Contract No.: FNS-03-030-TNN
MPR Reference No.: 6044-112

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Policy Research, Inc.

Empirical Bayes Shrinkage Estimates of State Food Stamp Participation Rates in 2000-2002 for All Eligible People and the Working Poor

Final Report

October 2005

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CONTENTS

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TABLES

TABLES (*continued)*

TABLES (*continued)*

Table **Page**

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FIGURES

Figure **Page**

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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 2004, the program served almost 24 million people in an average month at a total annual cost of nearly $25 billion in benefits. The average monthly food stamp benefit was about $200 per household.

This report presents estimates that, for each state, measure the need for the Food Stamp Program and the program's effectiveness in each of the three years from 2000 to 2002. 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 several years from all the states to derive each state's estimates for a given year and by using not only sample survey data but also census and administrative data. This report describes our shrinkage estimator in detail.

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I. INTRODUCTION

This report presents estimates of the food stamp participation rate and the number of people eligible for food stamps in each state for the years 2000 to 2002.[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 Washington rather than all families in the state, we can be confident—by a commonly used standard—only that Washington's food stamp participation rate in 2002 was between about 47 and 61 percent. This range is wide (but typical), reflecting our substantial uncertainty about what Washington's participation rate actually was.

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

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 2002 estimate for Washington would be calculated using just 2002 data on households in one sample from Washington. If 2002 data are collected for only a small number of Washington 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 2002 or what happened in Washington (and other states) in other years is relevant to estimating what happened in Washington in 2002. 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. 2004).

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 Washington's data to derive an estimate for Washington, even though conditions may be similar in Oregon or Idaho. 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 Washington. Then, the shrinkage estimator optimally averages the direct sample and regression estimates for Washington to obtain a shrinkage estimate. In another application of shrinkage methods, shrinkage estimates of poor school-aged children by state and county are used in allocating Title I compensatory education funds for disadvantaged youth (National Research Council 2000).

In these and other applications of shrinkage estimation, the gain in precision from borrowing strength via a shrinkage estimator can be substantial. The confidence intervals for the shrinkage estimates of WIC eligibles in 1992 were, on average, 61 percent narrower than the corresponding direct sample confidence intervals (Schirm 1995). To obtain that same gain in precision with a direct estimator would require—according to rough calculations—more than a six-fold increase in sample size, an option that is surely not available to us. Therefore, we must use an indirect estimator and borrow strength (while recognizing that the gain in precision 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, three years of CPS data, and three years of Food Stamp Program (FSP) and income tax data for all the states to obtain estimates for each state in each year (2000 to 2002) for all eligible people and for the working poor.

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

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

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

1. From CPS data and FSP administrative data, derive direct sample estimates of state food stamp participation rates for each of the three years 2000 to 2002.
2. Using a regression model, predict state food stamp participation rates based on administrative and decennial census data.
3. Using "shrinkage" methods, average the direct sample estimates and regression predictions to obtain preliminary shrinkage estimates of state food stamp participation rates.
4. Adjust the preliminary shrinkage estimates to obtain final shrinkage estimates of state food stamp participation rates.

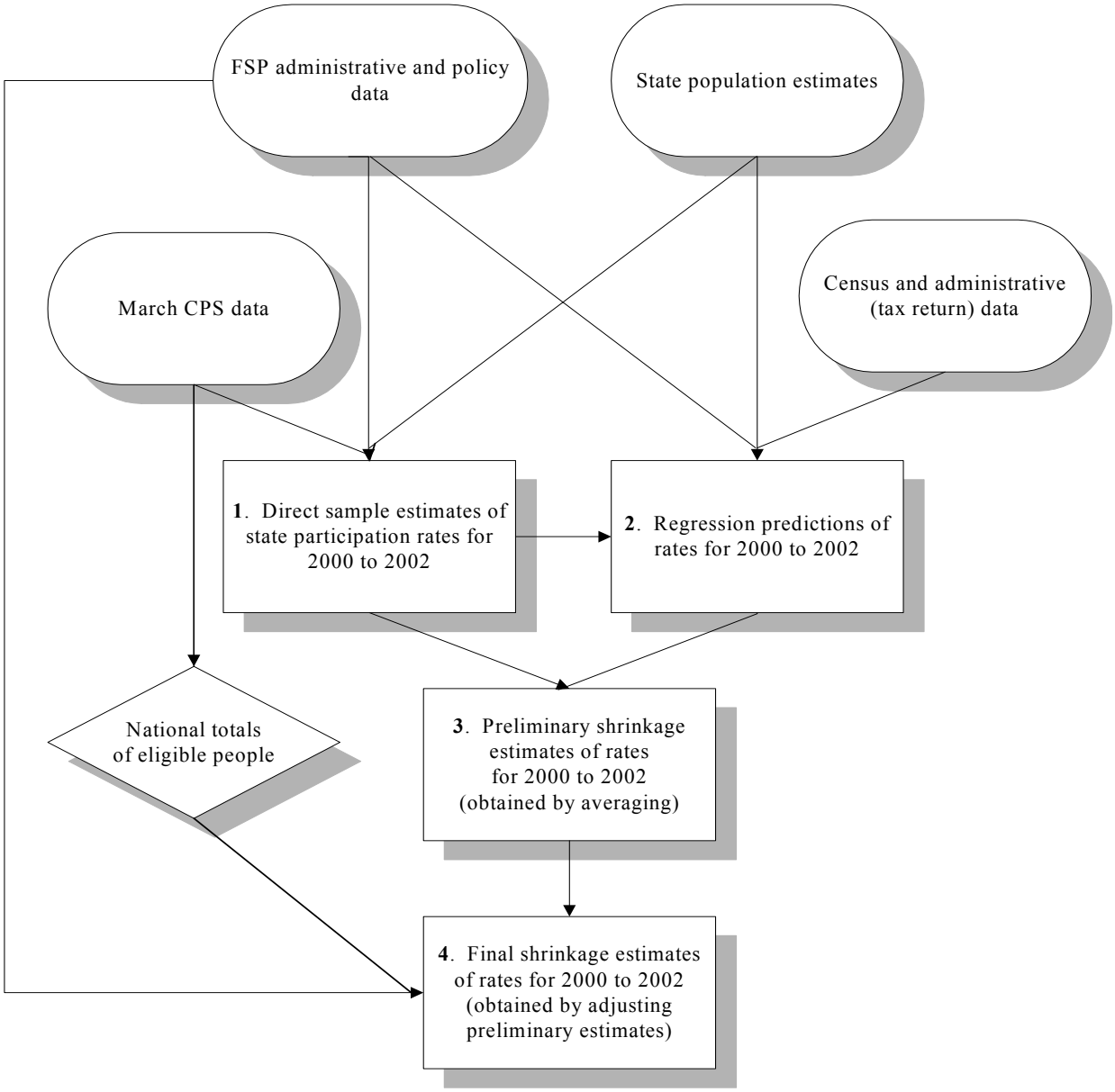
Each step is described in the remainder of this chapter. Additional technical details are provided in Appendix A.

1. From CPS data and FSP administrative data, derive direct sample estimates of state food stamp participation rates for each of the three years 2000 to 2002

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 2002, for example, from the March 2003 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 Washington's participation rate for all eligible people in 2002 was between 47 percent and 61 percent. This range is so wide and our uncertainty so great because the CPS sample for Washington 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—Washington and 2002 in our example—is the fundamental problem of "small area estimation."

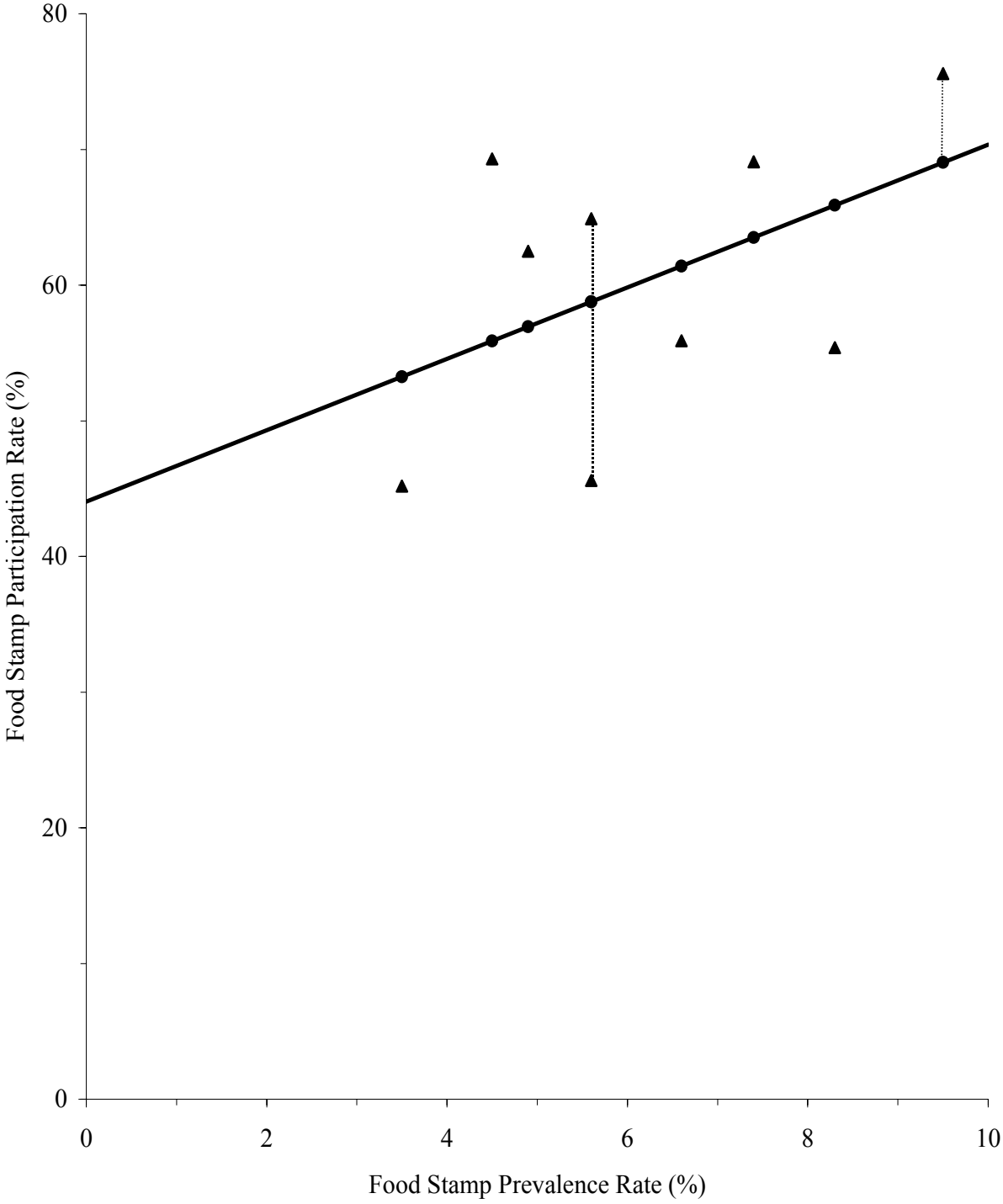
2. Using a regression model, predict state food stamp participation rates based on administrative and decennial census data

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.16 and A.17) for 2000 to 2002 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 tax return nonfiler rate, that is, the percentage of the population that is not claimed as exemptions on tax returns
- The poverty rate according to individual income tax data, namely, the percentage of exemptions that are claimed on tax returns with income below the federal poverty level
- The percentage of occupied housing units that are renter-occupied according to Census 2000
- The percentage of elderly people (age 65 or older) at or below the federal poverty level in 1999 according to Census 2000

- 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 two predictors are obtained from administrative data and population estimates, the third predictor is from administrative data, 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 Washington to estimate Washington's participation rate in that year, even though Washington, like nearly all states, has a small CPS sample. Deriving regression estimates in this step, we estimated a regression line from sample, administrative, and census data for several years and all the states and used the estimated line (with administrative and census data for Washington) to predict Washington's participation rate in a given year. In other words, the regression estimator not only uses the sample estimates from every state for several years to develop a regression estimate for a single state in a single year but also incorporates data from outside the sample, namely, data in administrative records systems and the census. In addition, the regression estimator derives estimates for all eligible people and the working poor jointly.

The regression estimator improves precision by using more data. It uses that additional data to identify states with sample estimates that seem too high or too low because of sampling error,

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

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

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

These limitations arise for the following reasons. The sample estimator uses relatively little information. It uses only the typically small number of sample observations for one state and one year to obtain an estimate for that state and year. It does not use sample data for other states or other years or data from other sources, such as administrative records or the census. Although the regression estimator borrows strength, using data from all the states and several years as well as administrative and census data, it makes no further use of the sample data after estimating the regression line. It treats the entire difference between the sample and regression estimates as sampling error, that is, error in the sample estimate. No allowance is made for prediction error,

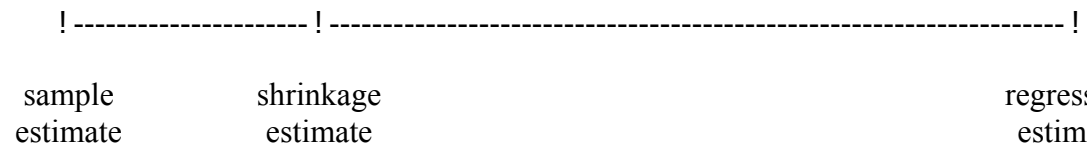
that is, error in the regression estimate. Although not all, if any, true state participation rates lie on the regression line, the assumption underlying the regression estimator is that they do.

