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Empirical Bayes Shrinkage Estimates of State Food Stamp Participation Rates in 2002 and 2003 for All Eligible People and 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 2005, the program served over 25 million people in an average month at a total annual cost of over $28 billion in benefits, excluding disaster assistance provided as a result of hurricanes in September 2005. The average monthly food stamp benefit was about $210 per household.

This report presents estimates that, for each state, measure the need for the Food Stamp Program and the program's effectiveness in both 2002 and 2003. 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. In addition to the participation rates that pertain to all eligible people, we derived estimates of participation rates for 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 multiple 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 2002 and 2003.[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 a 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.

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 Arkansas rather than all families in the state, we can be confident—by a commonly used standard—only that Arkansas' food stamp participation rate in 2003 was between about 50 and 64 percent. This range is wide (but typical), reflecting our substantial uncertainty about what Arkansas' participation rate actually was.

[1] The estimates presented here are also reported and compared with one another in Castner and Schirm (2006 and 2005a).

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 2003 estimate for Arkansas would be calculated using just 2003 data on households in one sample from Arkansas. If 2003 data are collected for only a small number of Arkansas 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 2003 or what happened in Arkansas (and other states) in other years is relevant to estimating what happened in Arkansas in 2003. 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 (DeNavas-Walt et al. 2005).

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 median 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 Arkansas' data to derive an estimate for Arkansas, even though conditions may be similar in Tennessee or Missouri. 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 Arkansas. Then, the shrinkage estimator optimally averages the direct sample and regression estimates for Arkansas 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. Therefore, we use an indirect estimator and borrow strength (while recognizing that the gain in precision might not be 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, two years of CPS data, and two years of Food Stamp Program (FSP) and income tax data for all the states to obtain estimates for each state in each year (2002 and 2003) 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 both 2002 and 2003.
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.

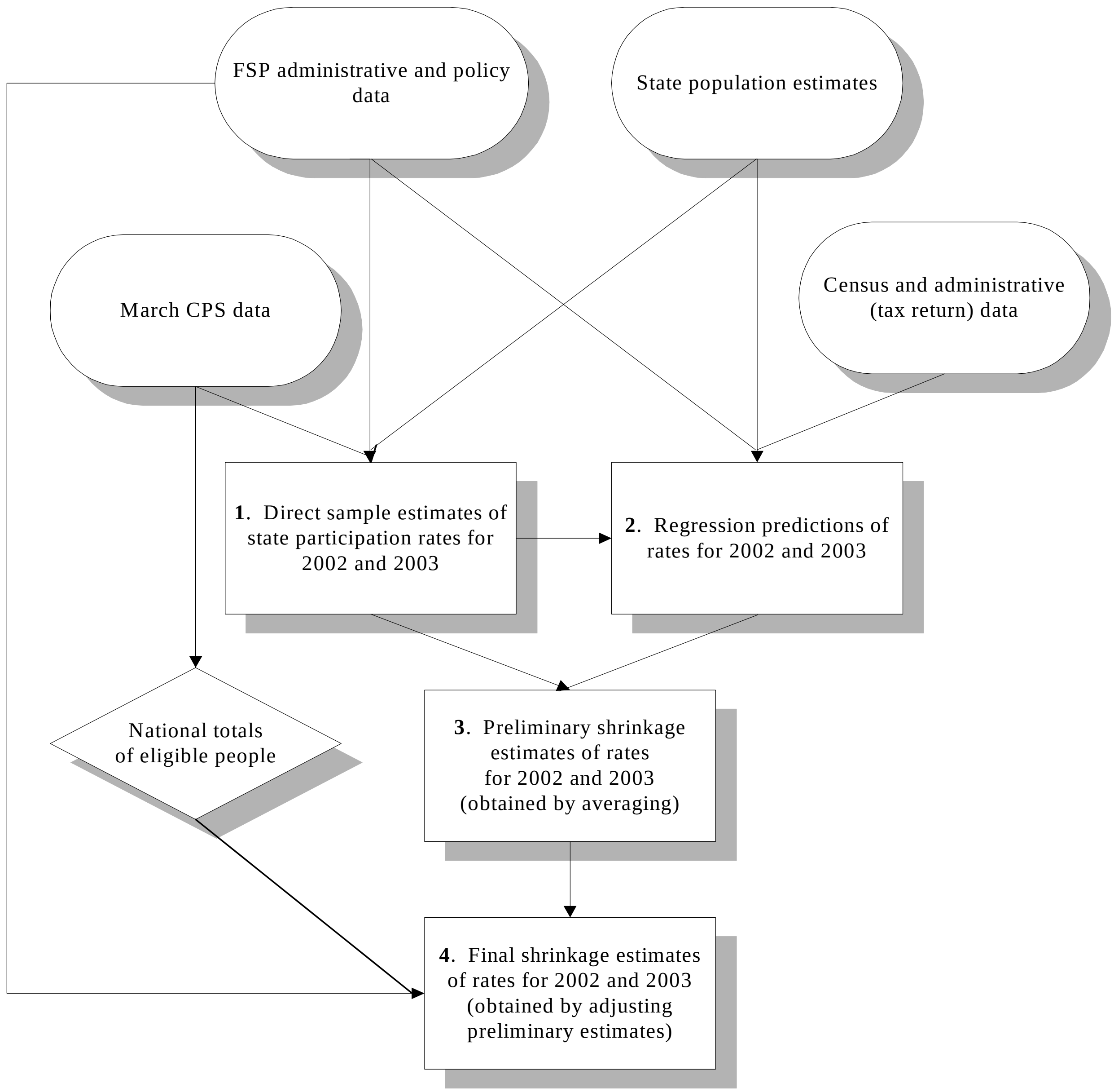
Each step is described in the remainder of this chapter. Additional technical details are provided in Appendix A.

1. From CPS data and FSP administrative data, derive direct sample estimates of state food stamp participation rates for both 2002 and 2003

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 of recipients in an average month in the fiscal year. 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 2003, for example, from the March 2004 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.

FIGURE II.1

THE ESTIMATION PROCEDURE



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 Arkansas' participation rate for all eligible people in 2003 was between 50 percent and 64 percent. This range is so wide and our uncertainty so great because the CPS sample for Arkansas 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—Arkansas and 2003 in our example—is the fundamental problem of "small area estimation."

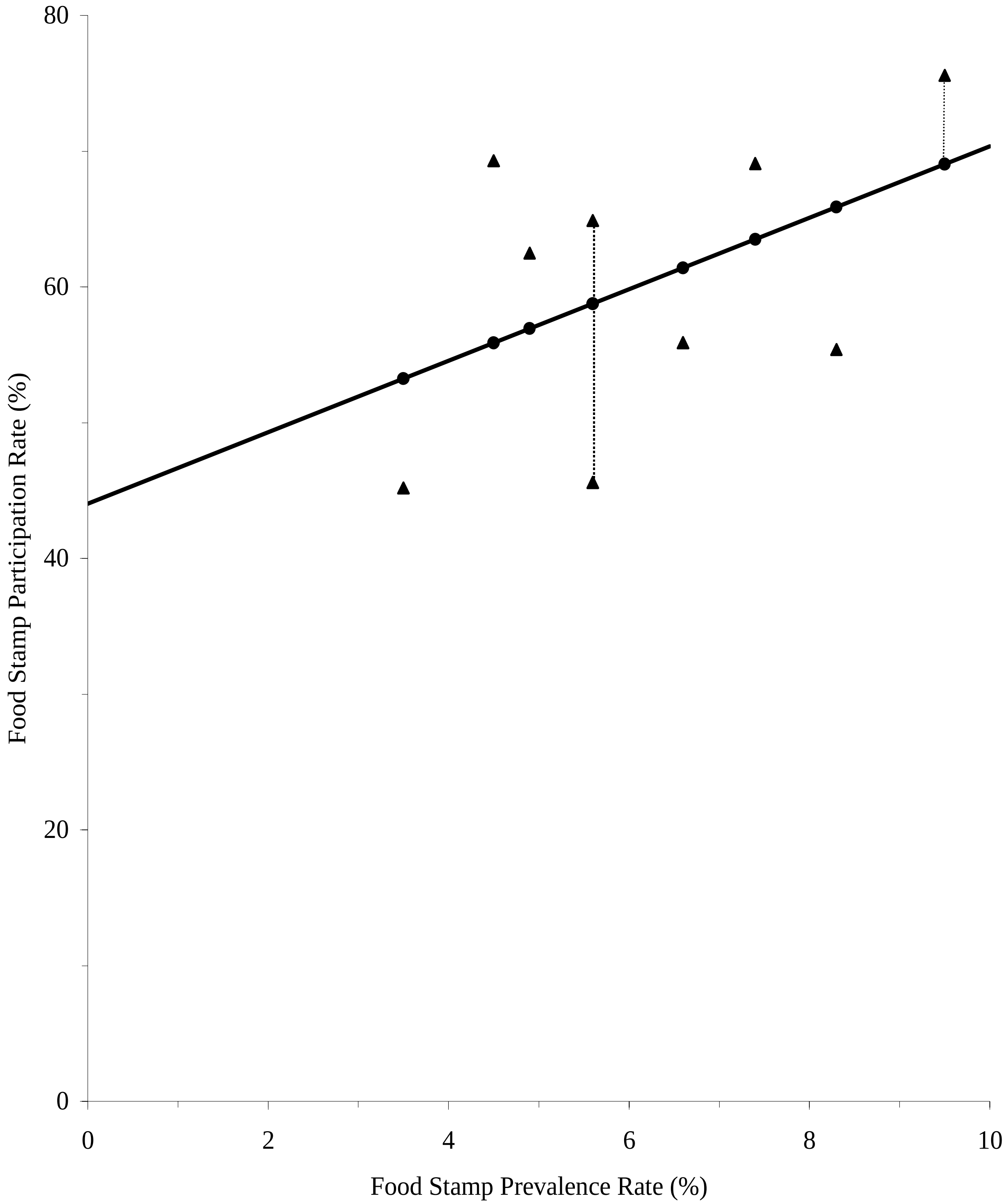
2. Using a regression model, predict state food stamp participation rates based on administrative and decennial census data

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. 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

FIGURE II.2

AN ILLUSTRATIVE REGRESSION ESTIMATOR



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.15 and A.16) for 2002 and 2003 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 six predictors, not just one. Adding five predictors improves our predictions. The six predictors used measure:

- The percentage of the population receiving food stamps, that is, the food stamp prevalence rate
- The total population on July 1
- The tax return nonfiler rate for elderly people (age 65 and older), that is, the percentage of the elderly population that is not claimed as exemptions on tax returns
- The percentage of people who were noncitizens in 1999 according to Census 2000
- The percentage of families at or below the federal poverty level in 1999 according to Census 2000
- An indicator that the state's policy for counting vehicle values in the asset test was different from the federal policy in the prior year

The first and third predictors are obtained from administrative data and population estimates, the second predictor is from population estimates, and the fourth and fifth predictors are from the decennial census. The last predictor is based on information provided by the Food and Nutrition Service. These six 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 Arkansas to estimate Arkansas' participation rate in that year, even though Arkansas, 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 multiple years and all the states and used the estimated line (with administrative and census data for Arkansas) to predict Arkansas' participation rate in a given year. In other words, the regression estimator not only uses the sample estimates from every state for multiple years to develop a regression estimate for a single state in a single year but also incorporates data from outside the sample, namely, data in administrative records systems and the 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 multiple 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 regression estimator. The shrinkage estimator optimizes the tradeoff between imprecision and bias.

