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Empirical Bayes Shrinkage Estimates of State Food Stamp Participation Rates in 2002-2004 for All Eligible People and the Working Poor

Final Report

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EXECUTIVE SUMMARY

The Food Stamp Program is a central component of American policy to alleviate hunger and poverty. The program's main purpose is "to permit low-income households to obtain a more nutritious diet . . . by increasing their purchasing power" (Food Stamp Act of 1977, as amended). The Food Stamp Program is the largest of the domestic food and nutrition assistance programs administered by the U.S. Department of Agriculture's Food and Nutrition Service. During fiscal year 2006, the program served 26 million people in an average month at a total annual cost of over $29 billion in benefits, excluding disaster assistance provided in October and November as a result of hurricanes. The average monthly food stamp benefit was about $211 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 2002 to 2004. The estimated numbers of people eligible for food stamps measure the need for the program. The estimated food stamp participation rates measure, state by state, the program's performance in reaching its target population. In addition to the participation rates that pertain to all eligible people, we derived estimates of participation rates for the "working poor," that is, people who were eligible for the Food Stamp Program and lived in households in which someone earned income from a job.

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

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I. INTRODUCTION

This report presents estimates of the food stamp participation rate and the number of people eligible for food stamps in each state for the years 2002 to 2004.[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 Ohio rather than all families in the state, we can be confident—by a commonly used standard—only that Ohio's food stamp participation rate in 2004 was between about 54 and 67 percent. This range is wide (but typical), reflecting our substantial uncertainty about what Ohio's participation rate actually was.

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

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 2004 estimate for Ohio would be calculated using just 2004 data on households in one sample from Ohio. If 2004 data are collected for only a small number of Ohio 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 2004 or what happened in Ohio (and other states) in other years is relevant to estimating what happened in Ohio in 2004. Using indirect estimation, the Census Bureau has improved the precision of state poverty rates derived from the CPS by calculating two- and three-year averages (DeNavas-Walt et al. 2006).

A generally superior indirect estimator is the "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 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 for children according to tax return data and per capita family income according to Census 2000. States with similar socioeconomic conditions, as reflected in these poverty rate and 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 Ohio's data to derive an estimate for Ohio, even though conditions may be similar in Pennsylvania or Indiana. 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 Ohio. Then, the shrinkage estimator optimally averages the direct sample and regression estimates for Ohio 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. For example, the confidence intervals for the shrinkage estimates of WIC eligibles in 1992 were, on average, 61 percent narrower than the corresponding confidence intervals for the direct estimates (Schirm 1995). To obtain that same gain in precision with a direct estimator would require—according to rough calculations—more than a six-fold increase in sample size. Therefore, we use an indirect estimator and borrow strength (while recognizing that the gain in precision might not be as large as for the 1992 WIC estimates).

As noted before, we have used a shrinkage estimator to derive state estimates of food stamp participation rates and counts of all eligible people and the eligible working poor. The estimator combined direct sample and regression estimates and borrowed strength across states, over time,

and between groups (all eligible people and the working poor). Like the estimators used in the other applications described in this chapter, our estimator also borrowed strength by using data from outside the main sample survey (the CPS), specifically, data from administrative records systems and the decennial census. In all, our estimator used one year of census data, three years of CPS data, and three years of Food Stamp Program (FSP) data, population estimates, and unemployment insurance data for all states to obtain estimates for each state in each year (2002 to 2004) 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 2002 to 2004.
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.

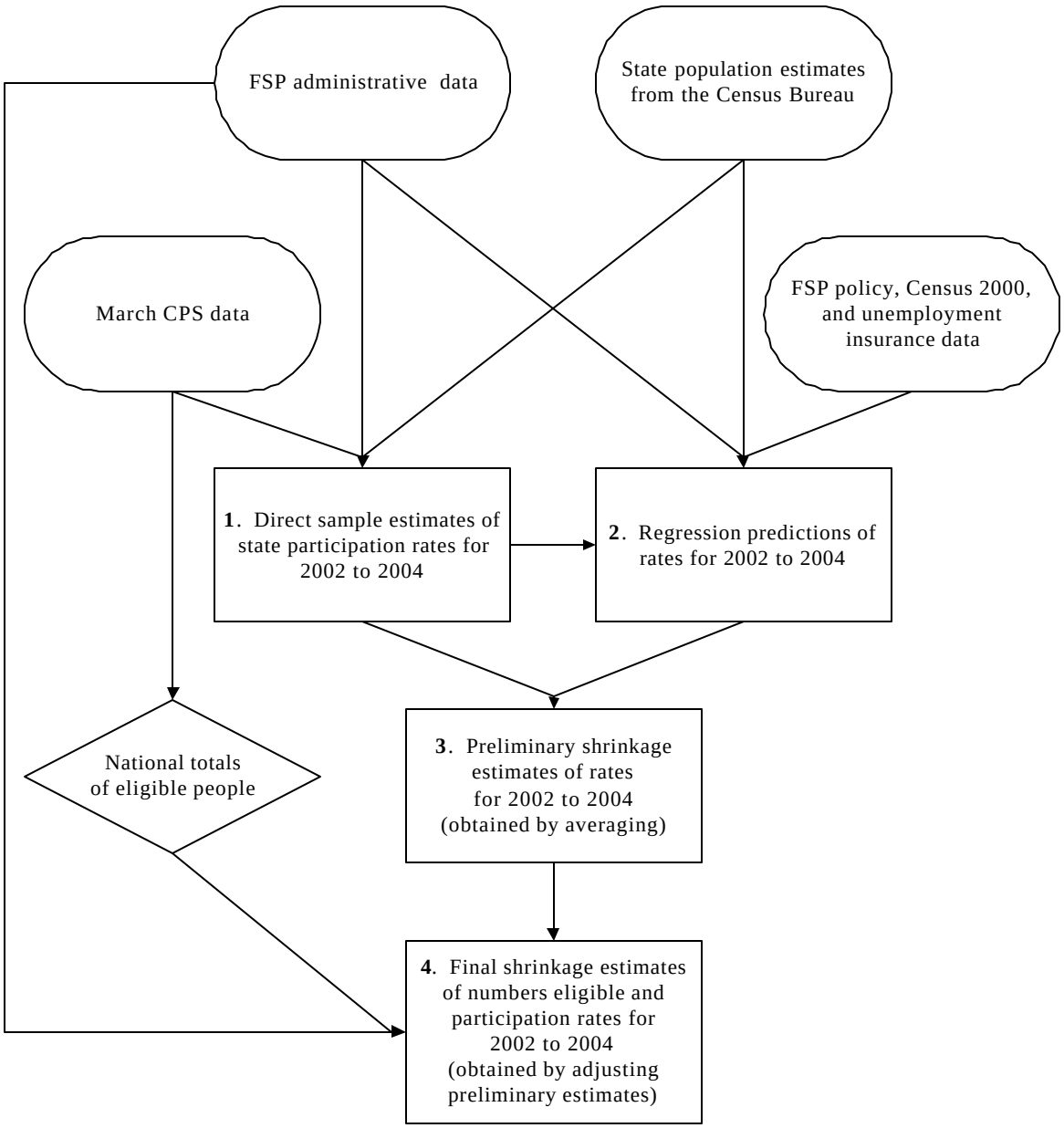
Each step is described in the remainder of this chapter. Additional technical details are provided in Appendix A.

1. From CPS data and FSP administrative data, derive direct sample estimates of state food stamp participation rates for each of the three years 2002 to 2004

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 2004, for example, from the March 2005 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.

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 Ohio's participation rate for all eligible people in 2004 was between 54 percent and 67 percent. This range is so wide and our uncertainty so great because the CPS sample for Ohio 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—Ohio and 2004 in our example—is the fundamental problem of "small area estimation."

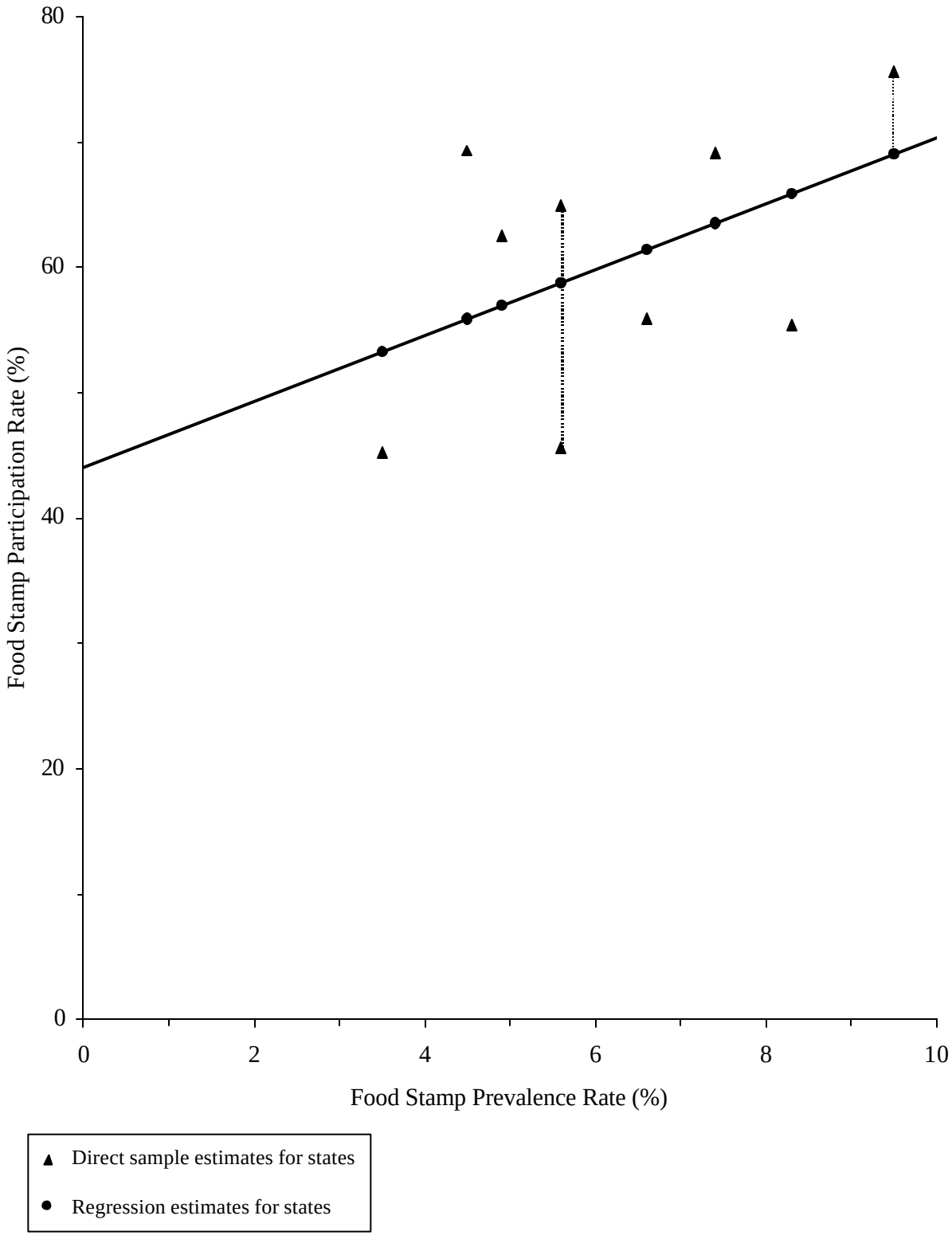
2. Using a regression model, predict state food stamp participation rates based on administrative and decennial census data

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 are systematically associated. States with higher

FIGURE II.2

AN ILLUSTRATIVE REGRESSION ESTIMATOR



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 direct 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 for 2002 to 2004 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 seven predictors, not just one. Adding six predictors improves our predictions. The seven predictors used measure:

- The percentage of the population receiving food stamps, that is, the food stamp prevalence rate
- The total population on July 1 according to the Census Bureau's population estimates
- The percentage of elderly people (age 65 or older) at or below the federal poverty level in 1999 according to Census 2000
- The percentage of people who were noncitizens in 1999 according to Census 2000
- The percentage of families that have related children and were at or below the federal poverty level in 1999 according to Census 2000
- The percentage of the population receiving first payments of unemployment insurance (UI) according to UI administrative data
- An indicator that the state's policy for counting vehicle values in the asset test was different from the federal policy in the prior year

The first and sixth predictors are obtained from administrative data and population estimates, the second predictor is from the Census Bureau's population estimates, and the third, fourth and fifth predictors are from the decennial census. The last predictor is based on information provided by the U.S Department of Agriculture's Food and Nutrition Service. These seven 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 the regression estimates and their standard errors. The standard errors tend to be fairly equal across the states and much smaller than the largest standard errors for direct sample estimates, reflecting substantial gains in precision from regression for the states with the most error-prone direct 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 direct sample estimates in Step 1, we used only one year's CPS sample data from Ohio to estimate Ohio's participation rate in that year, even though Ohio, like nearly all states, has a small CPS sample. Deriving regression estimates in this step, we estimated a regression line from sample, administrative, and census data for multiple years and all the states and used the estimated line (with administrative and census data for Ohio) to predict Ohio's participation rate in a given year. In other words, the regression estimator not only uses the sample estimates from every state for multiple years to develop a regression estimate for a single state in a single year but also incorporates data from outside the sample, namely, data in administrative records systems and the census. To improve precision even further, the estimator borrows strength across groups—all eligible people and the working poor—by deriving estimates for the groups jointly.

The regression estimator improves precision by using more data. It uses that additional data to identify states with direct 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 direct sample estimate showing a high rate is too high. The regression estimate will be lower than the direct 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 direct sample estimator uses relatively little information. It uses only the typically small number of sample observations for one state and one year to obtain an estimate for that state and year. It does not use sample data for other states or other years or data from other sources, such as administrative records or the census. Although the regression estimator borrows strength, using data from all the states and multiple years as well as administrative and census data, it makes no further use of the sample data after estimating the regression line. It treats the entire difference between the sample and

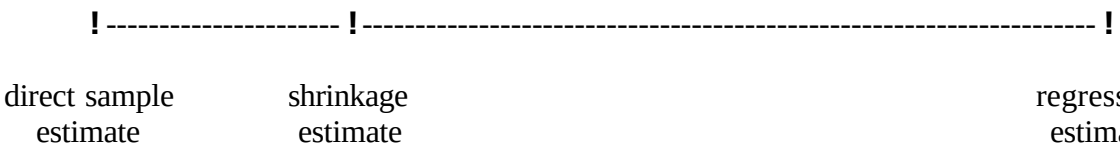
regression estimates as sampling error, that is, error in the direct sample estimate. No allowance is made for prediction error, that is, error in the regression estimate. Although not all, if any, true state participation rates lie on the regression line, the assumption underlying the regression estimator is that they do.

Using all of the information at hand, a shrinkage estimator addresses the limitations of the direct 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 direct sample estimate for a state, the closer the shrinkage estimate will be to it. The larger samples drawn in large states support more precise direct sample estimates, so shrinkage estimates tend to be closer to the direct sample estimates for large states. Given the precision of the direct 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 direct sample estimate when the regression line fits well than when the line fits poorly. Striking a compromise between the direct sample and regression estimators, the shrinkage estimator strikes a compromise between imprecision and bias. The direct 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 direct sample estimator. By sacrificing a little precision, the shrinkage estimator may be substantially less biased than the regression estimator. The shrinkage estimator optimizes the tradeoff between imprecision and bias.

FIGURE II.3

SHRINKAGE ESTIMATION

Poor predictions or state with relatively large sample Y more weight on direct 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 2004 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 38,844,127 for 2004, while the national total for 2004 estimated directly from the CPS was 38,354,693. 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 38,354,693) 38,844,127 (. 0.9874). Such benchmarking of estimates for smaller areas to a relatively precise estimated total for a larger area is common practice.