Using all of the information at hand, a shrinkage estimator addresses the limitations of the sample and regression estimators by combining the sample and regression estimates, striking a compromise. As illustrated in Figure II.3, a shrinkage estimator takes a weighted average of the sample and regression estimates, weighting them according to their relative accuracy. We calculated weights using the empirical Bayes methods described in Appendix A. Generally, the more precise the sample estimate for a state, the closer the shrinkage estimate will be to it. The larger samples drawn in large states support more precise sample estimates, so shrinkage estimates tend to be closer to the sample estimates for large states. Given the precision of the sample estimate for a state, the weight given to the regression estimate depends on how well the regression line "fits." If we find good predictors reflecting why some states have higher participation rates than other states, we say that the regression line "fits well." The shrinkage estimate will be closer to the regression estimate and farther from the sample estimate when the regression line fits well than when the line fits poorly. Striking a compromise between the sample and regression estimators, the shrinkage estimator strikes a compromise between imprecision and bias. The sample and regression estimates are optimally weighted to improve accuracy by minimizing a measure of error that reflects both imprecision and bias. By accepting a little bias, the shrinkage estimator may be substantially more precise than the sample estimator. By sacrificing a little precision, the shrinkage estimator may be substantially less biased than the 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 Y more weight on sample estimate:



Good predictions or state with relatively small sample Y more weight on 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 2002 estimates for all eligible people. In Appendix A, we describe the results

of the adjustment for other years and for the working poor and discuss our adjustment method in more detail.

To implement the 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 35,488,861 for 2002, while the national total for 2002 estimated directly from the CPS was 34,693,233. 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 34,693,233) 35,488,861 (. 0.9776). 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 2000 TO 2002 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 2000 to 2002 for all eligible people and for the working poor, respectively.[2,3] For those same years, Tables III.3 and III.4 display our final shrinkage estimates of the number of people eligible for food stamps and the number of eligible working poor in each state.

These shrinkage estimates are relatively precise; they have much smaller standard errors and narrower confidence intervals than the CPS direct sample estimates. Tables III.5 to III.10 display approximate 90-percent confidence intervals showing the uncertainty remaining after using shrinkage estimation. One interpretation of such an interval is that there is a 90-percent chance that the true value—that is, the true participation rate or the true number of eligible people—falls within the estimated bounds. For example, while our best estimate is that Washington's participation rate for all eligible people was 57 percent in 2002 (see Table III.1), the true rate may have been higher or lower. However, according to Table III.7, the chances are 90 in 100 that the true rate was between 53 and 61 percent, an interval that is about three-fifths as

[2] In Castner and Schirm (2005b), we present and discuss the participation rates for all eligible people. In Castner and Schirm (2005a), 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.

[3] The shrinkage estimates of participation rates for 2000 and 2001 presented here differ from, and are generally lower than, the estimates in Castner and Schirm (2004) because of improvements in data and methods. Because CPS data do not include the wide array of asset information required to determine assest eligibility, we developed a predictive model of asset eligibility using data from the Survey of Income and Program Participation. The model used to obtain the estimates presented previously for 1999-2001 was estimated from 1994 SIPP data and reflected program rules prior to the vehicle-related expansions in eligibility that begin in fiscal year 2001. The improved model used by Cunnyngham (2004) and for this report was estimated from 1999 SIPP data and reflected the expansions to the vehicle rules. The model was not yet available when we derived the previous national estimates. Additional details can be found in Cunnyngham (2004) and U. S. Department of Agriculture (2004).

wide as the interval (cited in Chapter I) around the direct sample estimate. A narrower interval means that we are less uncertain about the true value. According to our calculations, a shrinkage confidence interval for a participation rate is, on average, only about 60 percent as wide as the corresponding sample confidence interval. Thus, shrinkage substantially improves precision and 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 (2005a and 2005b), 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)

	2000	2001	2002
Alabama	56	53	53
Alaska	62	58	62
Arizona	46	47	53
Arkansas	57	55	56
California	54	49	49
Colorado	49	46	45
Connecticut	61	58	58
Delaware	52	49	51
District of Columbia	86	73	66
Florida	49	45	44
Georgia	53	50	54
Hawaii	89	77	74
Idaho	44	41	46
Illinois	63	62	59
Indiana	60	61	66
Iowa	54	51	52
Kansas	50	49	49
Kentucky	72	69	67
Louisiana	65	64	67
Maine	72	67	64
Maryland	52	50	48
Massachusetts	42	41	39
Michigan	68	64	65
Minnesota	57	54	56
Mississippi	52	52	56
Missouri	70	68	69
Montana	53	51	50
Nebraska	56	52	54
Nevada	38	40	42
New Hampshire	49	46	46
New Jersey	50	45	43
New Mexico	54	53	55
New York	57	52	50
North Carolina	48	47	46
North Dakota	50	55	51
Ohio	57	54	56
Oklahoma	56	54	58
Oregon	72	75	81
Pennsylvania	64	58	55
Rhode Island	63	60	57
South Carolina	56	55	59
South Dakota	58	57	56
Tennessee	64	61	66
Texas	46	45	47
Utah	47	43	43
Vermont	70	63	60
Virginia	54	52	52
Washington	56	54	57
West Virginia	85	75	72
Wisconsin	53	53	55
Wyoming	51	50	49
United States	56	53	54

TABLE III.2

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

	2000	2001	2002
Alabama	49	49	47
Alaska	52	51	55
Arizona	32	35	45
Arkansas	46	46	49
California	33	29	31
Colorado	45	44	39
Connecticut	48	47	43
Delaware	47	46	45
District of Columbia	46	35	37
Florida	42	40	41
Georgia	48	46	48
Hawaii	75	66	65
Idaho	42	41	43
Illinois	56	58	54
Indiana	58	62	65
Iowa	43	44	41
Kansas	42	43	41
Kentucky	66	66	65
Louisiana	64	65	71
Maine	65	66	60
Maryland	42	40	35
Massachusetts	29	28	23
Michigan	67	68	68
Minnesota	47	47	41
Mississippi	45	48	52
Missouri	65	67	67
Montana	48	47	46
Nebraska	46	45	43
Nevada	21	22	25
New Hampshire	38	38	31
New Jersey	32	33	24
New Mexico	39	48	50
New York	41	37	39
North Carolina	42	43	41
North Dakota	55	62	54
Ohio	50	53	50
Oklahoma	50	50	56
Oregon	67	73	84
Pennsylvania	61	59	53
Rhode Island	47	44	41
South Carolina	52	54	56
South Dakota	59	60	55
Tennessee	55	57	61
Texas	41	41	41
Utah	39	39	35
Vermont	60	57	50
Virginia	48	48	45
Washington	44	43	44
West Virginia	81	77	77
Wisconsin	54	56	54
Wyoming	51	52	45
United States	46	46	46

TABLE III.3

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

	2000	2001	2002
Alabama	675	739	802
Alaska	59	63	71
Arizona	557	613	709
Arkansas	428	466	504
California	3,352	3,372	3,435
Colorado	313	322	388
Connecticut	263	264	285
Delaware	60	64	75
District of Columbia	92	98	109
Florida	1,760	1,907	2,102
Georgia	1,023	1,100	1,177
Hawaii	130	138	142
Idaho	126	142	145
Illinois	1,195	1,299	1,466
Indiana	487	552	605
Iowa	225	244	264
Kansas	225	247	279
Kentucky	545	588	652
Louisiana	755	796	860
Maine	137	153	171
Maryland	405	415	473
Massachusetts	547	530	626
Michigan	878	988	1,142
Minnesota	339	359	388
Mississippi	524	564	568
Missouri	593	642	710
Montana	107	117	124
Nebraska	142	149	157
Nevada	156	169	227
New Hampshire	72	74	84
New Jersey	669	697	743
New Mexico	302	299	301
New York	2,449	2,523	2,634
North Carolina	978	1,031	1,222
North Dakota	62	68	71
Ohio	1,063	1,155	1,288
Oklahoma	443	472	528
Oregon	315	367	435
Pennsylvania	1,184	1,259	1,367
Rhode Island	114	118	123
South Carolina	515	571	641
South Dakota	74	78	84
Tennessee	764	844	871
Texas	2,871	2,974	3,280
Utah	162	177	207
Vermont	56	59	65
Virginia	603	632	661
Washington	513	560	598
West Virginia	262	288	320
Wisconsin	355	396	465
Wyoming	43	45	47
United States	29,968	31,783	34,693

TABLE III.4

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

	2000	2001	2002
Alabama	297	310	350
Alaska	32	32	38
Arizona	325	340	399
Arkansas	211	217	221
California	1,893	2,048	1,977
Colorado	160	164	188
Connecticut	110	94	113
Delaware	25	24	38
District of Columbia	28	28	32
Florida	814	827	933
Georgia	475	486	510
Hawaii	65	66	64
Idaho	74	82	87
Illinois	568	584	695
Indiana	202	239	259
Iowa	120	120	137
Kansas	113	119	142
Kentucky	233	239	263
Louisiana	350	371	402
Maine	50	55	60
Maryland	145	144	189
Massachusetts	203	183	219
Michigan	373	407	498
Minnesota	149	148	152
Mississippi	237	251	211
Missouri	281	285	339
Montana	56	55	62
Nebraska	71	75	86
Nevada	92	88	124
New Hampshire	21	27	35
New Jersey	250	254	306
New Mexico	182	140	154
New York	930	941	1,122
North Carolina	477	460	566
North Dakota	31	32	38
Ohio	447	480	565
Oklahoma	241	229	257
Oregon	157	193	215
Pennsylvania	507	467	534
Rhode Island	43	35	37
South Carolina	194	213	236
South Dakota	37	32	43
Tennessee	313	352	378
Texas	1,657	1,721	1,984
Utah	97	102	124
Vermont	20	19	29
Virginia	267	282	317
Washington	237	229	248
West Virginia	102	101	102
Wisconsin	179	182	238
Wyoming	25	24	26
United States	14,163	14,599	16,343

TABLE III.5

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

	Participation Rate (Percent)		Number of Eligible People (Thousands)	
	Lower Bound	Upper Bound	Lower Bound	Upper Bound
Alabama	52	60	626	725
Alaska	57	67	54	63
Arizona	41	50	503	611
Arkansas	53	61	398	458
California	51	56	3,214	3,491
Colorado	45	53	287	339
Connecticut	57	66	243	283
Delaware	47	56	54	65
District of Columbia	78	93	84	100
Florida	45	52	1,636	1,884
Georgia	49	56	959	1,087
Hawaii	81	96	120	141
Idaho	40	48	116	137
Illinois	60	67	1,129	1,261
Indiana	55	65	446	527
Iowa	49	58	205	244
Kansas	46	54	207	242
Kentucky	67	78	503	587
Louisiana	61	70	702	808
Maine	67	76	128	146
Maryland	48	57	369	442
Massachusetts	38	46	492	603
Michigan	64	72	825	931
Minnesota	51	63	302	376
Mississippi	47	57	475	572
Missouri	64	75	544	641
Montana	48	58	97	117
Nebraska	50	61	128	156
Nevada	34	42	139	173
New Hampshire	45	54	65	78
New Jersey	46	53	626	712
New Mexico	50	59	278	326
New York	54	60	2,313	2,585
North Carolina	45	51	923	1,032
North Dakota	45	55	55	68
Ohio	54	60	1,007	1,119
Oklahoma	52	60	414	473
Oregon	66	77	291	339
Pennsylvania	59	68	1,100	1,268
Rhode Island	58	68	105	123
South Carolina	52	61	477	554
South Dakota	53	63	67	80
Tennessee	59	68	714	813
Texas	44	48	2,748	2,994
Utah	42	52	145	178
Vermont	65	74	52	59
Virginia	49	58	552	655
Washington	53	60	479	548
West Virginia	80	91	245	279
Wisconsin	49	58	325	386
Wyoming	46	55	40	47
United States	55	57	29,473	30,463

TABLE III.6

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

	Participation Rate (Percent)		Number of Eligible People (Thousands)	
	Lower Bound	Upper Bound	Lower Bound	Upper Bound
Alabama	50	57	692	786
Alaska	54	63	58	68
Arizona	42	52	553	673
Arkansas	51	58	436	495
California	46	52	3,158	3,586
Colorado	43	50	295	349
Connecticut	53	62	242	285
Delaware	45	54	58	70
District of Columbia	66	81	87	108
Florida	42	47	1,805	2,009
Georgia	47	54	1,022	1,179
Hawaii	70	83	126	149
Idaho	38	45	130	153
Illinois	58	66	1,217	1,380
Indiana	56	66	507	596
Iowa	46	56	221	266
Kansas	45	52	231	263
Kentucky	63	74	541	636
Louisiana	60	68	743	848
Maine	63	72	142	163
Maryland	45	55	373	457
Massachusetts	37	45	477	583
Michigan	61	68	932	1,045
Minnesota	48	60	318	400
Mississippi	48	57	513	614
Missouri	62	74	588	696
Montana	47	56	106	127
Nebraska	46	57	134	165
Nevada	37	44	154	184
New Hampshire	42	51	66	81
New Jersey	42	47	661	733
New Mexico	49	58	276	322
New York	49	56	2,370	2,676
North Carolina	45	49	986	1,077
North Dakota	50	60	62	74
Ohio	52	57	1,097	1,212
Oklahoma	50	58	438	506
Oregon	69	80	339	395
Pennsylvania	54	63	1,166	1,351
Rhode Island	54	65	108	128
South Carolina	51	59	525	616
South Dakota	52	62	71	84
Tennessee	56	65	784	903
Texas	43	48	2,805	3,143
Utah	39	48	158	196
Vermont	59	67	55	63
Virginia	47	56	578	686
Washington	51	58	522	598
West Virginia	70	80	268	308
Wisconsin	49	58	365	428
Wyoming	45	54	41	49
United States	52	54	31,225	32,341

TABLE III.7

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	49	57	743	862
Alaska	57	67	65	77
Arizona	48	58	643	776
Arkansas	52	59	469	538
California	46	51	3,247	3,623
Colorado	42	49	357	419
Connecticut	53	62	261	308
Delaware	46	55	69	82
District of Columbia	59	74	97	120
Florida	42	47	1,993	2,211
Georgia	49	58	1,085	1,270
Hawaii	67	80	129	155
Idaho	43	50	134	155
Illinois	55	62	1,379	1,552
Indiana	61	71	559	652
Iowa	48	57	241	287
Kansas	45	52	258	300
Kentucky	62	73	601	703
Louisiana	62	72	797	924
Maine	60	69	160	182
Maryland	42	53	422	524
Massachusetts	35	42	567	684
Michigan	61	68	1,076	1,209
Minnesota	49	62	344	432
Mississippi	52	61	524	612
Missouri	64	75	653	768
Montana	45	54	113	135
Nebraska	49	60	141	173
Nevada	39	46	208	246
New Hampshire	41	50	76	93
New Jersey	40	45	700	786
New Mexico	51	60	278	325
New York	49	52	2,537	2,732
North Carolina	43	49	1,143	1,302
North Dakota	47	56	65	77
Ohio	53	59	1,221	1,354
Oklahoma	54	62	495	561
Oregon	75	86	404	465
Pennsylvania	50	59	1,256	1,479
Rhode Island	52	62	112	135
South Carolina	55	63	598	684
South Dakota	52	61	77	91
Tennessee	62	71	810	932
Texas	46	48	3,183	3,376
Utah	39	47	186	228
Vermont	56	64	60	69
Virginia	48	57	602	721
Washington	53	61	557	640
West Virginia	67	76	300	340
Wisconsin	50	59	427	503
Wyoming	44	53	43	52
United States	53	55	34,160	35,226