FIGURE II.3

SHRINKAGE ESTIMATION

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

●---------------------●--●

sample estimate | shrinkage estimate | regression estimate

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

●--●---------------------●

sample estimate | shrinkage estimate | regression estimate

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 so that the eligibles counts implied by the rates sum to the national eligibles count estimated directly from the CPS. This adjustment was 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 adjustment will focus on the 2003 estimates for all eligible people. In Appendix A, we describe the results of the adjustment for 2002 and for the working poor and discuss our adjustment method in more detail.

To implement the 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 37,700,237 for 2003, while the national total for 2003 estimated directly from the CPS was 37,027,552. 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 37,027,552 ÷ 37,700,237 (≈ 0.9822). Such benchmarking of estimates for smaller areas to a relatively precise estimated total for a larger area is common practice.

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.

III. STATE ESTIMATES OF FSP PARTICIPATION RATES AND NUMBERS OF ELIGIBLE PEOPLE FOR 2002 AND 2003 FOR ALL ELIGIBLE PEOPLE AND THE WORKING POOR

Tables III.1 and III.2 present our final shrinkage estimates of food stamp participation rates in each state for 2002 and 2003 for all eligible people and for the working poor, respectively.[2,] 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.8 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 Arkansas' participation rate for all eligible people was 62 percent in 2003 (see Table III.1), the true rate may have been higher or lower. However, according to Table III.6, the chances are 90 in 100 that the true rate was between 58 and 66 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 two-thirds as wide as the corresponding sample confidence interval. Thus, shrinkage substantially improves precision and

[2] In Castner and Schirm (2005a), we present and discuss the participation rates for all eligible people. In Castner and Schirm (2006), 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 from FSP administrative data the percentage of food stamp participants who are working poor. As indicated by the tables in this report, 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 (2006 and 2005a), 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)

	2002	2003
Alabama	55	56
Alaska	63	65
Arizona	57	64
Arkansas	58	62
California	48	45
Colorado	46	48
Connecticut	56	53
Delaware	50	53
District of Columbia	68	72
Florida	47	48
Georgia	59	65
Hawaii	76	67
Idaho	49	53
Illinois	60	61
Indiana	67	65
Iowa	54	57
Kansas	52	55
Kentucky	63	67
Louisiana	65	69
Maine	62	72
Maryland	46	48
Massachusetts	38	43
Michigan	62	65
Minnesota	56	59
Mississippi	56	60
Missouri	70	76
Montana	50	50
Nebraska	57	56
Nevada	41	44
New Hampshire	44	46
New Jersey	45	47
New Mexico	54	52
New York	51	48
North Carolina	46	49
North Dakota	50	51
Ohio	57	61
Oklahoma	58	67
Oregon	80	83
Pennsylvania	53	54
Rhode Island	52	53
South Carolina	58	65
South Dakota	54	52
Tennessee	70	82
Texas	47	48
Utah	43	48
Vermont	59	60
Virginia	51	54
Washington	57	60
West Virginia	67	68
Wisconsin	52	55
Wyoming	46	46
United States	54	56

TABLE III.2

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

	2002	2003
Alabama	50	50
Alaska	59	61
Arizona	45	46
Arkansas	52	59
California	33	34
Colorado	37	37
Connecticut	41	44
Delaware	42	46
District of Columbia	51	50
Florida	40	40
Georgia	48	51
Hawaii	61	54
Idaho	42	45
Illinois	52	52
Indiana	61	61
Iowa	45	45
Kansas	45	51
Kentucky	59	62
Louisiana	67	66
Maine	56	65
Maryland	36	40
Massachusetts	23	29
Michigan	64	65
Minnesota	42	48
Mississippi	52	51
Missouri	65	70
Montana	49	44
Nebraska	44	47
Nevada	24	28
New Hampshire	35	41
New Jersey	27	33
New Mexico	47	44
New York	41	42
North Carolina	40	45
North Dakota	52	53
Ohio	50	56
Oklahoma	55	64
Oregon	79	76
Pennsylvania	52	55
Rhode Island	37	35
South Carolina	54	62
South Dakota	51	47
Tennessee	64	74
Texas	38	38
Utah	33	38
Vermont	52	53
Virginia	42	43
Washington	41	41
West Virginia	70	68
Wisconsin	50	56
Wyoming	42	42
United States	45	47

TABLE III.3

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

	2002	2003
Alabama	775	823
Alaska	70	74
Arizona	656	706
Arkansas	479	495
California	3,477	3,723
Colorado	384	424
Connecticut	290	327
Delaware	74	81
District of Columbia	106	109
Florida	2,007	2,107
Georgia	1,070	1,139
Hawaii	137	147
Idaho	139	146
Illinois	1,446	1,544
Indiana	595	697
Iowa	255	262
Kansas	262	281
Kentucky	694	725
Louisiana	885	928
Maine	175	174
Maryland	480	503
Massachusetts	628	658
Michigan	1,114	1,193
Minnesota	379	386
Mississippi	574	585
Missouri	700	748
Montana	122	142
Nebraska	150	172
Nevada	232	245
New Hampshire	87	93
New Jersey	713	713
New Mexico	309	365
New York	2,621	2,963
North Carolina	1,225	1,292
North Dakota	70	74
Ohio	1,266	1,385
Oklahoma	527	548
Oregon	404	429
Pennsylvania	1,416	1,505
Rhode Island	135	135
South Carolina	649	674
South Dakota	88	97
Tennessee	826	858
Texas	3,211	3,789
Utah	207	219
Vermont	65	67
Virginia	677	712
Washington	593	646
West Virginia	339	355
Wisconsin	469	511
Wyoming	50	55
United States	34,302	37,028

TABLE III.4

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

	2002	2003
Alabama	328	365
Alaska	36	36
Arizona	389	386
Arkansas	204	222
California	1,849	1,991
Colorado	194	205
Connecticut	114	118
Delaware	37	40
District of Columbia	22	28
Florida	913	989
Georgia	497	547
Hawaii	69	81
Idaho	85	95
Illinois	684	652
Indiana	254	306
Iowa	125	128
Kansas	127	133
Kentucky	275	296
Louisiana	428	462
Maine	62	60
Maryland	172	165
Massachusetts	205	196
Michigan	484	505
Minnesota	150	174
Mississippi	214	249
Missouri	337	322
Montana	55	70
Nebraska	81	83
Nevada	131	127
New Hampshire	30	34
New Jersey	280	289
New Mexico	166	205
New York	1,069	1,129
North Carolina	553	529
North Dakota	36	36
Ohio	559	554
Oklahoma	259	261
Oregon	198	209
Pennsylvania	545	520
Rhode Island	42	49
South Carolina	244	306
South Dakota	46	47
Tennessee	344	380
Texas	2,007	2,130
Utah	130	127
Vermont	28	24
Virginia	329	314
Washington	251	313
West Virginia	113	126
Wisconsin	229	227
Wyoming	27	30
United States	16,004	16,869

TABLE III.5

APPROXIMATE 90-PERCENT CONFIDENCE INTERVALS FOR FINAL SHRINKAGE ESTIMATES FOR 2002, ALL ELIGIBLE PEOPLE

	Participation Rate (Percent)		Number of Eligible People (Thousands)	
	Lower Bound	Upper Bound	Lower Bound	Upper Bound
Alabama	51	59	718	833
Alaska	59	68	64	75
Arizona	52	61	604	708
Arkansas	54	63	445	513
California	45	50	3,275	3,679
Colorado	42	49	354	413
Connecticut	52	61	266	314
Delaware	46	53	68	80
District of Columbia	61	74	95	117
Florida	45	50	1,898	2,116
Georgia	54	63	988	1,152
Hawaii	70	83	126	149
Idaho	45	52	129	148
Illinois	56	63	1,356	1,536
Indiana	62	71	551	638
Iowa	50	59	233	276
Kansas	48	56	242	283
Kentucky	59	68	643	746
Louisiana	60	71	814	956
Maine	58	67	164	187
Maryland	41	50	432	527
Massachusetts	35	41	573	683
Michigan	59	66	1,045	1,183
Minnesota	51	61	344	415
Mississippi	51	60	530	618
Missouri	65	75	648	752
Montana	46	55	111	132
Nebraska	52	62	137	163
Nevada	37	45	211	253
New Hampshire	40	48	79	96
New Jersey	42	48	665	762
New Mexico	49	59	282	336
New York	49	53	2,528	2,714
North Carolina	43	50	1,136	1,315
North Dakota	46	54	65	76
Ohio	53	60	1,193	1,340
Oklahoma	55	62	494	559
Oregon	74	85	376	433
Pennsylvania	48	58	1,293	1,538
Rhode Island	47	57	122	148
South Carolina	54	61	608	690
South Dakota	50	58	81	95
Tennessee	65	75	768	884
Texas	45	48	3,103	3,319
Utah	39	47	188	226
Vermont	55	64	60	69
Virginia	47	56	617	738
Washington	52	62	545	641
West Virginia	63	71	319	359
Wisconsin	48	56	430	509
Wyoming	42	51	45	55
United States	53	55	33,768	34,837

TABLE III.6

APPROXIMATE 90-PERCENT CONFIDENCE INTERVALS FOR FINAL SHRINKAGE ESTIMATES FOR 2003, ALL ELIGIBLE PEOPLE

	Participation Rate (Percent)		Number of Eligible People (Thousands)	
	Lower Bound	Upper Bound	Lower Bound	Upper Bound
Alabama	52	60	760	887
Alaska	61	70	69	79
Arizona	59	69	651	761
Arkansas	58	66	460	529
California	43	47	3,541	3,904
Colorado	44	51	393	455
Connecticut	49	58	299	355
Delaware	49	58	75	88
District of Columbia	65	80	98	120
Florida	45	50	1,993	2,220
Georgia	61	68	1,072	1,206
Hawaii	62	73	134	159
Idaho	49	58	133	158
Illinois	57	65	1,444	1,644
Indiana	60	69	646	748
Iowa	52	62	240	283
Kansas	51	59	263	300
Kentucky	63	72	675	775
Louisiana	63	74	858	997
Maine	68	76	164	184
Maryland	44	51	465	540
Massachusetts	39	46	607	710
Michigan	61	70	1,115	1,272
Minnesota	54	65	351	420
Mississippi	54	66	529	640
Missouri	70	81	695	800
Montana	46	53	132	152
Nebraska	51	60	159	186
Nevada	41	48	225	265
New Hampshire	42	50	85	100
New Jersey	44	50	666	759
New Mexico	47	57	329	401
New York	44	51	2,750	3,177
North Carolina	46	53	1,204	1,380
North Dakota	47	56	67	80
Ohio	57	65	1,290	1,480
Oklahoma	63	71	514	582
Oregon	77	88	400	457
Pennsylvania	49	58	1,385	1,625
Rhode Island	49	56	126	144
South Carolina	62	69	636	713
South Dakota	47	57	88	107
Tennessee	77	88	798	918
Texas	45	50	3,586	3,992
Utah	44	52	201	237
Vermont	55	64	62	72
Virginia	49	58	652	773
Washington	55	64	596	696
West Virginia	63	73	331	380
Wisconsin	50	59	470	553
Wyoming	41	51	49	61
United States	55	57	36,402	37,653

