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Empirical Bayes Shrinkage Estimates of State Food Stamp Participation Rates in 1999-2001 for All Eligible People and for the Working Poor

Final Report

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EXECUTIVE SUMMARY

The Food Stamp Program is a central component of American 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 Stamp Act of 1977, as amended). The Food Stamp Program 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 2003, the program served over 21 million people in an average month at a total annual cost of over $21 billion in benefits. The average monthly food stamp benefit was about $195 per household.

This report presents estimates that, for each state, measure the need for the Food Stamp Program and the program's effectiveness in each of the three years from 1999 to 2001. The estimated numbers of people eligible for food stamps measure the need for the program. The estimated food stamp participation rates measure, state by state, the program's performance in reaching its target population.

Previous estimates of participation rates for states have pertained to all people eligible for the program (Schirm and Castner 2002). For 1999-2001, however, we derived estimates of participation rates for not only all eligible people but also the "working poor," that is, people who were eligible for the Food Stamp Program and lived in households in which someone earned income from a job.

The estimates for all eligible people and for the working poor were derived jointly using empirical Bayes shrinkage estimation methods and data from the Current Population Survey, the decennial census, and administrative records. The shrinkage estimator that was used averaged sample estimates of participation rates in each state with predictions from a regression model. The predictions were based on observed indicators of socioeconomic conditions in the states, such as the percentage of the total state population receiving food stamps. The shrinkage estimates derived are substantially more precise than direct sample estimates from the Current Population Survey or the Survey of Income and Program Participation, the best sources of current data on household incomes used to model program eligibility. Shrinkage estimators improve precision by "borrowing strength," that is, by using data for several years from all the states to derive each state's estimates for a given year and by using not only sample survey data but also census and administrative data. This report describes our shrinkage estimator in detail.

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I. INTRODUCTION

This report presents estimates of the food stamp participation rate and the number of people eligible for food stamps in each state for the years 1999 to 2001.[1] It also presents estimates of the participation rates for the working poor and the numbers of eligible working poor, where we define as "working poor" any person who is eligible for food stamps and lives in a household in which some member earns money from a job. These estimates were derived using "shrinkage" estimation methods. This introductory chapter overviews the advantages and some previous applications of shrinkage estimation. Chapter II describes how we derived shrinkage estimates, and Chapter III presents our state estimates for all eligible people and for the working poor. Technical details and additional information about our estimation methods are provided in Appendix A. In Appendix B, we discuss the differences between the estimates presented in this report and those in Cunnyngham (2003 and 2004).

The principal challenge in deriving state estimates like those presented in this report is that the leading national surveys collecting current income data for families and used for estimating program eligibility—the Current Population Survey (CPS) and the Survey of Income and Program Participation (SIPP)—have small samples for most states. Thus, "direct" estimates from these surveys are imprecise. For example, because of the potential errors introduced by the CPS surveying only a small number of families in Wyoming rather than all families in the state, we can be confident—by a commonly used standard—only that Wyoming's food stamp participation rate in 2001 was between about 51 and 68 percent. This range is wide (but typical), reflecting our substantial uncertainty about what Wyoming's participation rate actually was.

[1] The estimates presented here are also reported and compared with one another in Castner and Schirm (2004a and 2004b).

Why small samples make direct estimates imprecise is easy to see. By the definition of "direct," a direct estimate is based on data from one source for the state and time period in question. Thus, a 2001 estimate for Wyoming would be calculated using just 2001 data on households in one sample from Wyoming. If 2001 data are collected for only a small number of Wyoming households, as in the CPS or SIPP, a direct estimate will be imprecise, that is, subject to substantial sampling error because the estimator uses only the information contained in the small sample. Therefore, as illustrated before, estimates of participation rates will have large standard errors and wide confidence intervals, reflecting a lot of uncertainty about the true rate of participation.

To improve precision, statisticians have developed "indirect" estimators. These estimators "borrow strength" by using data from other states, time periods, or data sources. The assumption underlying indirect estimation is that what happened in other states in 2001 or what happened in Wyoming (and other states) in other years is relevant to estimating what happened in Wyoming in 2001. In an application of indirect estimation, the Census Bureau has improved the precision of state poverty rates from the CPS by calculating two- and three-year averages (Proctor and Dalaker 2003).

A generally superior indirect estimator is the so-called "shrinkage" estimator. A shrinkage estimator averages estimates obtained from different methods. For example, Fay and Herriott (1979) developed a shrinkage estimator that combined direct sample and regression estimates of per capita income for small places (population less than 1,000). Their estimates were used to allocate funds under the General Revenue Sharing Program. 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). To borrow strength across both space (states) and time, the current generation

WIC eligibles estimator uses several years of CPS data and combines direct sample estimates with predictions from a regression model. The predictions of WIC eligibles are based on, for example, state poverty rates according to tax return data and median family income according to Census 2000. States with similar socioeconomic conditions, as reflected in these poverty rate and mean income statistics, are observed (and predicted) to have similar proportions of infants and children eligible for WIC. This contrasts with the direct estimator that ignores systematic patterns across states, using, for example, only Wyoming data to derive an estimate for Wyoming, even though conditions may be similar in Montana or Colorado. The shrinkage estimator uses data for all the states (with data for prior years and data from other sources) to estimate a regression model and formulate a prediction for Wyoming. Then, the shrinkage estimator optimally averages the direct sample and regression estimates for Wyoming to obtain a shrinkage estimate. In another application of shrinkage methods, shrinkage estimates of poor school-aged children by state and county are used in allocating Title I compensatory education funds for disadvantaged youth (National Research Council 2000).

In these and other applications of shrinkage estimation, the gain in precision from borrowing strength via a shrinkage estimator can be substantial. The confidence intervals for the shrinkage estimates of WIC eligibles in 1992 were, on average, 61 percent narrower than the corresponding direct sample confidence intervals (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, an option that is surely not available to us. Therefore, we must use an indirect estimator and borrow strength (while recognizing that the gain in precision will often not be quite as large as for the 1992 WIC estimates).

As noted before, we have used a shrinkage estimator to derive state estimates of food stamp participation rates and counts of all eligible people and the eligible working poor. The estimator combined direct sample and regression estimates and borrowed strength across states, over time, and between groups (all eligible people and the working poor). Like the estimators used in the other applications described in this chapter, our estimator also borrowed strength by using data from outside the main sample survey (the CPS), specifically, data from administrative records systems and the decennial census. In all, our estimator used one year of census data, three years of CPS data, and three years of Food Stamp Program (FSP) and income tax data for all the states to obtain estimates for each state in each year (1999 to 2001) for all eligible people and for the working poor.

Although the shrinkage estimates derived for any one application are not guaranteed to be more accurate than estimates obtained using some other method, shrinkage estimators have good statistical properties in general, and we have found for our specific application that as in previous applications, shrinkage estimation can greatly improve precision. Additional support for shrinkage estimators is provided by the findings from simulation studies. For example, in a comprehensive evaluation of the relative accuracy of alternative estimators of state poverty rates, Schirm (1994) found that shrinkage estimates are substantially more accurate than direct estimates or indirect estimates obtained from other methods that have been widely used.

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

This chapter describes our procedure for estimating state food stamp participation rates for all eligible people and the working poor and the numbers eligible for food stamps. This procedure, summarized by the flow chart in Figure II.1, has the following four steps:

1. From CPS data and FSP administrative data, derive direct sample estimates of state food stamp participation rates for each of the three years 1999 to 2001.[2]
2. Using a regression model, predict state food stamp participation rates based on administrative and decennial census data.
3. Using "shrinkage" methods, average the direct sample estimates and regression predictions to obtain preliminary shrinkage estimates of state food stamp participation rates.
4. Adjust the preliminary shrinkage estimates to obtain final shrinkage estimates of state food stamp participation rates.

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

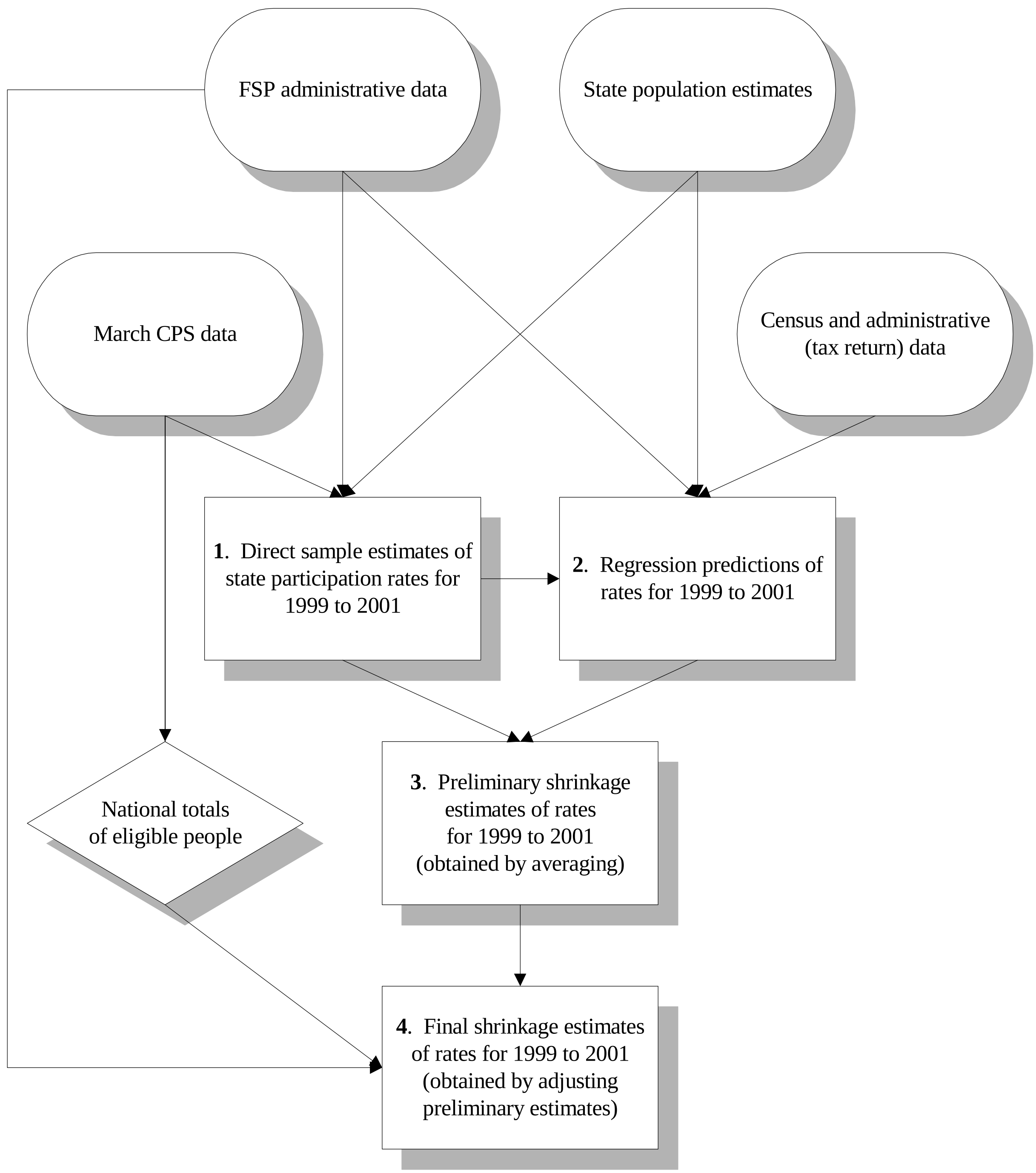
1. From CPS data and FSP administrative data, derive direct sample estimates of state food stamp participation rates for each of the three years 1999 to 2001

A food stamp participation rate is obtained by dividing an estimate of the number of people receiving food stamps by an estimate of the number of people eligible for food stamps, with the resulting ratio expressed as a percentage. We used FSP administrative data to estimate numbers

[2] In previous reports in this series, the estimates focused on September of each year. In this report, we derive estimates for the average month in the fiscal year. Deriving estimates for the average month in the year eliminates the effect of differential seasonality in FSP participation across states, thereby permitting "fairer" comparisons of state participation rates. (Deriving estimates for one specific month, in contrast, is advantageous to states with seasonally high participation in that month and disadvantageous to states with seasonally low participation.) Another benefit from deriving estimates for the average month in the year is that we use FSP sample data from 12 months rather than 1 month, substantially increasing the sample size and, thus, improving the precision of the estimates for the working poor.

FIGURE II.1

THE ESTIMATION PROCEDURE



of recipients. To derive direct sample estimates of participation rates, we used CPS data to estimate numbers of eligibles. Because the CPS collects family income data for the prior calendar year, we obtained estimates of eligibles in 2001, for example, from the March 2002 CPS. To derive a participation rate for the working poor, we divided the number of working poor recipients by the number of working poor people who were eligible, obtaining estimates from FSP administrative data and CPS data.

As noted in Chapter I, direct sample estimates of participation rates are relatively imprecise. The standard errors for the estimates, reported in Appendix A along with the estimated rates, tend to be large, so our uncertainty about states' true rates is great. For example, according to commonly used statistical standards, we can be confident only that Wyoming's participation rate for all eligible people in 2001 was between 51 percent and 68 percent. This range is so wide and our uncertainty so great because the CPS sample for Wyoming is small. This lack of data, that is, the small number of sample observations that pertain directly to the target geographic area and time period—Wyoming and 2001 in our example—is the fundamental problem of "small area estimation."

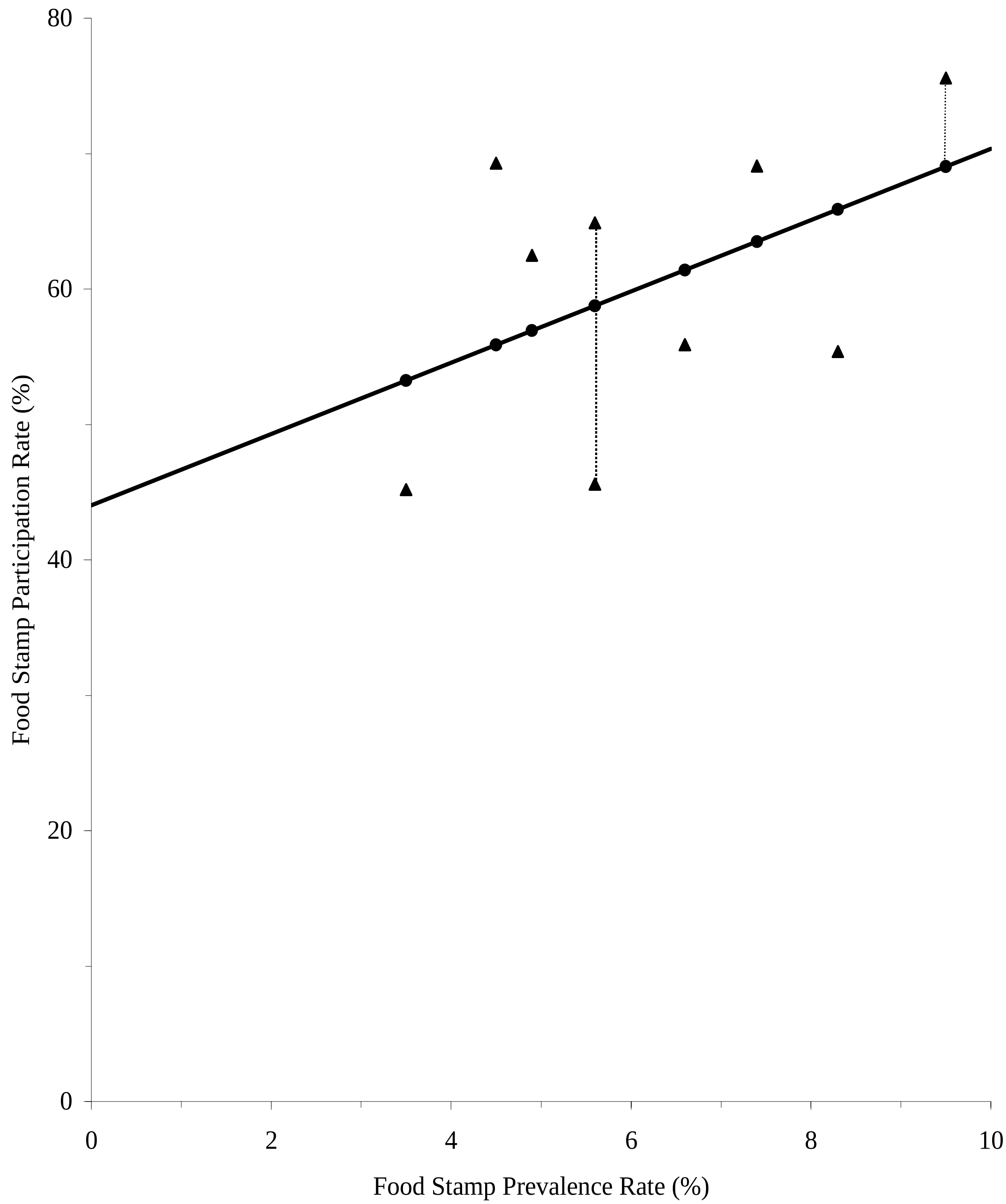
2. Using a regression model, predict state food stamp participation rates based on administrative and decennial census data

The main limitation of the sample estimates derived in the previous step is imprecision. Regression can reduce that imprecision. Regression estimates are predictions based on nonsample or highly precise sample data, such as census and administrative records data. The latter include records from government tax and transfer programs.

Figure II.2 illustrates how the regression estimator works. The simple example in the figure has only nine states and data for just one year on one predictor—the food stamp "prevalence" rate—that will be used to predict each state's food stamp participation rate for eligible people.

FIGURE II.2

AN ILLUSTRATIVE REGRESSION ESTIMATOR



The food stamp prevalence rate is measured by the percentage of all people (eligible and ineligible combined) who receive food stamps, in contrast to the food stamp participation rate, which is measured by the percentage of eligible people who receive food stamps. The triangles in the figure correspond to direct sample estimates; a triangle shows the prevalence rate in a state (read off the horizontal axis) and the sample estimate of the participation rate in that state (read off the 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 Food Stamp 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 (that is, we "regress" the sample estimates on the predictor). Regression estimates of participation rates are points on that line, the circles in Figure II.2. The predicted participation rate for a particular state is obtained by moving up or down from the state's sample estimate (the triangle) to the regression line (where there is a circle) and reading the value off 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 food stamps, the predicted participation rate is nearly 70 percent.

To derive the regression estimates presented in Appendix A (in Tables A.16 and A.17) for 1999 to 2001 and for all eligible people and the working poor, we included all of the states, not just nine as in our illustrative example, and we used five predictors, not just one. Adding four predictors improves our predictions. The five predictors used measure:

- The percentage of the population receiving food stamps, that is, the food stamp prevalence rate

- The tax return nonfiler rate, that is, the percentage of the population that is not claimed as exemptions on tax returns
- The poverty rate for working age adults according to individual income tax data, namely, the percentage of exemptions for working age adults (18-64) that are claimed on tax returns with income below the federal poverty level
- The percentage of occupied housing units that are renter-occupied according to Census 2000
- The percentage of elderly people (age 65 or older) at or below the federal poverty level in 1999 according to Census 2000

The first two predictors are obtained from administrative data and population estimates, the third predictor is from administrative data, and the last two predictors are from the decennial census. These five predictors were selected as the best from a longer list described in Appendix A, which provides complete definitions and sources for the predictors. Appendix A also presents standard errors for the regression estimates. These tend to be fairly equal across the states and much smaller than the largest standard errors for sample estimates, reflecting substantial gains in precision from regression for the states with the most error-prone sample estimates.

