 1,017,757 |
| Alaska | 109,049 | 102,617 | 92,982 |
| Arizona | 1,252,650 | 1,316,775 | 1,247,423 |
| Arkansas | 649,828 | 656,858 | 632,130 |
| California | 5,694,450 | 5,909,187 | 5,735,864 |
| Colorado | 582,170 | 608,716 | 611,223 |
| Connecticut | 403,962 | 394,197 | 406,652 |
| Delaware | 127,948 | 122,670 | 125,242 |
| District of Columbia | 134,623 | 133,167 | 132,891 |
| Florida | 3,543,227 | 3,623,725 | 3,583,636 |
| Georgia | 1,931,532 | 1,951,263 | 1,987,032 |
| Hawaii | 224,622 | 203,902 | 199,050 |
| Idaho | 234,685 | 229,604 | 226,064 |
| Illinois | 1,858,462 | 1,808,696 | 1,853,883 |
| Indiana | 1,007,947 | 998,233 | 976,940 |
| Iowa | 370,266 | 364,059 | 360,698 |
| Kansas | 384,277 | 378,158 | 383,563 |
| Kentucky | 933,729 | 910,537 | 950,454 |
| Louisiana | 1,025,557 | 1,105,809 | 1,067,204 |
| Maine | 209,145 | 198,035 | 191,499 |
| Maryland | 737,700 | 729,107 | 740,934 |
| Massachusetts | 903,592 | 899,824 | 842,451 |
| Michigan | 1,549,020 | 1,503,283 | 1,401,859 |
| Minnesota | 524,568 | 497,793 | 489,504 |
| Mississippi | 766,603 | 769,023 | 735,310 |
| Missouri | 969,795 | 965,824 | 949,332 |
| Montana | 137,585 | 140,685 | 136,773 |
| Nebraska | 211,622 | 210,194 | 216,524 |
| Nevada | 475,661 | 504,177 | 442,210 |
| New Hampshire | 117,415 | 117,591 | 121,710 |
| New Jersey | 1,039,083 | 1,088,502 | 1,090,896 |
| New Mexico | 439,399 | 444,840 | 412,857 |
| New York | 3,320,301 | 3,261,951 | 3,200,779 |
| North Carolina | 1,833,707 | 1,780,426 | 1,729,527 |
| North Dakota | 65,259 | 67,438 | 67,455 |
| Ohio | 1,776,824 | 1,817,688 | 1,735,949 |
| Oklahoma | 753,442 | 728,798 | 731,339 |
| Oregon | 653,896 | 662,769 | 649,726 |
| Pennsylvania | 1,771,274 | 1,790,074 | 1,822,263 |
| Rhode Island | 158,683 | 159,743 | 154,733 |
| South Carolina | 968,329 | 1,011,063 | 933,604 |
| South Dakota | 116,903 | 106,280 | 107,395 |
| Tennessee | 1,333,003 | 1,303,409 | 1,283,985 |
| Texas | 4,797,018 | 4,832,818 | 4,706,313 |
| Utah | 326,825 | 313,063 | 320,577 |
| Vermont | 76,901 | 76,735 | 70,925 |
| Virginia | 1,169,630 | 1,163,061 | 1,123,304 |
| Washington | 854,366 | 871,598 | 884,783 |
| West Virginia | 404,500 | 419,507 | 397,114 |
| Wisconsin | 701,542 | 694,711 | 699,492 |
| Wyoming | 65,639 | 58,148 | 54,274 |