TABLE III.7

APPROXIMATE 90-PERCENT CONFIDENCE INTERVALS FOR FINAL SHRINKAGE ESTIMATES FOR 2002, WORKING POOR

	Participation Rate (Percent)		Number of Eligible People (Thousands)	
	Lower Bound	Upper Bound	Lower Bound	Upper Bound
Alabama	44	57	286	371
Alaska	52	65	32	40
Arizona	38	52	329	449
Arkansas	46	59	180	228
California	29	37	1,636	2,063
Colorado	32	41	168	220
Connecticut	35	47	97	131
Delaware	36	49	31	43
District of Columbia	41	61	18	27
Florida	36	44	813	1,013
Georgia	43	54	438	555
Hawaii	52	70	58	79
Idaho	37	48	75	96
Illinois	45	59	588	780
Indiana	54	67	225	282
Iowa	38	51	106	143
Kansas	40	51	111	143
Kentucky	53	65	246	304
Louisiana	58	76	371	485
Maine	51	62	56	69
Maryland	29	43	137	207
Massachusetts	18	28	160	250
Michigan	56	72	425	544
Minnesota	35	48	125	175
Mississippi	44	59	182	245
Missouri	59	72	303	371
Montana	41	57	46	64
Nebraska	38	51	68	93
Nevada	20	28	109	154
New Hampshire	29	42	24	36
New Jersey	22	32	232	328
New Mexico	39	54	138	194
New York	36	45	945	1,193
North Carolina	36	45	491	616
North Dakota	45	60	31	42
Ohio	46	54	513	604
Oklahoma	49	62	230	288
Oregon	70	89	175	221
Pennsylvania	45	59	469	621
Rhode Island	30	44	35	50
South Carolina	48	60	215	273
South Dakota	43	59	38	53
Tennessee	57	70	308	380
Texas	35	41	1,828	2,186
Utah	29	38	112	148
Vermont	45	59	24	32
Virginia	35	49	272	385
Washington	34	48	211	291
West Virginia	62	77	102	125
Wisconsin	44	57	199	258
Wyoming	35	49	22	31
United States	44	47	15,523	16,485

TABLE III.8

APPROXIMATE 90-PERCENT CONFIDENCE INTERVALS FOR FINAL SHRINKAGE ESTIMATES FOR 2003, WORKING POOR

	Participation Rate (Percent)		Number of Eligible People (Thousands)	
	Lower Bound	Upper Bound	Lower Bound	Upper Bound
Alabama	43	57	316	414
Alaska	54	68	31	40
Arizona	40	53	333	438
Arkansas	52	65	197	246
California	30	38	1,775	2,208
Colorado	32	42	178	231
Connecticut	38	51	100	135
Delaware	39	53	34	46
District of Columbia	39	61	22	34
Florida	35	44	873	1,105
Georgia	45	57	479	616
Hawaii	45	62	68	93
Idaho	37	52	79	110
Illinois	47	58	582	721
Indiana	54	68	273	340
Iowa	40	50	113	144
Kansas	46	56	120	146
Kentucky	56	68	268	325
Louisiana	57	74	403	522
Maine	58	72	54	67
Maryland	34	46	141	190
Massachusetts	24	34	162	230
Michigan	59	72	456	555
Minnesota	40	56	145	203
Mississippi	43	59	210	289
Missouri	62	77	287	357
Montana	38	51	60	80
Nebraska	40	54	70	95
Nevada	24	33	106	148
New Hampshire	34	49	28	40
New Jersey	27	39	235	342
New Mexico	37	51	172	239
New York	37	47	983	1,276
North Carolina	39	51	456	602
North Dakota	45	60	30	41
Ohio	50	62	496	611
Oklahoma	57	70	233	289
Oregon	66	86	182	237
Pennsylvania	47	62	451	589
Rhode Island	30	40	42	57
South Carolina	55	68	272	339
South Dakota	38	56	38	56
Tennessee	66	81	341	419
Texas	34	41	1,941	2,320
Utah	32	43	108	145
Vermont	46	60	21	28
Virginia	36	49	266	363
Washington	36	46	272	353
West Virginia	61	75	113	139
Wisconsin	49	62	201	253
Wyoming	35	50	25	35
United States	46	49	16,365	17,372

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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. 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 both 2002 and 2003

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" 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 payment 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 resident population according to decennial census and administrative records (mainly vital statistics) data.[1,2,3,4] Similarly, we derived sample estimates of participation rates for the working poor for a given year according to:

[1] P_i is adjusted 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. The adjustment 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

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

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 percentages tend to be positively correlated and, therefore, partially "cancel out." Table A.5 presents estimates for 2002 and 2003 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 2002 and 2003 for all eligible people and for the working poor, respectively.

(continued)
sampling error. Participant figures, including counts of participants eligible only through disaster assistance, were provided by the Food and Nutrition Service (FNS).

[2] We adjusted for payment errors in order 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.

[3] We obtained estimates for 2002 and 2003 from the March CPS samples for 2003 and 2004, for which the survey instruments collected family income data for the prior calendar years, that is, 2002 and 2003.

[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 2002 population estimates were released on March 10, 2004 and the 2003 estimates were released in December 2004, at http://www.census.gov/popest/datasets.html. The population estimates pertain to July 1 of each year.

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 unemployed able-bodied adults, distributing annual amounts across months, and imputing net income—are described in Cunnyngham (2005) and earlier reports in that series.[5,6]

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:[7]

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[5] 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.

[6] 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 California 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.

[7] Correctly-eligible 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. 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 $\varepsilon_{2,i}$.

(3) $\text{var}(Y_{1,i}) = \text{variance due to } E_{1,i} \text{ when } \varepsilon_{1,i} \text{ is fixed} + \text{variance due to } \varepsilon_{1,i} \text{ when } E_{1,i} \text{ is fixed}$

$$= \text{var}_{E_1|\varepsilon_1}(Y_{1,i}) + \text{var}_{\varepsilon_1|E_1}(Y_{1,i})$$

and

(4) $\text{var}(Y_{2,i}) = \text{variance due to } E_{2,i} \text{ when } \varepsilon_{2,i} \text{ is fixed} + \text{variance due to } \varepsilon_{2,i} \text{ when } E_{2,i} \text{ is fixed}$

$$= \text{var}_{E_2|\varepsilon_2}(Y_{2,i}) + \text{var}_{\varepsilon_2|E_2}(Y_{2,i}).$$

When a variable is held fixed, we fix it at its point estimate. Note that 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.

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

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

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

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

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

and

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

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

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

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

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

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 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:[8]

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

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:

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

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

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

where:

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

Because CPS samples from different years are not independent, participation rates for different years are correlated.[9] We derived a preliminary jackknife estimate of the correlation

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

[9] 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.

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:

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

if *g* is odd, or:

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

if *g* is even.

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

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

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 $Y_{2,i,t\text{-}g}$ across states:

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

where $n_{i,t}$ and $n_{i,t\text{-}g}$ 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 $Y_{2,i,t\text{-}g}$:

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

Other intertemporal covariances—such as the covariance between the participation rates for 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.[10]

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

Our regression model consisted of four equations, with two predicting food stamp participation rates for all eligible people in 2002 and 2003, and two predicting food stamp participation rates for the working poor in 2002 and 2003. The four equations were estimated jointly, and the values of the regression coefficients could vary from equation to equation. The predictors used were (in addition to an intercept):

- The percentage of the population receiving food stamps, that is, the food stamp prevalence rate
- The total population on July 1
- The tax return nonfiler rate for elderly people (age 65 and older), that is, the percentage of the elderly population that is not claimed as exemptions on tax returns
- The percentage of people who were noncitizens in 1999 according to Census 2000
- The percentage of families at or below the federal poverty level in 1999 according to Census 2000
- An indicator that the state’s policy for counting vehicle values in the asset test was different from the federal policy in the prior year

The values for the fourth and fifth predictors are the same in each of the four equations of our regression model. For the first three predictors and the last predictor, we used 2002 values in both equations for predicting 2002 participation rates and 2003 values in both equations for predicting 2003 rates. Because prediction errors were allowed to be correlated and intergroup and intertemporal correlations among direct sample estimates were taken into account as

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

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 both years and both groups.

In addition to the 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.[11] 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 by, for example, population size, region, and percentage of the population that is black or Hispanic. We found no strong evidence of correctable bias.

[11] 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.

Definitions and data sources for the predictors in our best regression model are given in Table A.11. The values for the fourth and fifth predictors listed above are the same in each of the four 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 and A.14. Regression estimates of participation rates for all eligible people are in Table A.15, and regression estimates of rates for the working poor are in Table A.16. The standard errors for the regression estimates for all eligible people and for the working poor are in Tables A.17 and A.18, 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.[12] 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 8,053,188 equally-spaced points, starting with σ_1 = 0.001, σ_2 = 0.001, ρ = -0.990, η_1 = 0.000, η_2 = 0.000, and η_{12} = -0.990 and incrementing σ_1, σ_2, ρ, η_1, η_2, and η_{12} by 0.550, 0.600, 0.110, 0.600, 0.900, and 0.110, respectively, up to σ_1 = 6.051, σ_2 = 7.201, ρ =

[12] 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 = 7.200, η_2 = 9.000, and η_{12} = 0.990. For combination k of σ_1, σ_2, ρ, η_1, η_2, and η_{12} (k = 1, 2, ..., 8053188), we calculated a vector of shrinkage estimates:

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

a variance-covariance matrix:

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

and a probability:

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

In these expressions, Y is a column vector of direct sample estimates (from Step 1) with 204 elements, four sample estimates for each of the 51 states. The first four elements of Y pertain to the first state, the next four to the second state, and so forth. For a given state, the first two elements are the 2002 sample estimates for all eligible people and the working poor, respectively; and the final two elements are the 2003 estimates. The vector of shrinkage estimates, θ_k, has the same structure as the vector of sample estimates, Y. V is the (204 $\times$ 204) variance-covariance matrix for the sample estimates. Because state samples are independent in the CPS, V is block-diagonal with 51 (4 $\times$ 4) blocks. We described under Step 1 how we derived estimates for the elements of V. X is a (204 $\times$ 28) matrix containing values for each of the six predictors (plus an intercept) for every state, every year (2002 and 2003), and both groups (all eligible people and the working poor). The first four rows of X pertain to the first state, the next four rows pertain to the second state, and so forth. The four rows for state i are given by:

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

where x'_{it1} is a row vector for year t (t = 1 for 2002 and t = 2 for 2003) with seven elements (an intercept plus the six predictors listed under Step 2) to predict participation rates for all eligible people. x'_{it2} is a row vector for year t with seven elements to predict participation rates for the working poor. $\underline{0}$ is a row vector with seven 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 (28×1) 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 (4×4) blocks, and every block equals:

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

After calculating θ_k, U_k, and p_k^* 8,053,188 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, $\eta_{1,k}$, $\eta_{2,k}$, $\eta_{12,k}$):

$$(32) \quad p_k = \frac{p_k^*}{\sum_{k=1}^{8,053,188} p_k^*} \,,$$

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 8,053,188 sets of shrinkage estimates, weighting each set θ_k by its associated probability p_k. Thus, our shrinkage estimates are:

$$(33) \quad \theta = \sum_{k=1}^{8,053,188} p_k \theta_k \,.$$

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:

$$(34) \quad U = \sum_{k=1}^{8,053,188} p_k U_k + \sum_{k=1}^{8,053,188} p_k (\theta_k - \theta)(\theta_k - \theta)' .$$

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:

$$(35) \quad R = \sum_{k=1}^{8,053,188} p_k R_k ,$$

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:

$$(36) \quad G = \sum_{k=1}^{8,053,188} p_k G_k + \sum_{k=1}^{8,053,188} p_k (R_k - R)(R_k - R)' ,$$

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

$$(37) \quad \hat{B} = \sum_{k=1}^{8,053,188} p_k \hat{B}_k .$$

Regression estimates of participation rates for all eligible people and for the working poor were presented before in Tables A.15 and A.16, respectively. Preliminary shrinkage estimates of participation rates are displayed in Tables A.19 and A.20.

