

Errors in Survey Reporting and Imputation and Their Effects on Estimates of Food Stamp Program Participation

Contractor and Cooperator Report No. 72
December 2011

By **Bruce D. Meyer and Robert M. Goerge, University of Chicago**

Abstract

Receipt of Food Stamp Program (FSP) benefits by eligible people is often underreported in household surveys. Misreporting leads to biased estimates of program takeup and the effects of FSP on well-being and other outcomes. To understand the implications of underreporting, administrative data on FSP participation in two States are matched to American Community Survey (ACS) and Current Population Survey (CPS) data. Results indicate nearly 35 percent of true recipient households in the ACS and 50 percent in the CPS do not report receipt. Estimates of the determinants of program receipt using combined data show that using only survey data results in understated participation by single parents, nonwhites, and very low income households.

Acknowledgments

We have greatly benefitted from the comments of David Johnson, John Kirlin, Gayatri Koolwal, Alan Krueger, Cathleen Li, Nikolas Mittag, Daniel Schroeder, James Spletzer, Jane Stavely, and Shelly Ver Ploeg, as well as from seminar participants at the American Economic Association Meetings, American Statistical Association Meetings, Baylor University, Harvard University, USDA, Yale University and Centre for European Economic Research (ZEW). We are grateful for the assistance of many U.S. Census Bureau employees including David Johnson, Amy O'Hara, Lynn Riggs and Frank Limehouse. Lucy Bilaver, Kerry Franzetta and Janna Johnson provided excellent research assistance.

This study was conducted by the University of Chicago, under a cooperative research agreement with USDA's Economic Research Service (ERS) Food Assistance and Nutrition Research Program (FANRP): agreement number 59-4000-5-0097 (ERS project representative: Michele (Shelly) Ver Ploeg). The views expressed are those of the authors and not necessarily those of ERS or USDA.

I. Introduction

Comparisons of welfare and insurance program receipt in household surveys to those in administrative sources indicate that government benefits are substantially underreported. For example, more than forty percent of the total months of food stamp receipt and Temporary Assistance for Needy Families (TANF) receipt were not recorded in the Current Population Survey (CPS) in 2004. This underreporting is evident in most large national surveys, and has typically grown over time (Meyer, Mok and Sullivan, 2009). An important consequence of underreporting is that it may lead to significant biases in studies that examine the determinants of program participation, the distributional consequences of programs, and other program effects. This study examines the misreporting of Food Stamp Program (FSP) benefits, using administrative microdata matched to two major survey datasets. We examine rates of misreporting, how misreporting varies with household characteristics, and how it affects estimates of program receipt. We also examine whether the use of imputed observations leads to less bias in FSP participation estimates.

The use of government programs is examined in a large literature that relies on potentially error-ridden self-reports of program receipt. For example, a number of studies have examined the likelihood that those eligible for food stamps participate in the program (Blank and Ruggles, 1996; Haider, Schoeni and Jackowitz, 2003; Cunnyngham, Castner and Schirm, 2008; Wu, 2010). The use of other programs has also been heavily studied. Blank and Ruggles (1996) examine the takeup of Aid to Families with Dependent Children (AFDC) as well as food stamps, while McGarry (2002) analyzes the takeup rate for Supplemental Security Income (SSI). A few takeup studies have made simple, but rough corrections for under-reporting, such as Bitler, Currie and Scholz (2003) who examine the Women, Infants and Children (WIC) program using Survey of Income and Program Participation (SIPP) data. Other studies calculate takeup rates by dividing administrative data numerators of recipients, that do not suffer from under-reporting, by survey based denominators of all those eligible to participate.

In addition, many studies examine program receipt without conditioning on estimated eligibility.¹

Takeup studies typically show that participation rates among eligibles are well below one. However, given the extent of underreporting, a major part of what appears to be non-participation may actually be recipients whose receipt is not recorded in the household survey. A better understanding of underreporting and how it may bias takeup estimates has important implications for both policy makers and researchers. Policy makers have long been concerned with low participation rates in some programs, and have recently taken steps to increase participation (see U.S. GAO, 2004 for efforts to raise food stamp participation). Accurate estimates of program receipt are needed to know who is benefiting from programs, why families choose not to participate in certain programs, and how individual characteristics affect participation. Such information can be used to increase takeup and better target programs to the most needy.