Applying this adjustment, we 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 FOOD STAMP PARTICIPATION RATES AND NUMBERS OF ELIGIBLE PEOPLE FOR 2002 TO 2004 FOR ALL ELIGIBLE PEOPLE AND THE WORKING POOR

Tables III.1 and III.2 present our final shrinkage estimates of food stamp participation rates in each state for 2002 to 2004 for all eligible people and for the working poor, respectively. 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 Ohio's participation rate for all eligible people was 64 percent in 2004 (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 60 and 68 percent, an interval that is 60 percent as wide as the interval (cited in Chapter I) around the direct sample estimate. A narrower interval means that we are less uncertain about the true value. According to our calculations, a shrinkage confidence interval for a participation rate is, on average, only about 60 percent as wide as the corresponding sample confidence interval. Thus, shrinkage substantially improves precision and reduces our uncertainty.

Despite the impressive gains in precision, however, substantial uncertainty about the true participation rates for some states remains even after the application of shrinkage methods. Nevertheless, as discussed in Cunnyngham, Castner, and Schirm (2006), the shrinkage estimates

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

TABLE III.1

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

	2002	2003	2004
Alabama	55	55	57
Alaska	59	62	59
Arizona	58	66	71
Arkansas	59	61	68
California	47	45	46
Colorado	46	49	56
Connecticut	56	53	58
Delaware	49	53	61
District of Columbia	63	68	79
Florida	48	48	55
Georgia	59	64	67
Hawaii	77	70	72
Idaho	49	53	58
Illinois	59	61	67
Indiana	66	65	69
Iowa	54	57	61
Kansas	51	54	58
Kentucky	64	68	71
Louisiana	66	70	75
Maine	66	75	77
Maryland	48	49	53
Massachusetts	38	42	49
Michigan	60	63	66
Minnesota	58	60	57
Mississippi	57	60	61
Missouri	70	77	84
Montana	48	49	58
Nebraska	56	55	61
Nevada	41	45	54
New Hampshire	48	49	54
New Jersey	45	46	50
New Mexico	53	53	65
New York	51	47	53
North Carolina	47	48	56
North Dakota	48	50	53
Ohio	57	62	64
Oklahoma	60	69	75
Oregon	76	81	83
Pennsylvania	53	52	57
Rhode Island	52	52	52
South Carolina	57	65	68
South Dakota	50	50	53
Tennessee	70	83	83
Texas	47	48	58
Utah	47	52	60
Vermont	59	59	62
Virginia	53	55	59
Washington	56	60	65
West Virginia	70	71	76
Wisconsin	49	52	54
Wyoming	43	43	48
United States	54	56	60

TABLE III.2

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

	2002	2003	2004
Alabama	50	49	50
Alaska	54	64	54
Arizona	48	48	57
Arkansas	53	58	60
California	33	34	34
Colorado	37	38	47
Connecticut	41	45	45
Delaware	42	47	55
District of Columbia	37	40	41
Florida	41	39	42
Georgia	48	50	57
Hawaii	62	54	56
Idaho	42	46	52
Illinois	51	52	55
Indiana	60	62	65
Iowa	44	45	55
Kansas	44	50	50
Kentucky	59	62	63
Louisiana	69	68	72
Maine	59	65	68
Maryland	38	40	44
Massachusetts	23	29	36
Michigan	62	66	67
Minnesota	39	43	42
Mississippi	51	48	51
Missouri	64	69	75
Montana	45	44	52
Nebraska	43	45	51
Nevada	24	29	35
New Hampshire	39	41	46
New Jersey	27	34	38
New Mexico	48	46	58
New York	41	41	41
North Carolina	40	44	47
North Dakota	49	50	53
Ohio	50	56	58
Oklahoma	58	64	69
Oregon	77	78	76
Pennsylvania	51	54	55
Rhode Island	37	35	39
South Carolina	55	62	64
South Dakota	47	44	51
Tennessee	65	74	78
Texas	38	38	47
Utah	36	40	49
Vermont	51	53	53
Virginia	44	43	51
Washington	39	42	52
West Virginia	76	72	74
Wisconsin	46	54	50
Wyoming	40	43	48
United States	45	47	51

TABLE III.3

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

	2002	2003	2004
Alabama	775	838	855
Alaska	74	78	83
Arizona	642	680	732
Arkansas	476	504	497
California	3,486	3,735	3,967
Colorado	383	416	426
Connecticut	291	328	333
Delaware	75	83	85
District of Columbia	114	116	109
Florida	1,984	2,087	2,132
Georgia	1,068	1,143	1,256
Hawaii	136	141	134
Idaho	139	146	152
Illinois	1,455	1,523	1,565
Indiana	602	691	740
Iowa	257	264	286
Kansas	268	286	285
Kentucky	688	718	755
Louisiana	874	908	916
Maine	167	168	171
Maryland	459	489	492
Massachusetts	625	667	659
Michigan	1,161	1,232	1,364
Minnesota	367	382	412
Mississippi	566	584	615
Missouri	701	736	800
Montana	127	144	129
Nebraska	152	174	182
Nevada	230	242	218
New Hampshire	80	88	87
New Jersey	714	725	725
New Mexico	314	362	339
New York	2,629	3,009	2,978
North Carolina	1,215	1,317	1,332
North Dakota	73	77	75
Ohio	1,259	1,369	1,452
Oklahoma	515	534	535
Oregon	423	435	456
Pennsylvania	1,426	1,542	1,646
Rhode Island	134	138	140
South Carolina	653	684	722
South Dakota	94	103	98
Tennessee	820	849	942
Texas	3,218	3,740	3,786
Utah	191	201	203
Vermont	65	69	68
Virginia	652	690	802
Washington	610	649	665
West Virginia	326	342	327
Wisconsin	494	542	573
Wyoming	53	58	53
United States	34,302	37,028	38,355

TABLE III.4

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

	2002	2003	2004
Alabama	330	372	398
Alaska	38	34	45
Arizona	362	372	380
Arkansas	203	224	225
California	1,854	1,975	2,116
Colorado	191	201	223
Connecticut	116	117	111
Delaware	37	40	41
District of Columbia	30	35	25
Florida	892	1,021	1,010
Georgia	499	562	584
Hawaii	67	81	74
Idaho	85	92	87
Illinois	697	648	727
Indiana	255	304	333
Iowa	126	128	136
Kansas	132	136	134
Kentucky	273	294	307
Louisiana	413	447	450
Maine	59	60	66
Maryland	162	165	181
Massachusetts	207	193	227
Michigan	500	498	579
Minnesota	159	192	189
Mississippi	217	261	290
Missouri	342	326	364
Montana	59	70	64
Nebraska	83	87	93
Nevada	130	124	117
New Hampshire	28	34	33
New Jersey	276	285	300
New Mexico	160	195	182
New York	1,059	1,155	1,095
North Carolina	564	542	591
North Dakota	38	37	36
Ohio	554	554	653
Oklahoma	248	257	257
Oregon	204	203	222
Pennsylvania	555	522	624
Rhode Island	42	49	48
South Carolina	242	305	326
South Dakota	49	50	49
Tennessee	337	379	410
Texas	2,019	2,093	2,224
Utah	119	119	119
Vermont	29	25	27
Virginia	313	315	371
Washington	267	309	299
West Virginia	104	118	118
Wisconsin	251	233	291
Wyoming	28	30	29
United States	16,004	16,869	17,878

TABLE III.5

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

	Participation Rate (Percent)		Number of Eligible People (Thousands)	
	Lower Bound	Upper Bound	Lower Bound	Upper Bound
Alabama	51	59	723	828
Alaska	54	65	68	81
Arizona	54	62	595	689
Arkansas	55	63	446	507
California	45	50	3,284	3,688
Colorado	42	49	355	412
Connecticut	52	60	268	314
Delaware	45	52	69	80
District of Columbia	56	69	102	127
Florida	45	50	1,880	2,089
Georgia	55	64	986	1,150
Hawaii	70	83	125	148
Idaho	46	52	130	148
Illinois	56	63	1,373	1,538
Indiana	61	70	561	644
Iowa	50	58	237	277
Kansas	47	54	249	287
Kentucky	60	68	643	733
Louisiana	62	71	811	936
Maine	62	70	157	177
Maryland	43	52	417	501
Massachusetts	35	41	574	677
Michigan	57	63	1,097	1,226
Minnesota	53	63	333	400
Mississippi	53	61	525	606
Missouri	65	75	654	748
Montana	44	53	115	138
Nebraska	52	61	139	164
Nevada	38	45	209	251
New Hampshire	43	52	73	88
New Jersey	41	48	665	764
New Mexico	49	57	288	340
New York	49	52	2,539	2,720
North Carolina	43	50	1,132	1,298
North Dakota	44	52	68	79
Ohio	54	60	1,191	1,327
Oklahoma	56	63	485	544
Oregon	71	82	393	452
Pennsylvania	48	57	1,306	1,546
Rhode Island	48	57	123	145
South Carolina	54	61	615	691
South Dakota	47	54	87	101
Tennessee	65	75	765	875
Texas	45	48	3,111	3,326
Utah	43	50	176	206
Vermont	56	63	61	69
Virginia	49	57	598	705
Washington	51	60	565	655
West Virginia	66	74	307	345
Wisconsin	45	54	450	537
Wyoming	39	48	48	59
United States	53	55	33,772	34,832

TABLE III.6

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

	Participation Rate (Percent)		Number of Eligible People (Thousands)	
	Lower Bound	Upper Bound	Lower Bound	Upper Bound
Alabama	51	59	776	900
Alaska	58	67	72	84
Arizona	61	71	629	732
Arkansas	57	65	472	537
California	43	47	3,553	3,917
Colorado	45	52	387	445
Connecticut	49	57	302	354
Delaware	49	56	77	89
District of Columbia	61	76	103	128
Florida	46	51	1,980	2,193
Georgia	61	68	1,076	1,210
Hawaii	65	75	131	152
Idaho	49	57	135	158
Illinois	58	65	1,434	1,613
Indiana	61	69	645	737
Iowa	52	61	243	285
Kansas	51	57	268	304
Kentucky	64	72	674	762
Louisiana	65	75	847	970
Maine	71	79	159	177
Maryland	46	53	455	523
Massachusetts	39	45	616	717
Michigan	60	67	1,158	1,307
Minnesota	54	65	348	417
Mississippi	55	65	532	637
Missouri	72	82	690	783
Montana	46	52	134	154
Nebraska	52	59	161	186
Nevada	41	49	222	261
New Hampshire	45	52	81	95
New Jersey	43	49	677	774
New Mexico	48	57	330	394
New York	44	50	2,799	3,220
North Carolina	45	51	1,232	1,403
North Dakota	45	54	70	83
Ohio	58	66	1,280	1,458
Oklahoma	65	73	503	566
Oregon	76	87	407	462
Pennsylvania	48	57	1,421	1,663
Rhode Island	48	55	129	147
South Carolina	61	68	647	722
South Dakota	45	54	94	112
Tennessee	78	89	792	906
Texas	46	51	3,543	3,937
Utah	48	56	186	215
Vermont	54	63	64	74
Virginia	51	60	635	746
Washington	55	64	602	696
West Virginia	66	75	319	365
Wisconsin	47	56	498	587
Wyoming	39	48	51	64
United States	55	57	36,405	37,650

TABLE III.7

APPROXIMATE 90-PERCENT CONFIDENCE INTERVALS FOR FINAL SHRINKAGE ESTIMATES FOR 2004, ALL ELIGIBLE PEOPLE

	Participation Rate (Percent)		Number of Eligible People (Thousands)	
	Lower Bound	Upper Bound	Lower Bound	Upper Bound
Alabama	53	61	796	913
Alaska	55	63	77	89
Arizona	66	76	681	783
Arkansas	65	72	470	524
California	44	49	3,765	4,170
Colorado	53	60	399	454
Connecticut	54	62	308	357
Delaware	57	65	79	90
District of Columbia	73	86	101	117
Florida	52	57	2,035	2,230
Georgia	62	72	1,158	1,354
Hawaii	67	78	124	144
Idaho	53	63	139	164
Illinois	63	70	1,488	1,643
Indiana	64	73	695	786
Iowa	56	66	263	309
Kansas	54	62	266	304
Kentucky	67	75	713	796
Louisiana	71	79	862	969
Maine	73	81	162	180
Maryland	49	57	457	527
Massachusetts	46	53	615	703
Michigan	63	69	1,300	1,428
Minnesota	52	62	378	447
Mississippi	57	64	578	652
Missouri	80	88	761	840
Montana	55	62	121	138
Nebraska	57	65	170	194
Nevada	49	58	199	237
New Hampshire	49	58	80	95
New Jersey	46	55	660	791
New Mexico	61	68	319	358
New York	50	56	2,810	3,147
North Carolina	52	60	1,239	1,425
North Dakota	48	57	69	81
Ohio	60	68	1,357	1,547
Oklahoma	71	79	505	565
Oregon	78	88	428	484
Pennsylvania	53	62	1,523	1,768
Rhode Island	48	56	130	151
South Carolina	64	71	687	758
South Dakota	49	57	91	105
Tennessee	77	89	874	1,011
Texas	55	61	3,585	3,988
Utah	57	63	192	214
Vermont	58	66	63	72
Virginia	55	63	746	858
Washington	60	70	614	715
West Virginia	72	80	308	345
Wisconsin	51	57	540	607
Wyoming	43	53	47	58
United States	59	61	37,722	38,987

TABLE III.8

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

	Participation Rate (Percent)		Number of Eligible People (Thousands)	
	Lower Bound	Upper Bound	Lower Bound	Upper Bound
Alabama	44	56	289	371
Alaska	47	61	33	43
Arizona	41	55	312	412
Arkansas	47	59	181	226
California	29	37	1,643	2,064
Colorado	32	42	167	215
Connecticut	35	47	99	132
Delaware	36	48	32	42
District of Columbia	28	47	22	38
Florida	37	45	799	985
Georgia	42	54	440	558
Hawaii	53	71	57	77
Idaho	37	48	74	96
Illinois	44	58	605	789
Indiana	54	67	228	282
Iowa	38	50	109	143
Kansas	39	49	117	147
Kentucky	54	65	246	300
Louisiana	61	78	362	463
Maine	54	65	54	65
Maryland	31	45	133	192
Massachusetts	18	28	163	250
Michigan	55	69	444	555
Minnesota	32	46	131	186
Mississippi	43	58	186	249
Missouri	58	71	309	375
Montana	38	53	49	70
Nebraska	37	50	71	95
Nevada	20	28	108	151
New Hampshire	32	45	23	32
New Jersey	23	32	228	324
New Mexico	41	56	136	185
New York	37	46	941	1,178
North Carolina	35	44	500	627
North Dakota	42	57	33	44
Ohio	46	54	510	598
Oklahoma	52	64	222	274
Oregon	68	86	180	227
Pennsylvania	44	58	479	630
Rhode Island	32	43	35	48
South Carolina	48	61	215	269
South Dakota	40	55	41	57
Tennessee	58	72	303	371
Texas	34	41	1,842	2,196
Utah	32	41	104	134
Vermont	44	57	25	33
Virginia	37	51	264	362
Washington	33	45	226	308
West Virginia	68	83	94	114
Wisconsin	39	52	216	286
Wyoming	33	47	23	33
United States	44	47	15,526	16,483