Comparing how the direct sample and regression estimators use data reveals how the regression estimator "borrows strength" to improve precision. When we derived sample estimates in Step 1, we used only one year's CPS sample data from Wyoming to estimate Wyoming's participation rate in that year, even though Wyoming, like nearly all states, has a small CPS sample. Deriving regression estimates in this step, we estimated a regression line from sample, administrative, and census data for several years and all the states and used the estimated line (with administrative and census data for Wyoming) to predict Wyoming's participation rate in a given year. In other words, the regression estimator not only uses the sample estimates from every state for several 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 census. In addition, the regression estimator derives estimates for all eligible people and the working poor jointly.

The regression estimator improves precision by using more data. It uses that additional data to identify states with sample estimates that seem too high or too low because of sampling error, that is, error from drawing a sample—a subset of the population—that has a higher or lower participation rate than the entire state population has. For example, suppose a state has a low food stamp prevalence rate and values for other predictors that are consistent with a low food stamp participation rate. Then, our regression estimator would predict a low participation rate for that state, implying that a sample estimate showing a high rate is too high. The regression estimate will be lower than the sample estimate for such a state. On the other hand, if the sample data for a state show a much lower participation rate than expected in light of the food stamp prevalence rate and the other predictors, the regression estimate for that state will be higher than the sample estimate.

3. Using "shrinkage" methods, average the direct sample estimates and regression predictions to obtain preliminary shrinkage estimates of state food stamp participation rates

As noted before, the limitation of the direct sample estimator is imprecision. The limitation of the regression estimator is called "bias." Some states really have higher or lower participation rates than we expect (and predict with the regression estimator) based on the food stamp prevalence rate and other predictors used. Such errors in regression estimates reflect bias.

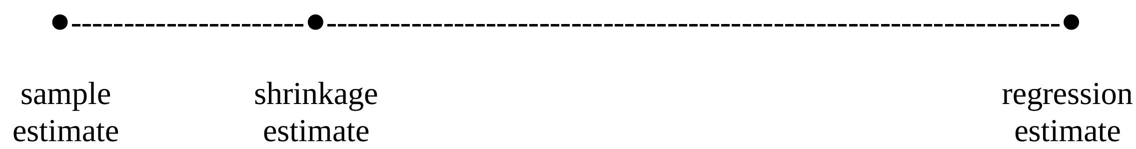
These limitations arise for the following reasons. The sample estimator uses relatively little information. It uses only the typically small number of sample observations for one state and one year to obtain an estimate for that state and year. It does not use sample data for other states or other years or data from other sources, such as administrative records or the census. Although the regression estimator borrows strength, using data from all the states and several years as well as administrative and census 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 sample 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.

Using all of the information at hand, a shrinkage estimator addresses the limitations of the sample and regression estimators by combining the sample and regression estimates, striking a compromise. As illustrated in Figure II.3, a shrinkage estimator takes a weighted average of the sample and regression estimates, weighting them according to their relative accuracy. We calculated weights using the empirical Bayes methods described in Appendix A. Generally, the more precise the sample estimate for a state, the closer the shrinkage estimate will be to it. The larger samples drawn in large states support more precise sample estimates, so shrinkage estimates tend to be closer to the sample estimates for large states. Given the precision of the sample estimate for a state, 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 and farther from the sample estimate when the regression line fits well than when the line fits poorly. Striking a compromise between the sample and regression estimators, the shrinkage estimator strikes a compromise between imprecision and bias. The sample 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 sample estimator. By sacrificing a little precision, the shrinkage estimator may be substantially less biased than the

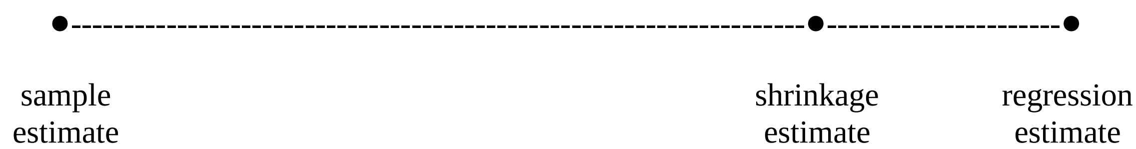
FIGURE II.3

SHRINKAGE ESTIMATION

Poor predictions or state with relatively large sample ⇒ more weight on sample estimate:



Good predictions or state with relatively small sample ⇒ more weight on regression estimate:



regression estimator. The shrinkage estimator optimizes the tradeoff between imprecision and bias.

In the next step of our estimation procedure, we make some fairly small adjustments to the shrinkage estimates that we derive in this step. Thus, we call the estimates from this step "preliminary" and the estimates from the next step "final."

4. Adjust the preliminary shrinkage estimates to obtain final shrinkage estimates of state food stamp participation rates

We adjusted the preliminary shrinkage estimates of participation rates in two ways. First, we adjusted the rates so that the eligibles counts implied by the rates sum to the national eligibles count estimated directly from the CPS. Second, we adjusted the rates so that no state's estimated rate is 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 the working poor). The following description of the adjustments will focus on the 2001 estimates for all eligible people. In Appendix A, we describe the results of the adjustment for other years and for the working poor and discuss our adjustment method in more detail.

To implement the first adjustment, we calculated preliminary estimates of eligibles counts from the preliminary estimates of participation rates derived in Step 3 and the administrative estimates of the numbers of food stamp recipients obtained in Step 1. The state eligibles counts summed to 29,126,248 for 2001, while the national total for 2001 estimated directly from the CPS was 28,320,555. To obtain estimated eligibles counts for states that sum (aside from rounding error) to the direct estimate of the national total, we multiplied each of the preliminary eligibles counts by 28,320,555 ÷ 29,126,248 (≈ 0.9723). 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 for 2001, one state had fewer estimated eligibles than participants, implying a participation rate over 100 percent. To cap participation rates at 100 percent, we performed a second adjustment. Specifically, we took eligibles away from the 50 states that had enough eligibles (that is, more eligibles than participants) and gave them to the state that did not have enough, stopping when the number of eligibles in that state equaled the number of participants. Eligibles were taken away from states in proportion to their numbers of eligibles. This adjustment, which moved very small numbers of eligibles among states, did not change the national total. Moreover, except for the state with a participation rate initially over 100 percent, this adjustment did not change any state’s participation rate in 2001 by more than seven-thousandths of a percentage point.

After completing this adjustment, we had obtained our final shrinkage estimates of the numbers of people eligible for food stamps. From those estimates and our administrative estimates of the numbers of food stamp recipients, we derived final shrinkage estimates of participation rates. Our final shrinkage estimates are presented in the next chapter.

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III. STATE ESTIMATES OF FSP PARTICIPATION RATES AND NUMBERS OF ELIGIBLE PEOPLE FOR 1999 TO 2001 FOR ALL ELIGIBLE PEOPLE AND FOR THE WORKING POOR

Tables III.1 and III.2 present our final shrinkage estimates of food stamp participation rates in each state for 1999 to 2001 for all eligible people and for the working poor, respectively.[3] For those same years, Tables III.3 and III.4 display our final shrinkage estimates of the number of people eligible for food stamps and the number of eligible working poor in each state.

These shrinkage estimates are relatively precise; they have much smaller standard errors and narrower confidence intervals than the CPS direct sample estimates. Tables III.5 to III.10 display approximate 90-percent confidence intervals showing the uncertainty remaining after using shrinkage estimation. One interpretation of such an 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, while our best estimate is that Wyoming's participation rate for all eligible people was 58 percent in 2001 (see Table III.1), the true rate may have been higher or lower. However, according to Table III.7, the chances are 90 in 100 that the true rate was between 53 and 63 percent, an interval that is about three-fifths as wide as the interval (cited in Chapter I) around the direct sample 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 60 percent as wide as the corresponding sample confidence interval. Thus, shrinkage substantially improves precision and

[3] In Castner and Schirm (2004b), we present and discuss the participation rates for all eligible people. In Castner and Schirm (2004a), we present and discuss the participation rates for the working poor, provide additional details about the derivation of the rates, and discuss several issues that arise in estimating the percentage of food stamp participants who are working poor from FSP administrative data. As indicated by the tables in this report and in Castner and Schirm (2004a), the estimated participation rates for the working poor are less precise than the estimated rates for all eligible people.

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 Castner and Schirm (2004a and 2004b), the shrinkage estimates are sufficiently precise to show, for example, whether a state's food stamp participation rate was probably near the top, near the bottom, or in the middle of the distribution of rates in a given year. That would be enough information for many important purposes, such as guiding an initiative to improve program performance.

TABLE III.1

FINAL SHRINKAGE ESTIMATES OF FOOD STAMP PARTICIPATION RATES, ALL ELIGIBLE PEOPLE (Percent)

	1999	2000	2001
Alabama	64	60	60
Alaska	71	73	72
Arizona	49	48	51
Arkansas	68	61	62
California	54	57	54
Colorado	54	52	52
Connecticut	66	68	67
Delaware	60	55	55
District of Columbia	93	87	77
Florida	55	52	48
Georgia	60	55	53
Hawaii	90	94	85
Idaho	48	50	48
Illinois	71	71	73
Indiana	64	67	71
Iowa	60	61	61
Kansas	48	54	55
Kentucky	77	78	77
Louisiana	76	70	73
Maine	84	82	81
Maryland	60	57	55
Massachusetts	43	45	45
Michigan	78	77	76
Minnesota	63	65	63
Mississippi	63	54	57
Missouri	73	77	79
Montana	60	60	61
Nebraska	64	63	61
Nevada	39	43	46
New Hampshire	51	57	55
New Jersey	54	54	50
New Mexico	72	59	62
New York	61	62	58
North Carolina	53	49	51
North Dakota	53	54	63
Ohio	60	62	63
Oklahoma	66	60	61
Oregon	70	77	84
Pennsylvania	73	72	69
Rhode Island	67	69	67
South Carolina	64	59	61
South Dakota	63	63	65
Tennessee	74	68	69
Texas	50	47	49
Utah	57	56	54
Vermont	78	77	72
Virginia	58	58	58
Washington	60	64	64
West Virginia	100	96	89
Wisconsin	54	61	64
Wyoming	56	56	58
United States	61	60	60

TABLE III.2

FINAL SHRINKAGE ESTIMATES OF FOOD STAMP PARTICIPATION RATES,
WORKING POOR
(Percent)

	1999	2000	2001
Alabama	56	54	60
Alaska	55	63	67
Arizona	35	33	40
Arkansas	56	53	59
California	27	34	31
Colorado	46	46	49
Connecticut	50	54	59
Delaware	52	48	52
District of Columbia	37	47	38
Florida	45	44	45
Georgia	54	52	52
Hawaii	65	79	75
Idaho	46	47	50
Illinois	61	65	73
Indiana	62	66	77
Iowa	49	49	55
Kansas	41	47	52
Kentucky	70	76	83
Louisiana	73	73	82
Maine	78	81	89
Maryland	48	46	49
Massachusetts	24	30	30
Michigan	74	75	83
Minnesota	57	59	63
Mississippi	57	50	58
Missouri	69	76	86
Montana	52	56	60
Nebraska	54	55	58
Nevada	21	25	27
New Hampshire	42	47	51
New Jersey	35	36	39
New Mexico	60	44	59
New York	38	46	42
North Carolina	47	44	51
North Dakota	55	59	72
Ohio	53	56	65
Oklahoma	61	58	63
Oregon	60	70	84
Pennsylvania	69	72	75
Rhode Island	50	58	59
South Carolina	60	57	64
South Dakota	65	67	74
Tennessee	62	60	69
Texas	42	42	45
Utah	49	49	53
Vermont	67	70	73
Virginia	52	53	58
Washington	47	53	57
West Virginia	96	95	100
Wisconsin	54	62	70
Wyoming	57	59	65
United States	48	50	54

TABLE III.3

FINAL SHRINKAGE ESTIMATES OF NUMBERS OF PEOPLE
ELIGIBLE FOR FOOD STAMPS,
ALL ELIGIBLE PEOPLE
(Thousands)

	1999	2000	2001
Alabama	612	631	659
Alaska	55	50	51
Arizona	514	532	562
Arkansas	368	397	412
California	3,679	3,137	3,054
Colorado	313	292	287
Connecticut	255	237	229
Delaware	61	56	57
District of Columbia	89	90	93
Florida	1,635	1,662	1,771
Georgia	985	988	1,044
Hawaii	136	122	124
Idaho	115	112	121
Illinois	1,129	1,059	1,092
Indiana	457	434	472
Iowa	212	198	205
Kansas	233	206	220
Kentucky	509	507	522
Louisiana	665	704	697
Maine	125	120	127
Maryland	424	375	371
Massachusetts	600	507	481
Michigan	834	770	839
Minnesota	324	298	309
Mississippi	452	503	517
Missouri	547	535	554
Montana	100	95	98
Nebraska	136	125	126
Nevada	152	139	147
New Hampshire	70	62	62
New Jersey	690	612	623
New Mexico	242	280	259
New York	2,478	2,267	2,288
North Carolina	902	952	938
North Dakota	61	57	60
Ohio	1,059	977	998
Oklahoma	400	410	418
Oregon	309	295	327
Pennsylvania	1,119	1,048	1,071
Rhode Island	112	105	104
South Carolina	475	489	518
South Dakota	70	68	68
Tennessee	669	714	745
Texas	2,757	2,841	2,757
Utah	144	135	142
Vermont	55	50	51
Virginia	597	557	560
Washington	499	455	477
West Virginia	240	233	242
Wisconsin	327	309	332
Wyoming	42	39	39
United States	29,034	27,835	28,321

TABLE III.4

FINAL SHRINKAGE ESTIMATES OF NUMBERS OF PEOPLE
ELIGIBLE FOR FOOD STAMPS,
WORKING POOR
(Thousands)

	1999	2000	2001
Alabama	280	267	256
Alaska	37	26	24
Arizona	315	320	299
Arkansas	183	182	171
California	2,186	1,838	1,917
Colorado	150	154	146
Connecticut	121	97	75
Delaware	26	25	22
District of Columbia	30	28	26
Florida	782	775	749
Georgia	458	441	432
Hawaii	70	62	58
Idaho	77	66	67
Illinois	539	491	460
Indiana	204	177	192
Iowa	114	104	94
Kansas	123	100	99
Kentucky	211	203	190
Louisiana	292	306	294
Maine	39	40	41
Maryland	175	131	119
Massachusetts	244	197	169
Michigan	384	334	334
Minnesota	121	119	111
Mississippi	207	211	207
Missouri	232	239	223
Montana	56	48	43
Nebraska	66	59	58
Nevada	97	76	71
New Hampshire	25	17	21
New Jersey	263	223	217
New Mexico	128	162	113
New York	1,048	836	829
North Carolina	386	450	388
North Dakota	30	29	28
Ohio	431	399	388
Oklahoma	201	207	182
Oregon	173	150	167
Pennsylvania	499	434	367
Rhode Island	39	35	26
South Carolina	201	176	179
South Dakota	35	32	26
Tennessee	289	286	290
Texas	1,570	1,610	1,544
Utah	78	77	75
Vermont	22	17	15
Virginia	263	241	237
Washington	236	194	173
West Virginia	86	86	78
Wisconsin	142	154	148
Wyoming	22	22	19
United States	13,984	12,953	12,455

TABLE III.5

APPROXIMATE 90-PERCENT CONFIDENCE INTERVALS FOR FINAL SHRINKAGE ESTIMATES FOR 1999, ALL ELIGIBLE PEOPLE

	Participation Rate (Percent)		Number of Eligible People (Thousands)	
	Lower Bound	Upper Bound	Lower Bound	Upper Bound
Alabama	58	69	562	662
Alaska	64	77	50	60
Arizona	44	54	459	570
Arkansas	62	73	337	399
California	50	58	3,428	3,931
Colorado	48	59	281	345
Connecticut	60	73	231	280
Delaware	54	66	55	67
District of Columbia	82	100	78	100
Florida	51	59	1,513	1,757
Georgia	56	65	913	1,058
Hawaii	82	99	123	149
Idaho	42	54	100	129
Illinois	66	75	1,053	1,205
Indiana	58	70	414	500
Iowa	54	66	190	233
Kansas	44	52	212	254
Kentucky	70	83	466	552
Louisiana	70	83	610	720
Maine	77	91	115	135
Maryland	54	66	382	467
Massachusetts	38	48	525	675
Michigan	72	84	773	896
Minnesota	56	70	287	361
Mississippi	58	68	416	489
Missouri	66	79	496	598
Montana	53	66	89	111
Nebraska	58	70	123	149
Nevada	35	44	135	170
New Hampshire	45	57	62	78
New Jersey	49	59	626	754
New Mexico	66	78	222	263
New York	56	66	2,285	2,672
North Carolina	49	58	823	982
North Dakota	46	59	54	69
Ohio	55	64	981	1,137
Oklahoma	61	70	373	428
Oregon	63	76	281	337
Pennsylvania	68	78	1,039	1,200
Rhode Island	61	74	102	123
South Carolina	58	70	431	519
South Dakota	56	70	62	77
Tennessee	69	79	622	716
Texas	48	53	2,624	2,892
Utah	51	63	128	160
Vermont	72	84	51	59
Virginia	53	64	541	653
Washington	55	66	456	541
West Virginia	91	100	240	260
Wisconsin	48	60	290	363
Wyoming	50	61	38	46
United States	60	62	28,391	29,676

TABLE III.6

APPROXIMATE 90-PERCENT CONFIDENCE INTERVALS FOR FINAL SHRINKAGE ESTIMATES FOR 2000, ALL ELIGIBLE PEOPLE

	Participation Rate (Percent)		Number of Eligible People (Thousands)	
	Lower Bound	Upper Bound	Lower Bound	Upper Bound
Alabama	55	65	581	682
Alaska	67	79	46	54
Arizona	43	53	478	585
Arkansas	56	67	363	431
California	55	60	3,003	3,272
Colorado	47	57	264	321
Connecticut	62	74	217	257
Delaware	50	61	50	61
District of Columbia	80	94	83	98
Florida	47	56	1,517	1,806
Georgia	50	59	915	1,062
Hawaii	86	100	112	133
Idaho	44	55	100	124
Illinois	67	76	990	1,128
Indiana	62	73	397	470
Iowa	55	66	180	216
Kansas	49	60	185	228
Kentucky	71	84	464	550
Louisiana	65	76	648	759
Maine	76	89	110	129
Maryland	51	62	340	410
Massachusetts	40	51	448	566
Michigan	72	82	719	821
Minnesota	59	72	267	328
Mississippi	48	60	449	557
Missouri	70	84	487	584
Montana	54	67	85	105
Nebraska	57	69	113	137
Nevada	38	48	123	155
New Hampshire	51	62	56	68
New Jersey	50	58	567	657
New Mexico	53	65	252	308
New York	58	65	2,122	2,412
North Carolina	46	52	895	1,009
North Dakota	48	60	50	64
Ohio	58	66	913	1,040
Oklahoma	56	65	381	438
Oregon	70	83	270	320
Pennsylvania	67	78	969	1,126
Rhode Island	63	75	95	114
South Carolina	54	65	446	533
South Dakota	56	70	60	76
Tennessee	63	73	666	761
Texas	44	49	2,691	2,991
Utah	50	62	121	150
Vermont	72	83	47	54
Virginia	53	64	506	607
Washington	59	68	421	489
West Virginia	89	100	216	251
Wisconsin	56	66	283	335
Wyoming	51	61	36	43
United States	59	61	27,340	28,331