Underreporting will also bias studies of the distributional consequences of transfer programs. Studies that examine the extent to which food stamps increase the resources of poor families will understate the impact of the FSP when there is underreporting. In addition, correcting for underreporting bias will yield better measures of the well-being of the disadvantaged. There is a very large literature examining the distributional consequences of welfare and social insurance programs. For example, Jolliffe et al. (2005) examines the effects of the Food Stamp Program on poverty. Engelhardt and Gruber (2006) analyze the effects of social security on poverty and the income distribution. U.S. Census (2007), Scholz, Moffitt and Cowan (2008), and Meyer (2009) analyze the consequences of a wide variety of programs and taxes on features of the income distribution. The latter two studies employ simple, but rough adjustments that account for program misreporting.

We examine misreporting of food stamp receipt in two large household surveys using administrative data from two states. The surveys are the CPS and the American Community Survey (ACS). Illinois and Maryland supply the administrative data. We find substantial under-reporting of food stamp receipt, with one-third to one-half of true recipient households not recorded as such. We examine over-reporting as well as well as

¹ For excellent reviews of research on program takeup, see Remler and Glied (2003) and Currie (2006).

under-reporting. Both not reporting when a recipient and reporting receipt when not a recipient are associated with a variety of household and interview characteristics. We find that misreporting also leads to biased estimates of the determinants of program receipt.

Our results also suggest biases in other types of program effect analyses. Often, receipt of a program will be used as an explanatory variable in a regression. Mismeasurement of receipt will lead to bias in such estimates. In addition, our analyses indicate that the errors of measurement are correlated with a range of explanatory variables. This non-classical form of the errors means that instrumental variable methods are unlikely to provide a solution to the measurement error problem.

Lastly, the results presented in this paper provide an informative assessment of survey quality and should guide the improvement of household surveys. There are very few variables in household surveys for which we can obtain independent and accurate measures to evaluate survey quality. We match administrative FSP and TANF data to two major survey datasets. The Social Security Numbers on the food stamp and TANF records that we use have been verified (compared to SSA records) as a necessary condition for receipt of benefits, so the accuracy of the match is very high. Thus, these analyses provide an important benchmark for the quality of survey data.

In the following section, we summarize past work on the misreporting of government transfers, emphasizing food stamp misreporting. In Section III, we describe our data sources and matching. Section IV provides our main evidence on misreporting while Section V analyzes how misreporting varies with household characteristics. Section VI shows that misreporting affects our understanding of program receipt. In Section VII we analyze imputation and the use of imputed data, and conclusions are offered in Section VIII.

II. Previous Research

A number of studies have documented significant underreporting of food stamps in large national surveys such as the CPS or the Survey of Income and Program

Participation (SIPP).² Several studies estimate underreporting by using administrative microdata that is directly linked to survey data. In perhaps the most comprehensive of these matching studies, Marquis and Moore (1990) show that 23 percent of survey respondents in four states, who were food stamps recipients according to administrative microdata, failed to report participation in the 1984 SIPP. Using a subset of these data, Bollinger and David (1997) find a nonreporting rate of 12 percent. Bollinger and David also conclude that higher income recipients are more likely and female recipients are less likely to fail to report receipt. Taeuber et al. (2004) examine FSP administrative records in Maryland linked to the national 2001 Supplementary Survey (American Community Survey), finding that about 40 percent of recipients do not report receipt.

The main limitation to direct matching of survey and administrative microdata at the individual or household level is that such matches are rarely available, and when these matched data are available, it is typically only for a short time period and for a small subset of the survey respondents, such as a single state. A second approach compares reported receipt in a survey (weighted to population totals) to administrative reports of the number of recipients served or dollars distributed. Studies that use this approach also find evidence of substantial underreporting. For example, Primus et al. (1999) compare weighted food stamp dollars reported by households in the CPS Annual Demographic File (ADF) to administrative numbers. They find that the underreporting rate increased from 24 percent in 1990 to 37 percent in 1997. Bitler, Currie, and Scholz (2003) estimate food stamp underreporting rates between 1995 and 1999 of about 14 percent in the CPS Food Security Supplement and about 11 percent in the SIPP. Cody and Tuttle (2002) calculate underreporting rates for the CPS ADF that range from about 21 percent in 1991 to 36 percent in 1999.

Meyer, Mok, and Sullivan (2009) document the degree of net underreporting of food stamps in several major household surveys by comparing the weighted total of food stamps dollars or months recorded in five household surveys with either dollar or month totals made available by the U.S. Department of Agriculture, Food and Nutrition

² Underreporting is not unique to food stamps. In fact, there is evidence of significant underreporting in many government transfer programs. See Meyer, Mok, and Sullivan (2009) for a comprehensive summary and numerous citations to the literature. Excellent summaries of data reporting issues in surveys include Moore, Stinson and Welniak (2000), Bound, Brown and Mathiowetz (2001), and Hotz and Scholz (2002).