TABLE III.9

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

	Participation Rate (Percent)		Number of Eligible People (Thousands)	
	Lower Bound	Upper Bound	Lower Bound	Upper Bound
Alabama	43	56	324	420
Alaska	56	72	30	38
Arizona	42	54	324	419
Arkansas	52	64	201	248
California	31	38	1,765	2,185
Colorado	33	42	177	225
Connecticut	39	51	101	133
Delaware	41	54	34	45
District of Columbia	29	50	26	44
Florida	34	43	904	1,138
Georgia	43	56	488	637
Hawaii	45	62	68	93
Idaho	39	53	78	105
Illinois	47	58	583	713
Indiana	55	68	272	335
Iowa	40	50	113	143
Kansas	45	54	123	149
Kentucky	57	68	268	320
Louisiana	60	76	393	501
Maine	58	72	54	66
Maryland	35	46	141	190
Massachusetts	24	34	161	225
Michigan	60	72	453	543
Minnesota	35	52	156	229
Mississippi	41	56	219	303
Missouri	62	76	292	359
Montana	38	51	60	81
Nebraska	38	51	74	100
Nevada	24	34	104	143
New Hampshire	34	48	28	40
New Jersey	28	40	234	336
New Mexico	40	53	167	223
New York	36	46	1,008	1,302
North Carolina	38	50	467	617
North Dakota	43	58	32	43
Ohio	50	62	498	610
Oklahoma	58	71	230	284
Oregon	69	88	179	228
Pennsylvania	47	61	454	589
Rhode Island	30	40	42	56
South Carolina	55	68	272	337
South Dakota	36	52	41	60
Tennessee	67	81	341	417
Texas	35	42	1,913	2,272
Utah	35	46	103	135
Vermont	46	60	21	28
Virginia	36	49	268	363
Washington	37	47	271	347
West Virginia	65	80	106	131
Wisconsin	48	60	206	259
Wyoming	36	50	25	35
United States	46	49	16,362	17,376

TABLE III.10

APPROXIMATE 90-PERCENT CONFIDENCE INTERVALS FOR FINAL SHRINKAGE ESTIMATES FOR 2004, WORKING POOR

	Participation Rate (Percent)		Number of Eligible People (Thousands)	
	Lower Bound	Upper Bound	Lower Bound	Upper Bound
Alabama	43	57	346	450
Alaska	47	61	39	51
Arizona	50	65	329	431
Arkansas	53	66	200	250
California	31	37	1,921	2,312
Colorado	42	52	200	247
Connecticut	40	51	97	125
Delaware	48	62	36	46
District of Columbia	32	49	20	31
Florida	38	46	910	1,110
Georgia	49	66	500	668
Hawaii	48	65	63	85
Idaho	45	60	75	99
Illinois	50	61	652	801
Indiana	58	71	298	368
Iowa	49	62	120	151
Kansas	45	56	119	149
Kentucky	57	69	279	335
Louisiana	64	80	400	501
Maine	61	76	59	73
Maryland	38	50	157	206
Massachusetts	31	42	192	262
Michigan	61	73	528	630
Minnesota	35	49	157	220
Mississippi	45	57	255	325
Missouri	69	82	332	396
Montana	46	59	56	71
Nebraska	45	56	83	102
Nevada	29	41	97	136
New Hampshire	39	54	28	38
New Jersey	31	45	248	352
New Mexico	51	65	161	203
New York	36	47	957	1,234
North Carolina	41	53	510	672
North Dakota	46	60	31	41
Ohio	53	64	590	717
Oklahoma	62	77	228	285
Oregon	67	86	194	250
Pennsylvania	49	62	551	698
Rhode Island	33	45	40	55
South Carolina	57	70	293	359
South Dakota	43	58	42	56
Tennessee	69	88	360	459
Texas	42	51	2,008	2,441
Utah	43	54	106	132
Vermont	46	60	23	30
Virginia	45	58	325	416
Washington	44	59	254	343
West Virginia	65	84	103	132
Wisconsin	45	54	265	317
Wyoming	40	56	24	34
United States	50	53	17,335	18,421

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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 2002 to 2004

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 direct sample estimates. The method for obtaining the standard errors is described later.

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

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

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; $e_{1,i}$ is the "correctly-eligible" rate, that is the percentage of participating people who are correctly receiving benefits according to Food Stamp Program Quality Control (FSPQC) data, calculated as 100 minus the payment error rate; $E_{1,i}$ is the percentage of people who are eligible for food stamps according to the CPS; and T_i is the resident population according to decennial census and administrative records (mainly vital statistics) data.[1,2,3,4] Similarly, we derived sample estimates of participation rates for the working poor for a given year according to:

[1] P_i is adjusted to exclude from our estimate of participants those people who received food stamps only because of a natural disaster, are not otherwise eligible, and, thus, are not included in our estimate of eligibles. The adjustment allows us to measure a state's participation rate under "normal" circumstances. Because P_i is obtained from FSP Program Operations data, which include the full population of food stamp cases, it is not subject to

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

where $Y_{2,i}$ is the estimated participation rate for the working poor for state *i*; $e_{2,i}$ 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 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 all eligible people and for the working poor, respectively.

(continued)

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

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

[3] We obtained estimates for 2002 to 2004 from the March CPS samples for 2003 to 2005, for which the survey instruments collected family income data for the prior calendar years, that is, 2002 to 2004.

[4] In broad terms, the population estimates derived by the Census Bureau in its Population Estimates Program are obtained by subtracting from census counts people "exiting" the population (due to death or net out-migration) and adding people "entering" the population (due to birth or net in-migration). The 2002 population estimates were released in March 2004, the 2003 estimates in December 2004, and the 2004 estimates in August 2006 at http://www.census.gov/popest/datasets.html. The population estimates pertain to July 1 of each year.

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. Working poor who are participating in the FSP are identified in the FSPQC data not just by their earnings but also by other indicators of earnings that suggest a household was very likely to have a member who worked. Specifically, a household is identified as working poor if the household had earnings according to the edited FSPQC datafile, or if prior to the editing process, multiple earnings indicators suggest that a member of the household was working (Figure A.1).[5] In Table A.11 we show the percentage of participating households that are correctly eligible and working poor based on the indicators that suggest a member was working. The first column shows the percentage of participants in households identified as working poor based on the edited FSPQC datafile. The second column shows the additional percentage that were counted as working poor based on other household information.

We derived food stamp eligibility estimates for states by applying FSP 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.

[5] Poikolainen and Ewell (2005) describe the procedure for editing the FSPQC data to ensure consistency between a household's income and FSP benefit.

FIGURE A.1

ALGORITHM TO IDENTIFY WORKING POOR HOUSEHOLDS

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

1. Earnings in the edited FSPQC data

2. Multiple indicators of earnings in the unedited FSPQC data

    a. At least one person with recorded earned income AND

        i. A recorded earned income deduction or at least one person with a recorded workforce participation variable indicating he or she is employed

        OR

        ii. Recorded earned and unearned income that sum to the recorded total income, or recorded earned income with the earned income deduction already subtracted and unearned income that sum to the recorded total income (some states subtract the earned income deduction from income deemed by an ineligible member before recording it on the file)

    b. A recorded earned income deduction AND

        i. At least one person with a recorded workforce participation variable indicating that he or she is employed

        OR

        ii. Earnings implied by the recorded earned income deduction and recorded unearned income that sum to the recorded total income

        OR

        iii. Recorded gross income that is more than the earned income implied by the earned income deduction and both unearned and earned income equal zero (to account for household records that have no recorded individual income amounts but do have what appear to be consistent household-level indicators)

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 Barrett and Poikolainen (2006) and earlier reports in that series.[6,7]

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:[8]

(3) $\text{var}(Y_{1,i})$ = variance due to $E_{1,i}$ when $e_{1,i}$ is fixed + variance due to $e_{1,i}$ when $E_{1,i}$ is fixed
$= \text{var}_{E_1|e_1}(Y_{1,i}) + \text{var}_{e_1|E_1}(Y_{1,i})$

and

(4) $\text{var}(Y_{2,i})$ = variance due to $E_{2,i}$ when $e_{2,i}$ is fixed + variance due to $e_{2,i}$ when $E_{2,i}$ is fixed
$= \text{var}_{E_2|e_2}(Y_{2,i}) + \text{var}_{e_2|E_2}(Y_{2,i})$.

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 $e_{1,i}$—like the estimates of $E_{2,i}$ and $e_{2,i}$—are based on independent samples.

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

[7] Because our focus in this document is on participation among people who are eligible for the FSP, these estimates of food stamp eligibility counts and participation rates do not include people who are not legally entitled to receive food stamps, such as Supplemental Security Income (SSI) recipients in 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.

[8] 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 $e_{1,i}$ and $e_{2,i}$.

For a given year, we estimated $\text{var}_{E_1|e_1}(Y_{1,i})$ and $\text{var}_{E_2|e_2}(Y_{2,i})$ 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:

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

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:

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

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

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

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

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

and

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

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) $$\text{var}_{E_1|e_1}(Y_{1,i}) = \frac{7}{8}\sum_{r=1}^{8}(Y_{1,i(r)} - Y_{1,i})^2.$$

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 $E_{1,i(r)}$; $e_{2,i}$ for $e_{1,i}$; and $Y_{2,i(r)}$ for $Y_{1,i(r)}$, in Equations (5) to (9). This results in:

(11) $$\text{var}_{E_2|e_2}(Y_{2,i}) = \frac{7}{8}\sum_{r=1}^{8}(Y_{2,i,(r)} - Y_{2,i})^2.$$

Then, based on Equation (1) we can estimate $\text{var}_{e_1|E_1}(Y_{1,i})$ according to:

(12) $$\text{var}_{e_1|E_1}(Y_{1,i}) = \left(100\frac{P_i}{T_i E_{1,i}}\right)^2 \text{var}(e_{1,i}),$$

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 $e_{1,i}$ (the correctly-eligible rate) and $e_{2,i}$ (the percentage of participants who are working poor and correctly eligible) from the FSPQC sample data as follows:

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

and

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

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; $e_{1,i,h}$ is an indicator that household h is eligible to receive food stamps; and $e_{2\,i,h}$ is an indicator that household h is working poor and eligible to receive food stamps. Then:

$$(15) \quad \text{var}_{e_1|E_1}(Y_{1,i}) = \left(100 \frac{P_i}{T_i E_{1,i}}\right)^2 \frac{1}{(\sum_h m_{i,h})^2} \left(\frac{n_i}{n_i - 1}\right) \sum_h m_{i,h}{}^2 \left(e_{1,i,h} - e_{1,i}\right)^2,$$

where n_i is the total number of households from state i in the FSPQC sample. Similarly, we estimate $\text{var}_{e_2|E_2}(Y_{2,i})$ according to:

$$(16) \quad \text{var}_{e_2|E_2}(Y_{2,i}) = \left(100 \frac{P_i}{T_i E_{2,i}}\right)^2 \frac{1}{(\sum_h m_{i,h})^2} \left(\frac{n_i}{n_i - 1}\right) \sum_h m_{i,h}{}^2 \left(e_{2\,i,h} - e_{2,i}\right)^2.$$

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:[9]

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

(17) $\text{cov}(Y_{1,i}, Y_{2,i}) =$ covariance due to $E_{1,i}$ and $E_{2,i}$ when $e_{1,i}$ and $e_{2,i}$ are fixed
+ covariance due to $e_{1,i}$ and $e_{2,i}$ when $E_{1,i}$ and $E_{2,i}$ are fixed
$= \text{cov}_{E_1E_2|e_1e_2}(Y_{1,i}, Y_{2,i}) + \text{cov}_{e_1e_2|E_1E_2}(Y_{1,i}, Y_{2,i})$.

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:

$$(18) \quad \text{cov}_{E_1E_2|e_1e_2}(Y_{1,i}, Y_{2,i}) = \frac{7}{8}\sum_{r=1}^{8}(Y_{1,i(r)} - Y_{1,i})(Y_{2,i(r)} - Y_{2,i}).$$

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

$$(19) \quad \text{cov}_{e_1e_2|E_1E_2}(Y_{1,i}, Y_{2,i}) = \left(100\frac{P_i}{T_iE_{1,i}}\right)\left(100\frac{P_i}{T_iE_{2,i}}\right)\text{cov}(e_{1,i}, e_{2,i})$$

where:

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

Because CPS samples from different years are not independent, participation rates for different years are correlated.[10] We derived a preliminary jackknife estimate of the correlation between $Y_{1,i,t}$ and $Y_{2,i,t-g}$, the sample estimate for all eligibles for one year and the sample estimate for the working poor for g years earlier, according to either:

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

if g is odd, or:

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

[10] 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.

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.[11]

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

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 2002, 2003, and 2004, and three predicting food stamp participation rates for the working poor in 2002, 2003, and 2004. 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 total population on July 1 according to the Census Bureau's population estimates
- The percentage of elderly people (age 65 or older) at or below the federal poverty level in 1999 according to Census 2000
- The percentage of people who were noncitizens in 1999 according to Census 2000
- The percentage of families that have related children and were at or below the federal poverty level in 1999 according to Census 2000
- The percentage of the population receiving first payments of unemployment insurance (UI) according to UI administrative data
- 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 third, fourth, and fifth predictors are the same in each of the six equations of our regression model. For the first two predictors and the last two predictors, we used 2002 values in both equations for predicting 2002 participation rates, 2003 values in both equations for predicting 2003 rates, and 2004 values in both equations for predicting 2004 rates. 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 both groups.

In addition to the predictors that we selected for our "best" model, we considered many other potential predictors measuring, for example, the tax return nonfiler rate for elderly people, 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.[12] 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.12. The values for the third, 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.13. Values for the other predictors, which are updated each year, are presented in Tables A.14 to

[12] 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.

A.16. Regression estimates of participation rates for all eligible people are in Table A.17, and regression estimates of rates for the working poor are in Table A.18. The standard errors for the regression estimates for all eligible people and for the working poor are in Tables A.19 and A.20, 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.[13] The estimator does not have a closed-form expression from which we can calculate shrinkage estimates. Instead, we must numerically integrate over six scalar parameters—s_1, s_2, r, h_1, h_2, and h_{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 7,947,225 equally-spaced points, starting with s_1 = 0.001, s_2 = 0.001, r = -0.990, h_1 = 0.000, h_2 = 0.000, and h_{12} = -0.990 and incrementing s_1, s_2, r, h_1, h_2, and h_{12} by 0.400, 0.500, 0.165, 0.500, 0.500, and 0.650, respectively, up to s_1 = 4.401, s_2 = 7.001, r = 0.990, h_1 = 7.000, h_2 = 9.000, and h_{12} = 0.990. For combination k of s_1, s_2, r, h_1, h_2, and h_{12} (k = 1, 2, ..., 7947225), we calculated a vector of shrinkage estimates:

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

a variance-covariance matrix:

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

[13] 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 direct 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, the shrinkage estimates presented in this report are between the direct 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.

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 2002 sample estimates for all eligible people and the working poor, respectively; the second two elements are the 2003 estimates; and the final two elements are the 2004 estimates. The vector of shrinkage estimates, q_k, has the same structure as the vector of sample estimates, Y. V is the (306 × 306) variance-covariance matrix for the sample estimates. Because state samples are independent in the CPS, V is block-diagonal with 51 (6 × 6) blocks. We described under Step 1 how we derived estimates for the elements of V. X is a (306 × 48) matrix containing values for each of the seven predictors (plus an intercept) for every state, every year (2002, 2003 and 2004), 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 2002, t = 2 for 2003, and t = 3 for 2004) with eight elements (an intercept plus the seven predictors listed under Step 2) to predict participation rates for all eligible people. x'_{it2} is a row vector for year t with eight elements to predict participation

rates for the working poor. $\underline{0}$ is a row vector with eight zeros. In a given year, the values of the predictors are the same for the equations for all eligible people and for the working poor. Thus, $x'_{it1} = x'_{it2}$. $\hat{B}_k$ is a (48 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:

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

After calculating q_k, U_k, and p_k^* 7,947,225 times (once for each combination of s_1, s_2, r, h_1, h_2, and h_{12}), we calculated the probability of ($s_{1,k}$, $s_{2,k}$, r_k, $h_{1,k}$, $h_{2,k}$, $h_{12,k}$):

$$(32) \quad p_k = \frac{p_k^*}{\sum_{k=1}^{7,947,225} p_k^*} ,$$

which is also an estimate of the probability that the shrinkage estimates q_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 s_1, s_2, r, h_1, h_2, and h_{12} and obtain a single set of shrinkage estimates, we calculated a weighted sum of the 7,947,225 sets of shrinkage estimates, weighting each set q_k by its associated probability p_k. Thus, our shrinkage estimates are:

$$(33) \quad q = \sum_{k=1}^{7,947,225} p_k q_k .$$

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:

$$(34)\quad U = \sum_{k=1}^{7,947,225} p_k U_k + \sum_{k=1}^{7,947,225} p_k (q_k - q)(q_k - q)' .$$

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 s_1, s_2, r, h_1, h_2, and h_{12} vary. Thus, the second term accounts for the variability from not knowing and, thus, having to estimate s_1, s_2, r, h_1, h_2, and h_{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:

$$(35)\quad R = \sum_{k=1}^{7,947,225} p_k R_k ,$$

where $R_k = X\hat{B}_k$ is the vector of regression estimates obtained when $s_1 = s_{1,k}$; $s_2 = s_{2,k}$; $r = r_k$; $h_1 = h_{1,k}$; $h_2 = h_{2,k}$; and $h_{12} = h_{12,k}$. The variance-covariance matrix is:

$$(36)\quad G = \sum_{k=1}^{7,947,225} p_k G_k + \sum_{k=1}^{7,947,225} p_k (R_k - R)(R_k - R)' ,$$

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

$$(37)\quad \hat{B} = \sum_{k=1}^{7,947,225} p_k \hat{B}_k .$$

Regression estimates of participation rates for all eligible people and for the working poor were presented before in Tables A.17 and A.18, respectively. Preliminary shrinkage estimates of participation rates are displayed in Tables A.21 and A.22.