TABLE III.7

APPROXIMATE 90-PERCENT CONFIDENCE INTERVALS FOR FINAL SHRINKAGE ESTIMATES FOR 2001, ALL ELIGIBLE PEOPLE

	Participation Rate (Percent)		Number of Eligible People (Thousands)	
	Lower Bound	Upper Bound	Lower Bound	Upper Bound
Alabama	56	63	619	698
Alaska	66	78	47	55
Arizona	46	56	507	616
Arkansas	57	66	383	441
California	50	58	2,825	3,282
Colorado	47	57	259	315
Connecticut	61	72	209	248
Delaware	49	61	51	63
District of Columbia	68	86	82	104
Florida	45	51	1,653	1,889
Georgia	49	58	957	1,131
Hawaii	78	92	114	135
Idaho	44	53	109	132
Illinois	68	78	1,018	1,165
Indiana	65	77	434	511
Iowa	55	67	185	225
Kansas	51	59	204	236
Kentucky	71	84	477	566
Louisiana	68	78	647	747
Maine	75	88	116	137
Maryland	49	61	331	411
Massachusetts	40	50	426	536
Michigan	71	81	781	897
Minnesota	56	70	274	344
Mississippi	51	63	464	570
Missouri	72	86	504	604
Montana	55	68	87	108
Nebraska	55	67	113	139
Nevada	42	50	135	160
New Hampshire	49	61	55	68
New Jersey	47	53	585	661
New Mexico	57	66	240	278
New York	54	62	2,138	2,439
North Carolina	48	54	882	994
North Dakota	57	69	54	65
Ohio	59	67	934	1,062
Oklahoma	56	66	386	451
Oregon	77	91	299	355
Pennsylvania	64	73	994	1,149
Rhode Island	61	73	95	113
South Carolina	55	66	468	568
South Dakota	58	72	61	75
Tennessee	64	74	692	799
Texas	46	52	2,587	2,927
Utah	48	60	127	158
Vermont	68	77	48	54
Virginia	53	63	513	608
Washington	59	68	443	511
West Virginia	82	96	224	261
Wisconsin	59	69	304	359
Wyoming	53	63	35	42
United States	59	61	27,772	28,870

TABLE III.8

APPROXIMATE 90-PERCENT CONFIDENCE INTERVALS FOR FINAL SHRINKAGE ESTIMATES FOR 1999, WORKING POOR

	Participation Rate (Percent)		Number of Eligible People (Thousands)	
	Lower Bound	Upper Bound	Lower Bound	Upper Bound
Alabama	47	64	239	321
Alaska	45	65	30	43
Arizona	27	42	249	381
Arkansas	47	64	154	211
California	23	30	1,930	2,442
Colorado	40	53	128	171
Connecticut	41	60	98	143
Delaware	42	62	21	31
District of Columbia	27	47	22	38
Florida	40	51	683	881
Georgia	47	60	403	514
Hawaii	54	75	59	82
Idaho	37	55	62	92
Illinois	53	68	475	603
Indiana	53	71	173	235
Iowa	42	56	98	130
Kansas	35	47	105	140
Kentucky	60	81	179	242
Louisiana	64	82	256	328
Maine	67	90	34	45
Maryland	39	57	143	207
Massachusetts	19	29	195	293
Michigan	66	83	342	426
Minnesota	49	66	102	140
Mississippi	47	67	171	243
Missouri	57	81	191	273
Montana	43	61	46	65
Nebraska	45	62	55	76
Nevada	15	27	69	125
New Hampshire	32	51	19	30
New Jersey	30	40	223	303
New Mexico	52	69	110	146
New York	32	45	872	1,225
North Carolina	41	54	334	439
North Dakota	44	65	24	36
Ohio	47	59	383	479
Oklahoma	54	69	177	226
Oregon	51	69	146	200
Pennsylvania	60	79	434	565
Rhode Island	40	60	31	46
South Carolina	51	69	172	230
South Dakota	55	75	30	40
Tennessee	54	70	250	327
Texas	38	46	1,428	1,712
Utah	41	58	64	92
Vermont	56	77	18	25
Virginia	44	59	224	302
Washington	40	54	200	272
West Virginia	81	100	72	100
Wisconsin	45	62	119	164
Wyoming	50	64	19	25
United States	46	49	13,448	14,520

TABLE III.9

APPROXIMATE 90-PERCENT CONFIDENCE INTERVALS FOR FINAL SHRINKAGE ESTIMATES FOR 2000, WORKING POOR

	Participation Rate (Percent)		Number of Eligible People (Thousands)	
	Lower Bound	Upper Bound	Lower Bound	Upper Bound
Alabama	46	62	227	307
Alaska	53	72	22	30
Arizona	29	37	282	358
Arkansas	46	61	155	208
California	30	37	1,649	2,027
Colorado	41	52	135	173
Connecticut	45	63	81	113
Delaware	38	58	20	30
District of Columbia	37	56	22	34
Florida	38	51	662	887
Georgia	45	59	380	503
Hawaii	66	91	52	72
Idaho	39	55	55	77
Illinois	57	72	436	546
Indiana	57	75	152	201
Iowa	43	55	92	116
Kansas	40	55	84	116
Kentucky	65	86	175	231
Louisiana	64	82	269	343
Maine	70	92	34	46
Maryland	38	54	109	154
Massachusetts	24	36	157	237
Michigan	66	84	295	374
Minnesota	51	66	104	134
Mississippi	41	59	173	249
Missouri	63	89	199	279
Montana	47	65	40	56
Nebraska	47	63	50	67
Nevada	20	31	60	93
New Hampshire	38	56	13	20
New Jersey	31	41	193	254
New Mexico	37	51	137	187
New York	40	52	729	944
North Carolina	39	50	394	507
North Dakota	49	70	24	34
Ohio	51	62	359	439
Oklahoma	52	65	184	230
Oregon	60	80	129	171
Pennsylvania	62	81	376	492
Rhode Island	48	67	29	41
South Carolina	50	64	153	199
South Dakota	57	78	27	38
Tennessee	53	67	253	319
Texas	38	46	1,460	1,760
Utah	41	57	65	90
Vermont	60	80	14	19
Virginia	46	60	209	273
Washington	47	60	170	217
West Virginia	81	100	74	99
Wisconsin	56	69	138	171
Wyoming	52	65	20	24
United States	49	52	12,530	13,375

TABLE III.10

APPROXIMATE 90-PERCENT CONFIDENCE INTERVALS FOR FINAL SHRINKAGE ESTIMATES FOR 2001, WORKING POOR

	Participation Rate (Percent)		Number of Eligible People (Thousands)	
	Lower Bound	Upper Bound	Lower Bound	Upper Bound
Alabama	53	67	226	285
Alaska	57	76	21	27
Arizona	34	46	254	344
Arkansas	52	65	151	191
California	27	34	1,704	2,130
Colorado	43	56	126	166
Connecticut	49	68	63	87
Delaware	42	63	17	26
District of Columbia	28	48	19	33
Florida	39	50	662	837
Georgia	46	59	377	486
Hawaii	64	86	50	67
Idaho	42	58	57	77
Illinois	66	80	414	507
Indiana	68	87	168	216
Iowa	49	62	82	106
Kansas	46	57	88	110
Kentucky	73	94	166	215
Louisiana	74	91	263	325
Maine	78	100	36	46
Maryland	40	57	98	141
Massachusetts	25	36	137	202
Michigan	75	92	300	369
Minnesota	54	72	95	127
Mississippi	49	67	176	238
Missouri	73	99	190	257
Montana	52	68	37	49
Nebraska	49	67	49	67
Nevada	22	31	59	83
New Hampshire	42	59	17	24
New Jersey	33	44	183	250
New Mexico	52	66	99	127
New York	37	47	735	924
North Carolina	46	56	350	425
North Dakota	61	82	24	32
Ohio	59	72	349	427
Oklahoma	56	71	161	204
Oregon	74	95	147	187
Pennsylvania	66	85	321	413
Rhode Island	49	69	22	31
South Carolina	56	73	156	202
South Dakota	63	84	22	29
Tennessee	61	77	257	323
Texas	42	48	1,446	1,642
Utah	45	61	64	87
Vermont	63	82	13	17
Virginia	50	66	204	269
Washington	52	63	155	190
West Virginia	87	100	78	87
Wisconsin	62	78	131	165
Wyoming	56	73	17	22
United States	52	55	12,077	12,833

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APPENDIX A

THE ESTIMATION PROCEDURE: ADDITIONAL TECHNICAL DETAILS

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This appendix provides additional information and technical details about our four-step procedure to estimate state food stamp participation rates for all eligible people and the working poor.[1] Each step is discussed in turn.

1. From CPS data and FSP administrative data, derive direct sample estimates of state food stamp participation rates for each of the three years 1999 to 2001.

Tables A.1 and A.2 display direct sample estimates of participation rates for all eligible people and for the working poor, respectively. Tables A.3 and A.4 present standard errors for the sample estimates. The method for obtaining the standard errors is described later.

We derived sample estimates of participation rates for all eligible people for a given 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; P_i is the number of people receiving food stamps in the year in question according to FSP Statistical Summary of Operations ("Program Operations") data; $\varepsilon_{1,i}$ is the "correctly-eligible" issuance rate, that is the percentage of participating people who are correctly receiving benefits according to Food Stamp Program Quality Control (FSPQC) data, calculated as 100 minus the issuance error rate; $E_{1,i}$ is the percentage of people who are eligible for food stamps according to the CPS; and T_i is the

[1] To derive the estimates presented in this report for all eligible people and the working poor, we used the same basic empirical Bayes shrinkage estimator that we have used previously to derive estimates for all eligible people only (Castner and Schirm 2003), although it is specified in terms of two groups rather than one. With such an estimator, we can derive the estimates for all eligible people and the working poor jointly, taking account of the between-group correlations in both sampling errors and model prediction errors. This improves the accuracy of the estimates and allows us to assess, for example, how participation rates for all eligible people and the working poor are related. Because the two-group estimator takes into account more information—that is, information about both groups—the estimates obtained from the two-group estimator for all eligible people would not be identical to estimates obtained from the one-group estimator that uses information and derives estimates for all eligible people only.

resident population according to decennial census and administrative records (mainly vital statistics) data.[2,3,4] Similarly, we derived sample estimates of participation rates for the working poor for a given year according to:

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

where $Y_{2,i}$ is the estimated participation rate for the working poor for state i; $\varepsilon_{2,i}$ is the percentage of participating people who are working poor and correctly receiving food stamps according to FSPQC data; $E_{2,i}$ is the percentage of people who are working poor and eligible for food stamps according to the CPS; and P_i and T_i are as defined above. As noted, we estimated eligibility percentages rather than eligibility counts from the CPS. Estimated percentages are more precise than estimated counts because the sampling errors in the numerators and denominators of

[2] If P_i includes people who received disaster relief benefits issued after a major natural disaster, P_i is adjusted by linearly interpolating between the participant figures for the months immediately before and after the period during which disaster relief was provided. This adjustment seeks to exclude from our estimate of participants those people who received food stamps only because of a natural disaster, are not otherwise eligible, and, thus, are not included in our estimate of eligibles. It allows us to measure a state's participation rate under "normal" circumstances. Because P_i is obtained from FSP Program Operations data, which include the full population of food stamp cases, it is not subject to sampling error. Participant figures were provided by the Food and Nutrition Service (FNS).

[3] We adjusted for issuance errors to exclude from our estimate of participants those people who were ineligible for food stamps and, thus, are not included in our estimate of eligibles.

[4] In broad terms, the population estimates derived by the Census Bureau in its Population Estimates Program are obtained by subtracting from 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). The 1999 population estimates that we used were released on August 30, 2000 at http://www.census.gov/population/www/estimates/st_sasrh.html. Although the Census Bureau did not adjust these published population estimates for net undercount in the (1990) decennial census, we adjusted the estimates when deriving our T_i figures using a state net population adjustment matrix published by the Census Bureau at http://www.census.gov/population/www/censusdata/adjustment.html. The sampling errors in the net undercount estimates are ignored in our subsequent estimates of statistical uncertainty. The 2000 and 2001 population estimates that we used were released on June 23, 2003 at http://eire.census.gov/popest/nat_st_dataset.csv. We did not adjust these estimates for net undercount in Census 2000. The population estimates pertain to July 1 of each year.

percentages tend to be positively correlated and, therefore, partially "cancel out."[5] Table A.5 presents estimates for 1999 to 2001 of the number of people receiving food stamps, and Table A.6 presents the population totals. Table A.7 presents the percentages of participating people who are correctly receiving food stamps, and Table A.8 presents the percentages of participating people who are correctly receiving food stamps and are working poor. Tables A.9 and A.10 display direct sample estimates of food stamp eligibility percentages for 1999 to 2001 for all eligible people and for the working poor, respectively.

We derived food stamp eligibility estimates for states by applying food stamp program rules to CPS households. However, some key information needed to determine whether a household is eligible for food stamps is not collected in the CPS. 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 ineligible for food stamps under provisions of the Personal Responsibility and Work Opportunity Reconciliation Act of 1996 (P.L. 104-193) and subsequent legislation pertaining to noncitizens and unemployed able-bodied adults ages 18 to 50 with no dependent children. Yet another limitation is that only annual, rather than monthly, income amounts are recorded.

Methods have been developed to address these data limitations. These methods—including procedures for identifying the members of the food stamp household within the (potentially) larger CPS household, taking account of the restrictions on participation by noncitizens and

[5] We obtained estimates for 1999 to 2001 from the March CPS samples for 2000 to 2002, for which the survey instruments collected family income data for the prior calendar years, that is, 1999 to 2001. We used the revised March 2000 public use file with weights based on Census 2000 population estimates, and the revised March 2001 file with weights based on Census 2000 and additional sample households (from the State Children's Health Insurance Program (SCHIP) sample expansion). The March 2002 file is also weighted based on Census 2000 population estimates and includes the additional sample.

unemployed able-bodied adults, distributing annual amounts across months, and imputing net income—are described in Cunnyngham (2004) and earlier reports in that series.[6,7,8]

In addition to our point estimates of participation rates, we need estimates of their sampling variability. We can estimate the variances of $Y_{1,i}$ and $Y_{2,i}$ as follows:[9]

$$\text{(3)} \quad \begin{aligned} \mathrm{var}(Y_{1,i}) &= \text{variance due to } E_{1,i} \text{ when } \varepsilon_{1,i} \text{ is fixed} + \text{variance due to } \varepsilon_{1,i} \text{ when } E_{1,i} \text{ is fixed} \\ &= \mathrm{var}_{E_1|\varepsilon_1}(Y_{1,i}) + \mathrm{var}_{\varepsilon_1|E_1}(Y_{1,i}) \end{aligned}$$

and

$$\text{(4)} \quad \begin{aligned} \mathrm{var}(Y_{2,i}) &= \text{variance due to } E_{2,i} \text{ when } \varepsilon_{2,i} \text{ is fixed} + \text{variance due to } \varepsilon_{2,i} \text{ when } E_{2,i} \text{ is fixed} \\ &= \mathrm{var}_{E_2|\varepsilon_2}(Y_{2,i}) + \mathrm{var}_{\varepsilon_2|E_2}(Y_{2,i}). \end{aligned}$$

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

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[6] These reports also describe how we applied the food stamp gross and net income tests and calculated the benefits for which an eligible household would qualify.

[7] Because our focus in this document is on participation among people who are eligible for the FSP, these estimates of food stamp eligibility counts and participation rates do not include people who are not legally entitled to receive food stamps, such as Supplemental Security Income (SSI) recipients in Caifornia who receive cash in lieu of food stamp benefits. We excluded these SSI recipients when identifying the members of food stamp households. It might be useful in other contexts, however, to consider participation rates among those eligible for food stamps or a cash substitute.

[8] Differences between the estimates presented in Cunnyngham (2004) and in this report are discussed in greater detail in Appendix B.

[9] Correctly-eligible issuance error rates are estimated from FSPQC sample data and are subject to sampling error, although it is small relative to other sources of error in the estimated participation rates (and was ignored when deriving previous sets of estimates). In taking into account this sampling error when deriving the estimates presented here, we take into account its correlation with the sampling error associated with the identification of the working poor participants, also estimated using the FSPQC data. That is, we take into account the correlation between $\varepsilon_{1,i}$ and $\varepsilon_{2,i}$.