Services. A time-series for the dollar reporting rates for three of the surveys, the CPS, the SIPP, and the Consumer Expenditure (CE) Survey, is reported in Figure 1. Month reporting rates for the CPS and SIPP can be found in Figure 2. Figures 1 and 2 show that food stamps are significantly under-reported in each of these surveys. The dollar and month reporting rates are remarkably similar, suggesting that most of the underreporting is due to understating the number of months of receipt rather than dollars per month. There is other evidence that monthly amounts are actually quite close to the true average for several programs and datasets. Previous research indicates that about two-thirds of the underreporting of food stamp months in surveys results from failure to report receipt at all (Moore, Marquis and Bogen, 1996).

As well as being significantly below one, the reporting rates have tended to fall over time. As shown in Figure 2, between 1987 and 2006, reporting rates for food stamp months fell in the CPS from 0.73 to 0.53. The SIPP typically has higher reporting rates for the FSP program, and these have fluctuated but not steadily declined over time. Thus, past work suggests substantial reporting error that is potentially becoming more common over time.

III. Data

We examine two large and frequently used household datasets: the 2001 American Community Survey (ACS)³ and the 2002-2005 Current Population Survey Annual Social and Economic Supplement (ASEC), formerly the Annual Demographic File or March CPS. These survey datasets are matched at the household level to administrative data on food stamp and TANF receipt in Illinois and Maryland. The ACS has replaced the Census of Population long form data and is the largest general purpose survey of U.S. households. The survey contains basic demographic information on households, characteristics of living units, receipt of government assistance, as well as information on citizenship, immigration status, education, labor force participation, and several categories of income. The ACS is also the best source of socio-economic data such as incomes at a fine geographic detail. Consequently, the ACS is currently being

³ Strictly speaking we used the 2001 Supplementary Survey or SS01 which differs slightly from the ACS.

used by several cities and states to determine local poverty rates.⁴ The CPS-ASEC is probably the most extensively used dataset in labor economics. It is the source of our official income distribution and poverty statistics and is the most common source for research on earnings, poverty and inequality. It includes approximately 100,000 households who are interviewed February through April, and report income and program receipt for the previous calendar year, as well as extensive demographic and labor force participation information. In both surveys the sample for our analyses is households with a household head at least age 16.

The administrative data provide information on food stamp and TANF receipt for Illinois and Maryland. The monthly records report program receipt, amounts (for some years), as well as Social Security Number (SSN). From these monthly records we are able to construct the start and end dates of receipt spells. The source of the Maryland data is the Client Automated Resource and Eligibility System (CARES) provided by the Maryland Department of Human Resources to the Census Bureau Data Integrated Division. The data provided to the Census Bureau currently cover the period 1998 through 2003 and include monthly information on all Maryland residents receiving food stamps and TANF benefits during that period. The source of Illinois data is the Illinois Department of Human Services (DHS) client database, a subsystem of the Client Information System. Each extract contains mainly cross-sectional data, with some limited historical information. From these extracts, Chapin Hall has created the Illinois Longitudinal Public Assistance Research Database (ILPARD), a longitudinal database of public assistance cases (including FSP and AFDC/TANF receipt), currently containing data from February 1989 to the present. The ILPARD is updated monthly with new cases from the IDHS system and records that IDHS has changed in the past month. The Food Stamp Program data of the Illinois DHS Client Database contain information on all members of the household and their monthly utilization of the program. The data supplied to the Census Bureau cover 1998 through 2004.

⁴ See Levitan et al. (2010), Smeeding et al. (2010), and Zedlewski et al. (2010) .

Matching

Matching the survey and administrative data is accomplished using a variable called the Protected Identification Key or PIK. In order to receive food stamps, an individual must have a validated SSN (their name, gender, and date of birth must match SSA records). The FSP data are subject to regular audits by the USDA. The validated SSN is converted to a PIK by the Census Bureau. The Census Bureau uses name, address and date of birth from the ACS records to create a PIK for survey individuals. A PIK is obtained for 96.4 percent of the Illinois TANF and food stamp records over the entire period and 97.8 percent of the Maryland records. In the survey data, a PIK is successfully obtained for at least one member of 92.7 percent of ACS households in Illinois and 94.9 percent of ACS households in Maryland. The rates are considerably lower for CPS households. Prior to 2005, respondents were asked to supply their SSN in the CPS to allow linking, and a PIK was not determined for those who did not supply an SSN, reducing the share of households that can be matched. We have a PIK for at least one member of 68 percent of Illinois CPS households and 81 percent of Maryland CPS households. The main sample for our analyses is households with at least one household member who has been assigned a PIK. The analyses were done at the Chicago Census Research Data Center by University of Chicago researchers with Census Bureau Special Sworn Status.