TABLE III.8

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

	Participation Rate (Percent)		Number of Eligible People (Thousands)	
	Lower Bound	Upper Bound	Lower Bound	Upper Bound
Alabama	42	55	259	336
Alaska	45	59	27	36
Arizona	28	37	284	365
Arkansas	41	52	185	236
California	29	36	1,708	2,078
Colorado	40	50	142	177
Connecticut	41	55	94	126
Delaware	39	55	21	30
District of Columbia	37	56	23	34
Florida	37	47	713	914
Georgia	42	54	417	533
Hawaii	63	86	55	75
Idaho	36	47	65	84
Illinois	49	62	502	634
Indiana	50	65	176	229
Iowa	38	47	107	133
Kansas	36	48	97	128
Kentucky	59	73	207	259
Louisiana	56	71	309	391
Maine	58	73	44	55
Maryland	35	48	123	168
Massachusetts	23	34	164	242
Michigan	60	75	330	417
Minnesota	40	54	127	171
Mississippi	37	52	197	276
Missouri	56	73	244	318
Montana	41	55	48	64
Nebraska	39	53	60	82
Nevada	17	25	74	110
New Hampshire	32	44	17	24
New Jersey	28	36	218	282
New Mexico	34	44	157	206
New York	36	46	818	1,043
North Carolina	37	47	422	532
North Dakota	47	63	26	35
Ohio	46	54	411	482
Oklahoma	45	56	214	268
Oregon	59	75	139	176
Pennsylvania	54	69	444	570
Rhode Island	40	55	36	50
South Carolina	46	58	172	217
South Dakota	51	67	32	43
Tennessee	49	61	279	348
Texas	37	45	1,515	1,800
Utah	34	45	83	111
Vermont	52	67	17	22
Virginia	42	54	234	300
Washington	39	49	210	264
West Virginia	70	91	89	115
Wisconsin	47	60	157	201
Wyoming	45	57	22	28
United States	45	47	13,727	14,600

TABLE III.9

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

	Participation Rate (Percent)		Number of Eligible People (Thousands)	
	Lower Bound	Upper Bound	Lower Bound	Upper Bound
Alabama	44	55	275	346
Alaska	44	58	27	36
Arizona	30	41	288	392
Arkansas	41	51	193	241
California	26	32	1,842	2,254
Colorado	39	49	145	184
Connecticut	40	54	80	108
Delaware	38	54	20	29
District of Columbia	27	44	21	35
Florida	36	45	738	915
Georgia	41	52	429	543
Hawaii	57	76	56	75
Idaho	36	46	71	93
Illinois	51	64	519	649
Indiana	54	70	209	269
Iowa	38	49	105	135
Kansas	38	48	105	132
Kentucky	59	74	211	267
Louisiana	58	73	328	414
Maine	59	74	49	62
Maryland	34	47	120	167
Massachusetts	23	33	149	217
Michigan	61	75	365	450
Minnesota	40	55	126	171
Mississippi	41	55	216	286
Missouri	59	76	249	321
Montana	41	54	47	62
Nebraska	37	52	63	88
Nevada	18	25	73	103
New Hampshire	32	44	23	32
New Jersey	28	37	220	289
New Mexico	41	54	122	159
New York	33	41	837	1,044
North Carolina	39	47	415	505
North Dakota	54	70	28	36
Ohio	48	57	440	520
Oklahoma	44	56	202	256
Oregon	66	80	174	212
Pennsylvania	52	67	408	525
Rhode Island	37	52	29	41
South Carolina	48	60	189	238
South Dakota	51	68	27	36
Tennessee	50	63	311	392
Texas	38	43	1,611	1,832
Utah	33	44	88	116
Vermont	49	65	16	21
Virginia	42	55	244	321
Washington	39	48	205	254
West Virginia	67	86	89	114
Wisconsin	50	63	161	204
Wyoming	45	58	21	27
United States	44	47	14,186	15,011

TABLE III.10

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	41	54	305	396
Alaska	48	61	33	43
Arizona	38	52	339	460
Arkansas	43	54	196	245
California	28	34	1,768	2,186
Colorado	35	44	166	210
Connecticut	36	49	96	130
Delaware	37	53	31	44
District of Columbia	27	47	23	41
Florida	36	45	834	1,032
Georgia	43	54	452	568
Hawaii	55	74	55	74
Idaho	37	48	76	97
Illinois	48	61	609	781
Indiana	57	72	229	289
Iowa	35	47	118	156
Kansas	36	46	124	159
Kentucky	58	72	235	291
Louisiana	63	80	355	449
Maine	54	66	54	66
Maryland	27	42	149	228
Massachusetts	18	28	170	268
Michigan	60	76	442	554
Minnesota	34	48	126	179
Mississippi	45	59	181	241
Missouri	60	75	301	378
Montana	38	53	52	72
Nebraska	36	50	71	100
Nevada	21	28	106	141
New Hampshire	25	37	28	42
New Jersey	21	28	259	354
New Mexico	43	57	133	174
New York	34	43	991	1,253
North Carolina	37	45	509	624
North Dakota	46	62	32	44
Ohio	46	53	524	607
Oklahoma	51	62	230	284
Oregon	75	92	193	237
Pennsylvania	45	60	460	607
Rhode Island	35	48	31	43
South Carolina	50	62	210	262
South Dakota	47	63	37	49
Tennessee	55	68	338	418
Texas	38	44	1,835	2,132
Utah	31	40	107	140
Vermont	43	58	25	34
Virginia	39	52	269	364
Washington	38	49	217	278
West Virginia	69	85	91	113
Wisconsin	47	61	208	268
Wyoming	38	51	22	30
United States	45	47	15,867	16,818

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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 each of the three years 2000 to 2002.

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] If P_i includes people who received disaster relief benefits issued after a major natural disaster, P_i is adjusted by linearly interpolating between the participant figures for the months immediately before and after the period during which disaster relief was provided. This adjustment seeks to exclude from our estimate of participants those people who received food stamps only because of a natural disaster, are not otherwise eligible, and, thus, are not included in our estimate of eligibles. It allows us to measure a state's participation rate under "normal"

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

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 2000 to 2002 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 2000 to 2002 for all eligible people and for the working poor, respectively.

(continued)
circumstances. Because P_i is obtained from FSP Program Operations data, which include the full population of food stamp cases, it is not subject to sampling error. Participant figures were provided by the Food and Nutrition Service (FNS).

[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 2000 to 2002 from the March CPS samples for 2001 to 2003, for which the survey instruments collected family income data for the prior calendar years, that is, 2000 to 2002. We used the revised March 2001 file with weights based on Census 2000 and additional sample households (from the State Children's Health Insurance Program (SCHIP) sample expansion). The March 2002 and March 2003 files are also weighted based on Census 2000 population estimates and include the additional sample.

[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 2000 and 2001 population estimates that we used were released on June 23, 2003, and the 2002 population estimates were released on March 10, 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 (2004) 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]

[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}) = $ variance due to $E_{1,i}$ when $\varepsilon_{1,i}$ is fixed + variance due to $\varepsilon_{1,i}$ when $E_{1,i}$ 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}) = $ variance due to $E_{2,i}$ when $\varepsilon_{2,i}$ is fixed + variance due to $\varepsilon_{2,i}$ when $E_{2,i}$ 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) $E_{1,i} = 100 \dfrac{Z_{1,i}}{N_i}$.

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:

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

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

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

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]

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

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

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

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

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

where:

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

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:

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

if *g* is odd, or:

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

if *g* is even.

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

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

To improve the precision of estimated correlations (and covariances), we used a simple smoothing technique in which we "replaced" the state-specific correlation from Equation (23) by the average correlation between $Y_{1,i,t}$ and $Y_{2,i,t-g}$ 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 $n_{i,t-g}$ are the (unweighted) number of households in the March CPS samples for one year and *g* years earlier, respectively. Using this average correlation, we obtained as our final estimate of the covariance between $Y_{1,i,t}$ and $Y_{2,i,t-g}$:

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

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 six equations, with three predicting food stamp participation rates for all eligible people in 2000, 2001, and 2002, and three predicting food stamp participation rates for the working poor in 2000, 2001, and 2002. The six equations were estimated jointly, and the values of the regression coefficients could vary from equation to equation. The predictors used were (in addition to an intercept):

- The percentage of the population receiving food stamps, that is, the food stamp prevalence rate
- The tax return nonfiler rate, that is, the percentage of the population that is not claimed as exemptions on tax returns
- The poverty rate according to individual income tax data, namely, the percentage of exemptions that are claimed on tax returns with income below the federal poverty level
- The percentage of occupied housing units that are renter-occupied according to Census 2000
- The percentage of elderly people (age 65 or older) at or below the federal poverty level in 1999 according to Census 2000
- 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 six equations of our regression model. For the first three predictors, we used 2000 values in both equations for predicting 2000 participation rates, 2001 values in both equations for predicting 2001 rates, and 2002 values in both equations for predicting 2002 rates. We included the sixth predictor only in

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

the two equations for predicting 2002 rates because 2001 was the first year in which states were given the option of deviating from federal rules by aligning the treatment of vehicle values in the Food Stamp Program with the rules in their Temporary Assistance for Needy Families programs. In prior years, there was no such variation across states in the rules for counting vehicle values in the Food Stamp Program's asset test. Because prediction errors were allowed to be correlated and intergroup and intertemporal correlations among direct sample estimates were taken into account as specified in the next step, the shrinkage estimates for a group (all eligible people or the working poor) in any one year were determined by the predictions and sample estimates for all three years and for both groups.

In addition to the 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.

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 six year-and-group-specific regression equations, and are displayed in Table A.12. Values for the other predictors, which are updated each year, are presented in Tables A.13 to A.15. Regression estimates of participation rates for all eligible people are in Table A.16, and regression estimates of rates for the working poor are in Table A.17. The standard errors for the regression estimates for all eligible people and for the working poor are in Tables A.18 and A.19, respectively.

3. Using Ashrinkage@ 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

[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.

[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.

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 4,730,880 equally-spaced points, starting with σ_1 = 0.001, σ_2 = 0.001, ρ = -0.990, η_1 = 1.000, η_2 = 3.250, and η_{12} = -0.110 and incrementing σ_1, σ_2, ρ, η_1, η_2, and η_{12} by 0.300, 0.400, 0.220, 0.400, 0.500, and 0.110, respectively, up to σ_1 = 3.301, σ_2 = 5.201, ρ = 0.990, η_1 = 7.000, η_2 = 10.750, and η_{12} = 0.990. For combination k of σ_1, σ_2, ρ, η_1, η_2, and η_{12} (k = 1, 2, ..., 4730880), 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 306 elements, six sample estimates for each of the 51 states. The first six elements of Y pertain to the first state, the next six to the second state, and so forth. For a given state, the first two elements are the 2000 sample estimates for all eligible people and the working poor, respectively; the second two elements are the 2001 estimates; and the final two elements are the 2002 estimates. The vector of shrinkage estimates, θ_k, has the same structure as the vector of sample estimates, Y. V is the (306 H 306) variance-covariance matrix for the sample estimates. Because state samples are independent in the CPS, V is block-diagonal with 51 (6 H 6) blocks. We described under Step 1 how we derived estimates for the elements of V. X is a (306 H 38) matrix containing values for each of the five or six predictors (plus an intercept) for every state, every year (2000,

2001, and 2002), and both groups (all eligible people and the working poor). The first six rows of X pertain to the first state, the next six rows pertain to the second state, and so forth. The six rows for state i are given by:

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

where x'_{it1} is a row vector for year t (t = 1 for 2000, t = 2 for 2001, and t = 3 for 2002) with six or seven elements (an intercept plus the five or six of the predictors listed under Step 2, with the sixth predictor included for 2002 only) to predict participation rates for all eligible people. x'_{it2} is a row vector for year t with six or seven elements to predict participation rates for the working poor. $\underline{0}$ is a row vector with six or 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 (38 H 1) vector of regression coefficients, and is given by:

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

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

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

After calculating θ_k, U_k, and p_k^* 4,730,880 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, $\eta_{1,k}$, $\eta_{2,k}$, $\eta_{12,k}$):

$$(32) \quad p_k = \frac{p_k^*}{\sum_{k=1}^{4,730,880} p_k^*},$$

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 4,730,880 sets of shrinkage estimates, weighting each set θ_k by its associated probability p_k. Thus, our shrinkage estimates are:

$$(33) \quad \theta = \sum_{k=1}^{4,730,880} p_k \theta_k .$$

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:

$$(34) \quad U = \sum_{k=1}^{4,730,880} p_k U_k + \sum_{k=1}^{4,730,880} p_k (\theta_k - \theta)(\theta_k - \theta)' .$$

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:

$$(35) \quad R = \sum_{k=1}^{4,730,880} p_k R_k \ ,$$

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:

$$(36) \quad G = \sum_{k=1}^{4,730,880} p_k G_k + \sum_{k=1}^{4,730,880} p_k (R_k - R)(R_k - R)' \ ,$$

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

$$(37) \quad \hat{B} = \sum_{k=1}^{4,730,880} p_k \hat{B}_k \ .$$

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

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

We adjusted the preliminary shrinkage estimates of participation rates 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 2002 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 35,488,861 for 2002, while the national total for 2002 estimated directly from the CPS was 34,693,233. 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 34,693,233) 35,488,861(. 0.9776).[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:

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

where $\theta_{F,1,i}$ is the final shrinkage estimate of the participation rate for all eligible people in state *i*, and $\psi_{F,1,i}$ is the final shrinkage estimate of the number of all eligible people. P_i and $\varepsilon_{1,i}$ are the participant count and correctly-eligible rate figures used in Equations (1) and (38). Participation rates for all states and all eligible people were shown in Chapter III, Table III.1. We derived final participation rates for the working poor in the same way. Our final estimates of the number of eligible working poor people were shown in Chapter III, Table III.4, and the final participation rates were shown in Chapter III, Table III.2.