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 the jackknife estimator proposed by Rao, Wu, and Yue (1992), treating CPS rotation groups as clusters. To obtain the first of these variances, for example, we let $Z_{1,i}$ equal the CPS sample estimate of the number of eligible people in state i (i = 1, 2, ..., 51) and $Z_{1,i,r}$ equal the contribution of rotation group r (r = 1, 2, ..., 8) to that estimate. In other words:

$$(5) \qquad Z_{1,i} = \sum_{r=1}^{8} Z_{1,i,r} .$$

We also let N_i equal the CPS sample estimate of the population in state i and $N_{i,r}$ equal the contribution of rotation group r to that estimate. That is:

$$(6) \qquad N_i = \sum_{r=1}^{8} N_{i,r} .$$

If, as described before, $E_{1,i}$ equals the CPS sample estimate of the percentage eligible in state i:

$$(7) \qquad E_{1,i} = 100\,\frac{Z_{1,i}}{N_i} .$$

If we were to exclude the observations in rotation group r, we could estimate the percentage eligible in state i and the participation rate for state i by:

$$(8) \qquad E_{1,i(r)} = 100\,\frac{Z_{1,i} - Z_{1,i,r}}{N_i - N_{i,r}}$$

and

$$(9) \qquad Y_{1,i(r)} = 100\,\frac{P_i(\varepsilon_{1,i}/100)}{(E_{1,i(r)}/100)T_i} .$$

The "(r)" subscript indicates that rotation group r has been excluded. By excluding each of the eight rotation groups in turn, we obtain eight alternative estimates for the participation rate in state i. Then, we can assess the degree of sampling variability (estimate the variance of $Y_{1,i}$) by measuring the variability among the eight estimates according to:

$$(10) \quad \text{var}_{E_1|\varepsilon_1}(Y_{1,i}) = \frac{7}{8}\sum_{r=1}^{8}(Y_{1,i(r)} - Y_{1,i})^2 .$$

The factor 7/8 enters this expression because the $Y_{1,i(r)}$ are obtained from samples that are only 7/8 the size of the full CPS sample for state i and, hence, are expected to be more variable than $Y_{1,i}$ (by a factor of 8/7). We obtain jackknife estimates of sampling error variances pertaining to the participation rates for the working poor in the same manner, substituting $Z_{2,i}$, the CPS sample estimate of the number of eligible working poor in state i, for $Z_{1,i}$; $Z_{2,i,r}$, the contribution of rotation group r to $Z_{2,i}$, for $Z_{1,i,r}$; $E_{2,i}$ for $E_{1,i}$; $E_{2,i(r)}$ for $E_{1,i(r)}$; $\varepsilon_{2,i}$ for $\varepsilon_{1,i}$; and $Y_{2,i(r)}$ for $Y_{1,i(r)}$, in Equations (5) to (9). This results in:

$$(11) \quad \text{var}_{E_2|\varepsilon_2}(Y_{2,i}) = \frac{7}{8}\sum_{r=1}^{8}(Y_{2,i(r)} - Y_{2,i})^2 .$$

Then, based on Equation (1) we can estimate $\text{var}_{\varepsilon_1|E_1}(Y_{1,i})$ according to:

$$(12) \quad \text{var}_{\varepsilon_1|E_1}(Y_{1,i}) = \left(100\frac{P_i}{T_i E_{1,i}}\right)^2 \text{var}(\varepsilon_{1,i}) ,$$

since P_i and T_i are constants (or, at least, subject to negligible sampling variability) and $E_{1,i}$ is held fixed at its point estimate. Also note that we estimated $\varepsilon_{1,i}$ (the correctly-eligible issuance rate) and $\varepsilon_{2,i}$ (the percentage of participants who are working poor and correctly eligible) from the FSPQC sample data as follows:

$$(13) \quad \varepsilon_{1,i} = 100\frac{\sum_h m_{i,h}\varepsilon_{1,i,h}}{\sum_h m_{i,h}},$$

and

$$(14) \quad \varepsilon_{2,i} = 100 \frac{\sum_h m_{i,h} \varepsilon_{2,i,h}}{\sum_h m_{i,h}},$$

where h indexes households in a state's FSPQC sample; $m_{i,h}$ equals the number of people in household h times the weight for household h; $\varepsilon_{1,i,h}$ is an indicator that household h is eligible to receive food stamps; and $\varepsilon_{2,i,h}$ is an indicator that household h is working poor and eligible to receive food stamps. Then:

$$(15) \quad \text{var}_{\varepsilon_1|E_1}(Y_{1,i}) = \left(100 \frac{P_i}{T_i E_{1,i}}\right)^2 \frac{1}{(\sum_h m_{i,h})^2} \left(\frac{n_i}{n_i - 1}\right) \sum_h m_{i,h}{}^2 \left(\varepsilon_{1,i,h} - \varepsilon_{1,i}\right)^2,$$

where n_i is the total number of households from state i in the FSPQC sample. Similarly, we estimate $\text{var}_{\varepsilon_2|E_2}(Y_{2,i})$ according to:

$$(16) \quad \text{var}_{\varepsilon_2|E_2}(Y_{2,i}) = \left(100 \frac{P_i}{T_i E_{2,i}}\right)^2 \frac{1}{(\sum_h m_{i,h})^2} \left(\frac{n_i}{n_i - 1}\right) \sum_h m_{i,h}{}^2 \left(\varepsilon_{2,i,h} - \varepsilon_{2,i}\right)^2.$$

Summing the estimates from Equations (10) and (15)—as indicated by Equation (3)—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 (11) and (16)—as indicated by Equation (4)—and taking the square root of the sum provides an estimated standard error of the participation rate for the working poor. Estimated standard errors for the direct estimates of participation rates for all eligible people and for the working poor are presented in Tables A.3 and A.4, respectively.

We estimated the covariance between the estimates of participation rates for all eligible people and the working poor, for a given year, according to:[10]

$$\begin{aligned}(17)\quad \mathrm{cov}(Y_{1,i},Y_{2,i}) &= \text{covariance due to } E_{1,i} \text{ and } E_{2,i} \text{ when } \varepsilon_{1,i} \text{ and } \varepsilon_{2,i} \text{ are fixed} \\ &\quad + \text{covariance due to } \varepsilon_{1,i} \text{ and } \varepsilon_{2,i} \text{ when } E_{1,i} \text{ and } E_{2,i} \text{ are fixed} \\ &= \mathrm{cov}_{E_1E_2|\varepsilon_1\varepsilon_2}(Y_{1,i},Y_{2,i}) + \mathrm{cov}_{\varepsilon_1\varepsilon_2|E_1E_2}(Y_{1,i},Y_{2,i}).\end{aligned}$$

To derive an estimate of the first term in this expression, we obtained a jackknife estimate of the covariance due to $E_{1,i}$ and $E_{2,i}$ according to:

$$(18)\quad \mathrm{cov}_{E_1E_2|\varepsilon_1\varepsilon_2}(Y_{1,i},Y_{2,i}) = \frac{7}{8}\sum_{r=1}^{8}(Y_{1,i(r)} - Y_{1,i})(Y_{2,i(r)} - Y_{2,i}).$$

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

$$(19)\quad \mathrm{cov}_{\varepsilon_1\varepsilon_2|E_1E_2}(Y_{1,i},Y_{2,i}) = \left(100\frac{P_i}{T_iE_{1,i}}\right)\left(100\frac{P_i}{T_iE_{2,i}}\right)\mathrm{cov}(\varepsilon_{1,i},\varepsilon_{2,i})$$

where:

$$(20)\quad \mathrm{cov}(\varepsilon_{1,i},\varepsilon_{2,i}) = \frac{1}{(\sum_h m_{i,h})^2}\left(\frac{n_i}{n_i-1}\right)\sum_h m_{i,h}{}^2\left(\varepsilon_{1,i,h}-\varepsilon_{1,i}\right)\left(\varepsilon_{2,i,h}-\varepsilon_{2,i}\right).$$

Because CPS samples from different years are not independent, participation rates for different years are correlated.[11] We derived a preliminary jackknife estimate of the correlation between $Y_{1,i,t}$ and $Y_{2,i,t-g}$, the sample estimate for all eligibles for one year and the sample estimate for the working poor for g years earlier, according to either:

[10] We do not need to include additional terms because the CPS and FSPQC samples are independent.

[11] In contrast, FSPQC samples from different years are independent. Hence, sampling variability in estimates from the CPS is the only source of intertemporal covariation between participation rates.

(21) $$\operatorname{cov}(Y_{1,i,t}, Y_{2,i,t-g}) = \frac{7}{8}\left[\sum_{r=1}^{4}(Y_{1,i(r),t} - Y_{1,i,t})(Y_{2,i(r+4),t-g} - Y_{2,i,t-g}) + \sum_{r=5}^{8}(Y_{1,i(r),t} - Y_{1,i,t})(Y_{2,i(r-4),t-g} - Y_{2,i,t-g})\right],$$

if g is odd, or:

(22) $$\operatorname{cov}(Y_{1,i,t}, Y_{2,i,t-g}) = \frac{7}{8}\left[\sum_{r=1}^{8}(Y_{1,i(r),t} - Y_{1,i,t})(Y_{2,i(r),t-g} - Y_{2,i,t-g})\right],$$

if g is even.

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

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

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 (23) by the average correlation between $Y_{1,i,t}$ and $Y_{2,i,t-g}$ across states:

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

where $n_{i,t}$ and $n_{i,t-g}$ are the (unweighted) number of households in the March CPS 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 $Y_{2,i,t-g}$:

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

Other intertemporal covariances—such as the covariance between the participation rates for the working poor in two different years—are similarly estimated. 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.[12]

2. Using a regression model, predict state food stamp participation rates based on administrative and decennial census data.

Our regression model consisted of six equations, with three predicting food stamp participation rates for all eligible people in 1999, 2000, and 2001, and three predicting food stamp participation rates for the working poor in 1999, 2000, and 2001. The six equations were estimated jointly. Although the values of the regression coefficients could vary from equation to equation, each equation had the same "best" predictors. The predictors were (in addition to an intercept):

- The percentage of the population receiving food stamps, that is, the food stamp prevalence rate
- The tax return nonfiler rate, that is, the percentage of the population that is not claimed as exemptions on tax returns
- The poverty rate for working age adults according to individual income tax data, namely, the percentage of exemptions for working age adults (18-64) that are claimed on tax returns with income below the federal poverty level
- The percentage of occupied housing units that are renter-occupied according to Census 2000
- The percentage of elderly people (age 65 or older) at or below the federal poverty level in 1999 according to Census 2000

The value for the last two predictors are the same in each of the six equations of our regression model. However, for the first three predictors, we used 1999 values in both equations for predicting 1999 participation rates, 2000 values in both equations for predicting 2000 rates, and 2001 values in both equations for predicting 2001 rates. Because prediction errors were allowed

[12] All interstate covariances equal zero because state samples are independent in both the CPS and the FSPQC.

to be correlated and intergroup and intertemporal correlations among direct sample estimates were taken into account as specified in the next step, the shrinkage estimates for a group (all eligible people or the working poor) in any one year were determined by the predictions and sample estimates for all three years and for both groups.

In addition to the five predictors that we selected for our "best" model, we considered many other potential predictors measuring, for example, Unemployment Insurance program participation, average adjusted gross income on tax returns, and the prevalence of households with no children. All of the predictors considered had three characteristics: (1) they are face valid, that is, it is plausible that they are good indicators of differences among states in food stamp 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 census or administrative records data—and, thus, measured with little or no sampling error.

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, judging performance by examining functions of the regression residuals, such as mean squared error.[13] 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 eligibles for certain types of states categorized

[13] 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.

by, for example, population size, region, and percentage of the population that is black or Hispanic. We found no strong evidence of correctable bias.

Definitions and data sources for the predictors in our best regression model are given in Table A.11. The values for the last two predictors listed above are the same in each of the six year-and-group-specific regression equations, and are displayed in Table A.12. Values for the other predictors, which are updated each year, are presented in Tables A.13 to A.15. Regression estimates of participation rates for all eligible people are in Table A.16, and regression estimates of rates for the working poor are in Table A.17. The standard errors for the regression estimates for all eligible people and for the working poor are in Tables A.18 and A.19, respectively.

3. Using "shrinkage" methods, average the direct sample estimates and regression predictions to obtain preliminary shrinkage estimates of state food stamp participation rates.

To average the direct sample estimates and the regression predictions, we used an empirical Bayes shrinkage estimator.[14] The estimator does not have a closed-form expression from which we can calculate shrinkage estimates. Instead, we must numerically integrate over six scalar parameters—σ_1, σ_2, ρ, η_1, η_2, and η_{12}—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 3,646,500 equally-spaced points, starting with $\sigma_1 = 0.001$, $\sigma_2 = 0.001$, $\rho = 0.000$, $\eta_1 = 0.001$, $\eta_2 = 2.000$, and $\eta_{12} = 0.000$ and incrementing σ_1, σ_2, ρ, η_1, η_2, and η_{12} by 0.500, 0.500, 0.110, 1.000, 1.000, and 0.110, respectively, up to $\sigma_1 = 6.001$, $\sigma_2 = 8.001$, $\rho =$

[14] Although our shrinkage estimator averages direct sample and regression estimates, a state's shrinkage estimate for either all eligible people or the working poor in a given year does not have to be between the sample 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, a shrinkage estimate presented in this report is between the sample and regression estimates. In the remaining cases, the shrinkage estimate is usually close to either the sample or regression estimate, and it is often close to both because the sample and regression estimates are close to each other.

0.990, η_1 = 10.001, η_2 = 16.001, and η_{12} = 0.990. For combination k of σ_1, σ_2, ρ, η_1, η_2, and η_{12} (k = 1, 2, ..., 3646500), we calculated a vector of shrinkage estimates:

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

a variance-covariance matrix:

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

and a probability:

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

In these expressions, Y is a column vector of direct sample estimates (from Step 1) with 306 elements, six sample estimates for each of the 51 states. 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 1999 sample estimates for all eligible people and the working poor, respectively; the second two elements are the 2000 estimates; and the final two elements are the 2001 estimates. The vector of shrinkage estimates, θ_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, 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 $\times$ 36) matrix containing values for each of the five predictors (plus an intercept) for every state, every year (1999, 2000, and 2001), and both groups (all eligible people and the working poor). 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:

$$(29)\quad X_i = \begin{pmatrix} x'_{i11} & \underline{0} & \underline{0} & \underline{0} & \underline{0} & \underline{0} \\ \underline{0} & x'_{i12} & \underline{0} & \underline{0} & \underline{0} & \underline{0} \\ \underline{0} & \underline{0} & x'_{i21} & \underline{0} & \underline{0} & \underline{0} \\ \underline{0} & \underline{0} & \underline{0} & x'_{i22} & \underline{0} & \underline{0} \\ \underline{0} & \underline{0} & \underline{0} & \underline{0} & x'_{i31} & \underline{0} \\ \underline{0} & \underline{0} & \underline{0} & \underline{0} & \underline{0} & x'_{i32} \end{pmatrix},$$

where x'_{it1} is a row vector for year t (t = 1 for 1999, t = 2 for 2000, and t = 3 for 2001) with six elements (an intercept plus the five predictors listed under Step 2) to predict participation rates for all eligible people. x'_{it2} is a row vector for year t with six elements to predict participation rates for the working poor. $\underline{0}$ is a row vector with six zeros. In a given year, the values of the predictors are the same for the equations for all eligible people and for the working poor. Thus, $x'_{it1} = x'_{it2}$. $\hat{B}_k$ is a (36×1) vector of regression coefficients, and is given by:

$$(30)\quad \hat{B}_k = (X'(\Sigma_k + V)^{-1} X)^{-1} X'(\Sigma_k + V)^{-1} Y .$$

Finally, Σ_k is a block-diagonal matrix with 51 (6×6) blocks, and every block equals:

$$(31)\quad \Sigma_k^* = \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix} \otimes \begin{pmatrix} \sigma_{1,k}^2 & \sigma_{1,k}\sigma_{2,k}\rho_k \\ \sigma_{1,k}\sigma_{2,k}\rho_k & \sigma_{2,k}^2 \end{pmatrix} + \begin{pmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{pmatrix} \otimes \begin{pmatrix} \eta_{1,k}^2 & \eta_{1,k}\eta_{2,k}\eta_{12,k} \\ \eta_{1,k}\eta_{2,k}\eta_{12,k} & \eta_{2,k}^2 \end{pmatrix}.$$

After calculating θ_k , U_k , and p_k^* 3,646,500 times (once for each combination of σ_1, σ_2, ρ, η_1, η_2, and η_{12}), we calculated the probability of ($\sigma_{1,k}$, $\sigma_{2,k}$, ρ_k, $\eta_{1,k}$, $\eta_{2,k}$, $\eta_{12,k}$):

$$(32)\quad p_k = \frac{p_k^*}{\sum_{k=1}^{3,646,500} p_k^*} ,$$

which is also an estimate of the probability that the shrinkage estimates θ_k are the true values. As Equation (32) suggests, the p_k are obtained by normalizing the p_k^* to sum to one.

To complete the numerical integration over σ_1, σ_2, ρ, η_1, η_2, and η_{12} and obtain a single set of shrinkage estimates, we calculated a weighted sum of the 3,646,500 sets of shrinkage estimates, weighting each set θ_k by its associated probability p_k. Thus, our shrinkage estimates are:

$$(33) \quad \theta = \sum_{k=1}^{3,646,500} p_k \theta_k \ .$$

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:

$$(34) \quad U = \sum_{k=1}^{3,646,500} p_k U_k + \sum_{k=1}^{3,646,500} p_k (\theta_k - \theta)(\theta_k - \theta)' \ .$$

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 σ_1, σ_2, ρ, η_1, η_2, and η_{12} vary. Thus, the second term accounts for the variability from not knowing and, thus, having to estimate σ_1, σ_2, ρ, η_1, η_2, and η_{12}. 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:

$$(35) \quad R = \sum_{k=1}^{3,646,500} p_k R_k \ ,$$

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 $\eta_{12} = \eta_{12,k}$. The variance-covariance matrix is:

$$(36) \quad G = \sum_{k=1}^{3,646,500} p_k G_k + \sum_{k=1}^{3,646,500} p_k (R_k - R)(R_k - R)' \ ,$$

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

$$(37) \quad \hat{B} = \sum_{k=1}^{3,646,500} p_k \hat{B}_k \ .$$

Regression estimates of participation rates for all eligible people and for the working poor were presented before in Tables A.16 and A.17, respectively. Preliminary shrinkage estimates of participation rates are displayed in Tables A.20 and A.21.

4. Adjust the preliminary shrinkage estimates to obtain final shrinkage estimates of state food stamp participation rates.

We adjusted the preliminary shrinkage estimates of participation rates in two ways. First, we adjusted the rates so that the eligibles counts implied by the rates sum to the national eligibles counts estimated directly from the CPS. Second, we adjusted the rates so that no state's estimated rate is greater than 100 percent. These adjustments were carried out for each year and each group separately. The following description of the adjustment will focus on the 2001 estimates for all eligible people.

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

$$(38) \quad \psi_{1,i} = \frac{P_i(\varepsilon_{1,i}/100)}{(\theta_{1,i}/100)},$$

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 issuance rate (100 minus the issuance error rate) figures used in Equation (1), and $\theta_{1,i}$ is the preliminary participation rate derived in Equation (33). The state eligibles counts from Equation (38) summed to 29,126,248 for 2001, while the national total for 2001 estimated directly from the CPS was 28,320,055. To obtain estimated eligibles counts for states that sum (aside from rounding error) to the direct estimate of the national total, we multiplied each of the eligibles counts from Equation (38) by 28,320,055 ÷ 29,126,248 (≈ 0.9723).[15]

After carrying out this first adjustment, there might be states with fewer estimated eligibles than participants, implying participation rates over 100 percent.[16] To cap participation rates at 100 percent, we performed a second adjustment when needed. Specifically, we took eligibles away from the 50 states that had enough eligibles (that is, more eligibles than participants) and gave them to the state that did not have enough, stopping when the number of eligibles in that state equaled the number of participants. Eligibles were taken away from states in proportion to their numbers of eligibles. This adjustment, which moved very small numbers of eligibles among states, did not change the national total. Moreover, except for the state with a participation rate initially over 100 percent, this adjustment did not change any state's participation rate for 2001 by more than seven-thousandths of a percentage point.[17]

Our final shrinkage estimates of the numbers of people eligible for food stamps were shown earlier in Table III.3 of Chapter III. From those final shrinkage estimates of the numbers of eligible people, we calculated final shrinkage estimates of participation rates according to:

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

[15] The adjustment factors for the other two years (1999 and 2000) for all eligible people were, respectively, 1.0018, and 0.9732. The direct estimates of the national totals for all eligibles for those years were 29,033,858 and 28,320,555. The adjustment factors for the three years (1999, 2000, and 2001) for the working poor were, respectively, 1.0010, 0.9626, and 0.9618. The direct estimates of the national totals for the working poor for those years were 13,983,809, 12,952,713, and 12,455,416.

[16] West Virginia had a participation rate for the working poor of 101 percent in 2001 and a participation rate for all eligible people of 104 percent in 1999. There were no other rates over 100 percent.

[17] For 1999, this adjustment did not change any state's participation rate by more than three-hundredths of a percentage point, except when a state's participation rate was initially over 100 percent. In 2000, no state's rates needed to be adjusted.

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). Participation rates for all states and all eligible people were shown in Chapter III, Table III.1. We derived final participation rates for the working poor in the same way. Our final estimates of the number of eligible working poor people were shown in Chapter III, Table III.4, and the final participation rates were shown in Chapter III, Table III.2.