## Table A.24. Final shrinkage estimates of number of working poor people eligible for SNAP

| | FY 2013 | FY 2014 | FY 2015 |
|---|---|---|---|
| Alabama | 428,955 | 443,694 | 464,426 |
| Alaska | 56,917 | 50,286 | 44,209 |
| Arizona | 720,476 | 783,505 | 655,601 |
| Arkansas | 292,948 | 318,811 | 282,917 |
| California | 3,112,931 | 3,398,012 | 3,419,775 |
| Colorado | 286,710 | 315,903 | 346,567 |
| Connecticut | 188,120 | 179,276 | 186,747 |
| Delaware | 58,233 | 60,313 | 59,942 |
| District of Columbia | 42,121 | 47,457 | 48,817 |
| Florida | 1,598,505 | 1,576,899 | 1,612,127 |
| Georgia | 910,799 | 956,244 | 1,004,508 |
| Hawaii | 128,396 | 108,177 | 113,719 |
| Idaho | 142,669 | 126,559 | 131,220 |
| Illinois | 849,876 | 842,798 | 927,003 |
| Indiana | 460,413 | 500,164 | 513,323 |
| Iowa | 211,923 | 188,896 | 200,682 |
| Kansas | 200,850 | 201,311 | 207,347 |
| Kentucky | 399,159 | 379,554 | 379,812 |
| Louisiana | 453,432 | 494,563 | 489,562 |
| Maine | 80,816 | 87,647 | 81,531 |
| Maryland | 349,942 | 327,065 | 347,139 |
| Massachusetts | 324,083 | 326,247 | 317,865 |
| Michigan | 633,710 | 699,919 | 622,232 |
| Minnesota | 256,938 | 275,157 | 275,305 |
| Mississippi | 336,905 | 325,150 | 295,669 |
| Missouri | 443,925 | 438,695 | 437,401 |
| Montana | 70,044 | 61,181 | 57,847 |
| Nebraska | 109,907 | 106,231 | 112,526 |
| Nevada | 234,227 | 244,396 | 226,854 |
| New Hampshire | 49,620 | 54,150 | 55,642 |
| New Jersey | 506,327 | 515,528 | 463,878 |
| New Mexico | 223,957 | 216,540 | 207,057 |
| New York | 1,487,525 | 1,500,477 | 1,464,621 |
| North Carolina | 918,217 | 741,717 | 872,625 |
| North Dakota | 29,921 | 31,676 | 30,212 |
| Ohio | 713,566 | 813,686 | 837,975 |
| Oklahoma | 371,919 | 363,822 | 375,904 |
| Oregon | 252,336 | 278,983 | 299,500 |
| Pennsylvania | 660,696 | 737,493 | 800,905 |
| Rhode Island | 59,206 | 68,778 | 62,494 |
| South Carolina | 392,181 | 456,648 | 439,770 |
| South Dakota | 58,137 | 50,357 | 54,346 |
| Tennessee | 547,132 | 575,007 | 591,009 |
| Texas | 2,741,503 | 2,722,566 | 2,538,787 |
| Utah | 173,650 | 177,289 | 198,718 |
| Vermont | 31,282 | 31,986 | 30,714 |
| Virginia | 524,546 | 584,797 | 536,569 |
| Washington | 333,314 | 377,967 | 443,284 |
| West Virginia | 142,177 | 153,166 | 149,384 |
| Wisconsin | 347,069 | 335,218 | 362,355 |
| Wyoming | 30,627 | 29,845 | 30,236 |

## Table A.25. Standard errors of final shrinkage estimates of number of people eligible for SNAP

| | FY 2013 | FY 2014 | FY 2015 |
|---|---|---|---|
| Alabama | 32,248 | 32,194 | 33,136 |
| Alaska | 4,779 | 3,976 | 3,272 |
| Arizona | 44,455 | 46,583 | 42,527 |
| Arkansas | 25,824 | 25,337 | 21,100 |
| California | 128,899 | 140,674 | 147,549 |
| Colorado | 23,904 | 24,727 | 25,733 |
| Connecticut | 14,671 | 14,863 | 15,587 |
| Delaware | 4,141 | 3,910 | 4,052 |
| District of Columbia | 5,851 | 5,699 | 5,053 |
| Florida | 91,022 | 92,219 | 90,548 |
| Georgia | 50,087 | 56,829 | 55,626 |
| Hawaii | 9,564 | 9,067 | 8,490 |
| Idaho | 8,524 | 8,918 | 8,302 |
| Illinois | 50,505 | 50,193 | 48,990 |
| Indiana | 32,728 | 31,868 | 32,523 |
| Iowa | 11,483 | 12,225 | 11,881 |
| Kansas | 12,807 | 13,987 | 15,104 |
| Kentucky | 28,874 | 28,244 | 31,659 |
| Louisiana | 32,304 | 35,541 | 33,173 |
| Maine | 7,012 | 6,424 | 6,801 |
| Maryland | 25,516 | 26,460 | 27,467 |
| Massachusetts | 32,234 | 32,714 | 29,433 |
| Michigan | 44,438 | 44,251 | 44,230 |
| Minnesota | 16,706 | 16,921 | 17,777 |
| Mississippi | 25,789 | 22,593 | 23,490 |
| Missouri | 38,069 | 40,963 | 39,510 |
| Montana | 5,550 | 5,871 | 5,551 |
| Nebraska | 8,807 | 8,512 | 8,962 |
| Nevada | 22,838 | 26,305 | 23,514 |
| New Hampshire | 4,445 | 4,667 | 5,311 |
| New Jersey | 38,821 | 41,413 | 41,668 |
| New Mexico | 17,669 | 17,426 | 14,029 |
| New York | 78,346 | 85,837 | 80,537 |
| North Carolina | 48,665 | 52,630 | 46,139 |
| North Dakota | 2,902 | 3,810 | 3,544 |
| Ohio | 51,627 | 53,519 | 51,505 |
| Oklahoma | 28,148 | 26,991 | 27,143 |
| Oregon | 16,572 | 18,217 | 18,546 |
| Pennsylvania | 51,357 | 51,008 | 51,768 |
| Rhode Island | 5,768 | 6,049 | 5,747 |
| South Carolina | 28,606 | 34,746 | 28,508 |
| South Dakota | 5,998 | 4,823 | 5,227 |
| Tennessee | 43,559 | 41,892 | 44,581 |
| Texas | 122,270 | 112,472 | 117,751 |
| Utah | 13,330 | 13,820 | 13,043 |
| Vermont | 2,244 | 2,459 | 2,640 |
| Virginia | 44,310 | 44,793 | 42,985 |
| Washington | 23,853 | 26,096 | 26,644 |
| West Virginia | 16,235 | 17,822 | 16,299 |
| Wisconsin | 20,876 | 21,424 | 22,363 |
| Wyoming | 3,371 | 2,950 | 2,991 |