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 2004 estimates for all eligible people.

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

$$(38) \quad y_{1,i} = \frac{P_i(e_{1,i}/100)}{(q_{1,i}/100)},$$

where $y_{1,i}$ is the preliminary count of all eligible people for state *i*, P_i and $e_{1,i}$ are the participant count and correctly-eligible rate (100 minus the payment error rate) figures used in Equation (1), and $q_{1,i}$ is the preliminary participation rate derived in Equation (33). The state eligibles counts from Equation (38) summed to 38,844,127 for 2004, while the national total for 2004 estimated directly from the CPS was 38,354,693. 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 38,354,693) 38,844,127 (. 0.9874).[14]

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:

$$(39) \quad q_{F,1,i} = 100\,\frac{P_i(e_{1,i}/100)}{y_{F,1,i}},$$

where $q_{F,1,i}$ is the final shrinkage estimate of the participation rate for all eligible people in state *i*, and $y_{F,1,i}$ is the final shrinkage estimate of the number of all eligible people. P_i and $e_{1,i}$ are the participant count and correctly-eligible rate figures used in Equations (1) and (38). Participation

[14] The adjustment factors for 2002 and 2003 for all eligible people were, respectively, 0.9819, and 0.9822. The direct estimates of the national totals for all eligibles for those years were 34,302,250 and 37,027,552. The adjustment factors for 2002, 2003, and 2004 for working poor eligibles were, respectively, 0.9764, 0.9826, and 0.9774. The direct estimates of the national totals for working poor eligibles for those years were 16,004,202, 16,868,633, and 17,877,800.

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

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

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

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

where r is the ratio used to adjust preliminary estimates of state eligibles counts to the direct estimate of the national total (. 0.9874 for all eligible people for 2004), and $U(6i\text{-}1,6i\text{-}1)$ is the $(6i\text{-}1,6i\text{-}1)$ diagonal element of U, which was derived according to Equation (34).[15] Our estimate

[15] The square root of $U(6i\text{-}1,6i\text{-}1)$ is the standard error of the preliminary shrinkage estimate of the 2004 participation rate for all eligible people for state i. When deriving estimates for 2002 and 2003, we would use the $(6i\text{-}5,6i\text{-}5)$ and $(6i\text{-}3,6i\text{-}3)$ diagonal elements of U, respectively. When deriving estimates for the working poor for 2002, 2003, and 2004, we would use the $(6i\text{-}4,6i\text{-}4)$, $(6i\text{-}2,6i\text{-}2)$, and $(6i,6i)$ diagonal elements of U, respectively.

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.23 and A.24 present final shrinkage estimates of participation rates for all eligible people (values of $q_{F,1,i}$) and for the working poor (values of $q_{F,2,i}$), respectively. Tables A.25 and A.26 present standard errors for the rates. Tables A.27 and A.28 display final shrinkage estimates of the numbers of all eligible people (values of $y_{F,1,i}$) and eligible working poor (values of $y_{F,2,i}$), respectively, and Tables A.29 and A.30 present the standard errors for those estimated counts.[16] Finally, Tables A.31 and A.32 show payment-error-adjusted numbers of all people receiving food stamps (values of $P_i(e_{1,i}/100)$) and the working poor receiving food stamps (values of $P_i(e_{2,i}/100)$).

[16] The rates and counts for all eligible people in Tables A.23 and A.27 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.24 and A.28 are the same as the rates and counts in Tables III.2 and III.4 of Chapter III, except for the number of digits displayed.

TABLE A.1

DIRECT SAMPLE ESTIMATES OF PARTICIPATION RATES,
ALL ELIGIBLE PEOPLE

	2002	2003	2004
Alabama	54.128	54.274	54.160
Alaska	58.361	60.194	56.326
Arizona	62.467	65.367	69.033
Arkansas	53.883	57.388	68.376
California	46.965	44.595	46.202
Colorado	44.618	45.461	51.435
Connecticut	57.260	49.830	48.921
Delaware	50.116	55.309	60.632
District of Columbia	68.749	76.758	82.246
Florida	45.709	47.812	54.509
Georgia	65.880	66.097	68.822
Hawaii	83.920	83.468	93.194
Idaho	47.668	55.678	59.495
Illinois	57.475	59.665	67.433
Indiana	66.846	61.910	61.484
Iowa	51.080	56.661	58.144
Kansas	48.216	52.930	51.463
Kentucky	68.103	68.030	66.840
Louisiana	60.975	66.847	75.787
Maine	59.674	71.601	82.804
Maryland	53.484	47.795	48.612
Massachusetts	36.035	39.516	48.679
Michigan	59.523	62.288	63.911
Minnesota	66.824	65.942	66.650
Mississippi	54.953	68.211	60.419
Missouri	76.390	88.898	87.164
Montana	49.768	45.843	58.505
Nebraska	51.858	61.537	58.240
Nevada	38.880	41.940	49.757
New Hampshire	45.176	45.379	56.393
New Jersey	44.080	48.182	54.251
New Mexico	52.221	51.845	63.189
New York	49.791	49.564	52.925
North Carolina	43.592	44.936	59.327
North Dakota	49.914	57.230	59.245
Ohio	57.543	64.391	60.388
Oklahoma	58.354	69.195	86.557
Oregon	84.374	81.770	76.835
Pennsylvania	52.319	53.621	61.001
Rhode Island	60.835	50.066	53.046
South Carolina	57.670	64.276	66.185
South Dakota	57.804	55.393	51.102
Tennessee	66.585	84.933	83.957
Texas	46.115	44.948	53.963
Utah	38.768	50.395	59.139
Vermont	61.737	61.149	70.446
Virginia	52.260	52.298	62.286
Washington	54.407	51.391	61.253
West Virginia	65.102	64.505	78.481
Wisconsin	51.943	51.925	53.838
Wyoming	48.962	48.150	53.315

TABLE A.2

DIRECT SAMPLE ESTIMATES OF PARTICIPATION RATES,
WORKING POOR

	2002	2003	2004
Alabama	46.944	46.625	48.598
Alaska	52.789	64.259	51.389
Arizona	56.316	46.890	60.118
Arkansas	43.545	60.351	58.170
California	31.492	35.081	33.639
Colorado	37.575	33.561	44.305
Connecticut	39.050	45.411	39.589
Delaware	44.373	47.546	64.670
District of Columbia	38.558	45.772	28.820
Florida	40.525	38.674	39.486
Georgia	52.445	50.396	66.539
Hawaii	60.913	71.930	76.890
Idaho	42.943	52.217	48.355
Illinois	51.789	50.225	55.349
Indiana	60.790	57.520	56.302
Iowa	41.591	42.628	53.211
Kansas	41.008	51.092	41.465
Kentucky	57.293	61.480	60.571
Louisiana	68.605	63.887	80.029
Maine	54.394	60.985	74.457
Maryland	41.865	41.044	38.452
Massachusetts	20.977	23.927	38.045
Michigan	68.067	62.972	67.618
Minnesota	38.532	62.102	41.316
Mississippi	52.778	54.715	47.850
Missouri	65.762	74.862	76.576
Montana	49.216	37.896	50.143
Nebraska	37.631	51.490	47.007
Nevada	21.736	27.448	32.835
New Hampshire	33.951	44.137	41.587
New Jersey	25.059	36.633	50.076
New Mexico	47.358	45.410	61.764
New York	40.839	45.500	40.403
North Carolina	38.053	39.777	47.581
North Dakota	60.119	64.333	57.052
Ohio	47.669	55.693	55.070
Oklahoma	55.344	71.293	87.824
Oregon	98.542	76.306	69.585
Pennsylvania	51.812	55.908	55.123
Rhode Island	40.033	32.931	40.991
South Carolina	53.476	62.490	66.975
South Dakota	58.046	45.138	54.911
Tennessee	60.401	77.185	86.624
Texas	37.356	34.866	44.068
Utah	31.168	38.618	45.778
Vermont	52.290	52.861	59.012
Virginia	49.955	40.206	52.242
Washington	35.532	34.245	50.646
West Virginia	69.105	70.624	81.992
Wisconsin	51.933	57.898	46.850
Wyoming	41.950	47.902	65.652

TABLE A.3

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

	2002	2003	2004
Alabama	3.888	4.232	3.980
Alaska	5.300	3.939	3.097
Arizona	3.977	5.694	7.561
Arkansas	3.842	4.278	4.647
California	1.796	1.349	1.472
Colorado	3.092	3.089	3.727
Connecticut	5.082	6.391	7.669
Delaware	3.922	5.218	6.130
District of Columbia	5.969	7.542	4.644
Florida	1.759	1.800	1.868
Georgia	5.539	3.005	7.358
Hawaii	10.705	7.080	10.404
Idaho	2.459	5.271	6.462
Illinois	3.474	4.087	3.223
Indiana	5.067	7.091	6.300
Iowa	4.634	5.388	5.729
Kansas	4.253	3.260	5.652
Kentucky	6.586	5.369	4.386
Louisiana	7.662	5.939	5.143
Maine	4.107	3.932	4.586
Maryland	13.358	3.096	3.859
Massachusetts	2.522	2.621	2.879
Michigan	3.146	3.504	2.398
Minnesota	8.021	7.198	5.201
Mississippi	3.350	5.914	2.537
Missouri	7.206	7.144	3.363
Montana	4.021	2.415	3.057
Nebraska	7.219	4.649	5.116
Nevada	3.004	2.825	5.740
New Hampshire	4.752	3.258	6.495
New Jersey	2.162	2.285	5.922
New Mexico	4.341	5.335	3.141
New York	1.163	2.747	2.499
North Carolina	2.507	2.530	3.710
North Dakota	3.383	5.398	6.285
Ohio	2.241	3.720	4.122
Oklahoma	3.098	4.900	8.056
Oregon	4.929	4.981	5.860
Pennsylvania	5.960	4.142	5.047
Rhode Island	8.794	2.501	3.890
South Carolina	3.284	3.503	3.089
South Dakota	3.544	6.310	3.011
Tennessee	5.335	8.610	9.123
Texas	0.952	1.565	2.251
Utah	3.724	3.797	2.592
Vermont	3.773	6.774	7.001
Virginia	5.430	5.214	5.535
Washington	3.941	4.083	5.377
West Virginia	3.253	5.120	3.936
Wisconsin	4.894	4.911	2.480
Wyoming	5.004	5.495	7.104

TABLE A.4

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

	2002	2003	2004
Alabama	5.905	6.249	6.244
Alaska	5.666	7.677	5.477
Arizona	5.926	4.994	9.323
Arkansas	5.076	5.454	8.643
California	2.332	2.254	1.927
Colorado	3.745	3.592	4.298
Connecticut	5.391	6.663	5.529
Delaware	6.092	7.933	11.703
District of Columbia	8.187	9.766	6.052
Florida	3.026	3.378	2.981
Georgia	4.730	5.804	10.482
Hawaii	10.762	10.434	13.002
Idaho	3.964	8.081	7.576
Illinois	8.900	4.486	5.222
Indiana	5.966	7.343	8.619
Iowa	5.927	4.359	5.265
Kansas	4.773	3.831	5.591
Kentucky	5.876	5.077	5.400
Louisiana	13.589	10.450	9.404
Maine	4.373	6.964	9.249
Maryland	11.904	5.269	5.329
Massachusetts	3.740	3.618	4.520
Michigan	8.786	5.033	4.772
Minnesota	6.722	9.686	7.188
Mississippi	6.490	7.078	4.246
Missouri	6.127	8.886	5.429
Montana	7.724	4.776	4.805
Nebraska	7.111	8.207	4.551
Nevada	2.717	3.271	5.526
New Hampshire	6.178	7.369	8.694
New Jersey	3.214	5.401	5.871
New Mexico	7.117	6.177	5.734
New York	3.448	4.119	4.279
North Carolina	3.191	5.724	6.104
North Dakota	7.130	8.185	7.245
Ohio	2.687	4.816	4.610
Oklahoma	5.365	7.433	14.232
Oregon	7.476	9.847	10.801
Pennsylvania	7.935	7.699	6.295
Rhode Island	5.970	3.892	5.207
South Carolina	5.804	7.323	6.582
South Dakota	8.128	13.202	7.329
Tennessee	5.941	7.097	12.580
Texas	2.059	2.004	3.226
Utah	3.526	4.902	4.534
Vermont	7.834	8.545	9.577
Virginia	8.252	6.117	6.485
Washington	5.228	3.848	8.072
West Virginia	6.277	6.970	11.950
Wisconsin	6.035	5.922	3.024
Wyoming	6.652	7.275	9.236

TABLE A.5

NUMBER OF PEOPLE RECEIVING FOOD STAMPS, MONTHLY AVERAGE

	2002	2003	2004
Alabama	443,547	472,066	497,591
Alaska	46,165	50,687	49,323
Arizona	378,721	466,153	529,559
Arkansas	283,909	310,359	346,441
California	1,709,147	1,708,354	1,855,898
Colorado	178,490	208,053	241,780
Connecticut	168,591	180,512	195,980
Delaware	39,628	46,027	55,642
District of Columbia	74,271	81,777	88,655
Florida	989,685	1,041,315	1,202,227
Georgia	645,633	750,208	867,148
Hawaii	106,370	100,382	98,589
Idaho	69,998	81,524	91,395
Illinois	886,344	953,929	1,069,596
Indiana	410,884	470,182	526,324
Iowa	140,729	153,816	179,179
Kansas	140,403	160,705	169,528
Kentucky	450,102	502,677	544,744
Louisiana	588,458	649,761	705,700
Maine	111,147	132,582	141,929
Maryland	228,398	252,294	273,872
Massachusetts	242,542	292,200	334,939
Michigan	750,037	837,629	943,713
Minnesota	216,960	234,631	247,465
Mississippi	324,852	355,783	376,864
Missouri	515,006	591,532	699,616
Montana	63,347	71,320	77,478
Nebraska	88,459	99,243	113,900
Nevada	97,035	111,352	120,275
New Hampshire	41,053	44,783	48,449
New Jersey	319,799	339,047	368,695
New Mexico	170,457	194,795	222,716
New York	1,354,346	1,434,936	1,598,143
North Carolina	574,369	644,503	747,301
North Dakota	36,781	39,663	41,421
Ohio	734,679	855,401	945,435
Oklahoma	312,844	380,299	411,840
Oregon	359,138	398,377	419,736
Pennsylvania	766,615	822,696	960,941
Rhode Island	71,933	74,068	77,528
South Carolina	379,310	450,556	497,218
South Dakota	47,663	51,176	53,459
Tennessee	598,012	728,305	806,490
Texas	1,554,428	1,872,473	2,258,951
Utah	90,448	105,630	123,411
Vermont	39,914	41,333	42,862
Virginia	353,978	390,783	485,877
Washington	350,373	403,992	453,497
West Virginia	234,235	246,890	255,936
Wisconsin	262,310	296,719	324,047
Wyoming	23,530	25,306	25,649