In Tables III.5 to III.7 of Chapter III, we reported approximate 90-percent confidence intervals for our final shrinkage estimates for all eligible people. In Tables III.8 to III.10 we reported the confidence intervals for the final shrinkage estimates for the working poor. The upper and lower bounds of the confidence intervals were calculated according to:

$$(40) \quad Upper\ Bound_i = F_i + 1.645\, e_i$$

and:

$$(41) \quad Lower\ Bound_i = F_i - 1.645\, e_i\ ,$$

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 eligibles counts, the standard errors are, respectively:

$$(42) \quad e_i = \frac{1}{r}\sqrt{U(5i,5i)}$$

and

$$(43) \quad e_i = \frac{\psi_{F,1,i}}{\theta_{F,1,i}}\ \frac{1}{r}\sqrt{U(5i,5i)}\ ,$$

where r is the ratio used to adjust preliminary estimates of state eligibles counts to the direct estimate of the national total ($\approx$ 0.9723 for all eligible people for 2001), and $U(5i,5i)$ is the

($5i$,$5i$) diagonal element of U, which was derived according to Equation (34).[18] 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.

Tables A.22 and A.23 present final shrinkage estimates of participation rates for all eligible people (values of $\theta_{F,1,i}$) and for the working poor (values of $\theta_{F,2,\mathrm{i}}$), respectively. Tables A.24 and A.25 present standard errors for the rates. Tables A.26 and A.27 display final shrinkage estimates of the numbers of all eligible people (values of $\psi_{F,1,i}$) and eligible working poor (values of $\psi_{F,2,i}$), respectively, and Tables A.28 and A.29 present the standard errors for those estimated counts.[19] Finally, Tables A.30 and A.31 show issuance-error-adjusted numbers of all people receiving food stamps (values of $P_i(\varepsilon_{1,i}/100)$) and the working poor receiving food stamps (values of $P_i(\varepsilon_{2,i}/100)$).

[18] The square root of $U(5i,5i)$ is the standard error of the preliminary shrinkage estimate of the 2001 participation rate for all eligible people for state i. When deriving estimates for 1999 and 2000, we would use the (i,i) and ($3i$,$3i$) diagonal elements of U, respectively. When deriving estimates for the working poor for 1999, 2000, and 2001, we would use the ($2i$,$2i$) , ($4i$,$4i$), and ($6i$,$6i$) diagonal elements of U, respectively.

[19] The rates and counts for all eligible people in Tables A.22 and A.26 are the same as the rates and counts in Tables III.1 and III.3 of Chapter III, except for the number of digits displayed. Likewise, the rates and counts for the working poor in Tables A.23 and A.27 are the same as the rates and counts in Tables III.2 and III.4 of Chapter III, except for the number of digits displayed.

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TABLE A.1

DIRECT SAMPLE ESTIMATES OF PARTICIPATION RATES,
ALL ELIGIBLE PEOPLE

	1999	2000	2001
Alabama	55.989	59.901	57.188
Alaska	69.368	69.112	67.048
Arizona	49.529	43.743	49.225
Arkansas	68.180	56.616	57.392
California	55.061	56.946	54.148
Colorado	63.684	46.437	50.730
Connecticut	67.420	63.482	67.998
Delaware	48.707	51.856	62.558
District of Columbia	103.740	84.519	71.489
Florida	58.124	51.262	45.519
Georgia	56.314	57.014	53.425
Hawaii	90.847	131.181	87.760
Idaho	39.837	44.372	43.440
Illinois	71.463	68.701	74.518
Indiana	74.388	68.977	72.110
Iowa	71.978	65.092	69.181
Kansas	41.836	64.404	52.888
Kentucky	79.397	81.580	81.142
Louisiana	70.720	62.857	71.032
Maine	96.590	81.973	85.165
Maryland	78.080	56.601	65.337
Massachusetts	38.285	39.949	38.638
Michigan	76.362	81.434	78.151
Minnesota	65.730	90.473	70.647
Mississippi	64.964	57.837	54.387
Missouri	75.572	101.077	96.536
Montana	59.683	57.892	64.607
Nebraska	63.305	73.103	65.979
Nevada	36.283	38.751	45.883
New Hampshire	47.003	56.983	51.644
New Jersey	66.145	55.441	48.547
New Mexico	63.400	62.945	63.076
New York	62.016	61.238	55.515
North Carolina	53.837	46.432	50.998
North Dakota	50.282	54.810	60.172
Ohio	56.289	57.360	61.335
Oklahoma	71.531	58.081	55.838
Oregon	72.535	81.174	97.758
Pennsylvania	73.937	73.295	65.882
Rhode Island	70.347	63.883	69.648
South Carolina	67.517	61.267	61.333
South Dakota	77.044	67.734	83.475
Tennessee	83.353	63.114	62.825
Texas	50.288	44.627	47.631
Utah	71.840	47.521	45.908
Vermont	88.380	78.676	69.546
Virginia	63.513	56.458	60.488
Washington	68.295	61.911	60.924
West Virginia	85.960	88.708	83.013
Wisconsin	49.946	59.824	63.826
Wyoming	56.608	52.959	59.848

TABLE A.2

DIRECT SAMPLE ESTIMATES OF PARTICIPATION RATES,
WORKING POOR

	1999	2000	2001
Alabama	48.062	55.451	52.948
Alaska	62.806	60.304	61.417
Arizona	35.980	30.383	39.310
Arkansas	62.248	52.824	50.786
California	25.527	32.025	31.636
Colorado	53.617	42.469	50.127
Connecticut	45.607	48.428	51.994
Delaware	37.365	48.444	49.442
District of Columbia	37.990	41.636	31.985
Florida	45.855	47.271	41.888
Georgia	49.101	62.859	50.036
Hawaii	60.966	107.443	82.758
Idaho	39.287	44.740	43.199
Illinois	63.155	62.023	72.390
Indiana	77.619	64.419	82.576
Iowa	55.966	46.218	56.407
Kansas	37.328	62.835	46.319
Kentucky	78.028	79.949	77.539
Louisiana	75.676	71.371	80.304
Maine	76.774	83.988	106.184
Maryland	60.194	43.702	49.951
Massachusetts	21.579	28.528	25.701
Michigan	71.138	87.351	86.603
Minnesota	51.744	66.388	52.723
Mississippi	58.966	49.035	53.251
Missouri	76.406	115.523	146.172
Montana	51.428	53.976	54.698
Nebraska	56.154	55.147	55.178
Nevada	22.230	25.596	23.235
New Hampshire	31.978	43.111	42.819
New Jersey	38.445	31.388	43.817
New Mexico	46.274	43.678	60.316
New York	45.682	47.676	38.764
North Carolina	45.867	38.508	52.771
North Dakota	59.717	69.514	72.192
Ohio	50.760	49.503	71.684
Oklahoma	78.940	55.112	54.699
Oregon	70.346	72.733	96.933
Pennsylvania	72.825	80.901	72.661
Rhode Island	59.391	60.138	63.076
South Carolina	60.417	54.964	70.000
South Dakota	79.198	68.454	91.800
Tennessee	69.364	50.897	67.746
Texas	41.140	40.173	44.184
Utah	56.614	44.031	44.311
Vermont	73.998	65.030	60.149
Virginia	54.052	50.981	67.947
Washington	62.280	52.956	52.986
West Virginia	85.437	95.257	98.961
Wisconsin	39.960	63.505	71.463
Wyoming	60.761	53.933	73.153

TABLE A.3

STANDARD ERRORS OF DIRECT SAMPLE ESTIMATES OF PARTICIPATION RATES, ALL ELIGIBLE PEOPLE

	1999	2000	2001
Alabama	6.205	4.279	2.465
Alaska	10.660	6.808	6.102
Arizona	4.167	3.522	3.769
Arkansas	11.930	5.917	3.246
California	2.636	1.498	3.082
Colorado	10.132	5.612	5.599
Connecticut	12.918	6.009	6.528
Delaware	8.864	4.865	8.564
District of Columbia	12.434	5.030	8.646
Florida	3.114	4.322	2.140
Georgia	3.682	3.069	4.117
Hawaii	10.987	22.668	7.872
Idaho	15.350	4.704	3.708
Illinois	4.652	4.150	5.057
Indiana	11.398	6.016	6.618
Iowa	10.263	6.024	7.644
Kansas	3.520	7.569	3.122
Kentucky	10.540	9.788	9.820
Louisiana	10.581	5.048	4.449
Maine	10.807	6.599	9.801
Maryland	13.469	4.900	13.361
Massachusetts	5.291	4.498	4.345
Michigan	5.488	4.453	4.568
Minnesota	11.378	8.999	11.163
Mississippi	4.040	4.913	5.299
Missouri	13.760	14.443	16.948
Montana	6.734	6.242	7.086
Nebraska	8.269	8.764	11.313
Nevada	3.814	6.012	2.795
New Hampshire	6.499	5.273	8.012
New Jersey	5.638	3.084	2.061
New Mexico	5.879	5.315	3.486
New York	3.949	2.913	2.660
North Carolina	5.224	1.957	2.037
North Dakota	9.993	7.084	5.625
Ohio	4.208	3.093	3.110
Oklahoma	4.102	3.329	4.818
Oregon	8.566	8.617	10.368
Pennsylvania	5.538	6.662	4.608
Rhode Island	9.486	6.365	6.411
South Carolina	10.099	4.688	7.495
South Dakota	7.130	10.497	9.009
Tennessee	4.821	3.755	4.753
Texas	1.611	1.593	2.187
Utah	9.153	8.791	6.827
Vermont	10.451	5.751	3.191
Virginia	8.838	7.206	4.885
Washington	7.069	4.851	4.106
West Virginia	9.871	5.906	5.573
Wisconsin	11.738	4.905	5.499
Wyoming	4.686	4.371	5.167

TABLE A.4

STANDARD ERRORS OF DIRECT SAMPLE ESTIMATES OF PARTICIPATION RATES, WORKING POOR

	1999	2000	2001
Alabama	8.802	8.186	5.242
Alaska	21.561	8.797	9.223
Arizona	5.855	2.449	4.233
Arkansas	19.280	7.710	5.007
California	2.005	2.274	2.193
Colorado	8.333	4.311	7.336
Connecticut	13.988	7.791	13.190
Delaware	12.247	11.720	14.015
District of Columbia	6.928	6.399	6.826
Florida	4.401	6.565	3.657
Georgia	5.299	6.718	5.773
Hawaii	9.169	25.867	10.829
Idaho	22.748	7.052	6.419
Illinois	7.516	6.619	6.777
Indiana	13.457	9.041	13.474
Iowa	8.060	4.387	7.361
Kansas	4.845	8.926	4.405
Kentucky	17.445	10.803	15.248
Louisiana	10.277	8.316	7.863
Maine	24.226	11.833	22.244
Maryland	18.145	6.603	11.278
Massachusetts	3.637	4.794	4.644
Michigan	6.758	11.416	8.161
Minnesota	12.261	5.951	10.783
Mississippi	12.648	7.658	7.189
Missouri	21.668	25.379	34.462
Montana	8.964	8.511	6.483
Nebraska	10.650	6.902	14.024
Nevada	5.202	4.357	3.024
New Hampshire	11.280	10.517	7.956
New Jersey	4.420	3.551	5.293
New Mexico	8.352	4.912	6.091
New York	6.125	4.880	3.237
North Carolina	6.437	4.098	3.381
North Dakota	17.699	10.369	12.138
Ohio	5.214	4.303	6.348
Oklahoma	7.615	4.949	8.127
Oregon	10.966	10.567	10.243
Pennsylvania	10.091	11.361	11.630
Rhode Island	18.534	8.992	12.346
South Carolina	12.312	5.896	9.258
South Dakota	9.176	13.009	16.362
Tennessee	10.921	5.202	8.471
Texas	2.632	2.683	1.802
Utah	12.969	7.677	7.562
Vermont	19.698	11.351	10.622
Virginia	10.499	5.853	10.924
Washington	12.714	6.101	4.326
West Virginia	25.332	13.950	12.932
Wisconsin	14.838	4.912	9.133
Wyoming	6.436	4.791	11.100

TABLE A.5

NUMBER OF PEOPLE RECEIVING FOOD STAMPS, MONTHLY AVERAGE

	1999	2000	2001
Alabama	405,273	396,057	411,292
Alaska	41,262	37,524	37,897
Arizona	257,362	259,006	291,372
Arkansas	252,989	246,572	256,441
California	2,027,089	1,831,697	1,668,351
Colorado	173,497	155,948	153,952
Connecticut	178,168	165,059	157,031
Delaware	38,880	32,218	31,886
District of Columbia	84,082	80,803	73,494
Florida	933,435	882,341	887,256
Georgia	616,600	559,468	573,505
Hawaii	125,155	118,041	108,313
Idaho	57,201	58,191	59,667
Illinois	820,034	779,420	825,295
Indiana	298,213	300,314	346,551
Iowa	128,790	123,322	126,494
Kansas	114,875	116,596	124,285
Kentucky	396,440	403,479	412,680
Louisiana	516,285	499,851	518,384
Maine	108,749	101,665	104,383
Maryland	264,393	219,180	208,426
Massachusetts	261,021	231,829	219,223
Michigan	682,680	610,974	641,269
Minnesota	208,062	196,048	197,727
Mississippi	288,057	275,856	297,805
Missouri	408,331	419,959	454,427
Montana	60,898	59,466	61,957
Nebraska	92,404	82,414	80,652
Nevada	61,673	60,905	69,396
New Hampshire	37,441	36,266	35,554
New Jersey	384,888	344,677	317,579
New Mexico	178,439	169,354	163,265
New York	1,545,424	1,438,568	1,353,542
North Carolina	488,942	479,636	493,672
North Dakota	33,442	31,895	37,755
Ohio	639,786	609,717	640,503
Oklahoma	271,351	253,287	260,021
Oregon	223,978	234,387	281,450
Pennsylvania	834,898	777,112	748,074
Rhode Island	76,394	74,256	71,272
South Carolina	308,570	295,335	315,718
South Dakota	44,065	42,962	44,594
Tennessee	510,828	496,031	521,510
Texas	1,400,526	1,332,785	1,366,210
Utah	88,163	81,945	79,716
Vermont	44,287	40,861	38,874
Virginia	361,581	336,080	331,226
Washington	306,654	295,061	308,589
West Virginia	247,249	226,897	219,663
Wisconsin	182,206	193,021	215,786
Wyoming	23,477	22,459	22,539

TABLE A.6

POPULATION ON JULY 1

	1999	2000	2001
Alabama	4,369,862	4,451,975	4,468,912
Alaska	619,500	627,697	633,630
Arizona	4,778,332	5,167,142	5,306,966
Arkansas	2,551,373	2,678,668	2,694,698
California	33,145,121	34,010,375	34,600,463
Colorado	4,056,133	4,326,758	4,430,989
Connecticut	3,282,031	3,411,956	3,434,602
Delaware	753,538	786,512	796,599
District of Columbia	519,000	571,641	573,822
Florida	15,111,244	16,051,395	16,373,330
Georgia	7,788,240	8,234,373	8,405,677
Hawaii	1,185,497	1,212,670	1,227,024
Idaho	1,251,700	1,299,721	1,320,585
Illinois	12,128,370	12,440,846	12,520,227
Indiana	5,942,901	6,091,950	6,126,743
Iowa	2,869,413	2,928,742	2,931,967
Kansas	2,654,052	2,692,557	2,702,125
Kentucky	3,960,825	4,048,832	4,068,816
Louisiana	4,372,035	4,469,768	4,470,368
Maine	1,253,040	1,277,284	1,284,470
Maryland	5,171,634	5,312,461	5,386,079
Massachusetts	6,175,169	6,361,720	6,401,164
Michigan	9,863,775	9,956,115	10,006,266
Minnesota	4,775,508	4,934,248	4,984,535
Mississippi	2,768,619	2,848,829	2,859,733
Missouri	5,468,338	5,605,067	5,637,309
Montana	882,779	903,416	905,382
Nebraska	1,666,028	1,713,375	1,720,039
Nevada	1,809,253	2,018,828	2,097,722
New Hampshire	1,201,134	1,240,472	1,259,359
New Jersey	8,143,412	8,433,276	8,511,116
New Mexico	1,739,844	1,821,767	1,830,935
New York	18,196,601	18,999,760	19,084,350
North Carolina	7,650,789	8,082,261	8,206,105
North Dakota	633,666	641,131	636,550
Ohio	11,256,654	11,363,568	11,389,785
Oklahoma	3,358,044	3,454,408	3,469,577
Oregon	3,316,154	3,431,137	3,473,441
Pennsylvania	11,994,016	12,286,107	12,303,104
Rhode Island	990,819	1,050,698	1,059,659
South Carolina	3,885,736	4,023,725	4,062,125
South Dakota	733,133	755,783	758,324
Tennessee	5,483,535	5,703,246	5,749,398
Texas	20,044,141	20,955,248	21,370,983
Utah	2,129,836	2,243,406	2,278,712
Vermont	593,740	609,952	612,978
Virginia	6,872,912	7,105,900	7,196,750
Washington	5,756,361	5,911,803	5,993,390
West Virginia	1,806,928	1,807,326	1,800,975
Wisconsin	5,250,446	5,374,367	5,405,947
Wyoming	479,602	494,086	493,754

TABLE A.7

PERCENTAGES OF PARTICIPANTS WHO ARE CORRECTLY ELIGIBLE

	1999	2000	2001
Alabama	95.97	95.68	95.91
Alaska	94.91	97.69	97.72
Arizona	97.78	98.42	98.74
Arkansas	98.60	98.84	99.11
California	98.35	98.06	98.25
Colorado	96.88	98.11	97.14
Connecticut	95.12	97.67	96.97
Delaware	94.22	95.69	98.68
District of Columbia	98.35	97.48	97.59
Florida	96.90	97.07	96.29
Georgia	96.48	96.30	96.90
Hawaii	98.28	97.80	97.49
Idaho	96.78	95.54	97.97
Illinois	97.08	97.08	97.12
Indiana	98.30	97.47	96.94
Iowa	98.08	97.62	98.36
Kansas	97.17	95.96	96.68
Kentucky	98.61	97.77	97.73
Louisiana	98.30	98.74	98.45
Maine	96.77	96.86	98.49
Maryland	96.02	96.80	98.62
Massachusetts	98.68	99.20	98.92
Michigan	95.46	97.15	99.30
Minnesota	98.53	99.03	98.38
Mississippi	99.51	98.35	98.87
Missouri	97.34	98.21	96.14
Montana	98.24	96.13	96.62
Nebraska	93.81	95.96	95.67
Nevada	96.68	97.53	97.78
New Hampshire	95.39	97.22	96.00
New Jersey	97.04	96.12	98.27
New Mexico	97.51	97.09	98.02
New York	98.22	96.99	97.67
North Carolina	98.37	97.74	97.70
North Dakota	96.60	96.91	99.34
Ohio	98.74	98.63	97.89
Oklahoma	97.10	97.74	97.91
Oregon	96.30	96.37	97.53
Pennsylvania	97.74	97.42	98.20
Rhode Island	98.83	96.81	98.27
South Carolina	98.66	98.58	99.51
South Dakota	99.79	99.89	99.45
Tennessee	97.26	97.77	98.22
Texas	98.78	99.16	98.35
Utah	93.37	92.89	96.48
Vermont	97.03	95.07	95.34
Virginia	96.52	96.50	98.36
Washington	98.24	98.28	98.53
West Virginia	97.02	98.74	98.11
Wisconsin	97.48	97.66	98.13
Wyoming	99.88	98.25	99.51