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

[13] The adjustment factors for the other two years (2000 and 2001) for all eligible people were, respectively, 0.9675, and 0.9717. The direct estimates of the national totals for all eligibles for those years were 29,968,272 and 31,782,975. The adjustment factors for the three years (2000, 2001, and 2002) for working poor eligibles were, respectively, 0.9620, 0.9667, and 0.9699. The direct estimates of the national totals for working poor eligibles for those years were 14,163,330, 14,598,639, and 16,342,659.

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

and

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

where r is the ratio used to adjust preliminary estimates of state eligibles counts to the direct estimate of the national total (. 0.9776 for all eligible people for 2002), and $U(6i\text{-}1,6i\text{-}1)$ is the (6*i*-1,6*i*-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.22 and A.23 present final shrinkage estimates of participation rates for all eligible people (values of $\theta_{F,1,i}$) and for the working poor (values of $\theta_{F,2,i}$), respectively. Tables A.24 and A.25 present standard errors for the rates. Tables A.26 and A.27 display final shrinkage estimates of the numbers of all eligible people (values of $\psi_{F,1,i}$) and eligible working poor (values of $\psi_{F,2,i}$), respectively, and Tables A.28 and A.29 present the standard errors for those estimated

[14] The square root of $U(6i\text{-}1,6i\text{-}1)$ is the standard error of the preliminary shrinkage estimate of the 2002 participation rate for all eligible people for state i. When deriving estimates for 2000 and 2001, we would use the (6*i*-5,6*i*-5) and (6*i*-3,6*i*-3) diagonal elements of U, respectively. When deriving estimates for the working poor for 2000, 2001, and 2002, we would use the (6*i*-4,6*i*-4), (6*i*-2,6*i*-2), and (6*i*,6*i*) diagonal elements of U, respectively.

counts.[15] Finally, Tables A.30 and A.31 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 $P_i(\varepsilon_{2,i}/100)$).

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

TABLE A.1

DIRECT SAMPLE ESTIMATES OF PARTICIPATION RATES,
ALL ELIGIBLE PEOPLE

	2000	2001	2002
Alabama	56.697	49.895	54.243
Alaska	54.457	50.168	59.517
Arizona	40.812	46.126	60.325
Arkansas	53.147	51.360	53.597
California	53.346	47.944	47.095
Colorado	45.075	43.465	44.260
Connecticut	57.425	62.585	56.881
Delaware	47.420	56.091	53.276
District of Columbia	82.229	69.328	68.547
Florida	50.506	43.052	43.707
Georgia	52.427	49.901	65.367
Hawaii	120.871	81.370	84.298
Idaho	38.947	37.430	45.789
Illinois	61.829	62.825	56.626
Indiana	62.354	65.582	67.394
Iowa	59.582	60.252	50.645
Kansas	58.758	45.712	47.869
Kentucky	78.872	72.564	68.256
Louisiana	57.094	62.810	60.933
Maine	71.378	70.135	60.119
Maryland	53.200	58.034	54.207
Massachusetts	36.042	35.355	36.346
Michigan	70.147	65.573	62.898
Minnesota	80.761	63.945	67.076
Mississippi	55.404	47.860	55.259
Missouri	87.340	80.468	76.379
Montana	49.632	51.663	49.808
Nebraska	61.898	59.804	51.093
Nevada	34.829	41.029	37.824
New Hampshire	49.311	41.677	45.155
New Jersey	49.962	43.394	43.439
New Mexico	53.817	54.526	51.820
New York	55.633	51.339	49.343
North Carolina	45.311	46.225	43.126
North Dakota	50.293	50.398	51.600
Ohio	52.412	52.557	57.782
Oklahoma	53.739	50.612	58.287
Oregon	74.336	76.659	89.647
Pennsylvania	64.422	55.286	52.090
Rhode Island	59.796	65.448	58.960
South Carolina	59.095	53.620	57.461
South Dakota	60.483	69.697	58.226
Tennessee	60.501	58.590	66.546
Texas	44.205	44.020	45.905
Utah	42.577	39.006	38.161
Vermont	68.859	60.608	61.993
Virginia	53.425	55.410	52.324
Washington	55.932	50.910	54.214
West Virginia	80.962	71.642	65.402
Wisconsin	51.618	52.081	53.836
Wyoming	46.266	52.140	48.870

TABLE A.2

DIRECT SAMPLE ESTIMATES OF PARTICIPATION RATES, WORKING POOR

	2000	2001	2002
Alabama	49.621	44.101	47.765
Alaska	47.126	43.987	53.776
Arizona	28.895	35.538	55.342
Arkansas	46.833	41.610	43.261
California	30.678	28.337	30.305
Colorado	43.834	42.968	38.443
Connecticut	45.996	48.985	38.779
Delaware	43.815	45.050	49.070
District of Columbia	39.831	29.232	38.720
Florida	45.708	37.798	40.764
Georgia	53.546	44.803	52.992
Hawaii	99.742	77.128	60.865
Idaho	37.342	36.532	42.657
Illinois	54.789	58.603	53.123
Indiana	56.497	69.902	66.271
Iowa	41.237	46.038	41.589
Kansas	57.088	37.461	40.723
Kentucky	73.555	67.233	60.517
Louisiana	60.711	64.278	68.621
Maine	65.123	75.532	56.364
Maryland	40.978	40.414	43.302
Massachusetts	25.563	23.190	22.345
Michigan	74.865	69.093	73.571
Minnesota	58.359	45.479	37.830
Mississippi	44.789	42.289	52.676
Missouri	93.084	102.019	68.029
Montana	44.236	41.792	51.559
Nebraska	46.162	46.961	38.089
Nevada	22.620	21.326	20.592
New Hampshire	31.869	31.632	34.281
New Jersey	26.928	37.336	24.021
New Mexico	35.967	49.220	46.736
New York	41.820	34.886	40.501
North Carolina	36.606	44.219	38.985
North Dakota	60.177	55.199	65.201
Ohio	44.918	56.245	48.077
Oklahoma	49.369	46.672	55.868
Oregon	67.304	73.388	106.855
Pennsylvania	68.360	54.080	50.833
Rhode Island	55.160	53.322	37.512
South Carolina	50.896	57.944	53.289
South Dakota	58.156	69.538	60.093
Tennessee	46.185	59.350	63.343
Texas	39.916	40.090	38.289
Utah	40.062	35.060	30.465
Vermont	50.177	47.122	52.981
Virginia	45.416	56.491	51.732
Washington	46.281	39.505	36.271
West Virginia	82.080	76.144	69.156
Wisconsin	53.581	56.000	57.275
Wyoming	46.566	59.011	43.459

TABLE A.3

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

	2000	2001	2002
Alabama	4.498	2.419	3.912
Alaska	5.440	4.060	5.788
Arizona	3.349	3.847	4.658
Arkansas	4.815	2.571	3.630
California	1.391	2.461	1.825
Colorado	5.862	4.710	2.930
Connecticut	4.695	5.540	4.905
Delaware	4.472	8.053	4.102
District of Columbia	5.404	8.098	6.011
Florida	4.333	1.621	1.538
Georgia	2.511	3.292	5.493
Hawaii	20.041	6.298	11.036
Idaho	3.362	2.633	2.450
Illinois	2.917	4.698	3.358
Indiana	5.991	5.657	5.180
Iowa	5.823	6.596	4.629
Kansas	6.706	2.322	4.241
Kentucky	8.368	9.092	6.589
Louisiana	4.076	3.334	7.632
Maine	4.888	7.010	4.128
Maryland	4.289	10.380	13.838
Massachusetts	3.893	3.679	2.583
Michigan	4.295	2.755	3.397
Minnesota	8.807	10.176	8.930
Mississippi	4.249	4.287	3.402
Missouri	11.152	12.319	7.120
Montana	4.834	4.489	4.034
Nebraska	7.665	9.799	7.150
Nevada	4.276	2.811	2.863
New Hampshire	4.239	5.126	4.718
New Jersey	3.592	1.556	1.718
New Mexico	3.236	3.394	4.351
New York	2.607	2.485	1.182
North Carolina	1.951	1.332	2.410
North Dakota	7.141	4.543	3.484
Ohio	2.598	2.046	2.387
Oklahoma	3.304	4.628	3.128
Oregon	7.079	7.396	4.762
Pennsylvania	5.040	3.930	5.967
Rhode Island	5.572	5.884	8.140
South Carolina	4.271	5.880	3.253
South Dakota	8.518	5.711	3.615
Tennessee	3.494	4.795	5.379
Texas	1.297	2.083	0.871
Utah	7.118	5.362	3.601
Vermont	5.818	3.493	3.790
Virginia	6.766	4.738	5.545
Washington	3.646	3.187	4.118
West Virginia	4.506	4.391	3.192
Wisconsin	4.850	3.807	5.107
Wyoming	4.171	3.759	5.051

TABLE A.4

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

	2000	2001	2002
Alabama	6.770	4.255	6.038
Alaska	6.710	6.374	5.984
Arizona	2.670	3.993	6.201
Arkansas	5.504	3.935	4.772
California	2.120	1.974	2.246
Colorado	4.479	6.458	3.593
Connecticut	7.459	10.893	5.185
Delaware	10.786	12.808	6.591
District of Columbia	6.727	6.164	8.488
Florida	6.504	3.130	3.121
Georgia	5.989	4.773	4.738
Hawaii	24.144	8.063	10.914
Idaho	4.960	4.724	4.017
Illinois	6.043	6.135	8.669
Indiana	8.918	10.736	6.460
Iowa	3.704	6.378	5.896
Kansas	8.489	3.669	4.761
Kentucky	7.747	13.292	5.992
Louisiana	6.648	6.628	13.509
Maine	9.456	13.543	4.356
Maryland	5.300	7.680	13.441
Massachusetts	5.058	4.203	3.855
Michigan	10.039	5.589	9.323
Minnesota	6.383	8.603	6.790
Mississippi	6.973	5.395	6.496
Missouri	17.999	20.872	6.271
Montana	6.623	4.651	7.989
Nebraska	7.298	10.531	7.292
Nevada	3.258	2.778	2.523
New Hampshire	5.960	4.738	6.106
New Jersey	3.354	3.500	2.853
New Mexico	3.539	5.499	6.849
New York	4.425	2.947	3.519
North Carolina	4.048	3.131	3.154
North Dakota	9.147	8.518	7.552
Ohio	3.341	4.085	2.704
Oklahoma	4.663	6.630	5.489
Oregon	8.767	5.815	8.730
Pennsylvania	8.572	8.098	7.809
Rhode Island	9.518	11.222	5.316
South Carolina	5.042	6.820	5.785
South Dakota	9.155	8.716	8.423
Tennessee	4.977	7.723	6.078
Texas	2.508	1.715	2.032
Utah	6.504	5.076	3.354
Vermont	8.332	8.615	8.044
Virginia	4.907	8.785	8.537
Washington	4.423	3.603	5.588
West Virginia	9.844	10.014	6.364
Wisconsin	6.468	6.366	6.978
Wyoming	4.684	7.612	6.812

TABLE A.5

NUMBER OF PEOPLE RECEIVING FOOD STAMPS, MONTHLY AVERAGE

	2000	2001	2002
Alabama	396,057	411,292	443,547
Alaska	37,524	37,897	46,165
Arizona	259,006	291,372	378,721
Arkansas	246,572	256,441	283,909
California	1,831,697	1,668,351	1,709,147
Colorado	155,948	153,952	178,490
Connecticut	165,059	157,031	168,591
Delaware	32,218	31,886	39,628
District of Columbia	80,803	73,494	74,271
Florida	882,341	887,256	989,685
Georgia	559,468	573,505	645,633
Hawaii	118,041	108,313	106,370
Idaho	58,191	59,667	69,998
Illinois	779,420	825,295	886,344
Indiana	300,314	346,551	410,884
Iowa	123,322	126,494	140,729
Kansas	116,596	124,285	140,403
Kentucky	403,479	412,680	450,102
Louisiana	499,851	518,384	588,458
Maine	101,665	104,383	111,147
Maryland	219,180	208,426	228,398
Massachusetts	231,829	219,223	242,542
Michigan	610,974	641,269	750,037
Minnesota	196,048	197,727	216,960
Mississippi	275,856	297,805	324,852
Missouri	419,959	454,427	515,006
Montana	59,466	61,957	63,347
Nebraska	82,414	80,652	88,459
Nevada	60,905	69,396	97,035
New Hampshire	36,266	35,554	41,053
New Jersey	344,677	317,579	319,799
New Mexico	169,354	163,265	170,457
New York	1,438,568	1,353,542	1,347,620
North Carolina	479,636	493,672	574,369
North Dakota	31,895	37,755	36,781
Ohio	609,717	640,503	734,679
Oklahoma	253,287	260,021	312,844
Oregon	234,387	281,450	359,138
Pennsylvania	777,112	748,074	766,615
Rhode Island	74,256	71,272	71,933
South Carolina	295,335	315,718	379,310
South Dakota	42,962	44,594	47,663
Tennessee	496,031	521,510	598,012
Texas	1,332,785	1,366,210	1,554,428
Utah	81,945	79,716	90,448
Vermont	40,861	38,874	39,914
Virginia	336,080	331,226	353,978
Washington	295,061	308,589	350,373
West Virginia	226,897	219,663	233,998
Wisconsin	193,021	215,786	262,310
Wyoming	22,459	22,539	23,530