## Table A.26. Standard errors of final shrinkage estimates of number of working poor people eligible for SNAP

| | FY 2013 | FY 2014 | FY 2015 |
|---|---|---|---|
| Alabama | 23,196 | 25,541 | 26,112 |
| Alaska | 4,115 | 3,461 | 2,945 |
| Arizona | 42,651 | 46,714 | 36,139 |
| Arkansas | 18,632 | 21,700 | 16,975 |
| California | 148,074 | 164,526 | 165,460 |
| Colorado | 16,940 | 18,798 | 22,696 |
| Connecticut | 11,136 | 11,075 | 11,832 |
| Delaware | 3,081 | 3,265 | 3,384 |
| District of Columbia | 4,424 | 5,210 | 4,618 |
| Florida | 81,954 | 83,611 | 81,862 |
| Georgia | 41,694 | 48,000 | 48,215 |
| Hawaii | 8,850 | 6,879 | 6,866 |
| Idaho | 7,285 | 7,014 | 7,090 |
| Illinois | 38,121 | 38,015 | 42,551 |
| Indiana | 21,733 | 22,759 | 24,582 |
| Iowa | 10,465 | 10,143 | 10,957 |
| Kansas | 9,689 | 11,892 | 12,875 |
| Kentucky | 20,158 | 20,337 | 21,237 |
| Louisiana | 21,271 | 25,178 | 25,885 |
| Maine | 5,161 | 4,784 | 4,786 |
| Maryland | 22,175 | 22,143 | 22,996 |
| Massachusetts | 20,439 | 21,236 | 19,880 |
| Michigan | 31,493 | 35,616 | 33,272 |
| Minnesota | 12,503 | 13,895 | 16,296 |
| Mississippi | 22,341 | 19,027 | 17,290 |
| Missouri | 23,583 | 25,980 | 25,246 |
| Montana | 3,664 | 3,288 | 3,033 |
| Nebraska | 6,335 | 5,938 | 6,670 |
| Nevada | 19,527 | 19,921 | 17,093 |
| New Hampshire | 2,971 | 3,356 | 3,943 |
| New Jersey | 35,785 | 34,511 | 30,414 |
| New Mexico | 12,488 | 11,378 | 9,481 |
| New York | 72,791 | 76,355 | 70,482 |
| North Carolina | 42,433 | 37,164 | 40,439 |
| North Dakota | 1,971 | 2,641 | 2,443 |
| Ohio | 31,310 | 38,751 | 39,586 |
| Oklahoma | 21,870 | 20,780 | 20,820 |
| Oregon | 12,886 | 14,899 | 15,321 |
| Pennsylvania | 31,322 | 35,244 | 38,605 |
| Rhode Island | 3,541 | 4,214 | 3,768 |
| South Carolina | 19,030 | 25,721 | 23,027 |
| South Dakota | 3,648 | 2,972 | 3,589 |
| Tennessee | 28,321 | 29,629 | 31,245 |
| Texas | 122,894 | 114,423 | 113,114 |
| Utah | 10,310 | 11,167 | 12,461 |
| Vermont | 1,640 | 1,664 | 1,875 |
| Virginia | 32,904 | 39,926 | 35,702 |
| Washington | 16,444 | 19,680 | 24,780 |
| West Virginia | 8,822 | 10,863 | 7,883 |
| Wisconsin | 17,086 | 16,649 | 18,864 |
| Wyoming | 2,536 | 2,250 | 2,516 |