TABLE A.6

POPULATION ON JULY 1

	2002	2003	2004
Alabama	4,478,896	4,503,726	4,525,375
Alaska	641,482	648,280	657,755
Arizona	5,441,125	5,579,222	5,739,879
Arkansas	2,706,268	2,727,774	2,750,000
California	35,001,986	35,462,712	35,842,038
Colorado	4,501,051	4,547,633	4,601,821
Connecticut	3,458,587	3,486,960	3,498,966
Delaware	805,945	818,166	830,069
District of Columbia	569,157	557,620	554,239
Florida	16,691,701	16,999,181	17,385,430
Georgia	8,544,005	8,676,460	8,918,129
Hawaii	1,240,663	1,248,755	1,262,124
Idaho	1,343,124	1,367,034	1,395,140
Illinois	12,586,447	12,649,087	12,712,016
Indiana	6,156,913	6,199,571	6,226,537
Iowa	2,935,840	2,941,976	2,952,904
Kansas	2,711,769	2,724,786	2,733,697
Kentucky	4,089,822	4,118,189	4,141,835
louisiana	4,476,192	4,493,665	4,506,685
Maine	1,294,894	1,309,205	1,314,985
Maryland	5,450,525	5,512,310	5,561,332
Massachusetts	6,421,800	6,420,357	6,407,382
Michigan	10,043,221	10,082,364	10,104,206
Minnesota	5,024,791	5,064,172	5,096,546
Mississippi	2,866,733	2,882,594	2,900,768
Missouri	5,669,544	5,719,204	5,759,532
Montana	910,372	918,157	926,920
Nebraska	1,727,564	1,737,475	1,747,704
Nevada	2,167,455	2,242,207	2,332,898
New Hampshire	1,274,405	1,288,705	1,299,169
New Jersey	8,575,252	8,642,412	8,685,166
New Mexico	1,852,044	1,878,562	1,903,006
New York	19,134,293	19,212,425	19,280,727
North Carolina	8,305,820	8,421,190	8,540,468
North Dakota	633,911	633,400	636,308
Ohio	11,408,699	11,437,680	11,450,143
Oklahoma	3,489,700	3,506,469	3,523,546
Oregon	3,520,355	3,564,330	3,591,363
Pennsylvania	12,328,827	12,370,761	12,394,471
Rhode Island	1,068,326	1,076,084	1,079,916
South Carolina	4,103,770	4,148,744	4,197,892
South Dakota	760,437	764,905	770,621
Tennessee	5,789,796	5,845,208	5,893,298
Texas	21,736,925	22,103,374	22,471,549
Utah	2,318,789	2,352,119	2,420,708
Vermont	616,408	619,343	621,233
Virginia	7,287,829	7,365,284	7,481,332
Washington	6,067,060	6,131,298	6,207,046
West Virginia	1,804,884	1,811,440	1,812,548
Wisconsin	5,439,692	5,474,290	5,503,533
Wyoming	498,830	502,111	505,887

TABLE A.7

PERCENTAGES OF PARTICIPANTS WHO ARE CORRECTLY ELIGIBLE

	2002	2003	2004
Alabama	96.307	97.393	97.424
Alaska	95.659	95.696	98.873
Arizona	98.309	96.636	97.759
Arkansas	98.698	99.087	98.153
California	96.652	97.978	98.981
Colorado	97.797	97.074	99.218
Connecticut	96.710	96.295	97.954
Delaware	92.069	94.630	92.793
District of Columbia	96.290	96.352	97.569
Florida	95.733	96.699	97.349
Georgia	97.723	98.207	96.820
Hawaii	98.429	98.529	98.177
Idaho	96.634	95.539	96.676
Illinois	97.271	98.206	97.662
Indiana	96.420	95.721	96.573
Iowa	98.474	97.297	97.634
Kansas	96.488	96.214	97.251
Kentucky	97.760	96.943	97.972
Louisiana	98.422	97.875	97.451
Maine	98.429	94.601	93.390
Maryland	95.624	95.425	95.298
Massachusetts	98.330	96.013	97.173
Michigan	92.798	93.194	94.794
Minnesota	97.951	97.508	95.263
Mississippi	98.473	98.610	98.847
Missouri	95.213	95.431	96.083
Montana	96.878	98.676	97.515
Nebraska	96.182	97.026	97.434
Nevada	98.510	97.795	97.196
New Hampshire	93.736	95.549	96.947
New Jersey	99.404	99.028	99.247
New Mexico	97.864	97.537	98.319
New York	98.497	98.707	98.242
North Carolina	98.736	98.675	99.756
North Dakota	95.875	95.662	95.362
Ohio	97.810	98.711	97.776
Oklahoma	98.042	96.319	97.234
Oregon	89.826	88.766	90.375
Pennsylvania	97.839	98.230	98.446
Rhode Island	97.768	95.818	94.771
South Carolina	98.949	97.993	98.285
South Dakota	99.352	99.518	97.259
Tennessee	96.273	96.945	97.387
Texas	96.756	96.837	96.621
Utah	98.296	98.830	99.099
Vermont	96.735	97.675	97.754
Virginia	97.814	98.036	97.680
Washington	96.613	95.621	95.835
West Virginia	97.644	98.010	96.921
Wisconsin	92.853	94.295	95.845
Wyoming	97.997	98.517	97.899

TABLE A.8

PERCENTAGES OF PARTICIPANTS WHO ARE CORRECTLY ELIGIBLE AND WORKING POOR

	2002	2003	2004
Alabama	37.074	38.811	39.981
Alaska	45.141	42.803	49.404
Arizona	45.876	38.398	41.202
Arkansas	37.681	41.957	38.902
California	35.652	39.564	38.960
Colorado	39.655	36.349	43.723
Connecticut	27.870	28.869	25.763
Delaware	39.356	40.492	40.674
District of Columbia	15.297	17.013	11.684
Florida	36.860	37.798	35.534
Georgia	37.221	37.250	38.657
Hawaii	39.353	43.273	42.169
Idaho	51.508	51.958	49.713
Illinois	40.198	35.630	37.640
Indiana	37.475	39.863	40.870
Iowa	39.487	37.538	41.873
Kansas	41.020	41.971	39.523
Kentucky	35.983	36.426	35.489
Louisiana	48.668	46.649	45.869
Maine	31.533	29.478	31.671
Maryland	27.015	26.517	29.015
Massachusetts	19.484	19.221	24.556
Michigan	41.525	39.506	41.042
Minnesota	28.646	35.681	32.062
Mississippi	33.981	35.491	39.273
Missouri	42.800	37.869	39.066
Montana	42.544	43.552	42.706
Nebraska	40.531	39.393	41.092
Nevada	31.991	32.222	33.965
New Hampshire	25.906	31.372	31.570
New Jersey	23.572	28.294	30.977
New Mexico	45.317	46.297	47.629
New York	32.172	33.031	28.340
North Carolina	38.943	36.875	37.167
North Dakota	51.610	47.259	45.820
Ohio	37.915	36.348	40.177
Oklahoma	45.838	43.641	43.235
Oregon	43.805	39.905	40.242
Pennsylvania	36.813	34.535	35.969
Rhode Island	21.725	23.271	23.804
South Carolina	34.812	41.838	41.832
South Dakota	48.657	43.495	46.464
Tennessee	36.660	38.531	39.714
Texas	49.052	42.947	45.986
Utah	47.863	45.284	47.124
Vermont	36.363	31.208	33.494
Virginia	39.175	34.312	39.255
Washington	29.410	31.807	34.029
West Virginia	33.573	34.671	34.161
Wisconsin	43.768	42.439	44.503
Wyoming	47.677	50.488	54.100

TABLE A.9

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

	2002	2003	2004
Alabama	17.620	18.809	19.779
Alaska	11.796	12.430	13.163
Arizona	10.954	12.352	13.065
Arkansas	19.216	19.645	18.084
California	10.049	10.584	11.093
Colorado	8.692	9.769	10.135
Connecticut	8.233	10.004	11.215
Delaware	9.033	9.625	10.259
District of Columbia	18.277	18.409	18.976
Florida	12.418	12.389	12.350
Georgia	11.209	12.847	13.679
Hawaii	10.056	9.489	8.229
Idaho	10.565	10.233	10.645
Illinois	11.918	12.413	12.186
Indiana	9.626	11.726	13.277
Iowa	9.241	8.978	10.189
Kansas	10.361	10.721	11.719
Kentucky	15.798	17.394	19.278
Louisiana	21.220	21.171	20.135
Maine	14.158	13.380	12.173
Maryland	7.492	9.138	9.654
Massachusetts	10.306	11.058	10.435
Michigan	11.643	12.430	13.853
Minnesota	6.329	6.851	6.940
Mississippi	20.306	17.843	21.255
Missouri	11.322	11.103	13.390
Montana	13.545	16.720	13.932
Nebraska	9.497	9.006	10.903
Nevada	11.343	11.580	10.071
New Hampshire	6.684	7.317	6.411
New Jersey	8.410	8.063	7.766
New Mexico	17.248	19.508	18.210
New York	14.002	14.874	15.386
North Carolina	15.663	16.806	14.713
North Dakota	11.145	10.467	10.478
Ohio	10.946	11.465	13.369
Oklahoma	15.062	15.097	13.130
Oregon	10.861	12.133	13.747
Pennsylvania	11.628	12.183	12.512
Rhode Island	10.821	13.173	12.826
South Carolina	15.859	16.557	17.589
South Dakota	10.773	12.020	13.203
Tennessee	14.934	14.222	15.874
Texas	15.004	18.251	17.999
Utah	9.890	8.807	8.543
Vermont	10.146	10.660	9.574
Virginia	9.091	9.946	10.185
Washington	10.255	12.260	11.431
West Virginia	19.465	20.709	17.438
Wisconsin	8.620	9.843	10.482
Wyoming	9.441	10.312	9.310

TABLE A.10

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

	2002	2003	2004
Alabama	7.821	8.725	9.046
Alaska	6.154	5.208	7.209
Arizona	5.670	6.842	6.323
Arkansas	9.078	7.910	8.425
California	5.528	5.433	5.997
Colorado	4.185	4.955	5.185
Connecticut	3.479	3.291	3.645
Delaware	4.361	4.791	4.216
District of Columbia	5.177	5.451	6.485
Florida	5.393	5.987	6.223
Georgia	5.363	6.391	5.649
Hawaii	5.539	4.836	4.284
Idaho	6.251	5.934	6.735
Illinois	5.466	5.350	5.722
Indiana	4.114	5.256	6.136
Iowa	4.551	4.604	4.775
Kansas	5.179	4.845	5.911
Kentucky	6.912	7.232	7.706
Louisiana	9.326	10.558	8.975
Maine	4.976	4.895	4.591
Maryland	2.704	2.957	3.716
Massachusetts	3.508	3.656	3.374
Michigan	4.556	5.212	5.669
Minnesota	3.210	2.662	3.768
Mississippi	7.296	8.006	10.663
Missouri	5.912	5.232	6.197
Montana	6.015	8.927	7.119
Nebraska	5.515	4.370	5.697
Nevada	6.589	5.830	5.333
New Hampshire	2.458	2.470	2.831
New Jersey	3.508	3.030	2.626
New Mexico	8.807	10.572	9.025
New York	5.576	5.422	5.814
North Carolina	7.077	7.095	6.835
North Dakota	4.981	4.600	5.228
Ohio	5.122	4.881	6.024
Oklahoma	7.425	6.639	5.754
Oregon	4.535	5.845	6.759
Pennsylvania	4.418	4.108	5.059
Rhode Island	3.654	4.864	4.169
South Carolina	6.017	7.271	7.398
South Dakota	5.254	6.447	5.870
Tennessee	6.269	6.220	6.274
Texas	9.390	10.435	10.490
Utah	5.990	5.266	5.248
Vermont	4.503	3.940	3.916
Virginia	3.809	4.528	4.880
Washington	4.780	6.120	4.909
West Virginia	6.305	6.691	5.883
Wisconsin	4.064	3.973	5.593
Wyoming	5.361	5.312	4.178

TABLE A.11

PERCENTAGE OF FOOD STAMP PARTICIPANTS WITH EARNERS IN THE HOUSEHOLD, BY INDICATORS OF EARNINGS, 2004

	Earned Income in Household	No Earned Income But Identified Based on Other Household Information	Total
Alabama	40.4	0.6	41.0
Alaska	49.5	0.6	50.1
Arizona	42.1	0.0	42.1
Arkansas	39.4	0.2	39.6
California	35.7	3.7	39.5
Colorado	43.8	0.2	44.1
Connecticut	26.1	0.4	26.5
Delaware	46.1	0.2	46.3
District of Columbia	11.7	0.3	12.0
Florida	36.5	0.0	36.5
Georgia	39.7	0.2	39.9
Hawaii	42.4	0.6	43.0
Idaho	51.1	0.3	51.4
Illinois	38.5	0.0	38.5
Indiana	42.4	0.0	42.5
Iowa	42.5	0.3	42.9
Kansas	40.6	0.0	40.6
Kentucky	36.2	0.0	36.2
Louisiana	46.9	0.2	47.1
Maine	35.1	0.4	35.5
Maryland	32.4	0.2	32.6
Massachusetts	25.8	0.6	26.4
Michigan	44.8	0.2	45.0
Minnesota	32.6	1.3	33.9
Mississippi	39.7	0.0	39.7
Missouri	40.7	0.0	40.7
Montana	43.2	0.5	43.7
Nebraska	42.2	0.2	42.5
Nevada	34.9	0.0	34.9
New Hampshire	32.8	0.1	32.9
New Jersey	30.5	0.8	31.3
New Mexico	48.0	0.5	48.5
New York	28.6	0.2	28.8
North Carolina	37.3	0.0	37.3
North Dakota	49.9	0.0	49.9
Ohio	41.1	0.0	41.1
Oklahoma	43.9	0.5	44.5
Oregon	45.6	0.7	46.4
Pennsylvania	36.4	0.2	36.6
Rhode Island	25.1	0.0	25.1
South Carolina	42.2	0.4	42.6
South Dakota	48.2	0.0	48.2
Tennessee	40.8	0.1	40.8
Texas	48.5	0.1	48.7
Utah	47.7	0.0	47.7
Vermont	34.7	0.1	34.8
Virginia	40.2	0.0	40.2
Washington	35.8	0.0	35.8
West Virginia	34.8	0.5	35.2
Wisconsin	47.4	0.2	47.6
Wyoming	55.0	0.2	55.3

TABLE A.12

DEFINITIONS AND DATA SOURCES FOR PREDICTORS

Predictor[a]	Definition	Principal Data Source[b]
Food stamp prevalence rate	$100 \times \frac{\text{Number of people receiving food stamps}}{\text{Resident population}}$	Counts of people receiving food stamps are from FSP Program Operations data and were provided by the Food and Nutrition Service. For more information, see the first footnote of Appendix A.
Total population	Resident population on July 1	All data for this predictor were obtained from the U.S. Census Bureau.
Elderly poverty rate	$100 \times \frac{\text{Number of elderly people (age 65 or older) below the poverty level}}{\text{Total number of elderly people (age 65 or older)}}$	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.
Noncitizen rate	$100 \times \frac{\text{Number of noncitizens}}{\text{Resident population}}$	The data for constructing this predictor were obtained from the Census 2000 Demographic Profiles released between May 7, 2002 and June 4, 2002 at http://www2.census.gov/census_2000/datasets/100_and_sample_profile.
Family with related children poverty rate	$100 \times \frac{\text{Number of families with related children and below the poverty level}}{\text{Total number of families with related children}}$	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.
Unemployment insurance rate	$100 \times \frac{\text{Number of people receiving first payments of unemployment insurance}}{\text{Resident population}}$	The data for constructing this predictor were obtained from the U.S. Department of Labor and the U.S. Census Bureau.
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).