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 so that the eligibles counts implied by the rates sum to the national eligibles counts estimated directly from the CPS. This adjustment was carried out for each year and each group separately. The following description of the adjustment will focus on the 2003 estimates for all eligible people.

To implement the 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 rate (100 minus the payment 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 37,700,237 for 2003, while the national total for 2003 estimated directly from the CPS was 37,027,552. 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 37,027,552 $\div$ 37,700,237($\approx$ 0.9822).[13]

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:

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

[13] The adjustment factor for 2002 for all eligible people was 0.9804. The direct estimate of the national total for all eligibles for that year was 34,302,250. The adjustment factors for the two years (2002 and 2003) for working poor eligibles were, respectively, 0.9759 and 0.9850. The direct estimates of the national totals for working poor eligibles for those years were 16,004,202 and 16,868,633.

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 and III.6 of Chapter III, we reported approximate 90-percent confidence intervals for our final shrinkage estimates for all eligible people. In Tables III.7 and III.8 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) $$Upper\ Bound_i = F_i + 1.645\, e_i$$

and:

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

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) $$e_i = \frac{1}{r}\sqrt{U(4i-1,4i-1)}$$

and

(43) $$e_i = \frac{\psi_{F,1,i}}{\theta_{F,1,i}}\ \frac{1}{r}\sqrt{U(4i-1,4i-1)}\ ,$$

where r is the ratio used to adjust preliminary estimates of state eligibles counts to the direct estimate of the national total ($\approx$ 0.9822 for all eligible people for 2003), and $U(4i\text{-}1,4i\text{-}1)$ is the

(4i-1,4i-1) diagonal element of U, which was derived according to Equation (34).[14] 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.21 and A.22 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.23 and A.24 present standard errors for the rates. Tables A.25 and A.26 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.27 and A.28 present the standard errors for those estimated counts.[15] Finally, Tables A.29 and A.30 show payment-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 $P_i(\varepsilon_{2,i}/100)$).

[14] The square root of U(4i-1,4i-1) is the standard error of the preliminary shrinkage estimate of the 2003 participation rate for all eligible people for state i. When deriving estimates for 2002, we would use the (4i-3,4i-3) diagonal elements of U. When deriving estimates for the working poor for 2002 and 2003, we would use the (4i-2,4i-2) and (4i,4i) diagonal elements of U, respectively.

[15] The rates and counts for all eligible people in Tables A.21 and A.25 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.22 and A.26 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.

TABLE A.1

DIRECT SAMPLE ESTIMATES OF
PARTICIPATION RATES,
ALL ELIGIBLE PEOPLE

	2002	2003
Alabama	54.128	54.274
Alaska	58.361	60.194
Arizona	62.467	65.367
Arkansas	53.883	57.388
California	46.965	44.595
Colorado	44.618	45.461
Connecticut	57.260	49.830
Delaware	50.116	55.309
District of Columbia	68.749	76.758
Florida	45.709	47.812
Georgia	65.880	66.097
Hawaii	83.920	83.468
Idaho	47.668	55.678
Illinois	57.475	59.665
Indiana	66.846	61.910
Iowa	51.080	56.661
Kansas	48.216	52.930
Kentucky	68.103	68.030
Louisiana	60.975	66.847
Maine	59.674	71.601
Maryland	53.484	47.795
Massachusetts	36.035	39.516
Michigan	59.523	62.288
Minnesota	66.824	65.942
Mississippi	54.953	68.211
Missouri	76.390	88.898
Montana	49.768	45.843
Nebraska	51.858	61.537
Nevada	38.880	41.940
New Hampshire	45.176	45.379
New Jersey	44.080	48.182
New Mexico	52.221	51.845
New York	49.791	49.564
North Carolina	43.592	44.936
North Dakota	49.914	57.230
Ohio	57.543	64.391
Oklahoma	58.354	69.195
Oregon	84.374	81.770
Pennsylvania	52.319	53.621
Rhode Island	60.835	50.066
South Carolina	57.670	64.276
South Dakota	57.804	55.393
Tennessee	66.585	84.933
Texas	46.115	44.948
Utah	38.768	50.395
Vermont	61.737	61.149
Virginia	52.260	52.298
Washington	54.407	51.391
West Virginia	65.102	64.505
Wisconsin	51.943	51.925
Wyoming	48.962	48.150

TABLE A.2

DIRECT SAMPLE ESTIMATES OF
PARTICIPATION RATES,
WORKING POOR

	2002	2003
Alabama	46.944	46.625
Alaska	52.789	64.259
Arizona	56.316	46.890
Arkansas	43.545	60.351
California	31.492	35.081
Colorado	37.575	33.561
Connecticut	39.050	45.411
Delaware	44.373	47.546
District of Columbia	38.558	45.772
Florida	40.525	38.674
Georgia	52.445	50.396
Hawaii	60.913	71.930
Idaho	42.943	52.217
Illinois	51.789	50.225
Indiana	60.790	57.520
Iowa	41.591	42.628
Kansas	41.008	51.092
Kentucky	57.293	61.480
Louisiana	68.605	63.887
Maine	54.394	60.985
Maryland	41.865	41.044
Massachusetts	20.977	23.927
Michigan	68.067	62.972
Minnesota	38.532	62.102
Mississippi	52.778	54.715
Missouri	65.762	74.862
Montana	49.216	37.896
Nebraska	37.631	51.490
Nevada	21.736	27.448
New Hampshire	33.951	44.137
New Jersey	25.059	36.633
New Mexico	47.358	45.410
New York	40.839	45.500
North Carolina	38.053	39.777
North Dakota	60.119	64.333
Ohio	47.669	55.693
Oklahoma	55.344	71.293
Oregon	98.542	76.306
Pennsylvania	51.812	55.908
Rhode Island	40.033	32.931
South Carolina	53.476	62.490
South Dakota	58.046	45.138
Tennessee	60.401	77.185
Texas	37.356	34.866
Utah	31.168	38.618
Vermont	52.290	52.861
Virginia	49.955	40.206
Washington	35.532	34.245
West Virginia	69.105	70.624
Wisconsin	51.933	57.898
Wyoming	41.950	47.902

TABLE A.3

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

	2002	2003
Alabama	3.888	4.232
Alaska	5.300	3.940
Arizona	3.977	5.694
Arkansas	3.842	4.278
California	1.796	1.349
Colorado	3.092	3.089
Connecticut	5.082	6.391
Delaware	3.922	5.218
District of Columbia	5.969	7.543
Florida	1.759	1.801
Georgia	5.539	3.005
Hawaii	10.705	7.080
Idaho	2.459	5.271
Illinois	3.474	4.087
Indiana	5.067	7.091
Iowa	4.634	5.388
Kansas	4.253	3.260
Kentucky	6.586	5.369
Louisiana	7.662	5.939
Maine	4.107	3.933
Maryland	13.358	3.096
Massachusetts	2.522	2.622
Michigan	3.146	3.504
Minnesota	8.021	7.198
Mississippi	3.350	5.914
Missouri	7.206	7.144
Montana	4.021	2.415
Nebraska	7.219	4.649
Nevada	3.004	2.825
New Hampshire	4.752	3.258
New Jersey	2.162	2.285
New Mexico	4.341	5.335
New York	1.163	2.747
North Carolina	2.507	2.530
North Dakota	3.383	5.398
Ohio	2.241	3.720
Oklahoma	3.098	4.900
Oregon	4.929	4.981
Pennsylvania	5.960	4.142
Rhode Island	8.794	2.502
South Carolina	3.284	3.503
South Dakota	3.544	6.310
Tennessee	5.335	8.611
Texas	0.952	1.565
Utah	3.724	3.797
Vermont	3.773	6.774
Virginia	5.430	5.214
Washington	3.941	4.083
West Virginia	3.253	5.120
Wisconsin	4.894	4.911
Wyoming	5.004	5.495

TABLE A.4

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

	2002	2003
Alabama	5.905	6.249
Alaska	5.666	7.676
Arizona	5.926	4.994
Arkansas	5.076	5.454
California	2.332	2.254
Colorado	3.745	3.592
Connecticut	5.391	6.662
Delaware	6.092	7.933
District of Columbia	8.187	9.766
Florida	3.026	3.378
Georgia	4.730	5.804
Hawaii	10.762	10.434
Idaho	3.964	8.081
Illinois	8.900	4.486
Indiana	5.966	7.343
Iowa	5.927	4.359
Kansas	4.773	3.831
Kentucky	5.876	5.077
Louisiana	13.589	10.450
Maine	4.373	6.964
Maryland	11.904	5.269
Massachusetts	3.740	3.618
Michigan	8.786	5.033
Minnesota	6.722	9.686
Mississippi	6.490	7.078
Missouri	6.127	8.886
Montana	7.724	4.776
Nebraska	7.111	8.206
Nevada	2.717	3.271
New Hampshire	6.178	7.369
New Jersey	3.214	5.401
New Mexico	7.117	6.177
New York	3.448	4.119
North Carolina	3.191	5.724
North Dakota	7.130	8.185
Ohio	2.687	4.816
Oklahoma	5.365	7.433
Oregon	7.476	9.847
Pennsylvania	7.935	7.699
Rhode Island	5.970	3.892
South Carolina	5.804	7.323
South Dakota	8.128	13.202
Tennessee	5.941	7.097
Texas	2.059	2.004
Utah	3.526	4.902
Vermont	7.834	8.545
Virginia	8.252	6.117
Washington	5.228	3.848
West Virginia	6.277	6.970
Wisconsin	6.035	5.922
Wyoming	6.652	7.275

TABLE A.5

NUMBER OF PEOPLE RECEIVING FOOD STAMPS, MONTHLY AVERAGE

	2002	2003
Alabama	443,547	472,066
Alaska	46,165	50,687
Arizona	378,721	466,153
Arkansas	283,909	310,359
California	1,709,147	1,708,354
Colorado	178,490	208,053
Connecticut	168,591	180,512
Delaware	39,628	46,027
District of Columbia	74,271	81,777
Florida	989,685	1,041,315
Georgia	645,633	750,208
Hawaii	106,370	100,382
Idaho	69,998	81,524
Illinois	886,344	953,929
Indiana	410,884	470,182
Iowa	140,729	153,816
Kansas	140,403	160,705
Kentucky	450,102	502,677
Louisiana	588,458	649,761
Maine	111,147	132,582
Maryland	228,398	252,294
Massachusetts	242,542	292,200
Michigan	750,037	837,629
Minnesota	216,960	234,631
Mississippi	324,852	355,783
Missouri	515,006	591,532
Montana	63,347	71,320
Nebraska	88,459	99,243
Nevada	97,035	111,352
New Hampshire	41,053	44,783
New Jersey	319,799	339,047
New Mexico	170,457	194,795
New York	1,354,346	1,434,936
North Carolina	574,369	644,503
North Dakota	36,781	39,663
Ohio	734,679	855,401
Oklahoma	312,844	380,299
Oregon	359,138	398,377
Pennsylvania	766,615	822,696
Rhode Island	71,933	74,068
South Carolina	379,310	450,556
South Dakota	47,663	51,176
Tennessee	598,012	728,305
Texas	1,554,428	1,872,473
Utah	90,448	105,630
Vermont	39,914	41,333
Virginia	353,978	390,783
Washington	350,373	403,992
West Virginia	234,235	246,890
Wisconsin	262,310	296,719
Wyoming	23,530	25,306