# APPENDIX B

# DATA FOR FIGURES IN CUNNYNGHAM (DECEMBER 2017)

## Table B.1. How many were eligible in 2015? What percentage participated?

| Eligible people (thousands) | State | Lower bound of confidence interval | FY 2015 participation rate | Upper bound of confidence interval |
|---|---|---|---|---|
| 650 | Oregon | 94 | 100 | 100 |
| 885 | Washington | 95 | 100 | 100 |
| 1,854 | Illinois | 95 | 100 | 100 |
| 413 | New Mexico | 94 | 100 | 100 |
| 125 | Delaware | 94 | 100 | 100 |
| 1,402 | Michigan | 95 | 100 | 100 |
| 71 | Vermont | 93 | 99 | 100 |
| 155 | Rhode Island | 93 | 99 | 100 |
| 133 | District of Columbia | 92 | 98 | 100 |
| 699 | Wisconsin | 91 | 96 | 100 |
| 1,284 | Tennessee | 89 | 95 | 100 |
| 407 | Connecticut | 88 | 94 | 100 |
| 361 | Iowa | 88 | 92 | 97 |
| 3,584 | Florida | 88 | 92 | 95 |
| 741 | Maryland | 86 | 92 | 97 |
| 107 | South Dakota | 83 | 90 | 97 |
| 1,822 | Pennsylvania | 86 | 90 | 94 |
| 191 | Maine | 85 | 90 | 95 |
| 949 | Missouri | 83 | 89 | 95 |
| 1,736 | Ohio | 83 | 87 | 92 |
| 93 | Alaska | 82 | 87 | 92 |
| 3,201 | New York | 83 | 87 | 91 |
| 1,987 | Georgia | 82 | 86 | 90 |
| 397 | West Virginia | 80 | 85 | 91 |
| 1,018 | Alabama | 80 | 85 | 89 |
| 199 | Hawaii | 78 | 84 | 90 |
| 735 | Mississippi | 79 | 83 | 88 |
| 977 | Indiana | 79 | 83 | 88 |
| 490 | Minnesota | 78 | 83 | 88 |
| 1,730 | North Carolina | 79 | 83 | 86 |
| 842 | Massachusetts | 78 | 82 | 87 |
| 934 | South Carolina | 78 | 82 | 86 |
| 442 | Nevada | 74 | 81 | 88 |
| 226 | Idaho | 75 | 80 | 85 |
| 1,067 | Louisiana | 76 | 80 | 84 |
| 137 | Montana | 73 | 78 | 83 |
| 731 | Oklahoma | 73 | 78 | 82 |
| 950 | Kentucky | 73 | 77 | 82 |
| 217 | Nebraska | 71 | 76 | 81 |
| 611 | Colorado | 71 | 76 | 81 |
| 122 | New Hampshire | 70 | 75 | 80 |
| 1,123 | Virginia | 70 | 75 | 79 |
| 1,091 | New Jersey | 70 | 74 | 79 |
| 632 | Arkansas | 68 | 72 | 76 |
| 384 | Kansas | 67 | 71 | 76 |
| 4,706 | Texas | 68 | 70 | 73 |
| 1,247 | Arizona | 66 | 70 | 74 |
| 5,736 | California | 67 | 70 | 72 |
| 321 | Utah | 65 | 69 | 74 |
| 67 | North Dakota | 57 | 62 | 67 |
| 54 | Wyoming | 53 | 59 | 64 |
| 7,158 | Midwest Region | 91 | 93 | 96 |
| 4,989 | Northeast Region | 84 | 87 | 90 |
| 12,221 | Southeast Region | 85 | 87 | 89 |
| 5,433 | Mid-Atlantic Region | 82 | 84 | 86 |
| 3,208 | Mountain Plains Region | 78 | 80 | 83 |
| 9,478 | Western Region | 74 | 76 | 78 |
| 7,550 | Southwest Region | 72 | 74 | 76 |
| 50,036 | United States | 82 | 83 | 84 |