TABLE A.6

POPULATION ON JULY 1

	2000	2001	2002
Alabama	4,451,975	4,468,912	4,478,896
Alaska	627,697	633,630	641,482
Arizona	5,167,142	5,306,966	5,441,125
Arkansas	2,678,668	2,694,698	2,706,268
California	34,010,375	34,600,463	35,001,986
Colorado	4,326,758	4,430,989	4,501,051
Connecticut	3,411,956	3,434,602	3,458,587
Delaware	786,512	796,599	805,945
District of Columbia	571,641	573,822	569,157
Florida	16,051,395	16,373,330	16,691,701
Georgia	8,234,373	8,405,677	8,544,005
Hawaii	1,212,670	1,227,024	1,240,663
Idaho	1,299,721	1,320,585	1,343,124
Illinois	12,440,846	12,520,227	12,586,447
Indiana	6,091,950	6,126,743	6,156,913
Iowa	2,928,742	2,931,967	2,935,840
Kansas	2,692,557	2,702,125	2,711,769
Kentucky	4,048,832	4,068,816	4,089,822
louisiana	4,469,768	4,470,368	4,476,192
Maine	1,277,284	1,284,470	1,294,894
Maryland	5,312,461	5,386,079	5,450,525
Massachusetts	6,361,720	6,401,164	6,421,800
Michigan	9,956,115	10,006,266	10,043,221
Minnesota	4,934,248	4,984,535	5,024,791
Mississippi	2,848,829	2,859,733	2,866,733
Missouri	5,605,067	5,637,309	5,669,544
Montana	903,416	905,382	910,372
Nebraska	1,713,375	1,720,039	1,727,564
Nevada	2,018,828	2,097,722	2,167,455
New Hampshire	1,240,472	1,259,359	1,274,405
New Jersey	8,433,276	8,511,116	8,575,252
New Mexico	1,821,767	1,830,935	1,852,044
New York	18,999,760	19,084,350	19,134,293
North Carolina	8,082,261	8,206,105	8,305,820
North Dakota	641,131	636,550	633,911
Ohio	11,363,568	11,389,785	11,408,699
Oklahoma	3,454,408	3,469,577	3,489,700
Oregon	3,431,137	3,473,441	3,520,355
Pennsylvania	12,286,107	12,303,104	12,328,827
Rhode Island	1,050,698	1,059,659	1,068,326
South Carolina	4,023,725	4,062,125	4,103,770
South Dakota	755,783	758,324	760,437
Tennessee	5,703,246	5,749,398	5,789,796
Texas	20,955,248	21,370,983	21,736,925
Utah	2,243,406	2,278,712	2,318,789
Vermont	609,952	612,978	616,408
Virginia	7,105,900	7,196,750	7,287,829
Washington	5,911,803	5,993,390	6,067,060
West Virginia	1,807,326	1,800,975	1,804,884
Wisconsin	5,374,367	5,405,947	5,439,692
Wyoming	494,086	493,754	498,830

TABLE A.7

PERCENTAGES OF PARTICIPANTS WHO ARE CORRECTLY ELIGIBLE

	2000	2001	2002
Alabama	95.68	95.91	96.26
Alaska	97.69	97.72	96.33
Arizona	98.42	98.74	98.57
Arkansas	98.84	99.11	98.71
California	98.06	98.25	98.00
Colorado	98.11	97.14	98.23
Connecticut	97.67	96.97	97.47
Delaware	95.69	98.68	96.79
District of Columbia	97.48	97.59	97.08
Florida	97.07	96.29	94.20
Georgia	96.30	96.90	97.87
Hawaii	97.80	97.49	98.43
Idaho	95.54	97.97	95.68
Illinois	97.08	97.12	97.49
Indiana	97.47	96.94	97.25
Iowa	97.62	98.36	98.49
Kansas	95.96	96.68	96.68
Kentucky	97.77	97.73	97.54
Louisiana	98.74	98.45	98.46
Maine	96.86	98.49	99.17
Maryland	96.80	98.62	98.56
Massachusetts	99.20	98.92	99.67
Michigan	97.15	99.30	98.54
Minnesota	99.03	98.38	99.22
Mississippi	98.35	98.87	98.48
Missouri	98.21	96.14	95.35
Montana	96.13	96.62	97.17
Nebraska	95.96	95.67	96.34
Nevada	97.53	97.78	98.52
New Hampshire	97.22	96.00	94.31
New Jersey	96.12	98.27	99.66
New Mexico	97.09	98.02	97.85
New York	96.99	97.67	98.56
North Carolina	97.74	97.70	98.87
North Dakota	96.91	99.34	98.99
Ohio	98.63	97.89	98.36
Oklahoma	97.74	97.91	98.08
Oregon	96.37	97.53	97.61
Pennsylvania	97.42	98.20	98.03
Rhode Island	96.81	98.27	97.74
South Carolina	98.58	99.51	99.07
South Dakota	99.89	99.45	99.39
Tennessee	97.77	98.22	96.81
Texas	99.16	98.35	99.30
Utah	92.89	96.48	98.34
Vermont	95.07	95.34	97.27
Virginia	96.50	98.36	97.87
Washington	98.28	98.53	97.83
West Virginia	98.74	98.11	97.81
Wisconsin	97.66	98.13	97.13
Wyoming	98.25	99.51	98.06

TABLE A.8

PERCENTAGES OF PARTICIPANTS WHO ARE CORRECTLY ELIGIBLE AND WORKING POOR

	2000	2001	2002
Alabama	36.557	37.113	37.467
Alaska	43.689	42.369	45.305
Arizona	40.726	41.219	47.269
Arkansas	39.384	39.107	37.798
California	33.710	35.496	35.835
Colorado	45.789	46.846	41.482
Connecticut	31.804	28.135	28.536
Delaware	36.945	35.475	42.953
District of Columbia	16.180	13.468	15.845
Florida	38.973	37.575	38.425
Georgia	40.800	39.308	38.177
Hawaii	41.028	40.201	39.208
Idaho	53.412	56.057	52.941
Illinois	40.639	40.798	42.524
Indiana	38.863	42.833	40.774
Iowa	41.435	41.158	39.971
Kansas	40.499	41.097	41.128
Kentucky	38.116	38.500	37.810
Louisiana	44.745	46.551	48.742
Maine	31.909	35.096	32.721
Maryland	27.572	27.843	28.624
Massachusetts	25.176	23.564	20.760
Michigan	41.137	43.351	45.257
Minnesota	35.707	35.633	28.913
Mississippi	38.299	40.540	33.818
Missouri	43.172	42.359	44.313
Montana	44.912	41.644	44.554
Nebraska	39.405	41.693	41.864
Nevada	31.799	27.237	31.663
New Hampshire	21.780	29.333	26.296
New Jersey	23.185	26.316	23.291
New Mexico	42.033	40.957	45.214
New York	26.667	25.863	32.341
North Carolina	41.600	40.184	40.692
North Dakota	53.224	52.545	55.838
Ohio	36.877	39.427	38.217
Oklahoma	47.744	44.216	46.447
Oregon	44.878	50.112	50.140
Pennsylvania	40.021	36.902	36.608
Rhode Island	27.247	21.635	21.382
South Carolina	33.915	36.449	34.823
South Dakota	50.939	42.227	49.539
Tennessee	34.474	38.329	38.820
Texas	51.017	51.166	52.177
Utah	46.470	49.729	48.010
Vermont	28.695	27.448	36.623
Virginia	38.266	41.278	40.622
Washington	35.088	32.118	30.807
West Virginia	36.155	35.497	33.360
Wisconsin	49.739	47.658	48.983
Wyoming	57.593	55.432	49.576

TABLE A.9

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

	2000	2001	2002
Alabama	15.013	17.691	17.574
Alaska	10.724	11.650	11.648
Arizona	12.088	11.753	11.373
Arkansas	17.119	18.364	19.321
California	9.900	9.881	10.161
Colorado	7.845	7.765	8.801
Connecticut	8.228	7.084	8.353
Delaware	8.266	7.042	8.933
District of Columbia	16.757	18.029	18.481
Florida	10.565	12.120	12.779
Georgia	12.480	13.249	11.314
Hawaii	7.876	10.576	10.011
Idaho	10.983	11.826	10.890
Illinois	9.837	10.190	12.124
Indiana	7.706	8.361	9.630
Iowa	6.899	7.043	9.322
Kansas	7.072	9.728	10.457
Kentucky	12.353	13.660	15.727
Louisiana	19.340	18.176	21.243
Maine	10.801	11.412	14.159
Maryland	7.507	6.576	7.619
Massachusetts	10.030	9.582	10.357
Michigan	8.499	9.705	11.700
Minnesota	4.872	6.103	6.387
Mississippi	17.189	21.513	20.195
Missouri	8.425	9.631	11.340
Montana	12.749	12.798	13.575
Nebraska	7.457	7.501	9.655
Nevada	8.448	7.884	11.661
New Hampshire	5.764	6.503	6.728
New Jersey	7.863	8.450	8.556
New Mexico	16.771	16.030	17.379
New York	13.200	13.493	14.068
North Carolina	12.801	12.715	15.854
North Dakota	9.586	11.691	11.131
Ohio	10.097	10.474	10.962
Oklahoma	13.336	14.498	15.085
Oregon	8.856	10.309	11.108
Pennsylvania	9.565	10.800	11.702
Rhode Island	11.442	10.099	11.162
South Carolina	12.244	14.424	15.936
South Dakota	9.388	8.391	10.699
Tennessee	14.055	15.206	15.026
Texas	14.267	14.283	15.469
Utah	7.969	8.653	10.052
Vermont	9.249	9.976	10.160
Virginia	8.543	8.170	9.085
Washington	8.770	9.965	10.421
West Virginia	15.311	16.703	19.389
Wisconsin	6.795	7.521	8.700
Wyoming	9.653	8.712	9.465

TABLE A.10

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

	2000	2001	2002
Alabama	6.554	7.745	7.768
Alaska	5.542	5.761	6.063
Arizona	7.065	6.368	5.945
Arkansas	7.741	8.944	9.166
California	5.918	6.040	5.774
Colorado	3.765	3.788	4.279
Connecticut	3.345	2.626	3.587
Delaware	3.454	3.152	4.304
District of Columbia	5.742	5.901	5.340
Florida	4.687	5.387	5.589
Georgia	5.177	5.986	5.444
Hawaii	4.004	4.601	5.523
Idaho	6.404	6.933	6.468
Illinois	4.647	4.589	5.637
Indiana	3.391	3.466	4.106
Iowa	4.231	3.857	4.607
Kansas	3.072	5.046	5.229
Kentucky	5.164	5.808	6.876
Louisiana	8.242	8.398	9.338
Maine	3.900	3.776	4.983
Maryland	2.776	2.666	2.770
Massachusetts	3.589	3.480	3.509
Michigan	3.372	4.021	4.594
Minnesota	2.431	3.108	3.300
Mississippi	8.280	9.983	7.275
Missouri	3.475	3.347	5.917
Montana	6.683	6.819	6.013
Nebraska	4.106	4.163	5.628
Nevada	4.241	4.225	6.884
New Hampshire	1.998	2.618	2.471
New Jersey	3.519	2.630	3.616
New Mexico	10.864	7.420	8.904
New York	4.828	5.258	5.624
North Carolina	6.744	5.467	7.218
North Dakota	4.400	5.646	4.969
Ohio	4.405	3.942	5.119
Oklahoma	7.091	7.100	7.453
Oregon	4.555	5.533	4.787
Pennsylvania	3.703	4.149	4.478
Rhode Island	3.491	2.729	3.838
South Carolina	4.891	4.889	6.040
South Dakota	4.979	3.571	5.167
Tennessee	6.492	5.858	6.330
Texas	8.129	8.159	9.745
Utah	4.237	4.962	6.147
Vermont	3.831	3.694	4.476
Virginia	3.985	3.363	3.814
Washington	3.784	4.186	4.905
West Virginia	5.530	5.686	6.254
Wisconsin	3.334	3.397	4.124
Wyoming	5.622	4.288	5.381

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.
Tax nonfiler rate	$100 - \left(100 \times \frac{\text{Number of exemptions on tax returns}}{\text{Resident Population}} \right)$	All data for constructing this predictor were obtained from the U.S. Census Bureau.
Tax poverty rate	$100 \times \frac{\text{Number of exemptions on tax returns with adjusted gross income below the poverty level}}{\text{Total number of exemptions on tax returns}}$	All data for constructing this predictor were obtained from the U.S. Census Bureau.
Rental rate	$100 \times \frac{\text{Number of renter-occupied units}}{\text{Number of occupied housing units}}$	The data for constructing this predictor were obtained from the Census 2000 Demographic Profiles released between May 7, 2002 and June 4, 2002 at http://www2.census.gov/census_2000/datasets/100_and_sample_profile.
Elderly poverty rate	$100 \times \frac{\text{Number of people ages 65 and over below the poverty level}}{\text{Total number of people ages 65 and over}}$	The data for constructing this predictor were obtained from the Census 2000 Demographic Profiles released between May 7, 2002 and June 4, 2002 at http://www2.census.gov/census_2000/datasets/100_and_sample_profile.
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 vary across the year-specific equations of our regression model, while values for the last two predictors do not vary. The sixth predictor was included only in the regression equations predicting 2002 participation rates.

[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 2000 and 2001 population estimates that we used were released on 6/23/03, and the 2002 population estimates were released on 3/10/04 at http://eire.census.gov/popest/nat_st_dataset.csv.