TABLE A.6

POPULATION ON JULY 1

	2002	2003
Alabama	4,478,896	4,503,726
Alaska	641,482	648,280
Arizona	5,441,125	5,579,222
Arkansas	2,706,268	2,727,774
California	35,001,986	35,462,712
Colorado	4,501,051	4,547,633
Connecticut	3,458,587	3,486,960
Delaware	805,945	818,166
District of Columbia	569,157	557,620
Florida	16,691,701	16,999,181
Georgia	8,544,005	8,676,460
Hawaii	1,240,663	1,248,755
Idaho	1,343,124	1,367,034
Illinois	12,586,447	12,649,087
Indiana	6,156,913	6,199,571
Iowa	2,935,840	2,941,976
Kansas	2,711,769	2,724,786
Kentucky	4,089,822	4,118,189
louisiana	4,476,192	4,493,665
Maine	1,294,894	1,309,205
Maryland	5,450,525	5,512,310
Massachusetts	6,421,800	6,420,357
Michigan	10,043,221	10,082,364
Minnesota	5,024,791	5,064,172
Mississippi	2,866,733	2,882,594
Missouri	5,669,544	5,719,204
Montana	910,372	918,157
Nebraska	1,727,564	1,737,475
Nevada	2,167,455	2,242,207
New Hampshire	1,274,405	1,288,705
New Jersey	8,575,252	8,642,412
New Mexico	1,852,044	1,878,562
New York	19,134,293	19,212,425
North Carolina	8,305,820	8,421,190
North Dakota	633,911	633,400
Ohio	11,408,699	11,437,680
Oklahoma	3,489,700	3,506,469
Oregon	3,520,355	3,564,330
Pennsylvania	12,328,827	12,370,761
Rhode Island	1,068,326	1,076,084
South Carolina	4,103,770	4,148,744
South Dakota	760,437	764,905
Tennessee	5,789,796	5,845,208
Texas	21,736,925	22,103,374
Utah	2,318,789	2,352,119
Vermont	616,408	619,343
Virginia	7,287,829	7,365,284
Washington	6,067,060	6,131,298
West Virginia	1,804,884	1,811,440
Wisconsin	5,439,692	5,474,290
Wyoming	498,830	502,111

TABLE A.7

PERCENTAGES OF PARTICIPANTS WHO ARE CORRECTLY ELIGIBLE

	2002	2003
Alabama	96.31	97.39
Alaska	95.66	95.70
Arizona	98.31	96.64
Arkansas	98.70	99.09
California	96.65	97.98
Colorado	97.80	97.07
Connecticut	96.71	96.30
Delaware	92.07	94.63
District of Columbia	96.29	96.35
Florida	95.73	96.70
Georgia	97.72	98.21
Hawaii	98.43	98.53
Idaho	96.63	95.54
Illinois	97.27	98.21
Indiana	96.42	95.72
Iowa	98.47	97.30
Kansas	96.49	96.21
Kentucky	97.76	96.94
Louisiana	98.42	97.88
Maine	98.43	94.60
Maryland	95.62	95.43
Massachusetts	98.33	96.01
Michigan	92.80	93.19
Minnesota	97.95	97.51
Mississippi	98.47	98.61
Missouri	95.21	95.43
Montana	96.88	98.68
Nebraska	96.18	97.03
Nevada	98.51	97.80
New Hampshire	93.74	95.55
New Jersey	99.40	99.03
New Mexico	97.86	97.54
New York	98.50	98.71
North Carolina	98.74	98.68
North Dakota	95.88	95.66
Ohio	97.81	98.71
Oklahoma	98.04	96.32
Oregon	89.83	88.77
Pennsylvania	97.84	98.23
Rhode Island	97.77	95.82
South Carolina	98.95	97.99
South Dakota	99.35	99.52
Tennessee	96.27	96.95
Texas	96.76	96.84
Utah	98.30	98.83
Vermont	96.74	97.68
Virginia	97.81	98.04
Washington	96.61	95.62
West Virginia	97.64	98.01
Wisconsin	92.85	94.30
Wyoming	98.00	98.52

TABLE A.8

PERCENTAGES OF PARTICIPANTS WHO ARE CORRECTLY ELIGIBLE AND WORKING POOR

	2002	2003
Alabama	37.074	38.811
Alaska	45.141	42.803
Arizona	45.876	38.398
Arkansas	37.681	41.957
California	35.652	39.564
Colorado	39.655	36.349
Connecticut	27.870	28.869
Delaware	39.356	40.492
District of Columbia	15.297	17.013
Florida	36.860	37.798
Georgia	37.221	37.250
Hawaii	39.353	43.273
Idaho	51.508	51.958
Illinois	40.198	35.630
Indiana	37.475	39.863
Iowa	39.487	37.538
Kansas	41.020	41.971
Kentucky	35.983	36.426
Louisiana	48.668	46.649
Maine	31.533	29.478
Maryland	27.015	26.517
Massachusetts	19.484	19.221
Michigan	41.525	39.506
Minnesota	28.646	35.681
Mississippi	33.981	35.491
Missouri	42.800	37.869
Montana	42.544	43.552
Nebraska	40.531	39.393
Nevada	31.991	32.222
New Hampshire	25.906	31.372
New Jersey	23.572	28.294
New Mexico	45.317	46.297
New York	32.172	33.031
North Carolina	38.943	36.875
North Dakota	51.610	47.259
Ohio	37.915	36.348
Oklahoma	45.838	43.641
Oregon	43.805	39.905
Pennsylvania	36.813	34.535
Rhode Island	21.725	23.271
South Carolina	34.812	41.838
South Dakota	48.657	43.495
Tennessee	36.660	38.531
Texas	49.052	42.947
Utah	47.863	45.284
Vermont	36.363	31.208
Virginia	39.175	34.312
Washington	29.410	31.807
West Virginia	33.573	34.671
Wisconsin	43.768	42.439
Wyoming	47.677	50.488

TABLE A.9

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

	2002	2003
Alabama	17.620	18.809
Alaska	11.796	12.430
Arizona	10.954	12.352
Arkansas	19.216	19.645
California	10.049	10.584
Colorado	8.692	9.769
Connecticut	8.233	10.004
Delaware	9.033	9.625
District of Columbia	18.277	18.409
Florida	12.418	12.389
Georgia	11.209	12.847
Hawaii	10.056	9.489
Idaho	10.565	10.233
Illinois	11.918	12.413
Indiana	9.626	11.726
Iowa	9.241	8.978
Kansas	10.361	10.721
Kentucky	15.798	17.394
Louisiana	21.220	21.171
Maine	14.158	13.380
Maryland	7.492	9.138
Massachusetts	10.306	11.058
Michigan	11.643	12.430
Minnesota	6.329	6.851
Mississippi	20.306	17.843
Missouri	11.322	11.103
Montana	13.545	16.720
Nebraska	9.497	9.006
Nevada	11.343	11.580
New Hampshire	6.684	7.317
New Jersey	8.410	8.063
New Mexico	17.248	19.508
New York	14.002	14.874
North Carolina	15.663	16.806
North Dakota	11.145	10.467
Ohio	10.946	11.465
Oklahoma	15.062	15.097
Oregon	10.861	12.133
Pennsylvania	11.628	12.183
Rhode Island	10.821	13.173
South Carolina	15.859	16.557
South Dakota	10.773	12.020
Tennessee	14.934	14.222
Texas	15.004	18.251
Utah	9.890	8.807
Vermont	10.146	10.660
Virginia	9.091	9.946
Washington	10.255	12.260
West Virginia	19.465	20.709
Wisconsin	8.620	9.843
Wyoming	9.441	10.312

TABLE A.10

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

	2002	2003
Alabama	7.821	8.725
Alaska	6.154	5.208
Arizona	5.670	6.842
Arkansas	9.078	7.910
California	5.528	5.433
Colorado	4.185	4.955
Connecticut	3.479	3.291
Delaware	4.361	4.791
District of Columbia	5.177	5.451
Florida	5.393	5.987
Georgia	5.363	6.391
Hawaii	5.539	4.836
Idaho	6.251	5.934
Illinois	5.466	5.350
Indiana	4.114	5.256
Iowa	4.551	4.604
Kansas	5.179	4.845
Kentucky	6.912	7.232
Louisiana	9.326	10.558
Maine	4.976	4.895
Maryland	2.704	2.957
Massachusetts	3.508	3.656
Michigan	4.556	5.212
Minnesota	3.210	2.662
Mississippi	7.296	8.006
Missouri	5.912	5.232
Montana	6.015	8.927
Nebraska	5.515	4.370
Nevada	6.589	5.830
New Hampshire	2.458	2.470
New Jersey	3.508	3.030
New Mexico	8.807	10.572
New York	5.576	5.422
North Carolina	7.077	7.095
North Dakota	4.981	4.600
Ohio	5.122	4.881
Oklahoma	7.425	6.639
Oregon	4.535	5.845
Pennsylvania	4.418	4.108
Rhode Island	3.654	4.864
South Carolina	6.017	7.271
South Dakota	5.254	6.447
Tennessee	6.269	6.220
Texas	9.390	10.435
Utah	5.990	5.266
Vermont	4.503	3.940
Virginia	3.809	4.528
Washington	4.780	6.120
West Virginia	6.305	6.691
Wisconsin	4.064	3.973
Wyoming	5.361	5.312

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 first footnote of Appendix A.
Total population	Resident population on July 1	All data for this predictor were obtained from the U.S. Census Bureau.
Elderly tax nonfiler rate	$100 - \left(100 \times \frac{\text{Number of exemptions for people age 65 and over on tax returns}}{\text{Resident population of people age 65 and over}}\right)$	All data for constructing this predictor were obtained from the U.S. Census Bureau.
Noncitizen rate	$100 \times \frac{\text{Number of noncitizens}}{\text{Resident population}}$	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.
Family poverty rate	$100 \times \frac{\text{Number of families below the poverty level}}{\text{Total number of families}}$	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.
Vehicle policy indicator	1, if state's rule for counting vehicle values in the asset test was different from the federal rule in the prior year 0, if state used federal rule for counting vehicle values in the prior year	The data for constructing this predictor were collected from various sources, including the Food and Nutrition Service, state websites, and the Center for Budget and Policy Priorities (http://www.cbpp.org/7-30-01fa.htm).

[a]Values for the first three predictors and the last predictor vary across the year-specific equations of our regression model, while values for the fourth and fifth 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 2002 population estimates that we used were released in March 2004, and the 2003 population estimates were released in December 2004 at http://www.census.gov/popest/datasets.html.