## Table B.2. How many working poor people were eligible in 2015? What percentage participated?

| Eligible people (thousands) | State | Lower bound of confidence interval | FY 2015 participation rate | Upper bound of confidence interval |
|---|---|---|---|---|
| 207 | New Mexico | 90 | 97 | 100 |
| 300 | Oregon | 85 | 93 | 100 |
| 362 | Wisconsin | 82 | 90 | 98 |
| 54 | South Dakota | 76 | 85 | 94 |
| 60 | Delaware | 77 | 85 | 93 |
| 622 | Michigan | 77 | 85 | 92 |
| 31 | Vermont | 76 | 85 | 93 |
| 201 | Iowa | 76 | 83 | 91 |
| 149 | West Virginia | 76 | 83 | 90 |
| 62 | Rhode Island | 75 | 83 | 91 |
| 927 | Illinois | 76 | 82 | 89 |
| 443 | Washington | 74 | 82 | 90 |
| 131 | Idaho | 73 | 80 | 87 |
| 82 | Maine | 72 | 79 | 87 |
| 591 | Tennessee | 72 | 79 | 86 |
| 1,465 | New York | 73 | 79 | 85 |
| 801 | Pennsylvania | 72 | 78 | 85 |
| 1,612 | Florida | 71 | 77 | 84 |
| 227 | Nevada | 67 | 77 | 86 |
| 838 | Ohio | 71 | 77 | 83 |
| 440 | South Carolina | 68 | 75 | 81 |
| 114 | Hawaii | 67 | 74 | 82 |
| 464 | Alabama | 67 | 74 | 81 |
| 347 | Maryland | 66 | 74 | 82 |
| 296 | Mississippi | 67 | 74 | 81 |
| 873 | North Carolina | 68 | 74 | 80 |
| 513 | Indiana | 68 | 74 | 80 |
| 1,005 | Georgia | 68 | 74 | 79 |
| 58 | Montana | 67 | 73 | 79 |
| 437 | Missouri | 66 | 73 | 80 |
| 275 | Minnesota | 65 | 72 | 79 |
| 490 | Louisiana | 66 | 72 | 78 |
| 113 | Nebraska | 64 | 71 | 78 |
| 380 | Kentucky | 63 | 70 | 76 |
| 44 | Alaska | 62 | 70 | 77 |
| 187 | Connecticut | 62 | 69 | 77 |
| 537 | Virginia | 60 | 67 | 74 |
| 2,539 | Texas | 62 | 67 | 72 |
| 56 | New Hampshire | 57 | 65 | 73 |
| 464 | New Jersey | 58 | 65 | 72 |
| 283 | Arkansas | 58 | 64 | 71 |
| 376 | Oklahoma | 58 | 64 | 70 |
| 207 | Kansas | 58 | 64 | 71 |
| 347 | Colorado | 56 | 63 | 70 |
| 199 | Utah | 56 | 63 | 69 |
| 49 | District of Columbia | 53 | 62 | 72 |
| 656 | Arizona | 56 | 62 | 67 |
| 318 | Massachusetts | 55 | 62 | 68 |
| 3,420 | California | 53 | 57 | 62 |
| 30 | North Dakota | 49 | 57 | 65 |
| 30 | Wyoming | 47 | 55 | 62 |
| 3,538 | Midwest Region | 77 | 80 | 84 |
| 2,200 | Northeast Region | 71 | 75 | 80 |
| 5,660 | Southeast Region | 72 | 75 | 78 |
| 2,407 | Mid-Atlantic Region | 69 | 73 | 77 |
| 1,676 | Mountain Plains Region | 66 | 69 | 73 |
| 3,894 | Southwest Region | 65 | 69 | 72 |
| 5,334 | Western Region | 60 | 64 | 67 |
| 24,709 | United States | 70 | 72 | 74 |

## Table B.3. Estimates of participation rates (percent)

| | All eligible people | | | Working poor | | |
|---|---|---|---|---|---|---|
| | FY 2013 | FY 2014 | FY 2015 | FY 2013 | FY 2014 | FY 2015 |
| Alabama | 87 | 85 | 85 | 77 | 70 | 74 |
| Alaska | 83 | 85 | 87 | 69 | 72 | 70 |
| Arizona | 76 | 68 | 70 | 67 | 56 | 62 |
| Arkansas | 76 | 73 | 72 | 69 | 61 | 64 |
| California | 68 | 67 | 70 | 54 | 52 | 57 |
| Colorado | 81 | 77 | 76 | 75 | 69 | 63 |
| Connecticut | 89 | 92 | 94 | 72 | 72 | 69 |
| Delaware | 99 | 100 | 100 | 89 | 86 | 85 |
| District of Columbia | 98 | 95 | 98 | 67 | 53 | 62 |
| Florida | 92 | 90 | 92 | 76 | 73 | 77 |
| Georgia | 93 | 87 | 86 | 80 | 73 | 74 |
| Hawaii | 75 | 84 | 84 | 64 | 73 | 74 |
| Idaho | 90 | 84 | 80 | 86 | 82 | 80 |
| Illinois | 100 | 100 | 100 | 83 | 83 | 82 |
| Indiana | 90 | 88 | 83 | 86 | 82 | 74 |
| Iowa | 95 | 96 | 92 | 93 | 90 | 83 |
| Kansas | 81 | 77 | 71 | 78 | 72 | 64 |
| Kentucky | 87 | 84 | 77 | 75 | 71 | 70 |
| Louisiana | 88 | 76 | 80 | 79 | 66 | 72 |
| Maine | 100 | 100 | 90 | 97 | 87 | 79 |
| Maryland | 91 | 93 | 92 | 73 | 75 | 74 |
| Massachusetts | 86 | 84 | 82 | 65 | 63 | 62 |
| Michigan | 100 | 100 | 100 | 100 | 93 | 85 |
| Minnesota | 87 | 88 | 83 | 79 | 81 | 72 |
| Mississippi | 84 | 82 | 83 | 75 | 68 | 74 |
| Missouri | 94 | 88 | 89 | 81 | 72 | 73 |
| Montana | 84 | 79 | 78 | 82 | 77 | 73 |
| Nebraska | 80 | 78 | 76 | 77 | 77 | 71 |
| Nevada | 64 | 65 | 81 | 54 | 59 | 77 |
| New Hampshire | 83 | 81 | 75 | 75 | 73 | 65 |
| New Jersey | 75 | 73 | 74 | 65 | 65 | 65 |
| New Mexico | 92 | 90 | 100 | 87 | 83 | 97 |
| New York | 87 | 86 | 87 | 76 | 77 | 79 |
| North Carolina | 82 | 80 | 83 | 75 | 68 | 74 |
| North Dakota | 69 | 63 | 62 | 70 | 64 | 57 |
| Ohio | 93 | 88 | 87 | 86 | 79 | 77 |
| Oklahoma | 79 | 78 | 78 | 67 | 59 | 64 |
| Oregon | 100 | 100 | 100 | 100 | 98 | 93 |
| Pennsylvania | 90 | 88 | 90 | 81 | 79 | 78 |
| Rhode Island | 96 | 96 | 99 | 78 | 81 | 83 |
| South Carolina | 85 | 78 | 82 | 81 | 69 | 75 |
| South Dakota | 88 | 93 | 90 | 94 | 94 | 85 |
| Tennessee | 100 | 100 | 95 | 82 | 82 | 79 |
| Texas | 76 | 73 | 70 | 66 | 66 | 67 |
| Utah | 76 | 72 | 69 | 70 | 67 | 63 |
| Vermont | 100 | 100 | 99 | 99 | 94 | 85 |
| Virginia | 80 | 78 | 75 | 74 | 70 | 67 |
| Washington | 100 | 100 | 100 | 89 | 86 | 82 |
| West Virginia | 78 | 80 | 85 | 72 | 72 | 83 |
| Wisconsin | 100 | 100 | 96 | 98 | 99 | 90 |
| Wyoming | 57 | 60 | 59 | 55 | 60 | 55 |
| Mid-Atlantic Region | 85 | 84 | 84 | 74 | 72 | 73 |
| Midwest Region | 96 | 95 | 93 | 89 | 85 | 80 |
| Mountain Plains Region | 86 | 82 | 80 | 79 | 74 | 69 |
| Northeast Region | 88 | 87 | 87 | 75 | 75 | 75 |
| Southeast Region | 90 | 87 | 87 | 77 | 72 | 75 |
| Southwest Region | 79 | 75 | 74 | 69 | 66 | 69 |
| Western Region | 75 | 73 | 76 | 62 | 59 | 64 |
| United States | 85 | 83 | 83 | 74 | 70 | 72 |