TABLE A.12

VALUES FOR TEMPORALLY CONSTANT PREDICTORS

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

TABLE A.13

2000 VALUES FOR TEMPORALLY VARIABLE PREDICTORS

	Food Stamp Prevalence Rate	Tax Nonfiler Rate	Tax Poverty Rate
Alabama	8.896	17.787	18.272
Alaska	5.978	12.758	10.768
Arizona	5.013	21.782	14.739
Arkansas	9.205	18.984	19.616
California	5.386	18.950	15.465
Colorado	3.604	14.236	11.141
Connecticut	4.838	13.167	8.734
Delaware	4.096	14.074	11.102
District of Columbia	14.135	25.899	16.816
Florida	5.497	18.105	16.347
Georgia	6.794	18.040	15.952
Hawaii	9.734	15.500	13.962
Idaho	4.477	13.524	14.827
Illinois	6.265	14.816	12.286
Indiana	4.930	12.335	12.324
Iowa	4.211	12.741	10.681
Kansas	4.330	13.343	11.858
Kentucky	9.965	17.383	17.073
Louisiana	11.183	19.405	20.509
Maine	7.959	13.494	12.527
Maryland	4.126	14.083	10.076
Massachusetts	3.644	14.910	8.879
Michigan	6.137	14.188	12.212
Minnesota	3.973	11.421	8.959
Mississippi	9.683	20.269	21.499
Missouri	7.492	14.450	14.144
Montana	6.582	13.078	18.135
Nebraska	4.810	11.432	11.971
Nevada	3.017	17.312	11.806
New Hampshire	2.924	9.104	7.907
New Jersey	4.087	13.785	10.112
New Mexico	9.296	23.309	23.075
New York	7.572	20.064	15.187
North Carolina	5.934	17.122	14.186
North Dakota	4.975	11.439	12.931
Ohio	5.366	12.454	12.271
Oklahoma	7.332	18.126	18.245
Oregon	6.831	16.720	13.389
Pennsylvania	6.325	13.890	12.329
Rhode Island	7.067	17.981	11.543
South Carolina	7.340	17.483	16.110
South Dakota	5.684	12.019	14.016
Tennessee	8.697	15.914	16.059
Texas	6.360	17.185	18.247
Utah	3.653	12.600	11.889
Vermont	6.699	11.647	11.899
Virginia	4.730	14.607	11.252
Washington	4.991	13.784	10.995
West Virginia	12.554	19.306	18.721
Wisconsin	3.592	11.168	10.045
Wyoming	4.546	10.215	13.878

TABLE A.14

2001 VALUES FOR TEMPORALLY VARIABLE PREDICTORS

	Food Stamp Prevalence Rate	Tax Nonfiler Rate	Tax Poverty Rate
Alabama	9.203	18.314	18.692
Alaska	5.981	12.936	11.157
Arizona	5.490	22.074	15.281
Arkansas	9.517	19.190	19.993
California	4.822	18.621	15.593
Colorado	3.474	14.221	11.614
Connecticut	4.572	12.731	8.977
Delaware	4.003	14.378	11.374
District of Columbia	12.808	25.801	16.627
Florida	5.419	18.276	17.017
Georgia	6.823	18.561	16.483
Hawaii	8.827	15.626	14.208
Idaho	4.518	13.880	15.403
Illinois	6.592	14.818	12.737
Indiana	5.656	12.506	13.037
Iowa	4.314	12.998	11.334
Kansas	4.600	13.184	12.531
Kentucky	10.143	17.375	17.201
Louisiana	11.596	19.558	20.525
Maine	8.127	13.755	12.860
Maryland	3.870	14.157	10.142
Massachusetts	3.425	14.679	9.070
Michigan	6.409	14.463	12.969
Minnesota	3.967	11.502	9.437
Mississippi	10.414	20.883	21.928
Missouri	8.061	14.670	14.651
Montana	6.843	13.096	18.580
Nebraska	4.689	11.490	12.616
Nevada	3.308	17.659	12.346
New Hampshire	2.823	9.259	8.303
New Jersey	3.731	13.421	10.453
New Mexico	8.917	17.665	21.700
New York	7.092	19.275	15.804
North Carolina	6.016	17.364	14.827
North Dakota	5.931	11.164	13.080
Ohio	5.623	12.644	12.855
Oklahoma	7.494	18.182	18.273
Oregon	8.103	17.232	14.208
Pennsylvania	6.080	13.990	12.660
Rhode Island	6.726	18.131	11.553
South Carolina	7.772	18.114	16.717
South Dakota	5.881	11.932	14.623
Tennessee	9.071	16.199	16.667
Texas	6.393	17.171	18.532
Utah	3.498	11.979	12.566
Vermont	6.342	11.669	12.145
Virginia	4.602	14.515	11.481
Washington	5.149	14.004	11.638
West Virginia	12.197	19.331	18.714
Wisconsin	3.992	11.273	10.611
Wyoming	4.565	10.218	13.895

TABLE A.15

2002 VALUES FOR TEMPORALLY VARIABLE PREDICTORS

	Food Stamp Prevalence Rate	Tax Nonfiler Rate	Tax Poverty Rate	Expanded Vehicle Rules in Previous Year
Alabama	9.903	18.742	19.036	1
Alaska	7.197	12.380	11.600	1
Arizona	6.960	22.420	16.038	0
Arkansas	10.491	19.505	20.567	1
California	4.883	18.759	15.653	0
Colorado	3.966	14.935	12.507	1
Connecticut	4.875	13.136	9.502	0
Delaware	4.917	14.429	11.769	1
District of Columbia	13.049	26.022	16.413	1
Florida	5.929	18.274	17.661	1
Georgia	7.557	18.778	17.341	0
Hawaii	8.574	15.444	14.548	0
Idaho	5.212	14.173	16.235	0
Illinois	7.042	15.120	13.356	1
Indiana	6.674	12.797	13.835	0
Iowa	4.793	13.411	12.106	0
Kansas	5.178	13.205	13.531	1
Kentucky	11.005	18.051	17.916	1
Louisiana	13.146	19.788	20.905	1
Maine	8.583	14.169	13.321	1
Maryland	4.190	14.265	10.318	1
Massachusetts	3.777	14.904	9.557	1
Michigan	7.468	14.753	13.757	1
Minnesota	4.318	11.864	10.126	0
Mississippi	11.332	21.144	22.237	0
Missouri	9.084	15.027	15.305	1
Montana	6.958	13.462	19.209	1
Nebraska	5.120	11.781	13.562	0
Nevada	4.477	17.743	13.007	1
New Hampshire	3.221	9.586	8.964	1
New Jersey	3.729	13.303	10.774	1
New Mexico	9.204	17.786	21.867	0
New York	7.043	19.219	16.332	0
North Carolina	6.915	17.630	15.660	1
North Dakota	5.802	11.461	13.716	1
Ohio	6.440	13.112	13.555	1
Oklahoma	8.965	18.389	19.318	1
Oregon	10.202	17.776	14.844	1
Pennsylvania	6.218	14.116	13.139	1
Rhode Island	6.733	17.877	11.927	0
South Carolina	9.243	18.614	17.285	1
South Dakota	6.268	12.038	15.545	1
Tennessee	10.329	16.513	17.198	0
Texas	7.151	17.387	19.224	1
Utah	3.901	11.789	13.729	1
Vermont	6.475	11.822	12.829	1
Virginia	4.857	14.493	11.711	0
Washington	5.775	14.307	12.080	0
West Virginia	12.965	19.830	19.195	1
Wisconsin	4.822	11.479	11.418	1
Wyoming	4.717	10.547	14.418	1

TABLE A.16

REGRESSION ESTIMATES OF PARTICIPATION RATES,
ALL ELIGIBLE PEOPLE

	2000	2001	2002
Alabama	56.326	54.311	53.971
Alaska	64.905	61.582	65.319
Arizona	44.331	45.410	50.951
Arkansas	58.429	56.285	57.412
California	46.663	42.796	43.563
Colorado	46.092	44.028	42.897
Connecticut	59.859	56.122	56.686
Delaware	49.621	47.032	48.824
District of Columbia	84.823	73.529	66.976
Florida	46.577	43.343	42.961
Georgia	47.817	45.788	48.708
Hawaii	83.030	71.979	69.478
Idaho	46.257	43.784	48.497
Illinois	61.182	59.787	57.805
Indiana	54.962	55.895	61.413
Iowa	52.178	49.950	52.102
Kansas	49.703	49.109	49.167
Kentucky	68.253	64.811	64.001
Louisiana	65.388	63.716	67.599
Maine	70.714	66.815	64.572
Maryland	49.552	47.068	45.544
Massachusetts	46.051	45.039	43.054
Michigan	61.860	58.845	60.200
Minnesota	53.325	50.769	52.236
Mississippi	49.457	50.620	54.831
Missouri	64.766	63.686	64.933
Montana	54.499	52.381	51.448
Nebraska	54.039	50.509	53.450
Nevada	38.728	40.417	43.187
New Hampshire	50.130	48.029	47.727
New Jersey	50.402	47.127	44.365
New Mexico	53.139	52.413	55.023
New York	55.371	51.060	49.881
North Carolina	45.813	44.479	45.212
North Dakota	47.912	52.882	49.715
Ohio	56.886	55.137	56.281
Oklahoma	52.680	51.093	55.168
Oregon	63.301	66.620	72.641
Pennsylvania	61.285	56.185	53.202
Rhode Island	60.975	57.130	55.142
South Carolina	51.782	51.089	54.656
South Dakota	51.120	49.883	49.806
Tennessee	62.888	60.679	66.565
Texas	42.716	41.869	43.640
Utah	49.848	46.456	46.376
Vermont	66.954	60.638	57.929
Virginia	49.991	47.917	49.367
Washington	55.928	54.200	57.214
West Virginia	87.670	77.657	75.276
Wisconsin	49.720	50.274	52.014
Wyoming	48.777	47.255	46.920

TABLE A.17

REGRESSION ESTIMATES OF PARTICIPATION RATES,
WORKING POOR

	2000	2001	2002
Alabama	51.948	52.949	51.198
Alaska	54.049	53.280	57.032
Arizona	28.889	31.524	40.438
Arkansas	51.654	52.494	55.264
California	29.909	25.745	27.775
Colorado	36.861	36.403	32.244
Connecticut	49.203	48.970	45.169
Delaware	42.923	42.710	41.217
District of Columbia	52.640	42.052	43.629
Florida	38.157	36.793	37.000
Georgia	38.820	38.050	39.926
Hawaii	67.679	59.556	59.152
Idaho	43.462	42.891	44.579
Illinois	51.660	53.691	50.541
Indiana	50.777	55.190	57.771
Iowa	46.730	47.525	44.986
Kansas	43.110	45.296	42.588
Kentucky	61.840	62.908	61.706
Louisiana	58.396	60.172	66.268
Maine	65.158	66.009	60.867
Maryland	39.970	39.242	33.439
Massachusetts	31.779	31.699	26.222
Michigan	56.167	57.583	57.317
Minnesota	49.330	50.474	44.928
Mississippi	45.359	48.829	52.478
Missouri	58.811	61.852	62.325
Montana	53.118	53.444	50.909
Nebraska	48.919	47.751	46.523
Nevada	23.220	24.417	28.361
New Hampshire	45.845	45.990	38.460
New Jersey	40.037	38.881	32.143
New Mexico	43.833	51.585	54.180
New York	35.410	32.188	33.127
North Carolina	37.512	38.081	36.731
North Dakota	44.052	51.253	42.501
Ohio	51.403	52.629	51.035
Oklahoma	45.108	45.575	51.940
Oregon	50.512	56.963	66.861
Pennsylvania	55.080	53.633	47.300
Rhode Island	43.803	41.570	39.138
South Carolina	45.804	47.719	50.418
South Dakota	48.006	49.236	45.024
Tennessee	57.234	58.799	63.476
Texas	34.894	34.388	36.079
Utah	44.833	44.907	41.875
Vermont	62.565	60.308	53.607
Virginia	41.025	41.158	38.225
Washington	45.459	45.884	46.658
West Virginia	80.944	77.855	78.122
Wisconsin	43.943	46.819	44.413
Wyoming	48.348	48.644	42.584

TABLE A.18

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

	2000	2001	2002
Alabama	4.131	4.097	4.141
Alaska	4.145	4.105	4.312
Arizona	4.617	4.628	4.660
Arkansas	4.008	3.999	4.014
California	4.258	4.300	4.245
Colorado	3.932	3.918	3.957
Connecticut	4.058	4.041	4.147
Delaware	4.002	4.019	4.013
District of Columbia	5.905	5.990	5.753
Florida	4.066	4.125	4.153
Georgia	3.993	3.995	4.081
Hawaii	4.968	4.715	4.655
Idaho	4.031	4.035	4.115
Illinois	3.902	3.919	3.893
Indiana	3.939	3.935	4.107
Iowa	3.965	3.947	4.072
Kansas	3.874	3.854	3.864
Kentucky	4.111	4.093	4.068
Louisiana	4.258	4.231	4.314
Maine	4.131	4.120	4.048
Maryland	3.975	4.005	4.067
Massachusetts	4.203	4.196	4.202
Michigan	4.055	4.040	4.007
Minnesota	4.159	4.168	4.313
Mississippi	4.543	4.456	4.607
Missouri	3.948	3.971	3.990
Montana	4.523	4.437	4.377
Nebraska	3.996	3.964	4.087
Nevada	4.213	4.161	4.130
New Hampshire	4.161	4.173	4.151
New Jersey	3.932	3.927	3.970
New Mexico	4.525	4.255	4.260
New York	4.266	4.333	4.261
North Carolina	4.124	4.089	4.093
North Dakota	4.196	4.192	4.170
Ohio	3.916	3.886	3.895
Oklahoma	3.961	3.939	3.985
Oregon	4.036	4.270	4.504
Pennsylvania	3.930	3.894	3.875
Rhode Island	4.138	4.206	4.182
South Carolina	4.055	4.035	4.062
South Dakota	4.090	4.096	4.107
Tennessee	4.002	3.979	4.172
Texas	4.150	4.153	4.100
Utah	4.062	4.057	4.090
Vermont	4.100	4.000	3.966
Virginia	3.923	3.929	4.076
Washington	3.912	3.894	4.002
West Virginia	4.991	4.787	4.529
Wisconsin	3.973	3.943	3.945
Wyoming	4.250	4.175	4.120

TABLE A.19

STANDARD ERRORS OF REGRESSION ESTIMATES OF PARTICIPATION RATES, WORKING POOR

	2000	2001	2002
Alabama	7.507	7.468	7.520
Alaska	7.465	7.410	7.693
Arizona	7.999	8.166	8.318
Arkansas	7.301	7.312	7.341
California	7.677	7.669	7.705
Colorado	7.140	7.156	7.219
Connecticut	7.343	7.336	7.415
Delaware	7.232	7.282	7.307
District of Columbia	9.906	9.545	9.837
Florida	7.325	7.454	7.539
Georgia	7.304	7.288	7.380
Hawaii	8.706	8.182	8.195
Idaho	7.292	7.296	7.419
Illinois	7.139	7.165	7.123
Indiana	7.164	7.193	7.366
Iowa	7.191	7.188	7.310
Kansas	7.066	7.068	7.084
Kentucky	7.463	7.460	7.396
Louisiana	7.656	7.641	7.764
Maine	7.499	7.495	7.351
Maryland	7.203	7.278	7.369
Massachusetts	7.542	7.553	7.580
Michigan	7.381	7.356	7.331
Minnesota	7.469	7.492	7.636
Mississippi	8.172	8.017	8.201
Missouri	7.213	7.271	7.267
Montana	8.009	7.891	7.874
Nebraska	7.224	7.229	7.361
Nevada	7.556	7.497	7.484
New Hampshire	7.427	7.526	7.499
New Jersey	7.145	7.176	7.240
New Mexico	7.987	7.661	7.708
New York	7.662	7.615	7.746
North Carolina	7.486	7.419	7.422
North Dakota	7.536	7.562	7.589
Ohio	7.131	7.124	7.121
Oklahoma	7.222	7.202	7.294
Oregon	7.349	7.641	8.046
Pennsylvania	7.184	7.138	7.100
Rhode Island	7.450	7.477	7.489
South Carolina	7.383	7.357	7.390
South Dakota	7.374	7.417	7.490
Tennessee	7.285	7.280	7.479
Texas	7.578	7.508	7.517
Utah	7.327	7.333	7.414
Vermont	7.410	7.301	7.217
Virginia	7.143	7.173	7.318
Washington	7.128	7.118	7.226
West Virginia	8.936	8.572	8.194
Wisconsin	7.188	7.200	7.192
Wyoming	7.579	7.509	7.485