TABLE A.12

VALUES FOR TEMPORALLY CONSTANT PREDICTORS

	Percentage Noncitizen	Family Poverty Rate
Alabama	1.250	12.518
Alaska	2.737	6.686
Arizona	9.009	9.897
Arkansas	1.931	12.020
California	15.916	10.594
Colorado	5.883	6.190
Connecticut	5.570	5.643
Delaware	3.298	6.466
District of Columbia	9.004	16.699
Florida	9.156	9.040
Georgia	4.984	9.883
Hawaii	6.991	7.647
Idaho	3.314	8.326
Illinois	7.452	7.817
Indiana	1.900	6.691
Iowa	2.089	6.024
Kansas	3.347	6.692
Kentucky	1.304	12.655
Louisiana	1.338	15.771
Maine	1.289	7.771
Maryland	5.355	6.081
Massachusetts	6.857	6.653
Michigan	2.854	7.424
Minnesota	3.317	5.082
Mississippi	0.837	15.958
Missouri	1.598	8.565
Montana	0.766	10.474
Nebraska	2.964	6.713
Nevada	9.999	7.538
New Hampshire	2.298	4.284
New Jersey	9.437	6.253
New Mexico	5.360	14.540
New York	10.984	11.468
North Carolina	3.940	9.038
North Dakota	1.083	8.319
Ohio	1.497	7.815
Oklahoma	2.492	11.184
Oregon	5.621	7.914
Pennsylvania	2.043	7.759
Rhode Island	6.018	8.853
South Carolina	1.819	10.744
South Dakota	1.066	9.297
Tennessee	1.860	10.318
Texas	9.521	11.975
Utah	4.947	6.479
Vermont	1.773	6.255
Virginia	4.768	6.983
Washington	6.054	7.332
West Virginia	0.495	13.888
Wisconsin	2.191	5.605
Wyoming	1.232	8.049

TABLE A.13

2002 VALUES FOR TEMPORALLY VARIABLE PREDICTORS

	Food Stamp Prevalence Rate	Total Population	Tax Elderly Nonfiler Rate	Expanded Vehicle Rules in Previous Year
Alabama	9.903	4,478,896	50.322	1
Alaska	7.197	641,482	30.974	1
Arizona	6.960	5,441,125	43.079	0
Arkansas	10.491	2,706,268	48.973	1
California	4.883	35,001,986	41.922	0
Colorado	3.966	4,501,051	33.880	1
Connecticut	4.875	3,458,587	36.436	0
Delaware	4.917	805,945	35.945	1
District of Columbia	13.049	569,157	44.327	1
Florida	5.929	16,691,701	42.805	1
Georgia	7.557	8,544,005	46.320	0
Hawaii	8.574	1,240,663	34.586	0
Idaho	5.212	1,343,124	38.298	0
Illinois	7.042	12,586,447	36.694	1
Indiana	6.674	6,156,913	34.156	0
Iowa	4.793	2,935,840	34.544	0
Kansas	5.178	2,711,769	31.690	1
Kentucky	11.005	4,089,822	48.446	1
Louisiana	13.146	4,476,192	51.037	1
Maine	8.583	1,294,894	44.402	1
Maryland	4.190	5,450,525	37.746	1
Massachusetts	3.777	6,421,800	39.852	1
Michigan	7.468	10,043,221	33.688	1
Minnesota	4.318	5,024,791	34.610	0
Mississippi	11.332	2,866,733	55.712	0
Missouri	9.084	5,669,544	38.611	1
Montana	6.958	910,372	33.783	1
Nebraska	5.120	1,727,564	33.202	0
Nevada	4.477	2,167,455	36.989	1
New Hampshire	3.221	1,274,405	35.828	1
New Jersey	3.729	8,575,252	36.485	1
New Mexico	9.204	1,852,044	43.099	0
New York	7.078	19,134,293	45.379	0
North Carolina	6.915	8,305,820	46.121	1
North Dakota	5.802	633,911	33.729	1
Ohio	6.440	11,408,699	38.982	1
Oklahoma	8.965	3,489,700	43.168	1
Oregon	10.202	3,520,355	36.807	1
Pennsylvania	6.218	12,328,827	40.470	1
Rhode Island	6.733	1,068,326	45.321	0
South Carolina	9.243	4,103,770	47.638	1
South Dakota	6.268	760,437	33.249	1
Tennessee	10.329	5,789,796	48.498	0
Texas	7.151	21,736,925	44.934	1
Utah	3.901	2,318,789	34.528	1
Vermont	6.475	616,408	38.079	1
Virginia	4.857	7,287,829	39.723	0
Washington	5.775	6,067,060	34.457	0
West Virginia	12.978	1,804,884	52.641	1
Wisconsin	4.822	5,439,692	35.175	1
Wyoming	4.717	498,830	32.463	1

TABLE A.14

2003 VALUES FOR TEMPORALLY VARIABLE PREDICTORS

	Food Stamp Prevalence Rate	Total Population	Tax Elderly Nonfiler Rate	Expanded Vehicle Rules in Previous Year
Alabama	10.482	4,503,726	49.929	1
Alaska	7.819	648,280	30.076	1
Arizona	8.355	5,579,222	42.842	0
Arkansas	11.378	2,727,774	48.689	1
California	4.817	35,462,712	42.283	0
Colorado	4.575	4,547,633	33.978	1
Connecticut	5.177	3,486,960	37.015	1
Delaware	5.626	818,166	35.739	1
District of Columbia	14.665	557,620	44.260	1
Florida	6.126	16,999,181	43.113	1
Georgia	8.646	8,676,460	46.139	0
Hawaii	8.039	1,248,755	35.020	1
Idaho	5.964	1,367,034	38.029	0
Illinois	7.541	12,649,087	37.014	1
Indiana	7.584	6,199,571	34.430	1
Iowa	5.228	2,941,976	34.328	0
Kansas	5.898	2,724,786	31.291	1
Kentucky	12.206	4,118,189	48.407	1
Louisiana	14.459	4,493,665	50.657	1
Maine	10.127	1,309,205	44.274	1
Maryland	4.577	5,512,310	37.968	1
Massachusetts	4.551	6,420,357	39.588	1
Michigan	8.308	10,082,364	32.325	1
Minnesota	4.633	5,064,172	34.278	0
Mississippi	12.342	2,882,594	55.150	0
Missouri	10.343	5,719,204	38.727	1
Montana	7.768	918,157	33.189	1
Nebraska	5.712	1,737,475	33.005	1
Nevada	4.966	2,242,207	37.403	1
New Hampshire	3.475	1,288,705	36.334	1
New Jersey	3.923	8,642,412	36.501	1
New Mexico	10.369	1,878,562	42.706	1
New York	7.469	19,212,425	45.010	1
North Carolina	7.653	8,421,190	45.584	1
North Dakota	6.262	633,400	32.891	1
Ohio	7.479	11,437,680	39.071	1
Oklahoma	10.846	3,506,469	43.151	1
Oregon	11.177	3,564,330	36.770	1
Pennsylvania	6.650	12,370,761	40.399	1
Rhode Island	6.883	1,076,084	45.044	0
South Carolina	10.860	4,148,744	47.148	1
South Dakota	6.691	764,905	32.877	1
Tennessee	12.460	5,845,208	48.338	0
Texas	8.471	22,103,374	44.824	1
Utah	4.491	2,352,119	34.462	1
Vermont	6.674	619,343	37.568	1
Virginia	5.306	7,365,284	39.451	0
Washington	6.589	6,131,298	34.515	0
West Virginia	13.629	1,811,440	52.411	1
Wisconsin	5.420	5,474,290	34.587	1
Wyoming	5.040	502,111	32.821	1

TABLE A.15

REGRESSION ESTIMATES OF
PARTICIPATION RATES,
ALL ELIGIBLE PEOPLE

	2002	2003
Alabama	53.893	54.921
Alaska	64.273	66.333
Arizona	52.907	61.286
Arkansas	59.377	62.449
California	45.612	42.480
Colorado	44.891	48.088
Connecticut	54.925	52.083
Delaware	47.760	51.763
District of Columbia	65.655	70.101
Florida	46.537	46.207
Georgia	54.925	61.001
Hawaii	73.180	63.587
Idaho	48.061	52.286
Illinois	59.528	60.390
Indiana	64.935	63.430
Iowa	54.232	56.822
Kansas	51.838	54.651
Kentucky	61.425	65.403
Louisiana	64.752	67.747
Maine	61.504	70.484
Maryland	44.293	46.785
Massachusetts	39.205	44.543
Michigan	64.226	66.802
Minnesota	54.298	56.887
Mississippi	54.576	57.853
Missouri	67.039	71.904
Montana	50.833	51.788
Nebraska	55.066	52.581
Nevada	42.308	45.412
New Hampshire	43.234	45.624
New Jersey	42.736	44.212
New Mexico	53.307	51.320
New York	50.976	46.131
North Carolina	48.408	52.264
North Dakota	49.462	50.051
Ohio	53.696	57.572
Oklahoma	56.061	64.492
Oregon	76.656	80.663
Pennsylvania	51.775	52.473
Rhode Island	51.756	53.847
South Carolina	56.215	64.288
South Dakota	50.047	49.405
Tennessee	68.675	80.474
Texas	45.964	50.438
Utah	42.790	45.997
Vermont	56.432	57.591
Virginia	49.906	53.108
Washington	57.786	61.872
West Virginia	67.115	67.814
Wisconsin	50.838	53.990
Wyoming	44.275	43.673

TABLE A.16

REGRESSION ESTIMATES OF
PARTICIPATION RATES,
WORKING POOR

	2002	2003
Alabama	51.202	52.020
Alaska	58.819	59.790
Arizona	36.552	42.225
Arkansas	55.363	57.421
California	31.577	29.167
Colorado	34.517	39.161
Connecticut	41.210	42.792
Delaware	39.423	44.603
District of Columbia	55.475	53.286
Florida	36.615	38.439
Georgia	44.751	49.486
Hawaii	59.477	50.755
Idaho	37.511	40.153
Illinois	51.588	52.804
Indiana	59.045	60.912
Iowa	45.639	47.394
Kansas	45.427	48.559
Kentucky	59.449	61.982
Louisiana	64.575	64.319
Maine	56.135	65.626
Maryland	34.136	38.992
Massachusetts	27.001	34.940
Michigan	62.213	64.882
Minnesota	44.232	46.697
Mississippi	49.854	49.288
Missouri	64.967	69.133
Montana	49.186	48.691
Nebraska	45.568	46.527
Nevada	25.489	28.969
New Hampshire	34.780	40.354
New Jersey	28.488	32.029
New Mexico	43.529	41.336
New York	37.697	36.683
North Carolina	41.793	47.602
North Dakota	45.817	46.369
Ohio	52.596	58.347
Oklahoma	51.991	59.238
Oregon	68.809	70.507
Pennsylvania	49.835	52.993
Rhode Island	36.590	37.062
South Carolina	52.145	60.181
South Dakota	47.234	45.849
Tennessee	62.414	71.511
Texas	38.935	44.598
Utah	32.765	37.383
Vermont	50.097	52.362
Virginia	38.667	41.790
Washington	46.086	47.958
West Virginia	65.673	64.147
Wisconsin	45.617	50.918
Wyoming	40.120	39.891

TABLE A.17

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

	2002	2003
Alabama	3.276	3.391
Alaska	3.411	3.426
Arizona	3.366	3.552
Arkansas	3.218	3.251
California	3.774	3.831
Colorado	3.128	3.106
Connecticut	3.343	3.162
Delaware	3.095	3.076
District of Columbia	4.660	4.775
Florida	3.155	3.170
Georgia	3.221	3.317
Hawaii	4.013	3.482
Idaho	3.298	3.428
Illinois	3.261	3.230
Indiana	3.510	3.262
Iowa	3.354	3.488
Kansas	3.156	3.168
Kentucky	3.227	3.284
Louisiana	3.529	3.605
Maine	3.356	3.476
Maryland	3.147	3.139
Massachusetts	3.284	3.190
Michigan	3.426	3.518
Minnesota	3.380	3.485
Mississippi	3.772	4.089
Missouri	3.305	3.374
Montana	3.581	3.616
Nebraska	3.324	3.108
Nevada	3.587	3.564
New Hampshire	3.357	3.395
New Jersey	3.268	3.248
New Mexico	3.736	3.796
New York	3.243	3.284
North Carolina	3.199	3.183
North Dakota	3.264	3.336
Ohio	3.313	3.357
Oklahoma	3.076	3.133
Oregon	4.060	4.067
Pennsylvania	3.317	3.379
Rhode Island	3.457	3.518
South Carolina	3.165	3.215
South Dakota	3.415	3.478
Tennessee	3.545	3.883
Texas	3.323	3.307
Utah	3.168	3.139
Vermont	3.156	3.125
Virginia	3.256	3.326
Washington	3.271	3.439
West Virginia	3.495	3.513
Wisconsin	3.161	3.189
Wyoming	3.430	3.491