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

[b]For estimates of the resident population in a given year, we used the July 1 population estimates published by the Census Bureau for that year. The 2002 population estimates that we used were released in March 2004, the 2003 population estimates were released in December 2004, and the 2004 estimates in August 2006 at http://www.census.gov/popest/datasets.html.

TABLE A.13

VALUES FOR TEMPORALLY CONSTANT PREDICTORS

	Percentage Noncitizen	Family with Related Children Poverty Rate	Elderly Poverty Rate
Alabama	1.250	18.152	15.534
Alaska	2.737	9.349	6.793
Arizona	9.009	15.238	8.372
Arkansas	1.931	18.120	13.845
California	15.916	15.261	8.082
Colorado	5.883	9.232	7.440
Connecticut	5.570	8.623	7.005
Delaware	3.298	9.853	7.863
District of Columbia	9.004	24.478	16.377
Florida	9.156	14.188	9.067
Georgia	4.984	13.896	13.546
Hawaii	6.991	11.274	7.395
Idaho	3.314	12.233	8.273
Illinois	7.452	11.550	8.326
Indiana	1.900	10.156	7.674
Iowa	2.089	9.293	7.708
Kansas	3.347	9.983	8.117
Kentucky	1.304	18.064	14.160
Louisiana	1.338	22.078	16.687
Maine	1.289	11.916	10.217
Maryland	5.355	8.665	8.526
Massachusetts	6.857	10.126	8.852
Michigan	2.854	11.312	8.207
Minnesota	3.317	7.578	8.194
Mississippi	0.837	22.233	18.796
Missouri	1.598	12.839	9.906
Montana	0.766	16.396	9.067
Nebraska	2.964	10.177	8.020
Nevada	9.999	11.416	7.140
New Hampshire	2.298	6.481	7.184
New Jersey	9.437	9.220	7.832
New Mexico	5.360	20.768	12.812
New York	10.984	16.904	11.328
North Carolina	3.940	13.312	13.228
North Dakota	1.083	12.002	11.133
Ohio	1.497	12.154	8.139
Oklahoma	2.492	16.533	11.114
Oregon	5.621	12.362	7.585
Pennsylvania	2.043	12.091	9.069
Rhode Island	6.018	14.250	10.555
South Carolina	1.819	15.655	13.886
South Dakota	1.066	13.880	11.143
Tennessee	1.860	15.011	13.469
Texas	9.521	16.635	12.774
Utah	4.947	8.706	5.818
Vermont	1.773	9.715	8.475
Virginia	4.768	10.225	9.490
Washington	6.054	11.157	7.499
West Virginia	0.495	21.443	11.874
Wisconsin	2.191	8.803	7.430
Wyoming	1.232	12.351	8.883

TABLE A.14

2002 VALUES FOR TEMPORALLY VARIABLE PREDICTORS

	Food Stamp Prevalence Rate	Total Population	Percentage Receiving Unemployment Insurance	Expanded Vehicle Rules in Previous Year
Alabama	9.903	4,478,896	3.247	1
Alaska	7.197	641,482	7.595	1
Arizona	6.960	5,441,125	2.296	0
Arkansas	10.491	2,706,268	3.875	1
California	4.883	35,001,986	4.004	0
Colorado	3.966	4,501,051	2.531	1
Connecticut	4.875	3,458,587	4.692	0
Delaware	4.917	805,945	4.012	1
District of Columbia	13.049	569,157	3.224	1
Florida	5.929	16,691,701	2.142	1
Georgia	7.557	8,544,005	3.045	0
Hawaii	8.574	1,240,663	2.388	0
Idaho	5.212	1,343,124	4.435	0
Illinois	7.042	12,586,447	3.705	1
Indiana	6.674	6,156,913	3.228	0
Iowa	4.793	2,935,840	3.795	0
Kansas	5.178	2,711,769	3.075	1
Kentucky	11.005	4,089,822	3.258	1
Louisiana	13.146	4,476,192	2.207	1
Maine	8.583	1,294,894	2.561	1
Maryland	4.190	5,450,525	2.394	1
Massachusetts	3.777	6,421,800	4.672	1
Michigan	7.468	10,043,221	4.697	1
Minnesota	4.318	5,024,791	3.395	0
Mississippi	11.332	2,866,733	2.685	0
Missouri	9.084	5,669,544	3.270	1
Montana	6.958	910,372	2.896	1
Nebraska	5.120	1,727,564	2.559	0
Nevada	4.477	2,167,455	3.957	1
New Hampshire	3.221	1,274,405	1.880	1
New Jersey	3.729	8,575,252	4.067	1
New Mexico	9.204	1,852,044	2.019	0
New York	7.078	19,134,293	3.230	0
North Carolina	6.915	8,305,820	4.487	1
North Dakota	5.802	633,911	2.564	1
Ohio	6.440	11,408,699	3.115	1
Oklahoma	8.965	3,489,700	2.003	1
Oregon	10.202	3,520,355	4.967	1
Pennsylvania	6.218	12,328,827	4.549	1
Rhode Island	6.733	1,068,326	4.115	0
South Carolina	9.243	4,103,770	3.547	1
South Dakota	6.268	760,437	1.525	1
Tennessee	10.329	5,789,796	3.792	0
Texas	7.151	21,736,925	2.504	1
Utah	3.901	2,318,789	2.748	1
Vermont	6.475	616,408	4.503	1
Virginia	4.857	7,287,829	2.380	0
Washington	5.775	6,067,060	4.631	0
West Virginia	12.978	1,804,884	3.147	1
Wisconsin	4.822	5,439,692	6.058	1
Wyoming	4.717	498,830	3.563	1

TABLE A.15

2003 VALUES FOR TEMPORALLY VARIABLE PREDICTORS

	Food Stamp Prevalence Rate	Total Population	Percentage Receiving Unemployment Insurance	Expanded Vehicle Rules in Previous Year
Alabama	10.482	4,503,726	3.123	1
Alaska	7.819	648,280	7.635	1
Arizona	8.355	5,579,222	2.077	0
Arkansas	11.378	2,727,774	3.792	1
California	4.817	35,462,712	3.891	0
Colorado	4.575	4,547,633	2.526	1
Connecticut	5.177	3,486,960	4.449	1
Delaware	5.626	818,166	4.012	1
District of Columbia	14.665	557,620	3.773	1
Florida	6.126	16,999,181	1.919	1
Georgia	8.646	8,676,460	2.934	0
Hawaii	8.039	1,248,755	2.387	1
Idaho	5.964	1,367,034	4.389	0
Illinois	7.541	12,649,087	3.599	1
Indiana	7.584	6,199,571	3.434	1
Iowa	5.228	2,941,976	3.860	0
Kansas	5.898	2,724,786	3.278	1
Kentucky	12.206	4,118,189	3.299	1
Louisiana	14.459	4,493,665	2.409	1
Maine	10.127	1,309,205	2.489	1
Maryland	4.577	5,512,310	2.357	1
Massachusetts	4.551	6,420,357	4.363	1
Michigan	8.308	10,082,364	4.979	1
Minnesota	4.633	5,064,172	3.354	0
Mississippi	12.342	2,882,594	2.490	0
Missouri	10.343	5,719,204	3.199	1
Montana	7.768	918,157	2.983	1
Nebraska	5.712	1,737,475	2.659	1
Nevada	4.966	2,242,207	3.498	1
New Hampshire	3.475	1,288,705	1.787	1
New Jersey	3.923	8,642,412	4.250	1
New Mexico	10.369	1,878,562	1.982	1
New York	7.469	19,212,425	3.118	1
North Carolina	7.653	8,421,190	4.132	1
North Dakota	6.262	633,400	2.459	1
Ohio	7.479	11,437,680	3.097	1
Oklahoma	10.846	3,506,469	2.193	1
Oregon	11.177	3,564,330	5.215	1
Pennsylvania	6.650	12,370,761	4.575	1
Rhode Island	6.883	1,076,084	4.005	0
South Carolina	10.860	4,148,744	3.583	1
South Dakota	6.691	764,905	1.546	1
Tennessee	12.460	5,845,208	3.436	0
Texas	8.471	22,103,374	2.414	1
Utah	4.491	2,352,119	2.439	1
Vermont	6.674	619,343	4.564	1
Virginia	5.306	7,365,284	2.249	0
Washington	6.589	6,131,298	4.370	0
West Virginia	13.629	1,811,440	3.012	1
Wisconsin	5.420	5,474,290	5.762	1
Wyoming	5.040	502,111	3.109	1

TABLE A.16

2004 VALUES FOR TEMPORALLY VARIABLE PREDICTORS

	Food Stamp Prevalence Rate	Total Population	Percentage Receiving Unemployment Insurance	Expanded Vehicle Rules in Previous Year
Alabama	10.996	4,525,375	2.620	1
Alaska	7.499	657,755	7.028	1
Arizona	9.226	5,739,879	1.675	1
Arkansas	12.598	2,750,000	3.085	1
California	5.178	35,842,038	3.101	0
Colorado	5.254	4,601,821	1.902	1
Connecticut	5.601	3,498,966	3.655	1
Delaware	6.703	830,069	3.324	1
District of Columbia	15.996	554,239	3.034	1
Florida	6.915	17,385,430	1.725	1
Georgia	9.723	8,918,129	2.336	0
Hawaii	7.811	1,262,124	1.895	1
Idaho	6.551	1,395,140	3.585	0
Illinois	8.414	12,712,016	3.086	1
Indiana	8.453	6,226,537	2.996	1
Iowa	6.068	2,952,904	3.013	0
Kansas	6.201	2,733,697	2.500	1
Kentucky	13.152	4,141,835	2.915	1
Louisiana	15.659	4,506,685	1.988	1
Maine	10.793	1,314,985	2.504	1
Maryland	4.925	5,561,332	1.964	1
Massachusetts	5.227	6,407,382	3.729	1
Michigan	9.340	10,104,206	4.572	1
Minnesota	4.856	5,096,546	2.887	1
Mississippi	12.992	2,900,768	2.083	0
Missouri	12.147	5,759,532	2.890	1
Montana	8.359	926,920	2.405	1
Nebraska	6.517	1,747,704	2.443	1
Nevada	5.156	2,332,898	2.847	1
New Hampshire	3.729	1,299,169	1.608	1
New Jersey	4.245	8,685,166	3.822	1
New Mexico	11.703	1,903,006	1.705	1
New York	8.289	19,280,727	2.663	1
North Carolina	8.750	8,540,468	3.197	1
North Dakota	6.510	636,308	2.072	1
Ohio	8.257	11,450,143	2.672	1
Oklahoma	11.688	3,523,546	1.696	1
Oregon	11.687	3,591,363	4.108	1
Pennsylvania	7.753	12,394,471	3.898	1
Rhode Island	7.179	1,079,916	3.760	1
South Carolina	11.844	4,197,892	2.926	1
South Dakota	6.937	770,621	1.332	1
Tennessee	13.685	5,893,298	2.848	0
Texas	10.052	22,471,549	1.880	1
Utah	5.098	2,420,708	1.853	1
Vermont	6.900	621,233	3.646	1
Virginia	6.495	7,481,332	1.678	1
Washington	7.306	6,207,046	3.354	0
West Virginia	14.120	1,812,548	2.455	1
Wisconsin	5.888	5,503,533	4.893	1
Wyoming	5.070	505,887	2.758	1

TABLE A.17

REGRESSION ESTIMATES OF PARTICIPATION RATES,
ALL ELIGIBLE PEOPLE

	2002	2003	2004
Alabama	54.290	53.939	56.543
Alaska	59.127	62.098	59.223
Arizona	55.875	64.712	69.469
Arkansas	58.710	60.853	68.011
California	45.145	42.413	44.176
Colorado	46.011	49.347	57.458
Connecticut	54.882	52.150	57.509
Delaware	47.730	51.170	60.277
District of Columbia	58.700	64.490	76.006
Florida	48.177	47.502	54.457
Georgia	56.105	61.470	64.666
Hawaii	74.223	66.832	69.535
Idaho	48.343	52.109	57.594
Illinois	58.583	60.684	65.614
Indiana	64.495	64.137	68.267
Iowa	53.538	55.832	60.905
Kansas	50.274	53.505	58.183
Kentucky	62.650	66.601	70.272
Louisiana	66.142	69.607	74.939
Maine	65.319	74.025	75.740
Maryland	47.658	49.564	54.087
Massachusetts	38.868	42.742	49.624
Michigan	60.375	63.339	66.484
Minnesota	54.336	56.578	53.205
Mississippi	56.165	58.289	59.907
Missouri	66.523	72.810	80.366
Montana	47.156	48.925	57.269
Nebraska	54.788	52.809	59.929
Nevada	42.588	46.053	54.521
New Hampshire	47.939	49.594	53.732
New Jersey	42.527	42.872	48.014
New Mexico	53.377	52.664	65.450
New York	50.532	45.327	52.101
North Carolina	47.278	49.426	55.243
North Dakota	47.092	47.995	51.715
Ohio	54.836	58.864	62.339
Oklahoma	58.250	67.248	73.332
Oregon	74.138	79.629	82.598
Pennsylvania	50.785	50.443	55.557
Rhode Island	51.185	51.275	51.489
South Carolina	56.707	63.742	67.752
South Dakota	47.492	47.641	52.497
Tennessee	69.601	81.831	82.664
Texas	46.723	51.538	59.766
Utah	47.956	51.979	60.433
Vermont	56.223	56.323	59.135
Virginia	52.376	54.963	58.271
Washington	55.099	60.348	65.409
West Virginia	70.232	70.713	75.140
Wisconsin	47.807	50.329	53.263
Wyoming	40.959	41.243	45.849

TABLE A.18

REGRESSION ESTIMATES OF PARTICIPATION RATES,
WORKING POOR

	2002	2003	2004
Alabama	50.389	50.181	49.938
Alaska	52.168	61.829	51.878
Arizona	41.736	44.093	52.332
Arkansas	54.705	56.556	59.444
California	32.061	30.969	32.177
Colorado	34.861	38.351	45.975
Connecticut	41.123	43.808	46.106
Delaware	39.130	44.898	51.359
District of Columbia	44.847	46.958	51.397
Florida	39.615	38.092	43.593
Georgia	43.764	46.728	53.172
Hawaii	60.553	51.249	53.642
Idaho	38.582	42.721	50.092
Illinois	50.059	52.476	54.313
Indiana	59.401	61.718	64.408
Iowa	45.165	47.329	55.930
Kansas	42.622	46.759	50.248
Kentucky	60.304	62.686	63.168
Louisiana	65.053	64.331	66.643
Maine	61.004	66.536	68.208
Maryland	36.429	38.635	43.351
Massachusetts	25.477	33.739	36.825
Michigan	58.143	63.952	62.697
Minnesota	43.169	44.876	46.196
Mississippi	49.694	47.759	51.977
Missouri	64.630	69.164	74.603
Montana	46.914	48.535	54.726
Nebraska	45.136	45.519	52.216
Nevada	25.207	29.365	34.901
New Hampshire	39.547	40.953	47.347
New Jersey	26.475	30.530	32.068
New Mexico	43.594	41.836	51.766
New York	37.163	35.450	37.662
North Carolina	38.385	44.141	46.002
North Dakota	40.787	42.157	45.831
Ohio	56.059	60.804	62.795
Oklahoma	55.341	60.699	65.528
Oregon	66.789	71.401	69.333
Pennsylvania	50.060	54.133	55.161
Rhode Island	36.504	35.490	37.198
South Carolina	51.436	58.526	59.400
South Dakota	42.948	41.552	47.271
Tennessee	62.895	70.785	74.375
Texas	37.989	43.043	47.856
Utah	38.619	42.115	50.612
Vermont	49.823	52.541	52.623
Virginia	40.713	40.737	48.954
Washington	43.253	47.869	54.612
West Virginia	73.608	69.807	70.996
Wisconsin	42.322	51.229	49.542
Wyoming	36.223	38.649	42.158