TABLE A.8

PERCENTAGES OF PARTICIPANTS WHO ARE CORRECTLY ELIGIBLE AND WORKING POOR

	1999	2000	2001
Alabama	38.34	36.56	37.11
Alaska	48.79	43.69	42.37
Arizona	42.31	40.73	41.22
Arkansas	40.15	39.38	39.11
California	28.63	33.71	35.50
Colorado	40.06	45.79	46.85
Connecticut	34.02	31.80	28.14
Delaware	35.17	36.95	35.48
District of Columbia	13.22	16.18	13.47
Florida	38.07	38.97	37.58
Georgia	39.94	40.80	39.31
Hawaii	36.50	41.03	40.20
Idaho	61.85	53.41	56.06
Illinois	39.76	40.64	40.80
Indiana	42.35	38.86	42.83
Iowa	43.64	41.44	41.16
Kansas	43.54	40.50	41.10
Kentucky	37.45	38.12	38.50
Louisiana	41.16	44.75	46.55
Maine	28.35	31.91	35.10
Maryland	31.56	27.57	27.84
Massachusetts	22.70	25.18	23.56
Michigan	41.82	41.14	43.35
Minnesota	33.43	35.71	35.63
Mississippi	41.05	38.30	40.54
Missouri	39.00	43.17	42.36
Montana	47.26	44.91	41.64
Nebraska	38.24	39.41	41.69
Nevada	32.52	31.80	27.24
New Hampshire	27.75	21.78	29.33
New Jersey	23.82	23.19	26.32
New Mexico	43.23	42.03	40.96
New York	25.99	26.67	25.86
North Carolina	37.41	41.60	40.18
North Dakota	49.09	53.22	52.55
Ohio	35.64	36.88	39.43
Oklahoma	45.48	47.74	44.22
Oregon	46.31	44.88	50.11
Pennsylvania	41.56	40.02	36.90
Rhode Island	25.26	27.25	21.64
South Carolina	39.11	33.92	36.45
South Dakota	51.26	50.94	42.23
Tennessee	35.08	34.47	38.33
Texas	46.83	51.02	51.17
Utah	43.73	46.47	49.73
Vermont	33.01	28.70	27.45
Virginia	37.58	38.27	41.28
Washington	36.30	35.09	32.12
West Virginia	33.55	36.16	35.50
Wisconsin	41.66	49.74	47.66
Wyoming	53.30	57.59	55.43

TABLE A.9

DIRECT SAMPLE ESTIMATES OF PERCENTAGES OF PEOPLE ELIGIBLE FOR FOOD STAMPS, ALL ELIGIBLE PEOPLE

	1999	2000	2001
Alabama	15.897	14.210	15.435
Alaska	9.113	8.450	8.717
Arizona	10.633	11.278	11.013
Arkansas	14.340	16.070	16.434
California	10.924	9.274	8.749
Colorado	6.507	7.615	6.653
Connecticut	7.659	7.443	6.520
Delaware	9.981	7.559	6.314
District of Columbia	15.359	16.303	17.484
Florida	10.298	10.409	11.463
Georgia	13.564	11.476	12.375
Hawaii	11.421	7.257	9.806
Idaho	11.102	9.640	10.190
Illinois	9.185	8.853	8.591
Indiana	6.631	6.966	7.604
Iowa	6.116	6.315	6.134
Kansas	10.053	6.452	8.408
Kentucky	12.431	11.943	12.216
Louisiana	16.414	17.567	16.072
Maine	8.695	9.405	9.398
Maryland	6.287	7.056	5.841
Massachusetts	10.895	9.049	8.768
Michigan	8.652	7.321	8.143
Minnesota	6.531	4.349	5.524
Mississippi	15.937	16.466	18.931
Missouri	9.618	7.280	8.028
Montana	11.355	10.930	10.234
Nebraska	8.219	6.314	6.799
Nevada	9.083	7.593	7.050
New Hampshire	6.326	4.988	5.248
New Jersey	6.934	7.086	7.553
New Mexico	15.774	14.339	13.857
New York	13.451	11.992	12.478
North Carolina	11.677	12.492	11.525
North Dakota	10.139	8.796	9.792
Ohio	9.970	9.226	8.975
Oklahoma	10.969	12.339	13.141
Oregon	8.967	8.110	8.084
Pennsylvania	9.202	8.407	9.063
Rhode Island	10.832	10.710	9.490
South Carolina	11.604	11.810	12.610
South Dakota	7.785	8.383	7.006
Tennessee	10.870	13.473	14.181
Texas	13.725	14.132	13.200
Utah	5.380	7.140	7.352
Vermont	8.189	8.095	8.694
Virginia	7.995	8.084	7.484
Washington	7.663	7.923	8.327
West Virginia	15.444	13.974	14.415
Wisconsin	6.773	5.863	6.137
Wyoming	8.637	8.433	7.590

TABLE A.10

DIRECT SAMPLE ESTIMATES OF PERCENTAGES OF PEOPLE
ELIGIBLE FOR FOOD STAMPS,
WORKING POOR

	1999	2000	2001
Alabama	7.399	5.865	6.451
Alaska	5.174	4.331	4.126
Arizona	6.334	6.719	5.757
Arkansas	6.396	6.863	7.328
California	6.860	5.669	5.410
Colorado	3.196	3.886	3.247
Connecticut	4.049	3.177	2.474
Delaware	4.857	3.124	2.872
District of Columbia	5.638	5.493	5.393
Florida	5.128	4.532	4.861
Georgia	6.440	4.410	5.360
Hawaii	6.321	3.717	4.288
Idaho	7.194	5.345	5.863
Illinois	4.257	4.105	3.715
Indiana	2.738	2.974	2.934
Iowa	3.500	3.775	3.148
Kansas	5.048	2.791	4.081
Kentucky	4.804	4.751	5.036
Louisiana	6.422	7.011	6.722
Maine	3.205	3.024	2.686
Maryland	2.680	2.603	2.157
Massachusetts	4.447	3.216	3.140
Michigan	4.069	2.890	3.208
Minnesota	2.815	2.137	2.681
Mississippi	7.243	7.563	7.928
Missouri	3.811	2.800	2.336
Montana	6.339	5.477	5.210
Nebraska	3.777	3.437	3.543
Nevada	4.987	3.748	3.878
New Hampshire	2.705	1.477	1.934
New Jersey	2.928	3.019	2.241
New Mexico	9.582	8.946	6.055
New York	4.831	4.235	4.732
North Carolina	5.212	6.411	4.581
North Dakota	4.338	3.809	4.317
Ohio	3.991	3.997	3.093
Oklahoma	4.655	6.352	6.058
Oregon	4.446	4.215	4.189
Pennsylvania	3.972	3.129	3.088
Rhode Island	3.279	3.202	2.307
South Carolina	5.140	4.529	4.047
South Dakota	3.890	4.230	2.705
Tennessee	4.711	5.891	5.132
Texas	7.953	8.077	7.403
Utah	3.197	3.855	3.926
Vermont	3.327	2.956	2.894
Virginia	3.658	3.550	2.796
Washington	3.105	3.307	3.121
West Virginia	5.373	4.765	4.375
Wisconsin	3.618	2.813	2.662
Wyoming	4.294	4.854	3.459

TABLE A.11

DEFINITIONS AND DATA SOURCES FOR PREDICTORS

Predictor[a]	Definition	Principal Data Source[b]
Food stamp prevalence rate	$100 \times \frac{\text{Number of people receiving food stamps}}{\text{Resident population}}$	Counts of people receiving food stamps are from FSP Program Operations data and were provided by the Food and Nutrition Service. For more information, see the second footnote of Appendix A.
Working age adult tax poverty rate	$100 \times \frac{\text{Number of exemptions for people ages 18-64 with adjusted gross income below the poverty level}}{\text{Total number of exemptions for people ages 18-64 on tax returns}}$	All data for constructing this predictor were obtained from the U.S. Census Bureau.
Tax nonfiler rate	$100 - \left(100 \times \frac{\text{Number of exemptions on tax returns}}{\text{Resident Population}}\right)$	All data for constructing this predictor were obtained from the U.S. Census Bureau.
Rental rate	$100 \times \frac{\text{Number of renter-occupied units}}{\text{Number of occupied housing units}}$	The data for constructing this predictor were obtained from the Census 2000 Demographic Profiles released between May 7, 2002 and June 4, 2002 at http://www2.census.gov/census_2000/datasets/100_and_sample_profile.
Elderly poverty rate	$100 \times \frac{\text{Number of people ages 65 and over below the poverty level}}{\text{Total number of people ages 65 and over}}$	The data for constructing this predictor were obtained from the Census 2000 Demographic Profiles released between May 7, 2002 and June 4, 2002 at http://www2.census.gov/census_2000/datasets/100_and_sample_profile.

[a]Values for the first three predictors vary across the year-specific equations of our regression model, while values for the last two predictors do not vary.

[b]For deriving tax nonfiler rates and food stamp prevalence rates for a given year, we used the July 1 population estimates published by the Census Bureau for that year. The 1999 population estimates that we used were released on August 30, 2000 at http://www.census.gov/population/www/estimates/st_sasrh.html. We adjusted these population estimates for net undercount in the (1990) decennial census using a state net population adjustment matrix published by the Census Bureau at http://www.census.gov/population/www/censusdata/adjustment.html. The population estimates that we used were released on 6/23/03 at http://eire.census.gov/popest/nat_st_dataset.csv. We did not adjust these estimates for net undercount in Census 2000.

TABLE A.12

VALUES FOR TEMPORALLY CONSTANT PREDICTORS

	Elderly Poverty Rate	Percentage of Occupied Units that are Rented
Alabama	15.534	27.539
Alaska	6.793	37.496
Arizona	8.372	31.966
Arkansas	13.845	30.609
California	8.082	43.090
Colorado	7.440	32.691
Connecticut	7.005	33.184
Delaware	7.863	27.683
District of Columbia	16.377	59.243
Florida	9.067	29.917
Georgia	13.546	32.505
Hawaii	7.395	43.486
Idaho	8.273	27.613
Illinois	8.326	32.730
Indiana	7.674	28.556
Iowa	7.708	27.657
Kansas	8.117	30.754
Kentucky	14.160	29.249
Louisiana	16.687	32.059
Maine	10.217	28.424
Maryland	8.526	32.264
Massachusetts	8.852	38.285
Michigan	8.207	26.218
Minnesota	8.194	25.447
Mississippi	18.796	27.662
Missouri	9.906	29.730
Montana	9.067	30.932
Nebraska	8.020	32.554
Nevada	7.140	39.128
New Hampshire	7.184	30.321
New Jersey	7.832	34.365
New Mexico	12.812	30.020
New York	11.328	47.014
North Carolina	13.228	30.640
North Dakota	11.133	33.386
Ohio	8.139	30.889
Oklahoma	11.114	31.590
Oregon	7.585	35.747
Pennsylvania	9.069	28.693
Rhode Island	10.555	39.975
South Carolina	13.886	27.789
South Dakota	11.143	31.802
Tennessee	13.469	30.075
Texas	12.774	36.200
Utah	5.818	28.481
Vermont	8.475	29.443
Virginia	9.490	31.907
Washington	7.499	35.414
West Virginia	11.874	24.818
Wisconsin	7.430	31.574
Wyoming	8.883	30.006

TABLE A.13

1999 VALUES FOR TEMPORALLY VARIABLE PREDICTORS

	Food Stamp Prevalence Rate	Tax Nonfiler Rate	Working Age Adult Tax Poverty Rate
Alabama	9.196	17.704	16.286
Alaska	6.554	13.120	10.379
Arizona	5.367	21.805	13.353
Arkansas	9.848	18.970	17.504
California	5.975	18.964	14.534
Colorado	4.169	14.601	10.485
Connecticut	5.304	13.415	8.335
Delaware	4.908	14.393	10.222
District of Columbia	16.152	26.734	15.413
Florida	6.092	18.909	15.454
Georgia	7.656	18.169	14.181
Hawaii	10.481	15.747	13.817
Idaho	4.568	13.764	13.965
Illinois	6.541	15.002	11.070
Indiana	5.000	12.641	10.799
Iowa	4.431	12.738	10.043
Kansas	4.337	13.358	10.638
Kentucky	10.069	17.812	15.643
Louisiana	11.701	19.528	18.748
Maine	8.551	14.083	12.275
Maryland	4.784	14.417	9.575
Massachusetts	4.112	15.384	8.752
Michigan	6.656	14.551	10.800
Minnesota	4.291	11.659	8.374
Mississippi	10.232	20.078	19.153
Missouri	7.516	14.712	12.843
Montana	6.863	13.361	17.667
Nebraska	5.356	11.319	10.890
Nevada	3.330	17.675	10.611
New Hampshire	3.092	9.670	7.942
New Jersey	4.619	14.202	9.317
New Mexico	10.162	17.023	20.144
New York	8.402	20.481	13.914
North Carolina	6.479	17.175	12.496
North Dakota	5.226	11.617	12.718
Ohio	5.573	12.710	11.351
Oklahoma	7.921	18.244	16.663
Oregon	6.779	16.830	12.179
Pennsylvania	6.828	14.404	11.285
Rhode Island	7.691	18.789	10.845
South Carolina	7.812	17.643	14.616
South Dakota	5.972	12.139	13.476
Tennessee	9.211	16.028	14.499
Texas	6.837	17.131	16.549
Utah	4.058	13.012	11.507
Vermont	7.324	12.120	11.669
Virginia	5.168	15.027	10.492
Washington	5.179	14.119	10.444
West Virginia	13.427	19.662	17.730
Wisconsin	3.472	11.570	8.853
Wyoming	4.810	10.483	13.525

TABLE A.14

2000 VALUES FOR TEMPORALLY VARIABLE PREDICTORS

	Food Stamp Prevalence Rate	Tax Nonfiler Rate	Working Age Adult Tax Poverty Rate
Alabama	8.933	17.787	16.463
Alaska	5.945	12.758	10.358
Arizona	5.077	21.782	13.089
Arkansas	9.216	18.984	17.738
California	5.242	18.950	13.965
Colorado	3.542	14.236	10.334
Connecticut	4.754	13.167	8.133
Delaware	3.981	14.074	9.988
District of Columbia	13.759	25.899	14.855
Florida	5.458	18.105	15.359
Georgia	6.740	18.040	14.312
Hawaii	9.526	15.500	13.500
Idaho	4.494	13.524	13.767
Illinois	6.435	14.816	11.004
Indiana	5.043	12.335	10.848
Iowa	4.197	12.741	9.970
Kansas	4.386	13.343	10.827
Kentucky	9.961	17.383	15.562
Louisiana	11.153	19.405	18.722
Maine	7.930	13.494	11.837
Maryland	4.037	14.083	9.389
Massachusetts	3.559	14.910	8.327
Michigan	6.129	14.188	10.682
Minnesota	3.947	11.421	8.304
Mississippi	9.780	20.269	19.410
Missouri	7.621	14.450	12.792
Montana	6.603	13.078	17.323
Nebraska	4.709	11.432	10.940
Nevada	3.078	17.312	10.627
New Hampshire	2.890	9.104	7.641
New Jersey	3.977	13.785	9.213
New Mexico	9.201	23.309	20.949
New York	7.471	20.064	13.835
North Carolina	5.901	17.122	12.607
North Dakota	5.121	11.439	12.439
Ohio	5.382	12.454	11.257
Oklahoma	7.289	18.126	16.580
Oregon	7.014	16.720	12.242
Pennsylvania	6.235	13.890	11.073
Rhode Island	6.971	17.981	10.530
South Carolina	7.355	17.483	14.624
South Dakota	5.698	12.019	13.055
Tennessee	8.736	15.914	14.608
Texas	6.353	17.185	16.239
Utah	3.622	12.600	11.609
Vermont	6.574	11.647	11.202
Virginia	4.683	14.607	10.309
Washington	5.024	13.784	10.226
West Virginia	12.355	19.306	17.623
Wisconsin	3.686	11.168	8.909
Wyoming	4.555	10.215	13.167

TABLE A.15

2001 VALUES FOR TEMPORALLY VARIABLE PREDICTORS

	Food Stamp Prevalence Rate	Tax Nonfiler Rate	Working Age Adult Tax Poverty Rate
Alabama	9.362	18.314	16.853
Alaska	6.412	12.936	10.581
Arizona	5.852	22.074	13.529
Arkansas	9.759	19.190	18.132
California	4.808	18.621	14.119
Colorado	3.580	14.221	10.785
Connecticut	4.607	12.731	8.521
Delaware	4.194	14.378	10.304
District of Columbia	12.756	25.801	14.774
Florida	5.558	18.276	15.934
Georgia	6.997	18.561	14.869
Hawaii	8.732	15.626	13.713
Idaho	4.655	13.880	14.275
Illinois	6.680	14.818	11.449
Indiana	5.924	12.506	11.545
Iowa	4.424	12.998	10.593
Kansas	4.702	13.184	11.383
Kentucky	10.327	17.375	15.807
Louisiana	11.944	19.558	18.741
Maine	8.268	13.755	12.285
Maryland	3.914	14.157	9.540
Massachusetts	3.473	14.679	8.622
Michigan	6.658	14.463	11.359
Minnesota	4.048	11.502	8.802
Mississippi	10.676	20.883	19.792
Missouri	8.321	14.670	13.236
Montana	6.921	13.096	17.685
Nebraska	4.764	11.490	11.543
Nevada	3.628	17.659	11.157
New Hampshire	2.905	9.259	8.111
New Jersey	3.710	13.421	9.528
New Mexico	8.904	17.665	19.653
New York	6.963	19.275	14.423
North Carolina	6.240	17.364	13.135
North Dakota	5.939	11.164	12.571
Ohio	5.808	12.644	11.810
Oklahoma	7.738	18.182	16.630
Oregon	8.753	17.232	12.994
Pennsylvania	6.098	13.990	11.387
Rhode Island	6.722	18.131	10.574
South Carolina	8.131	18.114	15.199
South Dakota	5.966	11.932	13.751
Tennessee	9.321	16.199	15.197
Texas	6.576	17.171	16.543
Utah	3.552	11.979	12.297
Vermont	6.359	11.669	11.484
Virginia	4.655	14.515	10.586
Washington	5.297	14.004	10.840
West Virginia	12.367	19.331	17.579
Wisconsin	4.206	11.273	9.442
Wyoming	4.562	10.218	13.184