TABLE A.18

STANDARD ERRORS OF REGRESSION ESTIMATES OF PARTICIPATION RATES, WORKING POOR

	2002	2003
Alabama	5.473	5.607
Alaska	5.645	5.669
Arizona	5.527	5.737
Arkansas	5.369	5.395
California	6.341	6.436
Colorado	5.216	5.203
Connecticut	5.442	5.310
Delaware	5.171	5.172
District of Columbia	7.309	7.470
Florida	5.310	5.343
Georgia	5.338	5.438
Hawaii	6.370	5.724
Idaho	5.482	5.597
Illinois	5.477	5.379
Indiana	5.672	5.391
Iowa	5.468	5.636
Kansas	5.290	5.294
Kentucky	5.392	5.432
Louisiana	5.861	5.861
Maine	5.545	5.767
Maryland	5.240	5.287
Massachusetts	5.427	5.370
Michigan	5.700	5.777
Minnesota	5.479	5.616
Mississippi	6.341	6.531
Missouri	5.493	5.567
Montana	6.019	6.020
Nebraska	5.457	5.210
Nevada	5.786	5.814
New Hampshire	5.522	5.664
New Jersey	5.412	5.421
New Mexico	6.250	6.114
New York	5.458	5.477
North Carolina	5.326	5.356
North Dakota	5.491	5.572
Ohio	5.478	5.524
Oklahoma	5.183	5.227
Oregon	6.581	6.613
Pennsylvania	5.474	5.577
Rhode Island	5.663	5.734
South Carolina	5.287	5.360
South Dakota	5.743	5.797
Tennessee	5.739	6.199
Texas	5.574	5.532
Utah	5.272	5.258
Vermont	5.256	5.242
Virginia	5.348	5.450
Washington	5.373	5.583
West Virginia	5.766	5.746
Wisconsin	5.265	5.298
Wyoming	5.747	5.804

TABLE A.19

PRELIMINARY SHRINKAGE ESTIMATES OF PARTICIPATION RATES, ALL ELIGIBLE PEOPLE

	2002	2003
Alabama	54.018	54.837
Alaska	62.095	64.036
Arizona	55.644	62.674
Arkansas	57.349	61.045
California	46.582	44.160
Colorado	44.618	46.805
Connecticut	55.133	52.271
Delaware	48.539	52.534
District of Columbia	66.196	70.997
Florida	46.276	46.948
Georgia	57.815	63.536
Hawaii	74.717	66.267
Idaho	47.758	52.499
Illinois	58.451	59.585
Indiana	65.306	63.410
Iowa	53.384	56.140
Kansas	50.616	53.984
Kentucky	62.120	66.032
Louisiana	64.160	67.327
Maine	61.257	70.737
Maryland	44.632	47.043
Massachusetts	37.251	41.862
Michigan	61.273	64.239
Minnesota	54.960	58.252
Mississippi	54.625	58.925
Missouri	68.689	74.160
Montana	49.512	48.696
Nebraska	55.687	54.878
Nevada	40.383	43.675
New Hampshire	43.281	45.395
New Jersey	43.707	46.282
New Mexico	52.877	51.159
New York	49.905	46.943
North Carolina	45.381	48.339
North Dakota	49.096	50.577
Ohio	55.629	59.890
Oklahoma	57.087	65.658
Oregon	78.249	81.046
Pennsylvania	51.950	52.741
Rhode Island	51.096	51.632
South Carolina	56.673	64.297
South Dakota	52.874	51.349
Tennessee	68.348	80.835
Texas	45.919	47.004
Utah	42.150	46.795
Vermont	58.333	58.855
Virginia	50.114	52.818
Washington	55.980	58.733
West Virginia	66.155	66.877
Wisconsin	50.897	53.734
Wyoming	45.418	44.853

TABLE A.20

PRELIMINARY SHRINKAGE ESTIMATES OF PARTICIPATION RATES, WORKING POOR

	2002	2003
Alabama	48.898	49.446
Alaska	57.223	60.021
Arizona	43.600	45.730
Arkansas	51.172	57.902
California	32.152	33.432
Colorado	35.679	36.405
Connecticut	40.271	43.664
Delaware	41.115	45.578
District of Columbia	49.944	49.394
Florida	38.987	39.211
Georgia	47.233	50.286
Hawaii	59.636	53.139
Idaho	41.157	44.098
Illinois	50.841	51.367
Indiana	59.251	60.235
Iowa	43.511	44.274
Kansas	44.269	49.871
Kentucky	57.412	60.841
Louisiana	65.272	64.571
Maine	54.888	64.061
Maryland	34.997	39.824
Massachusetts	22.515	28.181
Michigan	62.736	64.514
Minnesota	40.515	47.359
Mississippi	50.401	49.889
Missouri	63.789	68.517
Montana	47.630	43.707
Nebraska	43.389	46.559
Nevada	23.092	27.858
New Hampshire	34.505	40.796
New Jersey	26.299	32.748
New Mexico	45.384	43.283
New York	39.771	41.348
North Carolina	39.459	44.279
North Dakota	50.967	51.760
Ohio	48.660	55.305
Oklahoma	54.015	62.565
Oregon	77.445	74.847
Pennsylvania	50.577	53.842
Rhode Island	36.200	34.593
South Carolina	52.794	60.749
South Dakota	49.677	46.484
Tennessee	62.228	72.799
Texas	37.074	37.183
Utah	32.535	37.242
Vermont	50.617	52.379
Virginia	41.152	42.005
Washington	40.053	40.477
West Virginia	67.868	66.940
Wisconsin	49.031	54.743
Wyoming	40.794	41.825

TABLE A.21

FINAL SHRINKAGE ESTIMATES OF
PARTICIPATION RATES,
ALL ELIGIBLE PEOPLE

	2002	2003
Alabama	55.095	55.833
Alaska	63.334	65.198
Arizona	56.754	63.813
Arkansas	58.493	62.153
California	47.512	44.962
Colorado	45.508	47.655
Connecticut	56.233	53.220
Delaware	49.507	53.488
District of Columbia	67.517	72.287
Florida	47.199	47.801
Georgia	58.968	64.690
Hawaii	76.207	67.471
Idaho	48.711	53.453
Illinois	59.617	60.667
Indiana	66.608	64.562
Iowa	54.449	57.160
Kansas	51.625	54.965
Kentucky	63.359	67.231
Louisiana	65.440	68.550
Maine	62.479	72.022
Maryland	45.522	47.897
Massachusetts	37.994	42.623
Michigan	62.495	65.406
Minnesota	56.056	59.310
Mississippi	55.714	59.996
Missouri	70.059	75.507
Montana	50.499	49.581
Nebraska	56.797	55.876
Nevada	41.189	44.468
New Hampshire	44.143	46.220
New Jersey	44.579	47.123
New Mexico	53.931	52.088
New York	50.900	47.796
North Carolina	46.286	49.217
North Dakota	50.075	51.496
Ohio	56.739	60.978
Oklahoma	58.226	66.851
Oregon	79.810	82.518
Pennsylvania	52.986	53.699
Rhode Island	52.115	52.570
South Carolina	57.803	65.465
South Dakota	53.929	52.282
Tennessee	69.711	82.303
Texas	46.835	47.858
Utah	42.991	47.645
Vermont	59.497	59.925
Virginia	51.114	53.778
Washington	57.096	59.800
West Virginia	67.474	68.092
Wisconsin	51.912	54.710
Wyoming	46.325	45.668

TABLE A.22

FINAL SHRINKAGE ESTIMATES OF
PARTICIPATION RATES,
WORKING POOR

	2002	2003
Alabama	50.107	50.200
Alaska	58.635	60.937
Arizona	44.677	46.428
Arkansas	52.437	58.784
California	32.947	33.942
Colorado	36.561	36.960
Connecticut	41.266	44.330
Delaware	42.132	46.272
District of Columbia	51.178	50.148
Florida	39.951	39.809
Georgia	48.401	51.052
Hawaii	61.109	53.949
Idaho	42.175	44.770
Illinois	52.097	52.150
Indiana	60.716	61.154
Iowa	44.587	44.948
Kansas	45.363	50.631
Kentucky	58.831	61.768
Louisiana	66.885	65.556
Maine	56.244	65.039
Maryland	35.862	40.431
Massachusetts	23.072	28.611
Michigan	64.286	65.498
Minnesota	41.516	48.081
Mississippi	51.646	50.650
Missouri	65.366	69.562
Montana	48.807	44.373
Nebraska	44.461	47.269
Nevada	23.662	28.283
New Hampshire	35.358	41.418
New Jersey	26.949	33.247
New Mexico	46.506	43.943
New York	40.754	41.978
North Carolina	40.434	44.954
North Dakota	52.227	52.548
Ohio	49.862	56.148
Oklahoma	55.350	63.519
Oregon	79.359	75.988
Pennsylvania	51.827	54.664
Rhode Island	37.094	35.120
South Carolina	54.099	61.675
South Dakota	50.904	47.193
Tennessee	63.766	73.909
Texas	37.990	37.750
Utah	33.339	37.809
Vermont	51.867	53.176
Virginia	42.169	42.645
Washington	41.043	41.094
West Virginia	69.546	67.961
Wisconsin	50.243	55.578
Wyoming	41.800	42.461

TABLE A.23

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

	2002	2003
Alabama	2.477	2.613
Alaska	2.898	2.675
Arizona	2.758	3.029
Arkansas	2.520	2.619
California	1.681	1.332
Colorado	2.139	2.123
Connecticut	2.835	2.769
Delaware	2.405	2.552
District of Columbia	4.221	4.484
Florida	1.560	1.565
Georgia	2.737	2.315
Hawaii	3.958	3.386
Idaho	2.001	2.777
Illinois	2.262	2.393
Indiana	2.963	2.869
Iowa	2.760	2.871
Kansas	2.441	2.232
Kentucky	2.860	2.805
Louisiana	3.174	3.125
Maine	2.501	2.599
Maryland	2.733	2.171
Massachusetts	2.025	2.033
Michigan	2.356	2.601
Minnesota	3.187	3.217
Mississippi	2.584	3.471
Missouri	3.163	3.242
Montana	2.694	2.100
Nebraska	3.024	2.700
Nevada	2.309	2.243
New Hampshire	2.633	2.346
New Jersey	1.847	1.866
New Mexico	2.878	3.130
New York	1.101	2.090
North Carolina	2.056	2.038
North Dakota	2.424	2.861
Ohio	1.990	2.547
Oklahoma	2.192	2.552
Oregon	3.439	3.371
Pennsylvania	2.796	2.602
Rhode Island	3.112	2.108
South Carolina	2.218	2.282
South Dakota	2.587	3.128
Tennessee	2.982	3.513
Texas	0.956	1.559
Utah	2.379	2.371
Vermont	2.473	2.772
Virginia	2.788	2.784
Washington	2.823	2.800
West Virginia	2.434	2.858
Wisconsin	2.666	2.673
Wyoming	2.877	3.009