TABLE A.19

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

	2002	2003	2004
Alabama	2.996	3.105	3.101
Alaska	3.748	3.729	3.684
Arizona	3.237	3.554	3.324
Arkansas	2.931	2.947	2.858
California	3.474	3.505	3.581
Colorado	2.915	2.859	2.946
Connecticut	3.054	2.860	2.877
Delaware	2.802	2.792	2.792
District of Columbia	4.095	4.281	4.095
Florida	2.926	2.940	2.922
Georgia	3.203	3.246	3.559
Hawaii	4.040	3.363	3.271
Idaho	3.115	3.182	3.460
Illinois	2.947	2.905	2.877
Indiana	3.228	2.982	2.940
Iowa	3.049	3.166	3.490
Kansas	2.776	2.749	2.793
Kentucky	2.932	2.968	2.905
Louisiana	3.223	3.285	3.156
Maine	3.098	3.191	3.038
Maryland	3.014	2.934	2.999
Massachusetts	3.019	2.943	2.973
Michigan	3.007	3.084	3.043
Minnesota	3.221	3.241	2.962
Mississippi	3.493	3.753	3.656
Missouri	3.017	3.101	3.216
Montana	3.464	3.382	3.403
Nebraska	3.089	2.808	2.805
Nevada	3.297	3.261	3.400
New Hampshire	3.264	3.198	3.216
New Jersey	2.994	3.024	3.151
New Mexico	3.327	3.347	3.179
New York	2.927	2.979	3.017
North Carolina	3.084	3.096	3.085
North Dakota	2.911	2.962	3.014
Ohio	3.112	3.166	3.175
Oklahoma	2.905	2.999	2.966
Oregon	3.718	3.741	3.526
Pennsylvania	3.124	3.171	3.126
Rhode Island	3.029	3.183	3.126
South Carolina	2.894	2.948	2.926
South Dakota	3.045	3.084	3.097
Tennessee	3.340	3.634	3.944
Texas	3.025	3.058	3.170
Utah	2.960	2.979	3.065
Vermont	2.850	2.850	2.808
Virginia	3.138	3.174	2.948
Washington	2.945	3.061	3.479
West Virginia	3.540	3.569	3.532
Wisconsin	3.249	3.182	3.053
Wyoming	3.168	3.163	3.245

TABLE A.20

STANDARD ERRORS OF REGRESSION ESTIMATES OF PARTICIPATION RATES, WORKING POOR

	2002	2003	2004
Alabama	5.576	5.707	5.755
Alaska	6.547	6.800	6.701
Arizona	5.843	6.160	5.996
Arkansas	5.447	5.465	5.415
California	6.492	6.578	6.597
Colorado	5.402	5.382	5.426
Connecticut	5.525	5.378	5.340
Delaware	5.259	5.273	5.232
District of Columbia	6.954	7.211	7.003
Florida	5.507	5.540	5.497
Georgia	5.745	5.892	6.322
Hawaii	6.722	6.006	5.852
Idaho	5.720	5.767	6.067
Illinois	5.511	5.426	5.415
Indiana	5.680	5.491	5.476
Iowa	5.515	5.663	6.040
Kansas	5.225	5.209	5.231
Kentucky	5.461	5.486	5.483
Louisiana	5.892	5.892	5.882
Maine	5.602	5.809	5.630
Maryland	5.538	5.530	5.530
Massachusetts	5.540	5.519	5.489
Michigan	5.572	5.667	5.692
Minnesota	5.664	5.778	5.480
Mississippi	6.355	6.580	6.618
Missouri	5.544	5.657	5.926
Montana	6.297	6.224	6.334
Nebraska	5.536	5.306	5.251
Nevada	5.850	5.876	5.947
New Hampshire	5.837	5.917	5.811
New Jersey	5.543	5.647	5.726
New Mexico	6.136	5.962	5.917
New York	5.541	5.571	5.602
North Carolina	5.683	5.758	5.737
North Dakota	5.453	5.563	5.588
Ohio	5.721	5.795	5.786
Oklahoma	5.457	5.529	5.593
Oregon	6.555	6.661	6.410
Pennsylvania	5.696	5.782	5.702
Rhode Island	5.564	5.759	5.671
South Carolina	5.407	5.500	5.499
South Dakota	5.661	5.769	5.756
Tennessee	5.847	6.319	6.836
Texas	5.701	5.728	5.856
Utah	5.462	5.531	5.601
Vermont	5.325	5.356	5.272
Virginia	5.584	5.739	5.475
Washington	5.426	5.553	6.050
West Virginia	6.443	6.421	6.622
Wisconsin	5.835	5.815	5.646
Wyoming	5.794	5.837	5.938

TABLE A.21

PRELIMINARY SHRINKAGE ESTIMATES OF PARTICIPATION RATES,
ALL ELIGIBLE PEOPLE

	2002	2003	2004
Alabama	54.114	53.885	56.007
Alaska	58.345	61.202	58.034
Arizona	56.962	65.021	69.826
Arkansas	57.748	59.904	67.591
California	46.529	44.017	45.720
Colorado	44.713	47.675	55.547
Connecticut	55.003	51.990	57.005
Delaware	47.933	51.654	60.165
District of Columbia	61.434	66.980	78.444
Florida	46.891	47.389	54.192
Georgia	58.005	63.311	66.004
Hawaii	75.561	68.664	71.254
Idaho	47.901	52.236	57.504
Illinois	58.175	60.394	65.892
Indiana	64.613	63.958	67.782
Iowa	52.922	55.640	60.443
Kansas	49.598	53.141	57.091
Kentucky	62.829	66.641	69.829
Louisiana	65.095	68.752	74.170
Maine	64.471	73.533	76.448
Maryland	46.729	48.322	52.410
Massachusetts	37.445	41.330	48.772
Michigan	58.848	62.207	64.760
Minnesota	56.932	58.793	56.440
Mississippi	55.542	58.988	59.782
Missouri	68.655	75.294	82.918
Montana	47.615	48.051	57.739
Nebraska	55.088	54.500	60.164
Nevada	40.744	44.232	52.996
New Hampshire	46.984	47.727	53.085
New Jersey	43.699	45.460	49.812
New Mexico	52.106	51.576	63.824
New York	49.819	46.226	52.051
North Carolina	45.838	47.409	55.244
North Dakota	47.227	48.676	52.137
Ohio	56.043	60.581	62.862
Oklahoma	58.489	67.337	73.963
Oregon	74.967	79.915	82.214
Pennsylvania	51.640	51.483	56.761
Rhode Island	51.404	50.602	51.697
South Carolina	56.461	63.376	66.794
South Dakota	49.564	48.740	52.387
Tennessee	68.937	81.685	82.305
Texas	45.890	47.621	56.922
Utah	45.708	51.138	59.380
Vermont	58.306	57.793	61.111
Virginia	52.161	54.494	58.468
Washington	54.502	58.455	64.540
West Virginia	68.820	69.425	74.982
Wisconsin	48.462	50.663	53.494
Wyoming	42.421	42.483	47.020

TABLE A.22

PRELIMINARY SHRINKAGE ESTIMATES OF PARTICIPATION RATES,
WORKING POOR

	2002	2003	2004
Alabama	48.649	48.425	48.878
Alaska	52.897	62.951	52.526
Arizona	46.882	47.334	56.187
Arkansas	51.417	57.025	58.482
California	32.092	33.621	33.397
Colorado	36.171	37.038	46.274
Connecticut	39.708	43.748	44.456
Delaware	41.098	46.332	53.676
District of Columbia	36.541	38.990	40.033
Florida	39.917	37.866	41.350
Georgia	46.993	48.826	56.111
Hawaii	60.648	52.819	54.930
Idaho	41.404	45.422	51.160
Illinois	49.914	51.514	54.151
Indiana	58.903	60.645	63.129
Iowa	43.105	44.281	54.112
Kansas	42.668	48.714	48.895
Kentucky	57.902	61.166	61.594
Louisiana	67.770	66.625	70.244
Maine	57.863	63.855	66.886
Maryland	37.090	39.730	42.896
Massachusetts	22.338	28.570	35.361
Michigan	60.857	65.292	65.429
Minnesota	38.246	42.732	41.041
Mississippi	49.638	47.485	49.899
Missouri	62.924	67.570	73.399
Montana	44.249	43.372	50.917
Nebraska	42.406	44.140	49.428
Nevada	23.328	28.513	34.271
New Hampshire	37.752	40.206	45.440
New Jersey	26.637	33.092	37.210
New Mexico	47.107	45.408	56.868
New York	40.157	40.329	40.414
North Carolina	38.747	43.107	45.925
North Dakota	48.312	49.330	51.697
Ohio	49.071	55.123	56.816
Oklahoma	56.486	63.362	67.818
Oregon	75.426	76.782	74.417
Pennsylvania	49.667	53.519	54.099
Rhode Island	36.575	34.501	37.877
South Carolina	53.326	60.777	62.341
South Dakota	46.146	43.519	49.805
Tennessee	63.523	72.728	76.407
Texas	36.876	37.759	45.647
Utah	35.493	39.576	47.808
Vermont	49.361	51.718	52.185
Virginia	43.216	41.790	50.267
Washington	37.731	40.883	50.465
West Virginia	73.863	71.025	72.717
Wisconsin	44.653	53.155	48.481
Wyoming	38.726	41.968	46.793

TABLE A.23

FINAL SHRINKAGE ESTIMATES OF PARTICIPATION RATES,
ALL ELIGIBLE PEOPLE

	2002	2003	2004
Alabama	55.109	54.864	56.722
Alaska	59.418	62.314	58.775
Arizona	58.009	66.202	70.717
Arkansas	58.810	60.992	68.454
California	47.385	44.816	46.303
Colorado	45.535	48.541	56.256
Connecticut	56.014	52.935	57.732
Delaware	48.815	52.593	60.933
District of Columbia	62.564	68.197	79.445
Florida	47.754	48.250	54.884
Georgia	59.071	64.461	66.846
Hawaii	76.951	69.912	72.164
Idaho	48.781	53.185	58.237
Illinois	59.244	61.492	66.732
Indiana	65.801	65.120	68.647
Iowa	53.895	56.651	61.215
Kansas	50.510	54.107	57.820
Kentucky	63.985	67.851	70.720
Louisiana	66.292	70.001	75.116
Maine	65.656	74.869	77.423
Maryland	47.588	49.200	53.079
Massachusetts	38.134	42.081	49.394
Michigan	59.929	63.337	65.587
Minnesota	57.979	59.861	57.160
Mississippi	56.563	60.060	60.545
Missouri	69.917	76.662	83.976
Montana	48.491	48.924	58.476
Nebraska	56.101	55.490	60.932
Nevada	41.493	45.036	53.672
New Hampshire	47.847	48.595	53.763
New Jersey	44.503	46.286	50.448
New Mexico	53.064	52.514	64.638
New York	50.735	47.065	52.715
North Carolina	46.680	48.271	55.949
North Dakota	48.096	49.561	52.802
Ohio	57.073	61.682	63.665
Oklahoma	59.565	68.561	74.907
Oregon	76.346	81.367	83.263
Pennsylvania	52.590	52.418	57.485
Rhode Island	52.349	51.522	52.356
South Carolina	57.499	64.527	67.646
South Dakota	50.475	49.626	53.055
Tennessee	70.205	83.169	83.355
Texas	46.734	48.486	57.648
Utah	46.549	52.067	60.138
Vermont	59.378	58.843	61.891
Virginia	53.120	55.484	59.214
Washington	55.504	59.517	65.364
West Virginia	70.086	70.686	75.939
Wisconsin	49.353	51.584	54.177
Wyoming	43.201	43.255	47.620

TABLE A.24

FINAL SHRINKAGE ESTIMATES OF PARTICIPATION RATES,
WORKING POOR

	2002	2003	2004
Alabama	49.825	49.285	50.006
Alaska	54.175	64.069	53.738
Arizona	48.015	48.175	57.483
Arkansas	52.660	58.038	59.832
California	32.868	34.218	34.167
Colorado	37.045	37.695	47.342
Connecticut	40.667	44.525	45.481
Delaware	42.092	47.155	54.914
District of Columbia	37.424	39.683	40.957
Florida	40.882	38.538	42.304
Georgia	48.128	49.693	57.406
Hawaii	62.114	53.757	56.197
Idaho	42.404	46.229	52.340
Illinois	51.120	52.429	55.401
Indiana	60.327	61.721	64.585
Iowa	44.147	45.068	55.361
Kansas	43.699	49.579	50.023
Kentucky	59.301	62.252	63.015
Louisiana	69.408	67.808	71.865
Maine	59.261	64.989	68.429
Maryland	37.987	40.435	43.885
Massachusetts	22.878	29.078	36.177
Michigan	62.328	66.451	66.939
Minnesota	39.170	43.491	41.987
Mississippi	50.838	48.328	51.050
Missouri	64.445	68.770	75.093
Montana	45.319	44.142	52.092
Nebraska	43.431	44.924	50.568
Nevada	23.892	29.019	35.062
New Hampshire	38.664	40.920	46.489
New Jersey	27.280	33.679	38.068
New Mexico	48.246	46.215	58.180
New York	41.127	41.045	41.346
North Carolina	39.683	43.873	46.985
North Dakota	49.479	50.206	52.890
Ohio	50.257	56.102	58.127
Oklahoma	57.852	64.487	69.382
Oregon	77.249	78.146	76.134
Pennsylvania	50.867	54.470	55.347
Rhode Island	37.459	35.114	38.751
South Carolina	54.615	61.856	63.779
South Dakota	47.261	44.291	50.955
Tennessee	65.058	74.019	78.170
Texas	37.767	38.429	46.700
Utah	36.351	40.279	48.911
Vermont	50.554	52.636	53.389
Virginia	44.260	42.532	51.427
Washington	38.643	41.608	51.629
West Virginia	75.648	72.286	74.395
Wisconsin	45.732	54.099	49.600
Wyoming	39.662	42.713	47.873

TABLE A.25

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

	2002	2003	2004
Alabama	2.268	2.449	2.351
Alaska	3.130	2.842	2.512
Arizona	2.593	3.057	3.015
Arkansas	2.271	2.386	2.260
California	1.670	1.329	1.437
Colorado	2.074	2.061	2.213
Connecticut	2.674	2.542	2.559
Delaware	2.184	2.335	2.354
District of Columbia	4.125	4.451	3.710
Florida	1.529	1.497	1.529
Georgia	2.765	2.299	3.182
Hawaii	3.941	3.271	3.253
Idaho	1.942	2.607	2.959
Illinois	2.046	2.194	2.014
Indiana	2.762	2.636	2.545
Iowa	2.527	2.736	2.995
Kansas	2.188	2.054	2.330
Kentucky	2.546	2.537	2.355
Louisiana	2.875	2.867	2.647
Maine	2.424	2.451	2.460
Maryland	2.670	2.073	2.307
Massachusetts	1.905	1.942	2.020
Michigan	2.036	2.313	1.874
Minnesota	3.191	3.275	2.922
Mississippi	2.459	3.276	2.215
Missouri	2.853	2.958	2.540
Montana	2.603	2.068	2.324
Nebraska	2.758	2.416	2.403
Nevada	2.287	2.207	2.830
New Hampshire	2.671	2.316	2.775
New Jersey	1.870	1.888	2.768
New Mexico	2.657	2.811	2.258
New York	1.064	2.005	1.814
North Carolina	1.935	1.909	2.373
North Dakota	2.254	2.642	2.669
Ohio	1.871	2.431	2.527
Oklahoma	2.074	2.469	2.559
Oregon	3.230	3.139	3.118
Pennsylvania	2.692	2.503	2.598
Rhode Island	2.640	2.000	2.382
South Carolina	2.046	2.141	2.000
South Dakota	2.311	2.636	2.187
Tennessee	2.869	3.395	3.672
Texas	0.949	1.554	1.865
Utah	2.258	2.241	1.960
Vermont	2.325	2.657	2.581
Virginia	2.645	2.695	2.515
Washington	2.510	2.623	3.013
West Virginia	2.470	2.894	2.596
Wisconsin	2.634	2.562	1.926
Wyoming	2.775	2.846	3.006