TABLE A.16

REGRESSION ESTIMATES OF PARTICIPATION RATES,
ALL ELIGIBLE PEOPLE

	1999	2000	2001
Alabama	66.880	60.462	60.939
Alaska	71.755	72.112	71.348
Arizona	50.251	48.913	51.243
Arkansas	70.796	63.020	63.419
California	50.442	50.358	47.241
Colorado	53.123	51.379	50.439
Connecticut	67.129	67.326	65.022
Delaware	62.669	56.480	54.957
District of Columbia	95.671	87.526	77.792
Florida	55.100	50.648	48.569
Georgia	60.463	50.900	50.275
Hawaii	90.227	91.043	82.045
Idaho	51.755	52.031	51.080
Illinois	69.561	68.870	69.903
Indiana	61.871	63.385	67.007
Iowa	59.276	59.007	58.368
Kansas	53.937	55.934	57.469
Kentucky	75.495	74.162	73.516
Louisiana	76.485	69.126	70.863
Maine	81.983	78.564	77.231
Maryland	59.245	54.810	53.357
Massachusetts	48.649	49.602	49.558
Michigan	75.630	71.135	70.330
Minnesota	61.975	60.696	59.695
Mississippi	62.488	50.814	54.892
Missouri	70.955	72.615	74.651
Montana	60.933	59.896	60.572
Nebraska	63.847	61.009	59.331
Nevada	40.615	42.339	45.010
New Hampshire	53.710	56.656	55.991
New Jersey	57.016	56.264	54.245
New Mexico	73.298	56.873	59.979
New York	59.873	57.857	55.107
North Carolina	53.630	49.242	49.547
North Dakota	51.578	51.343	59.900
Ohio	63.850	64.193	64.739
Oklahoma	63.406	57.489	57.991
Oregon	66.150	70.543	77.292
Pennsylvania	72.036	69.280	65.946
Rhode Island	65.588	65.688	63.320
South Carolina	62.394	55.693	57.140
South Dakota	56.648	55.864	56.887
Tennessee	74.187	68.489	69.146
Texas	49.659	45.505	46.429
Utah	57.493	56.205	54.209
Vermont	77.912	75.333	71.060
Virginia	56.676	55.166	54.469
Washington	60.115	62.261	62.444
West Virginia	107.085	96.745	89.597
Wisconsin	52.346	56.928	59.658
Wyoming	54.852	54.331	55.044

TABLE A.17

REGRESSION ESTIMATES OF PARTICIPATION RATES,
WORKING POOR

	1999	2000	2001
Alabama	63.522	59.135	65.477
Alaska	55.199	60.448	64.638
Arizona	34.846	32.966	38.886
Arkansas	61.933	57.850	63.855
California	27.371	31.573	27.831
Colorado	42.914	42.135	44.213
Connecticut	54.455	56.618	60.759
Delaware	56.467	50.350	54.026
District of Columbia	45.716	54.347	45.828
Florida	45.717	42.702	43.862
Georgia	50.410	43.778	45.755
Hawaii	63.810	73.833	70.249
Idaho	49.929	49.749	52.553
Illinois	57.186	59.114	66.878
Indiana	57.064	59.122	69.727
Iowa	55.320	54.390	59.600
Kansas	47.434	49.639	56.129
Kentucky	67.941	70.114	77.876
Louisiana	66.837	64.861	73.008
Maine	74.789	74.603	82.412
Maryland	48.953	45.963	48.194
Massachusetts	32.527	35.700	37.292
Michigan	69.272	65.801	73.801
Minnesota	60.580	58.262	64.365
Mississippi	60.102	50.898	59.335
Missouri	63.448	67.327	77.421
Montana	57.012	58.783	63.581
Nebraska	56.441	55.864	58.531
Nevada	22.130	25.544	27.900
New Hampshire	50.108	53.264	56.984
New Jersey	44.665	45.846	47.567
New Mexico	67.533	48.238	62.242
New York	31.222	36.995	34.937
North Carolina	46.649	43.145	46.929
North Dakota	47.392	49.287	61.568
Ohio	56.825	58.901	65.227
Oklahoma	53.559	50.414	55.080
Oregon	49.246	56.724	70.014
Pennsylvania	64.578	63.753	67.600
Rhode Island	43.286	48.702	49.809
South Carolina	57.822	52.429	59.046
South Dakota	53.079	54.255	59.331
Tennessee	67.107	64.969	72.602
Texas	39.321	38.263	39.738
Utah	52.283	51.227	54.714
Vermont	71.275	71.661	75.065
Virginia	47.394	47.136	50.642
Washington	46.677	51.392	55.777
West Virginia	96.927	91.748	97.578
Wisconsin	46.073	51.113	58.569
Wyoming	54.019	54.772	58.945

TABLE A.18

STANDARD ERRORS OF REGRESSION ESTIMATES OF PARTICIPATION RATES,
ALL ELIGIBLE PEOPLE

	1999	2000	2001
Alabama	4.646	4.522	4.505
Alaska	4.755	4.556	4.546
Arizona	5.317	5.114	5.160
Arkansas	4.488	4.391	4.380
California	4.810	4.666	4.702
Colorado	4.336	4.278	4.286
Connecticut	4.606	4.438	4.424
Delaware	4.495	4.367	4.421
District of Columbia	8.030	6.335	6.757
Florida	4.747	4.508	4.582
Georgia	4.421	4.362	4.387
Hawaii	6.026	5.552	5.355
Idaho	4.601	4.411	4.446
Illinois	4.376	4.282	4.333
Indiana	4.391	4.288	4.328
Iowa	4.452	4.307	4.321
Kansas	4.343	4.216	4.216
Kentucky	4.546	4.510	4.497
Louisiana	4.824	4.665	4.660
Maine	4.702	4.534	4.517
Maryland	4.400	4.310	4.366
Massachusetts	4.725	4.566	4.581
Michigan	4.744	4.509	4.518
Minnesota	4.778	4.539	4.592
Mississippi	5.198	5.013	4.946
Missouri	4.327	4.333	4.396
Montana	5.255	5.130	5.047
Nebraska	4.539	4.363	4.352
Nevada	4.747	4.618	4.555
New Hampshire	4.813	4.566	4.615
New Jersey	4.402	4.291	4.311
New Mexico	5.095	5.092	4.645
New York	4.961	4.627	4.756
North Carolina	4.687	4.525	4.536
North Dakota	4.846	4.679	4.660
Ohio	4.350	4.274	4.263
Oklahoma	4.426	4.342	4.304
Oregon	4.428	4.440	4.796
Pennsylvania	4.452	4.320	4.291
Rhode Island	4.726	4.480	4.603
South Carolina	4.539	4.422	4.425
South Dakota	4.630	4.507	4.545
Tennessee	4.490	4.372	4.362
Texas	4.598	4.531	4.525
Utah	4.611	4.471	4.537
Vermont	4.699	4.510	4.407
Virginia	4.355	4.266	4.296
Washington	4.339	4.266	4.262
West Virginia	6.427	5.705	5.449
Wisconsin	4.562	4.354	4.354
Wyoming	4.852	4.717	4.664

TABLE A.19

STANDARD ERRORS OF REGRESSION ESTIMATES OF PARTICIPATION RATES, WORKING POOR

	1999	2000	2001
Alabama	8.521	8.298	8.282
Alaska	8.383	8.254	8.270
Arizona	9.320	8.840	9.134
Arkansas	8.241	8.060	8.094
California	8.558	8.460	8.461
Colorado	7.893	7.850	7.901
Connecticut	8.232	8.088	8.128
Delaware	8.108	7.971	8.071
District of Columbia	11.064	10.760	10.669
Florida	8.505	8.131	8.316
Georgia	8.101	8.052	8.063
Hawaii	9.699	9.763	9.299
Idaho	8.143	8.032	8.070
Illinois	7.960	7.901	7.995
Indiana	7.958	7.886	7.999
Iowa	8.003	7.901	7.946
Kansas	7.878	7.770	7.808
Kentucky	8.306	8.282	8.291
Louisiana	8.680	8.476	8.495
Maine	8.438	8.315	8.335
Maryland	7.958	7.895	8.020
Massachusetts	8.368	8.271	8.340
Michigan	8.537	8.267	8.291
Minnesota	8.397	8.230	8.335
Mississippi	9.428	9.066	8.950
Missouri	7.936	8.000	8.136
Montana	9.057	9.027	8.931
Nebraska	8.175	7.946	8.004
Nevada	8.492	8.353	8.286
New Hampshire	8.467	8.192	8.399
New Jersey	7.965	7.866	7.955
New Mexico	8.951	8.906	8.443
New York	8.446	8.408	8.409
North Carolina	8.410	8.277	8.268
North Dakota	8.674	8.405	8.455
Ohio	7.928	7.855	7.896
Oklahoma	8.104	7.956	7.947
Oregon	8.035	8.132	8.623
Pennsylvania	8.099	7.972	7.947
Rhode Island	8.207	8.139	8.236
South Carolina	8.301	8.132	8.135
South Dakota	8.360	8.158	8.272
Tennessee	8.183	8.050	8.071
Texas	8.396	8.318	8.256
Utah	8.216	8.118	8.197
Vermont	8.408	8.223	8.137
Virginia	7.909	7.847	7.923
Washington	7.905	7.843	7.871
West Virginia	10.995	10.219	9.839
Wisconsin	8.148	7.933	8.026
Wyoming	8.559	8.416	8.399

TABLE A.20

PRELIMINARY SHRINKAGE ESTIMATES OF PARTICIPATION RATES, ALL ELIGIBLE PEOPLE

	1999	2000	2001
Alabama	63.663	58.404	58.234
Alaska	70.781	71.138	70.201
Arizona	49.018	46.664	49.804
Arkansas	67.856	59.731	59.931
California	54.279	55.716	52.189
Colorado	53.778	50.959	50.707
Connecticut	66.442	66.240	64.771
Delaware	60.172	53.945	53.656
District of Columbia	93.283	84.834	74.911
Florida	55.419	50.157	46.914
Georgia	60.466	53.043	51.751
Hawaii	90.608	91.933	82.686
Idaho	48.365	48.232	47.117
Illinois	70.651	69.547	71.383
Indiana	64.206	65.680	69.155
Iowa	59.812	59.190	58.960
Kansas	47.902	52.764	53.105
Kentucky	76.888	75.725	75.174
Louisiana	76.430	68.273	71.183
Maine	84.169	80.144	78.962
Maryland	59.950	55.047	53.882
Massachusetts	43.019	44.176	43.813
Michigan	78.247	75.032	73.814
Minnesota	63.376	63.473	61.200
Mississippi	63.465	52.442	55.371
Missouri	72.838	74.959	76.678
Montana	59.768	58.573	59.659
Nebraska	63.753	61.510	59.515
Nevada	39.211	41.544	44.778
New Hampshire	51.376	55.111	53.783
New Jersey	54.222	52.689	48.715
New Mexico	71.871	57.157	60.085
New York	61.351	59.897	56.174
North Carolina	53.418	47.899	49.971
North Dakota	52.682	52.700	61.033
Ohio	59.743	59.924	61.071
Oklahoma	65.903	58.816	59.211
Oregon	69.922	74.499	81.627
Pennsylvania	73.008	70.332	66.665
Rhode Island	67.354	66.939	65.467
South Carolina	64.217	57.898	58.946
South Dakota	63.279	61.534	63.511
Tennessee	74.363	66.138	66.823
Texas	50.254	45.270	47.390
Utah	57.218	54.763	52.611
Vermont	77.923	75.331	70.404
Virginia	58.584	56.709	56.522
Washington	60.511	62.021	61.993
West Virginia	103.536	93.514	86.536
Wisconsin	54.467	59.368	62.075
Wyoming	55.693	54.526	56.145

TABLE A.21

PRELIMINARY SHRINKAGE ESTIMATES OF PARTICIPATION RATES, WORKING POOR

	1999	2000	2001
Alabama	55.581	52.215	57.451
Alaska	55.002	60.192	64.156
Arizona	34.615	31.732	38.639
Arkansas	55.635	51.477	56.367
California	26.578	32.339	29.712
Colorado	46.412	44.664	47.530
Connecticut	50.193	52.078	56.678
Delaware	51.976	46.179	50.295
District of Columbia	36.847	45.068	36.439
Florida	45.472	42.733	42.797
Georgia	53.776	49.808	50.243
Hawaii	64.886	75.597	72.100
Idaho	45.926	45.640	47.983
Illinois	60.600	62.113	70.330
Indiana	62.022	63.633	74.412
Iowa	49.394	47.274	53.313
Kansas	40.779	45.446	49.727
Kentucky	70.479	72.833	80.280
Louisiana	72.832	70.405	79.057
Maine	78.435	78.130	86.032
Maryland	47.799	44.328	46.826
Massachusetts	24.339	28.492	29.318
Michigan	74.445	72.345	79.972
Minnesota	57.539	56.578	60.992
Mississippi	57.204	48.139	55.967
Missouri	68.712	73.024	82.941
Montana	51.770	53.528	57.911
Nebraska	53.895	53.216	55.868
Nevada	20.682	24.406	25.562
New Hampshire	41.745	45.511	48.599
New Jersey	34.936	34.428	37.077
New Mexico	60.301	42.398	56.798
New York	38.343	44.156	40.597
North Carolina	47.379	42.668	49.218
North Dakota	54.586	57.067	68.823
Ohio	52.954	54.253	62.625
Oklahoma	61.370	56.234	60.725
Oregon	60.072	67.319	81.143
Pennsylvania	69.531	69.014	72.307
Rhode Island	50.010	55.364	56.775
South Carolina	60.160	54.836	61.891
South Dakota	64.764	64.894	70.689
Tennessee	62.164	57.556	66.344
Texas	41.821	40.662	43.538
Utah	49.276	47.576	50.773
Vermont	66.977	67.202	69.981
Virginia	51.766	51.306	55.530
Washington	47.269	51.445	55.145
West Virginia	96.372	91.546	97.401
Wisconsin	53.697	59.967	66.922
Wyoming	57.047	56.685	62.148

TABLE A.22

FINAL SHRINKAGE ESTIMATES OF PARTICIPATION RATES,
ALL ELIGIBLE PEOPLE

	1999	2000	2001
Alabama	63.566	60.015	59.890
Alaska	70.673	73.099	72.198
Arizona	48.943	47.951	51.221
Arkansas	67.752	61.378	61.636
California	54.196	57.252	53.674
Colorado	53.695	52.365	52.149
Connecticut	66.340	68.067	66.614
Delaware	60.080	55.433	55.182
District of Columbia	93.141	87.174	77.042
Florida	55.334	51.540	48.248
Georgia	60.373	54.506	53.224
Hawaii	90.469	94.468	85.038
Idaho	48.291	49.563	48.457
Illinois	70.542	71.465	73.414
Indiana	64.107	67.492	71.122
Iowa	59.720	60.823	60.637
Kansas	47.829	54.220	54.616
Kentucky	76.770	77.814	77.313
Louisiana	76.312	70.156	73.208
Maine	84.039	82.355	81.208
Maryland	59.858	56.566	55.415
Massachusetts	42.953	45.394	45.059
Michigan	78.127	77.101	75.914
Minnesota	63.279	65.224	62.941
Mississippi	63.368	53.888	56.946
Missouri	72.726	77.026	78.859
Montana	59.676	60.188	61.357
Nebraska	63.655	63.206	61.208
Nevada	39.151	42.691	46.051
New Hampshire	51.297	56.632	55.313
New Jersey	54.139	54.143	50.101
New Mexico	71.760	58.733	61.794
New York	61.257	61.549	57.772
North Carolina	53.336	49.221	51.393
North Dakota	52.601	54.152	62.769
Ohio	59.651	61.577	62.808
Oklahoma	65.801	60.438	60.896
Oregon	69.814	76.554	83.949
Pennsylvania	72.896	72.272	68.562
Rhode Island	67.250	68.785	67.330
South Carolina	64.119	59.495	60.623
South Dakota	63.182	63.231	65.318
Tennessee	74.249	67.963	68.724
Texas	50.176	46.519	48.738
Utah	57.130	56.273	54.108
Vermont	77.804	77.411	72.407
Virginia	58.494	58.273	58.130
Washington	60.419	63.731	63.756
West Virginia	100.000	96.093	88.998
Wisconsin	54.383	61.005	63.841
Wyoming	55.607	56.029	57.744

TABLE A.23

FINAL SHRINKAGE ESTIMATES OF PARTICIPATION RATES, WORKING POOR

	1999	2000	2001
Alabama	55.525	54.242	59.739
Alaska	54.946	62.530	66.712
Arizona	34.580	32.964	40.178
Arkansas	55.579	53.476	58.611
California	26.551	33.595	30.895
Colorado	46.365	46.398	49.423
Connecticut	50.143	54.100	58.936
Delaware	51.923	47.973	52.300
District of Columbia	36.809	46.818	37.889
Florida	45.426	44.392	44.502
Georgia	53.721	51.742	52.244
Hawaii	64.820	78.533	74.972
Idaho	45.880	47.412	49.895
Illinois	60.539	64.525	73.131
Indiana	61.960	66.103	77.375
Iowa	49.344	49.109	55.436
Kansas	40.738	47.211	51.707
Kentucky	70.408	75.661	83.478
Louisiana	72.759	73.139	82.206
Maine	78.358	81.163	89.458
Maryland	47.750	46.049	48.691
Massachusetts	24.315	29.598	30.486
Michigan	74.370	75.154	83.157
Minnesota	57.481	58.775	63.421
Mississippi	57.146	50.008	58.196
Missouri	68.643	75.860	86.244
Montana	51.719	55.606	60.215
Nebraska	53.841	55.282	58.093
Nevada	20.661	25.353	26.580
New Hampshire	41.703	47.280	50.535
New Jersey	34.900	35.764	38.554
New Mexico	60.241	44.045	59.060
New York	38.305	45.871	42.214
North Carolina	47.331	44.325	51.178
North Dakota	54.529	59.284	71.563
Ohio	52.901	56.360	65.119
Oklahoma	61.308	58.417	63.143
Oregon	60.011	69.933	84.375
Pennsylvania	69.461	71.694	75.187
Rhode Island	49.961	57.514	59.037
South Carolina	60.100	56.966	64.355
South Dakota	64.698	67.412	73.507
Tennessee	62.102	59.791	68.987
Texas	41.779	42.241	45.272
Utah	49.226	49.424	52.795
Vermont	66.906	69.812	72.768
Virginia	51.714	53.298	57.741
Washington	47.221	53.443	57.341
West Virginia	96.274	95.101	100.000
Wisconsin	53.643	62.296	69.587
Wyoming	56.989	58.886	64.625

TABLE A.24

STANDARD ERRORS OF FINAL SHRINKAGE ESTIMATES OF PARTICIPATION RATES, ALL ELIGIBLE PEOPLE

	1999	2000	2001
Alabama	3.158	2.922	2.170
Alaska	3.908	3.623	3.537
Arizona	3.209	2.918	3.035
Arkansas	3.483	3.212	2.627
California	2.249	1.492	2.441
Colorado	3.307	3.089	3.103
Connecticut	3.811	3.471	3.505
Delaware	3.590	3.208	3.683
District of Columbia	6.938	4.393	5.569
Florida	2.513	2.721	1.956
Georgia	2.703	2.479	2.699
Hawaii	5.117	5.007	4.439
Idaho	3.690	3.154	2.869
Illinois	2.874	2.832	3.007
Indiana	3.671	3.435	3.516
Iowa	3.698	3.407	3.588
Kansas	2.616	3.415	2.485
Kentucky	3.938	3.998	3.994
Louisiana	3.820	3.348	3.202
Maine	4.064	3.832	3.993
Maryland	3.628	3.184	3.650
Massachusetts	3.267	3.213	3.118
Michigan	3.488	3.091	3.175
Minnesota	4.362	4.067	4.279
Mississippi	3.066	3.514	3.526
Missouri	4.123	4.255	4.348
Montana	3.991	3.907	3.898
Nebraska	3.685	3.624	3.718
Nevada	2.737	3.025	2.333
New Hampshire	3.641	3.422	3.660
New Jersey	3.053	2.441	1.845
New Mexico	3.702	3.596	2.763
New York	2.910	2.390	2.311
North Carolina	2.857	1.792	1.864
North Dakota	4.014	3.831	3.596
Ohio	2.669	2.448	2.449
Oklahoma	2.775	2.571	2.878
Oregon	3.844	3.980	4.340
Pennsylvania	3.190	3.302	3.000
Rhode Island	3.887	3.635	3.676
South Carolina	3.632	3.201	3.545
South Dakota	4.090	4.381	4.314
Tennessee	3.159	2.769	2.994
Texas	1.478	1.493	1.825
Utah	3.767	3.646	3.583
Vermont	3.620	3.261	2.579
Virginia	3.336	3.225	3.023
Washington	3.113	2.897	2.740
West Virginia	5.478	4.386	4.123
Wisconsin	3.704	3.146	3.245
Wyoming	3.160	3.061	3.184