## Table B.4. How did your state rank in 2015?

| FY 2015 participation rate | State | Upper bound of confidence interval | FY 2015 rank | Lower bound of confidence interval |
|---|---|---|---|---|
| 100 | Oregon | 1 | 1 | 1 |
| 100 | Washington | 2 | 2 | 7 |
| 100 | Illinois | 2 | 3 | 7 |
| 100 | New Mexico | 2 | 4 | 9 |
| 100 | Delaware | 2 | 5 | 9 |
| 100 | Michigan | 3 | 6 | 10 |
| 99 | Vermont | 3 | 7 | 13 |
| 99 | Rhode Island | 3 | 8 | 13 |
| 98 | District of Columbia | 4 | 9 | 15 |
| 96 | Wisconsin | 6 | 10 | 15 |
| 95 | Tennessee | 7 | 11 | 18 |
| 94 | Connecticut | 7 | 12 | 20 |
| 92 | Iowa | 9 | 13 | 20 |
| 92 | Florida | 10 | 14 | 20 |
| 92 | Maryland | 10 | 15 | 23 |
| 90 | South Dakota | 9 | 16 | 28 |
| 90 | Pennsylvania | 12 | 17 | 23 |
| 90 | Maine | 11 | 18 | 26 |
| 89 | Missouri | 12 | 19 | 29 |
| 87 | Ohio | 15 | 20 | 28 |
| 87 | Alaska | 14 | 21 | 30 |
| 87 | New York | 16 | 22 | 28 |
| 86 | Georgia | 17 | 23 | 31 |
| 85 | West Virginia | 16 | 24 | 34 |
| 85 | Alabama | 19 | 25 | 34 |
| 84 | Hawaii | 18 | 26 | 37 |
| 83 | Mississippi | 20 | 27 | 35 |
| 83 | Indiana | 21 | 28 | 36 |
| 83 | Minnesota | 20 | 29 | 37 |
| 83 | North Carolina | 22 | 30 | 35 |
| 82 | Massachusetts | 22 | 31 | 37 |
| 82 | South Carolina | 23 | 32 | 37 |
| 81 | Nevada | 20 | 33 | 42 |
| 80 | Idaho | 25 | 34 | 40 |
| 80 | Louisiana | 27 | 35 | 40 |
| 78 | Montana | 28 | 36 | 43 |
| 78 | Oklahoma | 30 | 37 | 43 |
| 77 | Kentucky | 31 | 38 | 43 |
| 76 | Nebraska | 32 | 39 | 45 |
| 76 | Colorado | 32 | 40 | 46 |
| 75 | New Hampshire | 33 | 41 | 47 |
| 75 | Virginia | 35 | 42 | 46 |
| 74 | New Jersey | 35 | 43 | 47 |
| 72 | Arkansas | 39 | 44 | 48 |
| 71 | Kansas | 40 | 45 | 49 |
| 70 | Texas | 42 | 46 | 49 |
| 70 | Arizona | 42 | 47 | 49 |
| 70 | California | 44 | 48 | 49 |
| 69 | Utah | 42 | 49 | 49 |
| 62 | North Dakota | 49 | 50 | 51 |
| 59 | Wyoming | 50 | 51 | 51 |