Definitions

Food stamp receipt in the ACS comes from the question “At any time DURING THE PAST 12 MONTHS, did anyone in this household receive Food Stamps?” To match this we create a binary variable using the administrative data that indicates whether food stamps were received in the survey month or the previous 12 months by anyone in the household. Food stamp receipt in the CPS refers to receipt in the previous calendar year.

The food stamp household is notoriously difficult to define, but this complication does not impinge on our analyses. We examine whether a household in the ACS or CPS that reports (or does not report) receipt of food stamps, has any member that is a recipient

in the administrative data. Note that a survey household may contain more than one FSP assistance unit or may include some individuals who are in an assistance unit, as well as others who are not.⁵ Since not all individuals in a household are necessarily assigned a PIK, there is a bias in our estimates that leads the raw results to understate our main conclusions, as we discuss below. This reliance on the ACS or CPS household definition greatly simplifies the analysis.

Missing PIKs and Nonrandom Matching

A high percentage of the ACS survey households have a PIK which allows them to be matched to the administrative data. Overall the percentage of ACS households that have a valid PIK is 92 percent in Illinois and nearly 95 percent in Maryland. However, the rate is lower for those who are likely food stamp recipients. The rates are 89 percent in Illinois and 92 percent in Maryland for households with income below twice the federal poverty line. As mentioned above, the rates are much lower for the CPS sample, 68 and 81 percent for Illinois and Maryland, respectively, because the CPS interprets the failure to supply a social security number as lack of consent to matching. We examine what household characteristics are associated with it being unable to be linked to a PIK. The results of probit equations for whether a household is PIKed are reported in Appendix Table 1 for the ACS and Appendix Table 2 for the CPS. We find that we can reject that a PIK is missing at random. In the ACS, a number of characteristics are associated with a household being less likely to have a PIK, such as the household being small and the head being black or other race, Hispanic, or in Illinois a noncitizen. In the CPS, a PIK is less likely for smaller households and non-rural ones. In Illinois a missing PIK is also more common for whites and the employed, and in Maryland for Hispanics. Because of this nonrandomness in missing PIKs, in our analyses we multiply survey weights by the inverse of the predicted probability of a household having a PIK, where the covariates used in that prediction can be seen in Appendix Tables 1 and 2.

⁵ To be clear, we are able to accurately determine what share of true recipient survey households report receipt, but we cannot determine what share of true recipient assistance units report receipt.

IV. Agreement between Survey and Administrative Reports

Table 1 reports a cross tabulation of administrative receipt of food stamps and ACS survey reports of food stamps in the top panel for Illinois and in the bottom panel for Maryland. We take the administrative reports as truth, though there are uncommon ways in which they can be wrong. For example, if a clerical error leads benefits to be temporarily suspended, but they are later reinstated and paid, the data may indicate that benefits ended and were later restarted. Population estimates and all percentages are weighted by household weights adjusted for a missing PIK (multiplied by the inverse of the probability of having a PIK).

Overall, in the administrative data 8.1 percent of Illinois households receive food stamps and 6.3 percent of Maryland households do, over the 2000-2001 period to which the survey refers. However, reporting errors are common. In the ACS, the share of recipients according to the administrative data who are classified as nonrecipients in the survey, in other words the false negative rate, is 32 percent in Illinois and 37 percent in Maryland. These rates are just the row percentages in the fourth row of each cell. These are very high rates of failing to report receipt when a household is truly a recipient household. The share of true nonrecipients who are reported as recipients, in other words the false positive rate, is 0.8 percent in Illinois and 0.5 percent in Maryland. By comparing the column total for reported receipt to the row total for administrative receipt, we see that there is also a net understatement of receipt of 23 percent in Illinois and 29 percent in Maryland.⁶ If we account for the dollar understatement conditional on reporting receipt (which we can only do currently for Maryland) the net dollar understatement is much larger. Conditional on reporting receipt, in Maryland dollars are understated by 18 percent. Combining under-reporting of receipt with under-reporting of conditional dollars leads to a 42 percent understatement of dollars in Maryland.⁷ This figure is close to the 44 percent found nationally in the 2005 ACS in Meyer, Mok and

⁶ While we report weighted statistics throughout the paper, the weights tend to be unimportant. Here the unweighted numbers only differ from the weighted numbers by one percentage point for each state.