TABLE A.20

PRELIMINARY SHRINKAGE ESTIMATES OF PARTICIPATION RATES, ALL ELIGIBLE PEOPLE

	2000	2001	2002
Alabama	54.289	51.859	52.022
Alaska	60.354	56.806	60.923
Arizona	44.249	45.598	51.444
Arkansas	55.101	53.039	54.403
California	51.840	47.229	47.670
Colorado	47.263	45.169	44.203
Connecticut	59.321	56.093	56.388
Delaware	50.093	48.017	49.692
District of Columbia	82.726	71.369	64.933
Florida	47.087	43.530	43.357
Georgia	50.946	49.068	52.466
Hawaii	85.632	74.445	72.147
Idaho	42.560	40.072	45.208
Illinois	61.242	59.963	57.640
Indiana	58.190	59.144	64.540
Iowa	51.806	49.624	51.282
Kansas	48.158	47.236	47.489
Kentucky	70.039	66.607	65.827
Louisiana	63.261	62.332	65.855
Maine	69.409	65.484	62.988
Maryland	50.624	48.178	46.542
Massachusetts	40.650	39.754	37.765
Michigan	65.393	62.594	63.244
Minnesota	55.390	52.636	54.268
Mississippi	50.141	50.744	55.055
Missouri	67.346	66.128	67.583
Montana	51.634	49.888	48.615
Nebraska	53.835	50.257	53.049
Nevada	36.808	39.076	41.212
New Hampshire	47.526	45.101	44.864
New Jersey	47.896	43.523	41.936
New Mexico	52.703	51.943	54.158
New York	55.119	50.912	49.287
North Carolina	46.396	45.440	45.418
North Dakota	48.576	53.466	50.190
Ohio	54.736	52.760	54.858
Oklahoma	54.015	52.407	56.801
Oregon	69.388	72.649	78.851
Pennsylvania	61.860	56.705	53.725
Rhode Island	61.220	57.859	55.694
South Carolina	54.663	53.508	57.289
South Dakota	56.306	55.497	55.037
Tennessee	61.450	58.986	64.996
Texas	44.534	43.904	46.009
Utah	45.511	42.157	41.990
Vermont	67.464	61.061	58.569
Virginia	52.032	50.115	51.229
Washington	54.647	52.764	55.997
West Virginia	82.651	72.753	69.982
Wisconsin	51.329	51.900	53.554
Wyoming	49.267	48.132	47.662

TABLE A.21

PRELIMINARY SHRINKAGE ESTIMATES OF PARTICIPATION RATES, WORKING POOR

	2000	2001	2002
Alabama	46.825	47.545	45.989
Alaska	49.960	49.152	53.057
Arizona	31.253	34.135	43.464
Arkansas	44.366	44.580	47.150
California	31.386	27.954	30.052
Colorado	43.044	42.491	38.206
Connecticut	45.900	45.443	41.472
Delaware	45.157	44.668	43.590
District of Columbia	44.477	33.848	35.730
Florida	40.656	38.992	39.523
Georgia	46.259	44.865	46.887
Hawaii	71.748	64.050	62.830
Idaho	40.144	39.491	41.425
Illinois	53.672	55.713	52.606
Indiana	55.451	60.031	62.646
Iowa	40.987	42.080	39.958
Kansas	40.363	41.586	39.550
Kentucky	63.506	64.248	62.742
Louisiana	61.479	62.915	69.139
Maine	62.997	63.994	58.544
Maryland	39.977	39.089	33.603
Massachusetts	27.665	27.253	22.274
Michigan	64.751	65.990	66.082
Minnesota	45.240	45.909	39.941
Mississippi	42.938	46.443	50.433
Missouri	62.120	65.228	65.202
Montana	46.080	45.713	44.213
Nebraska	44.264	43.210	41.846
Nevada	20.349	20.810	24.091
New Hampshire	36.605	36.753	29.954
New Jersey	30.784	31.768	23.593
New Mexico	37.657	46.090	48.612
New York	39.674	35.973	37.677
North Carolina	40.257	41.684	40.028
North Dakota	53.136	59.962	52.052
Ohio	48.421	50.847	48.168
Oklahoma	48.228	48.480	54.799
Oregon	64.272	70.664	81.225
Pennsylvania	59.014	57.198	51.022
Rhode Island	45.457	42.912	40.078
South Carolina	49.611	52.162	54.230
South Dakota	56.285	57.557	53.376
Tennessee	52.487	54.941	59.583
Texas	39.464	39.256	39.656
Utah	37.725	37.485	34.103
Vermont	57.280	55.040	48.673
Virginia	46.347	46.790	44.049
Washington	42.000	41.802	42.297
West Virginia	77.460	74.294	74.412
Wisconsin	51.673	54.487	52.353
Wyoming	49.338	49.993	43.563

TABLE A.22

FINAL SHRINKAGE ESTIMATES OF PARTICIPATION RATES,
ALL ELIGIBLE PEOPLE

	2000	2001	2002
Alabama	56.112	53.372	53.215
Alaska	62.380	58.463	62.320
Arizona	45.736	46.928	52.623
Arkansas	56.952	54.586	55.651
California	53.581	48.607	48.763
Colorado	48.851	46.487	45.217
Connecticut	61.313	57.729	57.681
Delaware	51.775	49.418	50.832
District of Columbia	85.505	73.451	66.422
Florida	48.669	44.800	44.351
Georgia	52.657	50.499	53.669
Hawaii	88.508	76.617	73.801
Idaho	43.990	41.242	46.244
Illinois	63.299	61.713	58.962
Indiana	60.144	60.870	66.021
Iowa	53.546	51.071	52.458
Kansas	49.776	48.614	48.578
Kentucky	72.392	68.551	67.337
Louisiana	65.385	64.150	67.365
Maine	71.741	67.395	64.432
Maryland	52.324	49.583	47.609
Massachusetts	42.015	40.913	38.631
Michigan	67.590	64.421	64.695
Minnesota	57.250	54.172	55.513
Mississippi	51.825	52.225	56.318
Missouri	69.608	68.057	69.133
Montana	53.368	51.344	49.730
Nebraska	55.643	51.723	54.265
Nevada	38.045	40.216	42.157
New Hampshire	49.122	46.417	45.893
New Jersey	49.504	44.792	42.898
New Mexico	54.474	53.458	55.400
New York	56.970	52.397	50.417
North Carolina	47.954	46.766	46.459
North Dakota	50.206	55.026	51.342
Ohio	56.575	54.300	56.116
Oklahoma	55.829	53.936	58.103
Oregon	71.719	74.768	80.659
Pennsylvania	63.937	58.359	54.957
Rhode Island	63.276	59.547	56.971
South Carolina	56.499	55.069	58.602
South Dakota	58.198	57.117	56.299
Tennessee	63.514	60.707	66.486
Texas	46.030	45.185	47.064
Utah	47.039	43.386	42.953
Vermont	69.731	62.841	59.912
Virginia	53.780	51.577	52.404
Washington	56.483	54.303	57.282
West Virginia	85.427	74.875	71.587
Wisconsin	53.053	53.415	54.783
Wyoming	50.921	49.537	48.756

TABLE A.23

FINAL SHRINKAGE ESTIMATES OF PARTICIPATION RATES,
WORKING POOR

	2000	2001	2002
Alabama	48.675	49.182	47.414
Alaska	51.934	50.847	54.701
Arizona	32.488	35.311	44.811
Arkansas	46.119	46.115	48.612
California	32.626	28.917	30.984
Colorado	44.745	43.954	39.390
Connecticut	47.713	47.008	42.757
Delaware	46.942	46.209	44.940
District of Columbia	46.235	35.014	36.837
Florida	42.262	40.335	40.747
Georgia	48.087	46.410	48.340
Hawaii	74.585	66.256	64.778
Idaho	41.731	40.852	42.709
Illinois	55.793	57.632	54.236
Indiana	57.642	62.098	64.588
Iowa	42.607	43.529	41.196
Kansas	41.957	43.018	40.776
Kentucky	66.015	66.461	64.687
Louisiana	63.908	65.082	71.281
Maine	65.486	66.197	60.358
Maryland	41.556	40.435	34.645
Massachusetts	28.758	28.192	22.965
Michigan	67.309	68.263	68.130
Minnesota	47.028	47.490	41.179
Mississippi	44.634	48.043	51.996
Missouri	64.575	67.474	67.223
Montana	47.901	47.287	45.584
Nebraska	46.012	44.698	43.143
Nevada	21.153	21.527	24.838
New Hampshire	38.053	38.019	30.881
New Jersey	32.001	32.862	24.324
New Mexico	39.146	47.677	50.119
New York	41.242	37.212	38.845
North Carolina	41.848	43.120	41.269
North Dakota	55.237	62.027	53.666
Ohio	50.335	52.598	49.661
Oklahoma	50.133	50.150	56.497
Oregon	66.812	73.098	83.742
Pennsylvania	61.346	59.168	52.603
Rhode Island	47.255	44.391	41.321
South Carolina	51.572	53.958	55.911
South Dakota	58.509	59.541	55.031
Tennessee	54.562	56.833	61.430
Texas	41.024	40.608	40.885
Utah	39.215	38.775	35.160
Vermont	59.542	56.934	50.184
Virginia	48.179	48.401	45.415
Washington	43.660	43.242	43.608
West Virginia	80.521	76.853	76.719
Wisconsin	53.715	56.363	53.975
Wyoming	51.289	51.716	44.912

TABLE A.24

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

	2000	2001	2002
Alabama	2.499	2.068	2.399
Alaska	3.021	2.829	3.138
Arizona	2.694	2.804	3.011
Arkansas	2.427	2.096	2.306
California	1.346	1.877	1.625
Colorado	2.491	2.384	2.212
Connecticut	2.837	2.851	2.888
Delaware	2.723	2.900	2.685
District of Columbia	4.341	4.755	4.328
Florida	2.079	1.454	1.401
Georgia	2.010	2.203	2.557
Hawaii	4.498	3.905	4.014
Idaho	2.224	2.032	2.046
Illinois	2.124	2.355	2.118
Indiana	3.024	2.980	3.087
Iowa	2.806	2.822	2.773
Kansas	2.372	1.949	2.216
Kentucky	3.374	3.344	3.224
Louisiana	2.805	2.593	3.025
Maine	2.785	2.859	2.616
Maryland	2.833	3.054	3.131
Massachusetts	2.590	2.505	2.196
Michigan	2.472	2.246	2.294
Minnesota	3.790	3.796	3.851
Mississippi	2.927	2.839	2.673
Missouri	3.462	3.475	3.393
Montana	3.013	2.917	2.732
Nebraska	3.295	3.277	3.315
Nevada	2.470	2.172	2.131
New Hampshire	2.781	2.837	2.780
New Jersey	1.937	1.407	1.495
New Mexico	2.647	2.491	2.627
New York	1.923	1.936	1.132
North Carolina	1.614	1.258	1.835
North Dakota	3.076	2.863	2.638
Ohio	1.821	1.637	1.767
Oklahoma	2.272	2.362	2.204
Oregon	3.268	3.444	3.402
Pennsylvania	2.758	2.604	2.714
Rhode Island	3.045	3.076	3.126
South Carolina	2.582	2.647	2.387
South Dakota	3.106	3.037	2.733
Tennessee	2.512	2.609	2.840
Texas	1.196	1.561	0.843
Utah	2.901	2.798	2.624
Vermont	2.840	2.504	2.505
Virginia	2.790	2.683	2.869
Washington	2.298	2.216	2.411
West Virginia	3.385	3.160	2.698
Wisconsin	2.742	2.597	2.696
Wyoming	2.737	2.580	2.675

TABLE A.25

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

	2000	2001	2002
Alabama	3.860	3.422	3.759
Alaska	4.136	4.048	4.131
Arizona	2.472	3.287	4.110
Arkansas	3.355	3.095	3.253
California	1.939	1.766	1.990
Colorado	2.913	3.177	2.810
Connecticut	4.282	4.404	3.926
Delaware	4.855	4.912	4.630
District of Columbia	5.718	5.161	6.154
Florida	3.166	2.614	2.633
Georgia	3.563	3.317	3.324
Hawaii	6.883	5.677	5.879
Idaho	3.273	3.245	3.175
Illinois	3.932	3.903	4.084
Indiana	4.637	4.726	4.527
Iowa	2.884	3.337	3.478
Kansas	3.420	2.983	3.089
Kentucky	4.485	4.696	4.159
Louisiana	4.598	4.577	5.064
Maine	4.436	4.508	3.646
Maryland	3.882	4.094	4.390
Massachusetts	3.385	3.181	3.109
Michigan	4.743	4.310	4.661
Minnesota	4.184	4.345	4.302
Mississippi	4.556	4.064	4.496
Missouri	5.150	5.192	4.608
Montana	4.310	3.784	4.469
Nebraska	4.357	4.518	4.418
Nevada	2.524	2.253	2.157
New Hampshire	3.763	3.540	3.814
New Jersey	2.479	2.731	2.288
New Mexico	3.203	3.812	4.053
New York	3.029	2.492	2.765
North Carolina	2.939	2.548	2.547
North Dakota	4.986	5.067	4.959
Ohio	2.446	2.683	2.209
Oklahoma	3.399	3.593	3.586
Oregon	4.691	4.353	5.273
Pennsylvania	4.606	4.527	4.425
Rhode Island	4.609	4.587	4.006
South Carolina	3.606	3.806	3.745
South Dakota	4.864	4.919	4.935
Tennessee	3.672	3.970	3.947
Texas	2.143	1.586	1.862
Utah	3.466	3.224	2.823
Vermont	4.759	4.699	4.603
Virginia	3.600	4.028	4.173
Washington	3.016	2.804	3.298
West Virginia	6.203	5.843	4.961
Wisconsin	4.021	4.063	4.073
Wyoming	3.647	4.071	3.964