## Table B.5a. How did your state compare with other states in 2015 for all eligibles? (Oregon – Pennsylvania)

| | OR | WA | IL | NM | DE | MI | VT | RI | DC | WI | TN | CT | IA | FL | MD | SD | PA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OR | - | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| WA | H | - | - | - | - | - | - | L | L | L | L | L | L | L | L | L | L |
| IL | H | - | - | - | - | - | - | - | L | L | L | L | L | L | L | L | L |
| NM | H | - | - | - | - | - | - | - | - | L | L | L | L | L | L | L | L |
| DE | H | - | - | - | - | - | - | - | - | L | L | L | L | L | L | L | L |
| MI | H | - | - | - | - | - | - | - | - | - | L | L | L | L | L | L | L |
| VT | H | - | - | - | - | - | - | - | - | - | - | - | L | L | L | L | L |
| RI | H | H | - | - | - | - | - | - | - | - | - | - | L | L | L | L | L |
| DC | H | H | H | - | - | - | - | - | - | - | - | - | - | L | L | L | L |
| WI | H | H | H | H | H | - | - | - | - | - | - | - | - | - | - | - | L |
| TN | H | H | H | H | H | H | - | - | - | - | - | - | - | - | - | - | - |
| CT | H | H | H | H | H | H | - | - | - | - | - | - | - | - | - | - | - |
| IA | H | H | H | H | H | H | H | H | - | - | - | - | - | - | - | - | - |
| FL | H | H | H | H | H | H | H | H | H | - | - | - | - | - | - | - | - |
| MD | H | H | H | H | H | H | H | H | H | - | - | - | - | - | - | - | - |
| SD | H | H | H | H | H | H | H | H | H | - | - | - | - | - | - | - | - |
| PA | H | H | H | H | H | H | H | H | H | H | - | - | - | - | - | - | - |
| ME | H | H | H | H | H | H | H | H | H | H | - | - | - | - | - | - | - |
| MO | H | H | H | H | H | H | H | H | H | H | H | - | - | - | - | - | - |
| OH | H | H | H | H | H | H | H | H | H | H | H | H | H | - | - | - | - |
| AK | H | H | H | H | H | H | H | H | H | H | H | H | H | - | - | - | - |
| NY | H | H | H | H | H | H | H | H | H | H | H | H | H | H | - | - | - |
| GA | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | - | - |
| WV | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | - | - |
| AL | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | - | H |
| HI | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | - | H |
| MS | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H |
| IN | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H |
| MN | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H |
| NC | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H |
| MA | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H |
| SC | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H |
| NV | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H |
| ID | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H |
| LA | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H |
| MT | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H |
| OK | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H |
| KY | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H |
| NE | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H |
| CO | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H |
| NH | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H |
| VA | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H |
| NJ | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H |
| AR | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H |
| KS | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H |
| TX | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H |
| AZ | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H |
| CA | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H |
| UT | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H |
| ND | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H |
| WY | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H |

Note: An “H” indicates that there is at least a 90 percent chance the state identified at the top of the column has a higher true participation rate than the state identified at the left of the row. An “L” indicates that there is at least a 90 percent chance that the row state has a higher true participation rate than the column state.

## Table B.5b. How did your state compare with other states in 2015 for all eligibles? (Maine – Idaho)

| | ME | MO | OH | AK | NY | GA | WV | AL | HI | MS | IN | MN | NC | MA | SC | NV | ID |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OR | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| WA | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| IL | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| NM | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| DE | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| MI | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| VT | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| RI | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| DC | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| WI | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| TN | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| CT | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| IA | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| FL | - | - | - | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| MD | - | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| SD | - | - | - | - | - | - | L | - | L | L | L | L | L | L | L | L | L |
| PA | - | - | - | - | - | - | L | - | - | - | L | L | L | L | L | L | L |
| ME | - | - | - | - | - | - | - | - | - | - | - | - | L | L | L | L | L |
| MO | - | - | - | - | - | - | - | - | - | - | - | - | - | - | L | - | - |
| OH | - | - | - | - | - | - | - | - | - | - | - | - | - | - | L | - | L |
| AK | - | - | - | - | - | - | - | - | - | - | - | - | - | - | L | - | - |
| NY | - | - | - | - | - | - | - | - | - | - | - | - | - | - | L | - | - |
| GA | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| WV | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| AL | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| HI | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| MS | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| IN | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| MN | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| NC | H | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| MA | H | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| SC | H | H | H | H | H | - | - | - | - | - | - | - | - | - | - | - | - |
| NV | H | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| ID | H | - | H | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| LA | H | H | H | H | H | H | H | H | H | H | - | - | - | - | - | - | - |
| MT | H | H | H | H | H | H | H | H | H | H | H | H | H | - | H | - | - |
| OK | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | - | - |
| KY | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | - | - |
| NE | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | - |
| CO | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H |
| NH | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H |
| VA | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H |
| NJ | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H |
| AR | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H |
| KS | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H |
| TX | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H |
| AZ | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H |
| CA | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H |
| UT | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H |
| ND | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H |
| WY | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H |