TABLE A.26

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

	2002	2003	2004
Alabama	3.742	3.885	3.969
Alaska	4.260	4.983	4.333
Arizona	4.031	3.733	4.691
Arkansas	3.556	3.671	4.021
California	2.269	2.214	1.918
Colorado	2.838	2.743	3.022
Connecticut	3.569	3.659	3.379
Delaware	3.740	3.986	4.246
District of Columbia	5.915	6.356	5.152
Florida	2.589	2.683	2.549
Georgia	3.464	3.990	5.042
Hawaii	5.590	5.088	5.114
Idaho	3.225	4.176	4.429
Illinois	4.086	3.191	3.461
Indiana	3.906	3.899	4.106
Iowa	3.620	3.155	3.754
Kansas	3.059	2.875	3.329
Kentucky	3.526	3.374	3.491
Louisiana	5.165	4.956	4.929
Maine	3.377	4.132	4.409
Maryland	4.250	3.590	3.606
Massachusetts	2.929	2.916	3.372
Michigan	4.217	3.659	3.579
Minnesota	4.082	4.950	4.259
Mississippi	4.471	4.726	3.754
Missouri	3.741	4.310	3.982
Montana	4.705	3.876	3.914
Nebraska	3.852	3.962	3.161
Nevada	2.405	2.755	3.619
New Hampshire	4.070	4.454	4.439
New Jersey	2.876	3.655	4.034
New Mexico	4.472	4.053	4.104
New York	2.801	3.171	3.184
North Carolina	2.723	3.694	3.909
North Dakota	4.352	4.495	4.349
Ohio	2.436	3.451	3.419
Oklahoma	3.707	4.103	4.652
Oregon	5.377	5.731	5.809
Pennsylvania	4.218	4.263	3.957
Rhode Island	3.590	3.128	3.592
South Carolina	3.736	4.022	3.963
South Dakota	4.643	4.979	4.579
Tennessee	4.007	4.526	5.745
Texas	2.011	2.003	2.764
Utah	2.741	3.280	3.294
Vermont	4.190	4.238	4.273
Virginia	4.196	3.876	3.829
Washington	3.624	3.104	4.670
West Virginia	4.542	4.615	5.565
Wisconsin	3.905	3.767	2.671
Wyoming	4.315	4.373	4.798

TABLE A.27

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

	2002	2003	2004
Alabama	775,127	837,997	854,652
Alaska	74,323	77,841	82,973
Arizona	641,822	680,446	732,059
Arkansas	476,471	504,205	496,748
California	3,486,199	3,734,818	3,967,290
Colorado	383,349	416,067	426,427
Connecticut	291,077	328,376	332,519
Delaware	74,742	82,816	84,735
District of Columbia	114,308	115,538	108,880
Florida	1,984,046	2,086,925	2,132,417
Georgia	1,068,085	1,142,953	1,255,982
Hawaii	136,060	141,472	134,128
Idaho	138,663	146,445	151,718
Illinois	1,455,253	1,523,483	1,565,340
Indiana	602,081	691,127	740,432
Iowa	257,130	264,178	285,780
Kansas	268,210	285,769	285,141
Kentucky	687,695	718,202	754,664
Louisiana	873,672	908,496	915,530
Maine	166,627	167,525	171,198
Maryland	458,944	489,334	491,713
Massachusetts	625,407	666,694	658,923
Michigan	1,161,397	1,232,479	1,363,973
Minnesota	366,536	382,189	412,423
Mississippi	565,546	584,149	615,275
Missouri	701,336	736,354	800,484
Montana	126,558	143,848	129,203
Nebraska	151,658	173,530	182,134
Nevada	230,376	241,800	217,807
New Hampshire	80,425	88,054	87,365
New Jersey	714,320	725,388	725,337
New Mexico	314,367	361,806	338,766
New York	2,629,350	3,009,392	2,978,359
North Carolina	1,214,879	1,317,496	1,332,426
North Dakota	73,320	76,557	74,807
Ohio	1,259,071	1,368,921	1,451,998
Oklahoma	514,932	534,273	534,596
Oregon	422,552	434,601	455,589
Pennsylvania	1,426,232	1,541,706	1,645,663
Rhode Island	134,343	137,748	140,334
South Carolina	652,750	684,226	722,425
South Dakota	93,817	102,627	98,000
Tennessee	820,063	848,936	942,255
Texas	3,218,205	3,739,756	3,786,085
Utah	190,998	200,501	203,365
Vermont	65,026	68,610	67,698
Virginia	651,804	690,478	801,510
Washington	609,878	649,055	664,909
West Virginia	326,338	342,326	326,650
Wisconsin	493,508	542,404	573,279
Wyoming	53,375	57,637	52,731

TABLE A.28

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

	2002	2003	2004
Alabama	330,039	371,744	397,833
Alaska	38,467	33,863	45,345
Arizona	361,851	371,551	379,569
Arkansas	203,153	224,366	225,252
California	1,853,922	1,975,262	2,116,215
Colorado	191,067	200,622	223,299
Connecticut	115,538	117,041	111,013
Delaware	37,053	39,523	41,213
District of Columbia	30,358	35,060	25,291
Florida	892,315	1,021,309	1,009,832
Georgia	499,313	562,356	583,933
Hawaii	67,392	80,806	73,979
Idaho	85,026	91,627	86,807
Illinois	696,967	648,275	726,697
Indiana	255,241	303,668	333,061
Iowa	125,876	128,117	135,525
Kansas	131,796	136,046	133,944
Kentucky	273,115	294,137	306,791
Louisiana	412,620	447,009	450,428
Maine	59,141	60,137	65,689
Maryland	162,429	165,451	181,072
Massachusetts	206,560	193,151	227,347
Michigan	499,701	497,979	578,616
Minnesota	158,669	192,498	188,966
Mississippi	217,136	261,276	289,922
Missouri	342,034	325,734	363,966
Montana	59,468	70,367	63,518
Nebraska	82,553	87,024	92,556
Nevada	129,928	123,642	116,513
New Hampshire	27,506	34,334	32,901
New Jersey	276,328	284,834	300,016
New Mexico	160,109	195,143	182,326
New York	1,059,448	1,154,758	1,095,413
North Carolina	563,657	541,702	591,149
North Dakota	38,365	37,335	35,884
Ohio	554,256	554,211	653,473
Oklahoma	247,878	257,364	256,634
Oregon	203,654	203,431	221,858
Pennsylvania	554,809	521,607	624,499
Rhode Island	41,719	49,087	47,624
South Carolina	241,775	304,743	326,119
South Dakota	49,071	50,256	48,748
Tennessee	336,977	379,122	409,733
Texas	2,018,873	2,092,620	2,224,404
Utah	119,091	118,755	118,903
Vermont	28,710	24,506	26,890
Virginia	313,307	315,259	370,876
Washington	266,655	308,826	298,900
West Virginia	103,954	118,417	117,522
Wisconsin	251,044	232,767	290,750
Wyoming	28,285	29,912	28,985

TABLE A.29

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

	2002	2003	2004
Alabama	31,896	37,413	35,418
Alaska	3,915	3,550	3,547
Arizona	28,686	31,417	31,210
Arkansas	18,402	19,722	16,402
California	122,892	110,763	123,125
Colorado	17,461	17,668	16,774
Connecticut	13,894	15,769	14,739
Delaware	3,344	3,678	3,274
District of Columbia	7,536	7,541	5,085
Florida	63,537	64,731	59,418
Georgia	49,994	40,765	59,794
Hawaii	6,968	6,620	6,047
Idaho	5,521	7,179	7,708
Illinois	50,268	54,363	47,247
Indiana	25,273	27,975	27,450
Iowa	12,055	12,757	13,980
Kansas	11,616	10,850	11,492
Kentucky	27,365	26,854	25,129
Louisiana	37,887	37,208	32,261
Maine	6,151	5,484	5,439
Maryland	25,750	20,613	21,373
Massachusetts	31,245	30,760	26,947
Michigan	39,450	45,003	38,969
Minnesota	20,176	20,909	21,081
Mississippi	24,590	31,861	22,509
Missouri	28,617	28,408	24,208
Montana	6,792	6,080	5,134
Nebraska	7,457	7,554	7,184
Nevada	12,699	11,851	11,483
New Hampshire	4,489	4,197	4,509
New Jersey	30,013	29,592	39,794
New Mexico	15,744	19,365	11,835
New York	55,142	128,179	102,483
North Carolina	50,364	52,116	56,517
North Dakota	3,436	4,080	3,781
Ohio	41,283	53,955	57,643
Oklahoma	17,930	19,236	18,263
Oregon	17,880	16,767	17,059
Pennsylvania	72,998	73,613	74,370
Rhode Island	6,776	5,346	6,385
South Carolina	23,226	22,700	21,357
South Dakota	4,296	5,452	4,040
Tennessee	33,508	34,654	41,506
Texas	65,348	119,849	122,491
Utah	9,265	8,628	6,629
Vermont	2,547	3,098	2,823
Virginia	32,457	33,539	34,037
Washington	27,581	28,600	30,648
West Virginia	11,499	14,014	11,168
Wisconsin	26,342	26,943	20,376
Wyoming	3,429	3,792	3,329

TABLE A.30

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

	2002	2003	2004
Alabama	24,784	29,304	31,574
Alaska	3,025	2,634	3,657
Arizona	30,381	28,788	30,975
Arkansas	13,718	14,190	15,140
California	127,985	127,788	118,793
Colorado	14,635	14,598	14,252
Connecticut	10,139	9,618	8,248
Delaware	3,292	3,341	3,187
District of Columbia	4,798	5,616	3,181
Florida	56,513	71,095	60,845
Georgia	35,937	45,156	51,288
Hawaii	6,065	7,648	6,732
Idaho	6,467	8,276	7,346
Illinois	55,711	39,451	45,399
Indiana	16,528	19,183	21,175
Iowa	10,323	8,968	9,190
Kansas	9,225	7,888	8,915
Kentucky	16,239	15,944	16,994
Louisiana	30,705	32,672	30,891
Maine	3,370	3,823	4,233
Maryland	18,174	14,687	14,880
Massachusetts	26,446	19,373	21,193
Michigan	33,813	27,423	30,937
Minnesota	16,537	21,912	19,166
Mississippi	19,095	25,551	21,321
Missouri	19,856	20,416	19,302
Montana	6,174	6,179	4,772
Nebraska	7,322	7,675	5,785
Nevada	13,080	11,737	12,026
New Hampshire	2,896	3,737	3,142
New Jersey	29,127	30,913	31,793
New Mexico	14,841	17,113	12,863
New York	72,150	89,221	84,349
North Carolina	38,680	45,608	49,184
North Dakota	3,374	3,343	2,951
Ohio	26,863	34,090	38,439
Oklahoma	15,884	16,374	17,208
Oregon	14,175	14,918	16,927
Pennsylvania	46,007	40,822	44,645
Rhode Island	3,998	4,373	4,414
South Carolina	16,537	19,814	20,266
South Dakota	4,821	5,650	4,380
Tennessee	20,755	23,180	30,111
Texas	107,486	109,083	131,660
Utah	8,979	9,670	8,008
Vermont	2,379	1,973	2,152
Virginia	29,699	28,732	27,615
Washington	25,009	23,036	27,038
West Virginia	6,241	7,560	8,791
Wisconsin	21,438	16,207	15,655
Wyoming	3,077	3,063	2,905

TABLE A.31

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

	2002	2003	2004
Alabama	427,167	459,759	484,773
Alaska	44,161	48,505	48,767
Arizona	372,317	450,472	517,692
Arkansas	280,213	307,525	340,042
California	1,651,925	1,673,811	1,836,986
Colorado	174,558	201,965	239,889
Connecticut	163,044	173,824	191,970
Delaware	36,485	43,555	51,632
District of Columbia	71,516	78,794	86,500
Florida	947,455	1,006,941	1,170,356
Georgia	630,932	736,757	839,573
Hawaii	104,699	98,905	96,792
Idaho	67,642	77,887	88,357
Illinois	862,156	936,816	1,044,589
Indiana	396,174	450,063	508,287
Iowa	138,581	149,658	174,940
Kansas	135,472	154,621	164,868
Kentucky	440,020	487,310	533,697
Louisiana	579,172	635,954	687,712
Maine	109,401	125,424	132,547
Maryland	218,403	240,752	260,995
Massachusetts	238,492	280,550	325,470
Michigan	696,019	780,620	894,583
Minnesota	212,514	228,784	235,743
Mississippi	319,892	350,838	372,519
Missouri	490,353	564,505	672,212
Montana	61,369	70,376	75,553
Nebraska	85,082	96,292	110,977
Nevada	95,589	108,897	116,902
New Hampshire	38,481	42,790	46,970
New Jersey	317,893	335,751	365,919
New Mexico	166,816	189,997	218,972
New York	1,333,990	1,416,382	1,570,048
North Carolina	567,109	635,963	745,478
North Dakota	35,264	37,942	39,500
Ohio	718,590	844,375	924,409
Oklahoma	306,719	366,300	400,449
Oregon	322,599	353,623	379,336
Pennsylvania	750,048	808,134	946,008
Rhode Island	70,327	70,970	73,474
South Carolina	375,323	441,513	488,691
South Dakota	47,354	50,929	51,994
Tennessee	575,724	706,055	785,416
Texas	1,504,002	1,813,247	2,182,621
Utah	88,907	104,394	122,299
Vermont	38,611	40,372	41,899
Virginia	346,240	383,108	474,605
Washington	338,506	386,301	434,609
West Virginia	228,716	241,977	248,056
Wisconsin	243,562	279,791	310,583
Wyoming	23,059	24,931	25,110

TABLE A.32

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

	2002	2003	2004
Alabama	164,441	183,214	198,942
Alaska	20,839	21,696	24,368
Arizona	173,742	178,993	218,189
Arkansas	106,980	130,217	134,772
California	609,345	675,893	723,058
Colorado	70,780	75,625	105,713
Connecticut	46,986	52,112	50,490
Delaware	15,596	18,637	22,632
District of Columbia	11,361	13,913	10,358
Florida	364,798	393,596	427,199
Georgia	240,311	279,452	335,213
Hawaii	41,860	43,438	41,574
Idaho	36,055	42,358	45,435
Illinois	356,293	339,885	402,596
Indiana	153,979	187,429	215,109
Iowa	55,570	57,739	75,028
Kansas	57,593	67,449	67,003
Kentucky	161,960	183,105	193,324
Louisiana	286,391	303,107	323,698
Maine	35,048	39,083	44,950
Maryland	61,702	66,901	79,464
Massachusetts	47,257	56,164	82,248
Michigan	311,453	330,914	387,319
Minnesota	62,150	83,719	79,342
Mississippi	110,388	126,271	148,006
Missouri	220,423	224,007	273,312
Montana	26,950	31,061	33,088
Nebraska	35,853	39,095	46,804
Nevada	31,042	35,880	40,851
New Hampshire	10,635	14,049	15,295
New Jersey	75,383	95,930	114,211
New Mexico	77,246	90,184	106,077
New York	435,720	473,974	452,914
North Carolina	223,677	237,660	277,749
North Dakota	18,983	18,744	18,979
Ohio	278,554	310,921	379,847
Oklahoma	143,401	165,966	178,059
Oregon	157,320	158,972	168,910
Pennsylvania	282,214	284,118	345,641
Rhode Island	15,627	17,236	18,455
South Carolina	132,045	188,504	207,996
South Dakota	23,191	22,259	24,839
Tennessee	219,231	280,623	320,289
Texas	762,478	804,171	1,038,801
Utah	43,291	47,833	58,156
Vermont	14,514	12,899	14,356
Virginia	138,671	134,085	190,731
Washington	103,045	128,498	154,320
West Virginia	78,640	85,599	87,430
Wisconsin	114,808	125,925	144,211
Wyoming	11,218	12,776	13,876