TABLE A.25

STANDARD ERRORS OF FINAL SHRINKAGE ESTIMATES OF PARTICIPATION RATES,
WORKING POOR

	1999	2000	2001
Alabama	4.944	4.938	4.152
Alaska	6.041	5.596	5.645
Arizona	4.412	2.363	3.702
Arkansas	5.274	4.768	4.137
California	1.892	2.096	2.091
Colorado	4.031	3.424	4.059
Connecticut	5.693	5.346	5.785
Delaware	5.942	5.964	6.206
District of Columbia	5.968	5.770	5.904
Florida	3.500	3.924	3.153
Georgia	3.928	4.384	4.031
Hawaii	6.287	7.694	6.657
Idaho	5.366	4.830	4.672
Illinois	4.379	4.392	4.468
Indiana	5.698	5.615	5.958
Iowa	4.162	3.509	4.172
Kansas	3.526	4.565	3.484
Kentucky	6.397	6.283	6.548
Louisiana	5.502	5.356	5.280
Maine	7.046	6.855	7.201
Maryland	5.320	4.826	5.338
Massachusetts	2.973	3.637	3.561
Michigan	4.967	5.431	5.200
Minnesota	5.438	4.610	5.439
Mississippi	6.052	5.488	5.287
Missouri	7.315	7.710	7.897
Montana	5.480	5.491	4.934
Nebraska	5.232	4.790	5.402
Nevada	3.598	3.266	2.740
New Hampshire	5.658	5.603	5.413
New Jersey	3.234	2.990	3.606
New Mexico	5.207	4.159	4.376
New York	3.919	3.585	2.920
North Carolina	3.931	3.378	3.007
North Dakota	6.632	6.298	6.472
Ohio	3.560	3.436	4.003
Oklahoma	4.531	3.947	4.512
Oregon	5.662	5.929	6.230
Pennsylvania	5.563	5.797	5.706
Rhode Island	6.139	5.892	6.168
South Carolina	5.239	4.536	5.061
South Dakota	6.047	6.456	6.678
Tennessee	5.042	4.212	4.809
Texas	2.299	2.391	1.742
Utah	5.278	4.857	4.918
Vermont	6.354	6.110	5.821
Virginia	4.697	4.277	4.841
Washington	4.408	3.967	3.544
West Virginia	9.306	8.355	7.879
Wisconsin	5.152	4.060	4.854
Wyoming	4.420	3.966	4.963

TABLE A.26

FINAL SHRINKAGE ESTIMATES OF NUMBERS OF PEOPLE ELIGIBLE
FOR FOOD STAMPS,
ALL ELIGIBLE PEOPLE

	1999	2000	2001
Alabama	611,873	631,420	658,656
Alaska	55,413	50,147	51,294
Arizona	514,170	531,610	561,684
Arkansas	368,176	397,065	412,355
California	3,678,577	3,137,275	3,053,903
Colorado	313,033	292,183	286,770
Connecticut	255,461	236,844	228,589
Delaware	60,974	55,615	57,020
District of Columbia	88,785	90,356	93,096
Florida	1,634,627	1,661,777	1,770,720
Georgia	985,368	988,454	1,044,131
Hawaii	135,962	122,204	124,173
Idaho	114,636	112,172	120,634
Illinois	1,128,528	1,058,782	1,091,791
Indiana	457,273	433,707	472,352
Iowa	211,514	197,930	205,187
Kansas	233,384	206,355	220,006
Kentucky	509,225	506,955	521,663
Louisiana	665,043	703,507	697,119
Maine	125,223	119,572	126,597
Maryland	424,119	375,079	370,931
Massachusetts	599,671	506,613	481,271
Michigan	834,144	769,844	838,819
Minnesota	323,969	297,662	309,057
Mississippi	452,355	503,456	517,051
Missouri	546,534	535,456	554,009
Montana	100,252	94,977	97,565
Nebraska	136,178	125,121	126,061
Nevada	152,295	139,143	147,346
New Hampshire	69,624	62,258	61,707
New Jersey	689,882	611,908	622,911
New Mexico	242,468	279,954	258,976
New York	2,477,938	2,266,910	2,288,321
North Carolina	901,785	952,437	938,491
North Dakota	61,416	57,078	59,752
Ohio	1,059,033	976,606	998,259
Oklahoma	400,421	409,612	418,070
Oregon	308,950	295,058	326,981
Pennsylvania	1,119,441	1,047,518	1,071,452
Rhode Island	112,268	104,510	104,024
South Carolina	474,801	489,355	518,237
South Dakota	69,596	67,870	67,897
Tennessee	669,148	713,584	745,341
Texas	2,757,156	2,840,986	2,756,925
Utah	144,089	135,267	142,142
Vermont	55,231	50,183	51,186
Virginia	596,641	556,549	560,455
Washington	498,618	455,013	476,900
West Virginia	239,881	233,147	242,153
Wisconsin	326,597	308,996	331,685
Wyoming	42,169	39,383	38,842

TABLE A.27

FINAL SHRINKAGE ESTIMATES OF NUMBERS OF PEOPLE ELIGIBLE FOR FOOD STAMPS, WORKING POOR

	1999	2000	2001
Alabama	279,870	266,926	255,516
Alaska	36,638	26,218	24,069
Arizona	314,918	319,993	298,922
Arkansas	182,767	181,596	171,103
California	2,186,043	1,837,994	1,916,799
Colorado	149,911	153,900	145,924
Connecticut	120,869	97,033	74,964
Delaware	26,337	24,812	21,629
District of Columbia	30,199	27,925	26,124
Florida	782,215	774,631	749,156
Georgia	458,420	441,153	431,502
Hawaii	70,480	61,668	58,079
Idaho	77,107	65,555	67,037
Illinois	538,611	490,892	460,415
Indiana	203,840	176,558	191,842
Iowa	113,908	104,050	93,914
Kansas	122,762	100,020	98,781
Kentucky	210,871	203,262	190,329
Louisiana	292,028	305,798	293,548
Maine	39,349	39,969	40,951
Maryland	174,719	131,233	119,185
Massachusetts	243,710	197,191	169,450
Michigan	383,916	334,428	334,305
Minnesota	121,013	119,103	111,092
Mississippi	206,916	211,266	207,454
Missouri	231,966	239,000	223,193
Montana	55,645	48,029	42,848
Nebraska	65,629	58,744	57,883
Nevada	97,076	76,388	71,111
New Hampshire	24,914	16,707	20,637
New Jersey	262,659	223,444	216,773
New Mexico	128,061	161,620	113,221
New York	1,048,382	836,315	829,263
North Carolina	386,423	450,147	387,618
North Dakota	30,103	28,635	27,721
Ohio	431,067	398,947	387,798
Oklahoma	201,273	207,010	182,080
Oregon	172,827	150,412	167,159
Pennsylvania	499,475	433,800	367,158
Rhode Island	38,622	35,179	26,119
South Carolina	200,782	175,830	178,813
South Dakota	34,910	32,463	25,618
Tennessee	288,540	286,000	289,751
Texas	1,569,750	1,609,669	1,544,086
Utah	78,311	77,048	75,086
Vermont	21,847	16,795	14,663
Virginia	262,777	241,292	236,786
Washington	235,732	193,723	172,847
West Virginia	86,157	86,261	77,974
Wisconsin	141,509	154,115	147,784
Wyoming	21,957	21,966	19,333

TABLE A.28

STANDARD ERRORS OF FINAL SHRINKAGE ESTIMATES OF NUMBERS OF PEOPLE ELIGIBLE FOR FOOD STAMPS,
ALL ELIGIBLE PEOPLE

	1999	2000	2001
Alabama	30,410	30,748	23,860
Alaska	3,065	2,486	2,513
Arizona	33,735	32,355	33,278
Arkansas	18,939	20,778	17,572
California	152,721	81,748	138,888
Colorado	19,288	17,238	17,064
Connecticut	14,683	12,076	12,029
Delaware	3,645	3,219	3,805
District of Columbia	6,617	4,554	6,729
Florida	74,270	87,742	71,804
Georgia	44,141	44,951	52,946
Hawaii	7,694	6,477	6,482
Idaho	8,763	7,138	7,141
Illinois	46,003	41,958	44,722
Indiana	26,202	22,072	23,349
Iowa	13,103	11,088	12,141
Kansas	12,770	12,999	10,009
Kentucky	26,138	26,047	26,952
Louisiana	33,306	33,578	30,493
Maine	6,059	5,563	6,224
Maryland	25,718	21,111	24,430
Massachusetts	45,630	35,861	33,302
Michigan	37,258	30,865	35,080
Minnesota	22,343	18,561	21,010
Mississippi	21,902	32,828	32,011
Missouri	31,004	29,579	30,547
Montana	6,709	6,165	6,199
Nebraska	7,888	7,175	7,657
Nevada	10,653	9,860	7,464
New Hampshire	4,944	3,762	4,083
New Jersey	38,925	27,590	22,945
New Mexico	12,515	17,140	11,579
New York	117,773	88,018	91,546
North Carolina	48,326	34,680	34,038
North Dakota	4,689	4,038	3,423
Ohio	47,408	38,825	38,925
Oklahoma	16,898	17,422	19,757
Oregon	17,018	15,340	16,905
Pennsylvania	49,011	47,854	46,880
Rhode Island	6,493	5,523	5,679
South Carolina	26,910	26,328	30,302
South Dakota	4,508	4,702	4,484
Tennessee	28,484	29,075	32,471
Texas	81,239	91,166	103,223
Utah	9,505	8,765	9,412
Vermont	2,571	2,114	1,823
Virginia	34,048	30,799	29,144
Washington	25,708	20,682	20,494
West Virginia	12,303	10,643	11,218
Wisconsin	22,254	15,933	16,861
Wyoming	2,397	2,151	2,142

TABLE A.29

STANDARD ERRORS OF FINAL SHRINKAGE ESTIMATES OF NUMBERS OF PEOPLE ELIGIBLE FOR FOOD STAMPS, WORKING POOR

	1999	2000	2001
Alabama	24,922	24,297	17,764
Alaska	4,028	2,346	2,037
Arizona	40,176	22,934	27,544
Arkansas	17,342	16,193	12,078
California	155,780	114,702	129,728
Colorado	13,032	11,358	11,986
Connecticut	13,723	9,588	7,360
Delaware	3,014	3,085	2,567
District of Columbia	4,896	3,442	4,071
Florida	60,262	68,480	53,087
Georgia	33,521	37,374	33,301
Hawaii	6,836	6,042	5,158
Idaho	9,019	6,679	6,278
Illinois	38,962	33,417	28,137
Indiana	18,745	14,997	14,774
Iowa	9,607	7,434	7,070
Kansas	10,625	9,672	6,656
Kentucky	19,158	16,880	14,933
Louisiana	22,082	22,396	18,856
Maine	3,539	3,376	3,297
Maryland	19,467	13,754	13,068
Massachusetts	29,798	24,231	19,798
Michigan	25,640	24,168	20,909
Minnesota	11,449	9,341	9,529
Mississippi	21,912	23,185	18,848
Missouri	24,721	24,290	20,440
Montana	5,896	4,743	3,512
Nebraska	6,378	5,090	5,384
Nevada	16,906	9,841	7,331
New Hampshire	3,380	1,980	2,211
New Jersey	24,337	18,679	20,281
New Mexico	11,069	15,261	8,390
New York	107,273	65,365	57,363
North Carolina	32,091	34,301	22,779
North Dakota	3,661	3,042	2,507
Ohio	29,011	24,321	23,841
Oklahoma	14,875	13,987	13,013
Oregon	16,306	12,753	12,345
Pennsylvania	40,000	35,076	27,868
Rhode Island	4,746	3,604	2,729
South Carolina	17,503	14,000	14,064
South Dakota	3,263	3,109	2,328
Tennessee	23,424	20,146	20,202
Texas	86,387	91,100	59,436
Utah	8,397	7,572	6,995
Vermont	2,075	1,470	1,173
Virginia	23,865	19,361	19,854
Washington	22,005	14,380	10,686
West Virginia	8,328	7,578	5,990
Wisconsin	13,591	10,043	10,311
Wyoming	1,703	1,479	1,485

TABLE A.30

NUMBER OF PEOPLE RECEIVING FOOD STAMPS, ADJUSTED FOR ISSUANCE ERRORS,
ALL ELIGIBLE PEOPLE

	1999	2000	2001
Alabama	388,940	378,947	394,470
Alaska	39,162	36,657	37,033
Arizona	251,649	254,914	287,701
Arkansas	249,447	243,712	254,159
California	1,993,642	1,796,162	1,639,155
Colorado	168,084	153,001	149,549
Connecticut	169,473	161,213	152,273
Delaware	36,633	30,829	31,465
District of Columbia	82,695	78,767	71,723
Florida	904,499	856,488	854,339
Georgia	594,896	538,768	555,726
Hawaii	123,002	115,444	105,594
Idaho	55,359	55,596	58,456
Illinois	796,089	756,661	801,527
Indiana	293,143	292,716	335,947
Iowa	126,317	120,387	124,419
Kansas	111,624	111,886	120,159
Kentucky	390,929	394,481	403,312
Louisiana	507,508	493,553	510,349
Maine	105,236	98,473	102,807
Maryland	253,870	212,166	205,550
Massachusetts	257,576	229,974	216,855
Michigan	651,686	593,561	636,780
Minnesota	205,003	194,146	194,524
Mississippi	286,646	271,304	294,440
Missouri	397,469	412,442	436,886
Montana	59,826	57,165	59,863
Nebraska	86,684	79,084	77,160
Nevada	59,625	59,401	67,855
New Hampshire	35,715	35,258	34,132
New Jersey	373,495	331,304	312,085
New Mexico	173,996	164,426	160,032
New York	1,517,915	1,395,267	1,322,004
North Carolina	480,972	468,796	482,318
North Dakota	32,305	30,909	37,506
Ohio	631,725	601,364	626,988
Oklahoma	263,482	247,563	254,587
Oregon	215,691	225,879	274,498
Pennsylvania	816,029	757,063	734,609
Rhode Island	75,500	71,887	70,039
South Carolina	304,435	291,141	314,171
South Dakota	43,972	42,915	44,349
Tennessee	496,831	484,970	512,227
Texas	1,383,440	1,321,590	1,343,668
Utah	82,318	76,119	76,910
Vermont	42,972	38,847	37,062
Virginia	348,998	324,317	325,794
Washington	301,257	289,986	304,053
West Virginia	239,881	224,038	215,511
Wisconsin	177,614	188,504	211,751
Wyoming	23,449	22,066	22,429

TABLE A.31

NUMBER OF PEOPLE RECEIVING FOOD STAMPS, ADJUSTED FOR ISSUANCE ERRORS, WORKING POOR

	1999	2000	2001
Alabama	155,398	144,787	152,643
Alaska	20,131	16,394	16,057
Arizona	108,898	105,483	120,101
Arkansas	101,580	97,110	100,286
California	580,416	617,465	592,198
Colorado	69,506	71,407	72,120
Connecticut	60,607	52,495	44,181
Delaware	13,675	11,903	11,312
District of Columbia	11,116	13,074	9,898
Florida	355,331	343,875	333,386
Georgia	246,270	228,263	225,433
Hawaii	45,685	48,430	43,543
Idaho	35,377	31,081	33,448
Illinois	326,070	316,748	336,704
Indiana	126,299	116,711	148,438
Iowa	56,207	51,098	52,062
Kansas	50,011	47,220	51,077
Kentucky	148,471	153,790	158,882
Louisiana	212,477	223,658	241,313
Maine	30,833	32,440	36,634
Maryland	83,429	60,432	58,032
Massachusetts	59,257	58,365	51,658
Michigan	285,517	251,336	277,997
Minnesota	69,559	70,003	70,456
Mississippi	118,245	105,650	120,730
Missouri	159,229	181,305	192,491
Montana	28,779	26,707	25,801
Nebraska	35,335	32,475	33,626
Nevada	20,057	19,367	18,901
New Hampshire	10,390	7,899	10,429
New Jersey	91,669	79,913	83,574
New Mexico	77,145	71,185	66,868
New York	401,578	383,623	350,067
North Carolina	182,899	199,529	198,377
North Dakota	16,415	16,976	19,838
Ohio	228,039	224,845	252,531
Oklahoma	123,397	120,929	114,971
Oregon	103,715	105,188	141,040
Pennsylvania	346,942	311,008	276,054
Rhode Island	19,296	20,233	15,420
South Carolina	120,669	100,163	115,076
South Dakota	22,586	21,884	18,831
Tennessee	179,188	171,002	199,890
Texas	655,824	679,947	699,035
Utah	38,549	38,080	39,642
Vermont	14,617	11,725	10,670
Virginia	135,893	128,604	136,723
Washington	111,315	103,531	99,113
West Virginia	82,947	82,035	77,974
Wisconsin	75,909	96,007	102,839
Wyoming	12,513	12,935	12,494

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APPENDIX B

DIFFERENCES BETWEEN THE PARTICIPATION RATES IN THIS REPORT AND OTHER PUBLISHED RATES

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The national estimates presented here and in Castner and Schirm (2004a) for the working poor differ by one to two percentage points from those in Cunnyngham (2003), due to the use of improved methods for identifying the working poor in the FSPQC data. A thorough discussion of the motivation to improve the methods and the methods themselves are included in Castner and Schirm (2004a).

The national estimates presented here and in Castner and Schirm (2004a and 2004b) for both all eligible people and the working poor differ by six to seven percentage points from those recently released in Cunnyngham (2004), which presents participation rates for 1999-2002 based on a substantially revised methodology for estimating the number eligible for the FSP. A small portion of the difference in the estimated number eligible resulted from minor technical improvements. The majority of the difference resulted from improvements in the estimation of asset eligibility, which are discussed briefly here, and in detail in Cunnyngham (2004).

Because the CPS data do not include the wide array of asset information required to determine asset eligibility, we impute asset eligibility using a model estimated from the Survey of Income and Program Participation (SIPP) data. The model used to obtain the estimates presented here for 1999-2001 was estimated from 1994 SIPP data and reflected program rules prior to the vehicle-related expansions in eligibility that began in fiscal year 2001. The improved model used by Cunnyngham (2004) was estimated from 1999 SIPP data (the latest data available when the work began) and reflected the expansions to the vehicle rules. This model was not yet available when we derived the estimates presented in this report.

The impact of the combination of the data and modeling changes led to a substantial downward revision in the national participation rates. When we revise the state estimates in the future, we expect them to be revised downward, though revisions will vary by state.