Note: An “H” indicates that there is at least a 90 percent chance the state identified at the top of the column has a higher true participation rate than the state identified at the left of the row. An “L” indicates that there is at least a 90 percent chance that the row state has a higher true participation rate than the column state.

## Table B.5c. How did your state compare with other states in 2015 for all eligibles? (Louisiana – Wyoming)

| | LA | MT | OK | KY | NE | CO | NH | VA | NJ | AR | KS | TX | AZ | CA | UT | ND | WY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OR | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| WA | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| IL | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| NM | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| DE | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| MI | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| VT | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| RI | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| DC | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| WI | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| TN | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| CT | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| IA | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| FL | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| MD | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| SD | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| PA | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| ME | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| MO | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| OH | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| AK | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| NY | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| GA | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| WV | - | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| AL | - | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| HI | - | - | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| MS | - | - | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| IN | - | - | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| MN | - | - | - | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| NC | - | - | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| MA | - | - | - | - | L | L | L | L | L | L | L | L | L | L | L | L | L |
| SC | - | - | - | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| NV | - | - | - | - | - | - | - | - | - | L | L | L | L | L | L | L | L |
| ID | - | - | - | - | - | - | - | L | L | L | L | L | L | L | L | L | L |
| LA | - | - | - | - | - | - | - | L | L | L | L | L | L | L | L | L | L |
| MT | - | - | - | - | - | - | - | - | - | L | L | L | L | L | L | L | L |
| OK | - | - | - | - | - | - | - | - | - | L | L | L | L | L | L | L | L |
| KY | - | - | - | - | - | - | - | - | - | L | L | L | L | L | L | L | L |
| NE | - | - | - | - | - | - | - | - | - | - | - | L | L | L | L | L | L |
| CO | - | - | - | - | - | - | - | - | - | - | - | L | L | L | L | L | L |
| NH | - | - | - | - | - | - | - | - | - | - | - | L | - | L | L | L | L |
| VA | H | - | - | - | - | - | - | - | - | - | - | L | L | L | L | L | L |
| NJ | H | - | - | - | - | - | - | - | - | - | - | - | - | L | L | L | L |
| AR | H | H | H | H | - | - | - | - | - | - | - | - | - | - | - | L | L |
| KS | H | H | H | H | - | - | - | - | - | - | - | - | - | - | - | L | L |
| TX | H | H | H | H | H | H | H | H | - | - | - | - | - | - | - | L | L |
| AZ | H | H | H | H | H | H | - | H | - | - | - | - | - | - | - | L | L |
| CA | H | H | H | H | H | H | H | H | H | - | - | - | - | - | - | L | L |
| UT | H | H | H | H | H | H | H | H | H | - | - | - | - | - | - | L | L |
| ND | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | - | - |
| WY | H | H | H | H | H | H | H | H | H | H | H | H | H | H | H | - | - |

Note: An “H” indicates that there is at least a 90 percent chance the state identified at the top of the column has a higher true participation rate than the state identified at the left of the row. An “L” indicates that there is at least a 90 percent chance that the row state has a higher true participation rate than the column state.

## Table B.6. Estimates of participation rates varied widely

| FY 2015 participation rate for all eligible people | | |
|---|---|---|
| **Above 92 percent (top quarter)** | **Between 77 and 92 percent** | **Below 77 percent (bottom quarter)** |
| Oregon | Iowa | Nebraska |
| Washington | Florida | Colorado |
| Illinois | Maryland | New Hampshire |
| New Mexico | South Dakota | Virginia |
| Delaware | Pennsylvania | New Jersey |
| Michigan | Maine | Arkansas |
| Vermont | Missouri | Kansas |
| Rhode Island | Ohio | Texas |
| District of Columbia | Alaska | Arizona |
| Wisconsin | New York | California |
| Tennessee | Georgia | Utah |
| Connecticut | West Virginia | North Dakota |
| | Alabama | Wyoming |
| | Hawaii | |
| | Mississippi | |
| | Indiana | |
| | Minnesota | |
| | North Carolina | |
| | Massachusetts | |
| | South Carolina | |
| | Nevada | |
| | Idaho | |
| | Louisiana | |
| | Montana | |
| | Oklahoma | |
| | Kentucky | |

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