TABLE A.24

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

	2002	2003
Alabama	3.939	4.077
Alaska	4.033	4.498
Arizona	4.200	3.811
Arkansas	3.797	3.951
California	2.314	2.241
Colorado	2.992	2.888
Connecticut	3.767	3.967
Delaware	3.883	4.147
District of Columbia	6.087	6.528
Florida	2.662	2.844
Georgia	3.465	3.885
Hawaii	5.526	5.145
Idaho	3.271	4.453
Illinois	4.435	3.375
Indiana	4.119	4.112
Iowa	3.945	3.303
Kansas	3.405	3.041
Kentucky	3.780	3.597
Louisiana	5.386	5.134
Maine	3.434	4.292
Maryland	4.457	3.686
Massachusetts	3.084	3.011
Michigan	4.788	3.890
Minnesota	4.187	4.923
Mississippi	4.655	4.896
Missouri	3.973	4.611
Montana	4.846	3.879
Nebraska	4.201	4.376
Nevada	2.457	2.844
New Hampshire	4.084	4.373
New Jersey	2.817	3.722
New Mexico	4.736	4.335
New York	2.879	3.311
North Carolina	2.775	3.772
North Dakota	4.617	4.796
Ohio	2.453	3.550
Oklahoma	3.754	4.158
Oregon	5.587	6.038
Pennsylvania	4.398	4.424
Rhode Island	4.032	3.248
South Carolina	3.853	4.146
South Dakota	4.843	5.387
Tennessee	4.068	4.599
Texas	2.062	2.041
Utah	2.831	3.404
Vermont	4.325	4.376
Virginia	4.409	3.989
Washington	4.010	3.259
West Virginia	4.303	4.406
Wisconsin	3.928	3.887
Wyoming	4.373	4.521

TABLE A.25

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

	2002	2003
Alabama	775,325	823,457
Alaska	69,727	74,396
Arizona	656,021	705,923
Arkansas	479,051	494,784
California	3,476,895	3,722,707
Colorado	383,580	423,803
Connecticut	289,945	326,612
Delaware	73,697	81,429
District of Columbia	105,923	109,001
Florida	2,007,380	2,106,532
Georgia	1,069,956	1,138,907
Hawaii	137,387	146,589
Idaho	138,864	145,711
Illinois	1,446,157	1,544,188
Indiana	594,782	697,100
Iowa	254,515	261,823
Kansas	262,413	281,310
Kentucky	694,491	724,824
Louisiana	885,048	927,720
Maine	175,101	174,147
Maryland	479,778	502,641
Massachusetts	627,705	658,216
Michigan	1,113,722	1,193,490
Minnesota	379,113	385,743
Mississippi	574,163	584,768
Missouri	699,917	747,617
Montana	121,525	141,942
Nebraska	149,799	172,333
Nevada	232,075	244,888
New Hampshire	87,173	92,578
New Jersey	713,099	712,503
New Mexico	309,313	364,760
New York	2,620,806	2,963,385
North Carolina	1,225,225	1,292,165
North Dakota	70,422	73,680
Ohio	1,266,491	1,384,716
Oklahoma	526,777	547,934
Oregon	404,209	428,539
Pennsylvania	1,415,568	1,504,928
Rhode Island	134,946	135,001
South Carolina	649,309	674,421
South Dakota	87,808	97,413
Tennessee	825,867	857,871
Texas	3,211,299	3,788,830
Utah	206,806	219,109
Vermont	64,896	67,371
Virginia	677,388	712,389
Washington	592,867	645,991
West Virginia	338,969	355,368
Wisconsin	469,178	511,410
Wyoming	49,777	54,592

TABLE A.26

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

	2002	2003
Alabama	328,182	364,970
Alaska	35,540	35,604
Arizona	388,882	385,530
Arkansas	204,018	221,516
California	1,849,487	1,991,324
Colorado	193,594	204,611
Connecticut	113,861	117,556
Delaware	37,017	40,277
District of Columbia	22,199	27,744
Florida	913,118	988,709
Georgia	496,502	547,384
Hawaii	68,500	80,517
Idaho	85,490	94,613
Illinois	683,897	651,744
Indiana	253,607	306,486
Iowa	124,633	128,456
Kansas	126,961	133,216
Kentucky	275,297	296,438
Louisiana	428,183	462,363
Maine	62,314	60,092
Maryland	172,053	165,469
Massachusetts	204,826	196,302
Michigan	484,477	505,228
Minnesota	149,701	174,119
Mississippi	213,739	249,303
Missouri	337,215	322,026
Montana	55,218	70,000
Nebraska	80,640	82,708
Nevada	131,187	126,860
New Hampshire	30,078	33,920
New Jersey	279,727	288,536
New Mexico	166,099	205,231
New York	1,069,147	1,129,095
North Carolina	553,188	528,677
North Dakota	36,347	35,670
Ohio	558,647	553,749
Oklahoma	259,081	261,287
Oregon	198,238	209,207
Pennsylvania	544,529	519,758
Rhode Island	42,128	49,078
South Carolina	244,082	305,640
South Dakota	45,558	47,166
Tennessee	343,806	379,686
Texas	2,007,039	2,130,271
Utah	129,850	126,512
Vermont	27,983	24,257
Virginia	328,846	314,420
Washington	251,068	312,694
West Virginia	113,077	125,954
Wisconsin	228,506	226,572
Wyoming	26,837	30,089

TABLE A.27

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

	2002	2003
Alabama	34,858	38,533
Alaska	3,191	3,052
Arizona	31,877	33,508
Arkansas	20,637	20,850
California	123,035	110,325
Colorado	18,026	18,877
Connecticut	14,616	16,995
Delaware	3,581	3,885
District of Columbia	6,623	6,761
Florida	66,331	68,978
Georgia	49,664	40,759
Hawaii	7,136	7,356
Idaho	5,703	7,569
Illinois	54,867	60,920
Indiana	26,455	30,973
Iowa	12,903	13,149
Kansas	12,407	11,425
Kentucky	31,348	30,242
Louisiana	42,934	42,286
Maine	7,010	6,285
Maryland	28,805	22,786
Massachusetts	33,448	31,389
Michigan	41,982	47,453
Minnesota	21,557	20,924
Mississippi	26,629	33,835
Missouri	31,602	32,102
Montana	6,484	6,012
Nebraska	7,975	8,328
Nevada	13,008	12,350
New Hampshire	5,200	4,700
New Jersey	29,537	28,217
New Mexico	16,504	21,922
New York	56,665	129,583
North Carolina	54,416	53,514
North Dakota	3,409	4,093
Ohio	44,421	57,837
Oklahoma	19,828	20,919
Oregon	17,419	17,507
Pennsylvania	74,701	72,911
Rhode Island	8,059	5,412
South Carolina	24,911	23,506
South Dakota	4,212	5,828
Tennessee	35,322	36,616
Texas	65,543	123,393
Utah	11,444	10,904
Vermont	2,697	3,116
Virginia	36,950	36,874
Washington	29,313	30,249
West Virginia	12,227	14,917
Wisconsin	24,099	24,987
Wyoming	3,092	3,596

TABLE A.28

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

	2002	2003
Alabama	25,801	29,641
Alaska	2,445	2,628
Arizona	36,562	31,644
Arkansas	14,773	14,888
California	129,888	131,482
Colorado	15,845	15,985
Connecticut	10,393	10,519
Delaware	3,411	3,610
District of Columbia	2,641	3,612
Florida	60,833	70,638
Georgia	35,548	41,657
Hawaii	6,194	7,679
Idaho	6,630	9,410
Illinois	58,214	42,174
Indiana	17,206	20,607
Iowa	11,029	9,440
Kansas	9,531	8,002
Kentucky	17,688	17,262
Louisiana	34,480	36,209
Maine	3,805	3,966
Maryland	21,383	15,087
Massachusetts	27,376	20,661
Michigan	36,087	30,003
Minnesota	15,098	17,829
Mississippi	19,267	24,101
Missouri	20,497	21,344
Montana	5,483	6,119
Nebraska	7,619	7,657
Nevada	13,621	12,757
New Hampshire	3,474	3,581
New Jersey	29,237	32,299
New Mexico	16,914	20,249
New York	75,531	89,069
North Carolina	37,966	44,358
North Dakota	3,213	3,255
Ohio	27,479	35,009
Oklahoma	17,573	17,105
Oregon	13,956	16,624
Pennsylvania	46,208	42,061
Rhode Island	4,579	4,539
South Carolina	17,385	20,545
South Dakota	4,334	5,384
Tennessee	21,933	23,628
Texas	108,952	115,178
Utah	11,028	11,392
Vermont	2,333	1,996
Virginia	34,385	29,413
Washington	24,529	24,799
West Virginia	6,996	8,165
Wisconsin	17,864	15,844
Wyoming	2,807	3,203

TABLE A.29

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

	2002	2003
Alabama	427,167	459,759
Alaska	44,161	48,505
Arizona	372,317	450,472
Arkansas	280,213	307,525
California	1,651,925	1,673,811
Colorado	174,558	201,965
Connecticut	163,044	173,824
Delaware	36,485	43,555
District of Columbia	71,516	78,794
Florida	947,455	1,006,941
Georgia	630,932	736,757
Hawaii	104,699	98,905
Idaho	67,642	77,887
Illinois	862,156	936,816
Indiana	396,174	450,063
Iowa	138,581	149,658
Kansas	135,472	154,621
Kentucky	440,020	487,310
Louisiana	579,172	635,954
Maine	109,401	125,424
Maryland	218,403	240,752
Massachusetts	238,492	280,550
Michigan	696,019	780,620
Minnesota	212,514	228,784
Mississippi	319,892	350,838
Missouri	490,353	564,505
Montana	61,369	70,376
Nebraska	85,082	96,292
Nevada	95,589	108,897
New Hampshire	38,481	42,790
New Jersey	317,893	335,751
New Mexico	166,816	189,997
New York	1,333,990	1,416,382
North Carolina	567,109	635,963
North Dakota	35,264	37,942
Ohio	718,590	844,375
Oklahoma	306,719	366,300
Oregon	322,599	353,623
Pennsylvania	750,048	808,134
Rhode Island	70,327	70,970
South Carolina	375,323	441,513
South Dakota	47,354	50,929
Tennessee	575,724	706,055
Texas	1,504,002	1,813,247
Utah	88,907	104,394
Vermont	38,611	40,372
Virginia	346,240	383,108
Washington	338,506	386,301
West Virginia	228,716	241,977
Wisconsin	243,562	279,791
Wyoming	23,059	24,931

TABLE A.30

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

	2002	2003
Alabama	164,441	183,214
Alaska	20,839	21,696
Arizona	173,742	178,993
Arkansas	106,980	130,217
California	609,345	675,893
Colorado	70,780	75,625
Connecticut	46,986	52,112
Delaware	15,596	18,637
District of Columbia	11,361	13,913
Florida	364,798	393,596
Georgia	240,311	279,452
Hawaii	41,860	43,438
Idaho	36,055	42,358
Illinois	356,293	339,885
Indiana	153,979	187,429
Iowa	55,570	57,739
Kansas	57,593	67,449
Kentucky	161,960	183,105
Louisiana	286,391	303,107
Maine	35,048	39,083
Maryland	61,702	66,901
Massachusetts	47,257	56,164
Michigan	311,453	330,914
Minnesota	62,150	83,719
Mississippi	110,388	126,271
Missouri	220,423	224,007
Montana	26,950	31,061
Nebraska	35,853	39,095
Nevada	31,042	35,880
New Hampshire	10,635	14,049
New Jersey	75,383	95,930
New Mexico	77,246	90,184
New York	435,720	473,974
North Carolina	223,677	237,660
North Dakota	18,983	18,744
Ohio	278,554	310,921
Oklahoma	143,401	165,966
Oregon	157,320	158,972
Pennsylvania	282,214	284,118
Rhode Island	15,627	17,236
South Carolina	132,045	188,504
South Dakota	23,191	22,259
Tennessee	219,231	280,623
Texas	762,478	804,171
Utah	43,291	47,833
Vermont	14,514	12,899
Virginia	138,671	134,085
Washington	103,045	128,498
West Virginia	78,640	85,599
Wisconsin	114,808	125,925
Wyoming	11,218	12,776

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