TABLE A.26

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

	2000	2001	2002
Alabama	675,336	739,100	802,330
Alaska	58,764	63,344	71,359
Arizona	557,365	613,067	709,392
Arkansas	427,926	465,611	503,582
California	3,352,237	3,372,275	3,434,887
Colorado	313,199	321,699	387,757
Connecticut	262,934	263,772	284,887
Delaware	59,544	63,671	75,456
District of Columbia	92,120	97,647	108,551
Florida	1,759,827	1,907,019	2,102,038
Georgia	1,023,168	1,100,461	1,177,369
Hawaii	130,433	137,821	141,868
Idaho	126,383	141,740	144,827
Illinois	1,195,372	1,298,799	1,465,515
Indiana	486,689	551,910	605,242
Iowa	224,830	243,620	264,217
Kansas	224,781	247,170	279,429
Kentucky	544,927	588,341	651,989
Louisiana	754,837	795,550	860,084
Maine	137,262	152,544	171,070
Maryland	405,486	414,556	472,827
Massachusetts	547,361	530,035	625,774
Michigan	878,183	988,474	1,142,420
Minnesota	339,117	359,088	387,780
Mississippi	523,503	563,794	568,051
Missouri	592,522	641,943	710,307
Montana	107,114	116,593	123,776
Nebraska	142,127	149,179	157,045
Nevada	156,135	168,727	226,767
New Hampshire	71,776	73,533	84,363
New Jersey	669,241	696,738	742,954
New Mexico	301,845	299,360	301,071
New York	2,449,117	2,523,044	2,634,447
North Carolina	977,598	1,031,349	1,222,312
North Dakota	61,564	68,160	70,917
Ohio	1,062,957	1,154,683	1,287,732
Oklahoma	443,427	472,020	528,090
Oregon	314,952	367,132	434,612
Pennsylvania	1,184,068	1,258,769	1,367,453
Rhode Island	113,609	117,619	123,409
South Carolina	515,302	570,500	641,240
South Dakota	73,740	77,646	84,143
Tennessee	763,560	843,776	870,759
Texas	2,871,142	2,973,729	3,279,649
Utah	161,820	177,268	207,078
Vermont	55,710	58,977	64,802
Virginia	603,045	631,670	661,094
Washington	513,406	559,919	598,395
West Virginia	262,258	287,828	319,714
Wisconsin	355,311	396,429	465,079
Wyoming	43,334	45,277	47,325

TABLE A.27

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

	2000	2001	2002
Alabama	297,456	310,362	350,495
Alaska	31,567	31,579	38,235
Arizona	324,678	340,128	399,494
Arkansas	210,563	217,469	220,754
California	1,892,544	2,047,909	1,976,765
Colorado	159,587	164,081	187,971
Connecticut	110,022	93,986	112,518
Delaware	25,357	24,480	37,875
District of Columbia	28,277	28,269	31,946
Florida	813,672	826,542	933,276
Georgia	474,689	485,738	509,896
Hawaii	64,933	65,719	64,383
Idaho	74,480	81,877	86,768
Illinois	567,723	584,231	694,938
Indiana	202,474	239,039	259,388
Iowa	119,930	119,602	136,544
Kansas	112,543	118,734	141,615
Kentucky	232,961	239,061	263,090
Louisiana	349,968	370,784	402,386
Maine	49,537	55,341	60,254
Maryland	145,422	143,519	188,707
Massachusetts	202,950	183,237	219,258
Michigan	373,405	407,242	498,228
Minnesota	148,854	148,360	152,336
Mississippi	236,701	251,297	211,283
Missouri	280,767	285,281	339,491
Montana	55,755	54,563	61,917
Nebraska	70,579	75,229	85,836
Nevada	91,557	87,803	123,699
New Hampshire	20,758	27,431	34,957
New Jersey	249,724	254,315	306,216
New Mexico	181,847	140,251	153,775
New York	930,184	940,746	1,121,976
North Carolina	476,800	460,059	566,341
North Dakota	30,733	31,983	38,270
Ohio	446,700	480,115	565,376
Oklahoma	241,215	229,256	257,193
Oregon	157,438	192,946	215,031
Pennsylvania	506,974	466,559	533,507
Rhode Island	42,817	34,737	37,223
South Carolina	194,220	213,269	236,247
South Dakota	37,403	31,627	42,907
Tennessee	313,410	351,714	377,908
Texas	1,657,457	1,721,430	1,983,749
Utah	97,105	102,235	123,505
Vermont	19,692	18,741	29,129
Virginia	266,931	282,480	316,622
Washington	237,132	229,206	247,520
West Virginia	101,880	101,459	101,751
Wisconsin	178,735	182,457	238,048
Wyoming	25,220	24,159	25,973

TABLE A.28

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

	2000	2001	2002
Alabama	30,074	28,641	36,178
Alaska	2,846	3,065	3,594
Arizona	32,836	36,628	40,589
Arkansas	18,237	17,880	20,871
California	84,205	130,203	114,434
Colorado	15,972	16,499	18,967
Connecticut	12,168	13,025	14,262
Delaware	3,131	3,736	3,985
District of Columbia	4,677	6,321	7,073
Florida	75,188	61,879	66,385
Georgia	39,055	48,001	56,097
Hawaii	6,628	7,024	7,716
Idaho	6,389	6,983	6,409
Illinois	40,106	49,565	52,635
Indiana	24,468	27,017	28,299
Iowa	11,782	13,460	13,968
Kansas	10,713	9,907	12,745
Kentucky	25,399	28,700	31,220
Louisiana	32,377	32,161	38,618
Maine	5,329	6,470	6,945
Maryland	21,952	25,538	31,097
Massachusetts	33,747	32,455	35,567
Michigan	32,116	34,465	40,509
Minnesota	22,449	25,161	26,901
Mississippi	29,569	30,650	26,965
Missouri	29,468	32,778	34,865
Montana	6,047	6,624	6,801
Nebraska	8,415	9,453	9,594
Nevada	10,136	9,114	11,463
New Hampshire	4,064	4,494	5,111
New Jersey	26,179	21,891	25,889
New Mexico	14,666	13,951	14,275
New York	82,647	93,207	59,150
North Carolina	32,901	27,739	48,275
North Dakota	3,772	3,546	3,644
Ohio	34,216	34,805	40,546
Oklahoma	18,042	20,667	20,034
Oregon	14,351	16,909	18,328
Pennsylvania	51,075	56,170	67,535
Rhode Island	5,467	6,077	6,772
South Carolina	23,550	27,422	26,115
South Dakota	3,936	4,129	4,085
Tennessee	30,200	36,266	37,201
Texas	74,579	102,756	58,768
Utah	9,981	11,432	12,651
Vermont	2,269	2,350	2,710
Virginia	31,285	32,861	36,191
Washington	20,885	22,847	25,183
West Virginia	10,392	12,147	12,051
Wisconsin	18,366	19,272	22,890
Wyoming	2,329	2,358	2,596

TABLE A.29

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

	2000	2001	2002
Alabama	23,586	21,594	27,786
Alaska	2,514	2,514	2,887
Arizona	24,701	31,657	36,638
Arkansas	15,318	14,593	14,772
California	112,475	125,048	126,951
Colorado	10,389	11,859	13,409
Connecticut	9,874	8,805	10,332
Delaware	2,623	2,602	3,902
District of Columbia	3,497	4,167	5,337
Florida	60,950	53,557	60,308
Georgia	35,172	34,713	35,062
Hawaii	5,992	5,631	5,844
Idaho	5,841	6,505	6,450
Illinois	40,007	39,563	52,330
Indiana	16,289	18,193	18,181
Iowa	8,119	9,170	11,529
Kansas	9,175	8,234	10,730
Kentucky	15,825	16,891	16,915
Louisiana	25,180	26,075	28,586
Maine	3,356	3,769	3,640
Maryland	13,584	14,531	23,912
Massachusetts	23,886	20,674	29,683
Michigan	26,314	25,714	34,086
Minnesota	13,242	13,575	15,916
Mississippi	24,160	21,259	18,271
Missouri	22,390	21,951	23,273
Montana	5,017	4,367	6,070
Nebraska	6,683	7,603	8,789
Nevada	10,926	9,190	10,743
New Hampshire	2,053	2,554	4,317
New Jersey	19,342	21,131	28,800
New Mexico	14,879	11,215	12,437
New York	68,317	62,990	79,849
North Carolina	33,489	27,187	34,953
North Dakota	2,774	2,613	3,536
Ohio	21,705	24,493	25,148
Oklahoma	16,354	16,427	16,326
Oregon	11,054	11,490	13,539
Pennsylvania	38,066	35,701	44,878
Rhode Island	4,177	3,589	3,609
South Carolina	13,580	15,044	15,824
South Dakota	3,109	2,613	3,848
Tennessee	21,091	24,570	24,283
Texas	86,595	67,253	90,352
Utah	8,583	8,501	9,918
Vermont	1,574	1,547	2,672
Virginia	19,946	23,507	29,092
Washington	16,383	14,860	18,717
West Virginia	7,848	7,714	6,579
Wisconsin	13,379	13,151	17,965
Wyoming	1,793	1,902	2,293

TABLE A.30

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

	2000	2001	2002
Alabama	378,947	394,470	426,958
Alaska	36,657	37,033	44,471
Arizona	254,914	287,701	373,305
Arkansas	243,712	254,159	280,247
California	1,796,162	1,639,155	1,674,964
Colorado	153,001	149,549	175,331
Connecticut	161,213	152,273	164,326
Delaware	30,829	31,465	38,356
District of Columbia	78,767	71,723	72,102
Florida	856,488	854,339	932,283
Georgia	538,768	555,726	631,881
Hawaii	115,444	105,594	104,700
Idaho	55,596	58,456	66,974
Illinois	756,661	801,527	864,097
Indiana	292,716	335,947	399,585
Iowa	120,387	124,419	138,604
Kansas	111,886	120,159	135,742
Kentucky	394,481	403,312	439,029
Louisiana	493,553	510,349	579,396
Maine	98,473	102,807	110,224
Maryland	212,166	205,550	225,109
Massachusetts	229,974	216,855	241,742
Michigan	593,561	636,780	739,086
Minnesota	194,146	194,524	215,268
Mississippi	271,304	294,440	319,914
Missouri	412,442	436,886	491,058
Montana	57,165	59,863	61,554
Nebraska	79,084	77,160	85,221
Nevada	59,401	67,855	95,599
New Hampshire	35,258	34,132	38,717
New Jersey	331,304	312,085	318,712
New Mexico	164,426	160,032	166,792
New York	1,395,267	1,322,004	1,328,214
North Carolina	468,796	482,318	567,879
North Dakota	30,909	37,506	36,410
Ohio	601,364	626,988	722,630
Oklahoma	247,563	254,587	306,837
Oregon	225,879	274,498	350,555
Pennsylvania	757,063	734,609	751,513
Rhode Island	71,887	70,039	70,307
South Carolina	291,141	314,171	375,782
South Dakota	42,915	44,349	47,372
Tennessee	484,970	512,227	578,935
Texas	1,321,590	1,343,668	1,543,547
Utah	76,119	76,910	88,947
Vermont	38,847	37,062	38,824
Virginia	324,317	325,794	346,438
Washington	289,986	304,053	342,770
West Virginia	224,038	215,511	228,873
Wisconsin	188,504	211,751	254,782
Wyoming	22,066	22,429	23,074

TABLE A.31

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

	2000	2001	2002
Alabama	144,787	152,643	166,184
Alaska	16,394	16,057	20,915
Arizona	105,483	120,101	179,018
Arkansas	97,110	100,286	107,312
California	617,465	592,198	612,473
Colorado	71,407	72,120	74,041
Connecticut	52,495	44,181	48,109
Delaware	11,903	11,312	17,021
District of Columbia	13,074	9,898	11,768
Florida	343,875	333,386	380,286
Georgia	228,263	225,433	246,483
Hawaii	48,430	43,543	41,706
Idaho	31,081	33,448	37,058
Illinois	316,748	336,704	376,909
Indiana	116,711	148,438	167,534
Iowa	51,098	52,062	56,251
Kansas	47,220	51,077	57,745
Kentucky	153,790	158,882	170,184
Louisiana	223,658	241,313	286,826
Maine	32,440	36,634	36,368
Maryland	60,432	58,032	65,377
Massachusetts	58,365	51,658	50,352
Michigan	251,336	277,997	339,444
Minnesota	70,003	70,456	62,730
Mississippi	105,650	120,730	109,858
Missouri	181,305	192,491	228,215
Montana	26,707	25,801	28,224
Nebraska	32,475	33,626	37,032
Nevada	19,367	18,901	30,724
New Hampshire	7,899	10,429	10,795
New Jersey	79,913	83,574	74,484
New Mexico	71,185	66,868	77,070
New York	383,623	350,067	435,834
North Carolina	199,529	198,377	233,722
North Dakota	16,976	19,838	20,538
Ohio	224,845	252,531	280,772
Oklahoma	120,929	114,971	145,307
Oregon	105,188	141,040	180,072
Pennsylvania	311,008	276,054	280,642
Rhode Island	20,233	15,420	15,381
South Carolina	100,163	115,076	132,087
South Dakota	21,884	18,831	23,612
Tennessee	171,002	199,890	232,148
Texas	679,947	699,035	811,054
Utah	38,080	39,642	43,424
Vermont	11,725	10,670	14,618
Virginia	128,604	136,723	143,793
Washington	103,531	99,113	107,939
West Virginia	82,035	77,974	78,062
Wisconsin	96,007	102,839	128,487
Wyoming	12,935	12,494	11,665