⁷ This figure is from the subsample of recipients with income less than twice the poverty line and will be updated with the full sample figure when available.

Sullivan (2009).⁸ These are very substantial rates of under-reporting. Approximately one-third of those households that receive are not recorded as receiving in the survey.

Table 2 repeats the ACS cross tabulations of Table 1, but only for those observations for which it is imputed as to whether or not the household receives food stamps.⁹ Several patterns are evident in this table. First, only a small share of households are imputed, approximately 2.1 percent of the total population estimate and 1.7 percent of the total sample in Illinois and 1.4 percent of the total population estimate and 1.3 percent of the total sample in Maryland. However, a large share of true food stamp households are imputed, 14.3 percent of the population estimate in Illinois and 11.3 percent in Maryland. An even larger share of reported food stamp households are imputed in each state. Second, among those who are imputed, a very large share are true food stamp recipients (55 percent in Illinois and 49 percent in Maryland). Third, a substantial share of the false positives are due to imputation. These observations account for 41 percent of false positives in Illinois and 26 percent of false positives in Maryland, despite being no more than 2.1 percent of the total sample. Because of these imputed false positives, the overall false positive rate is not a good indicator of households' tendency to report receipt when they are not recipients.

Using CPS data, we repeat these cross-tabulations, reporting the results in Table 3 for the full sample and Table 4 for the imputed sample. In Illinois, 9.8 percent of households receive food stamps, while in Maryland 5.3 percent do according to the administrative data. The share of administrative food stamp recipient households that do not report receipt in the CPS is even higher than in the ACS. 48 percent of Illinois recipient households do not report, while 53 percent do not in Maryland. The share of non-recipients that report receipt remains low, just under 1.0 percent in Illinois and 0.4 percent in Maryland. Since the CPS data are for over 3 or 4 years, depending on the state, we can examine how reporting has changed over time (these results are not separately indicated in the tables). In Illinois, there is some tendency for the false negative reporting to increase, while in Maryland the tendency is pronounced. By 2004,

⁸ Earlier under-reporting rates cannot be calculated for the ACS from public use data since information on food stamp receipt is not released.

⁹ Imputation methods in the ACS and CPS are described in Section VIII.

over 60 percent of recipient households are not recorded as recipients. In summary, the evidence from the two states is that half of recipients do not report food stamp receipt.

Accounting for both false negatives and positives, we can calculate from Table 3 that the net understatement of receipt is 40 percent in Illinois and 46 percent in Maryland. These numbers accord quite closely with the 39 percent for the Illinois time period and 38 percent for the Maryland time period reported in Meyer, Mok and Sullivan (2009) based on national aggregate data for months of participation.

Table 4 displays a somewhat different pattern for imputed observations in the CPS than we saw in the ACS. First, a larger, but still small share of households are imputed, approximately 3.8 percent in Illinois and 2.9 percent in Maryland. However, a substantial share of true food stamp households are imputed, but a smaller share than in the ACS, 9.2 percent in Illinois and 9.4 percent in Maryland. About 7.9 percent of CPS reported food stamp households are imputed in Illinois, and 11.4 percent in Maryland. Second, among those who are imputed, the share that are true recipients is smaller than it was in the ACS (24 percent in Illinois and 17 percent in Maryland). Third, overall a larger share of the false positives is due to imputation. These observations account for 33 percent of false positives in Illinois and 51 percent of false positives in Maryland. Again, because of these imputed false positives, the overall false positive rate is not a good indicator of households' tendency to report receipt when they are not recipients. However, the low false positive rate does mean that the aggregate under-reporting rate (one minus the reporting rate) is a good approximation to the rate of false negative reports. This is a useful result since aggregate rates are available for most years and the entire U.S., while our matched results are geographically and temporally limited.

Possible Biases in these Probabilities

Our main findings are likely somewhat stronger than reported because our methods will likely tend to bias downward false negative reporting rates and bias upward false positive rates. First, we include households in our samples if anyone in the household has a PIK. Someone in the household may receive food stamps, but if they do not have a PIK we do not treat the household as a recipient household unless someone

else in the household who has a PIK is a recipient in the administrative data. This issue would have the effect of understating true food stamp receipt. We might reasonably assume that affected households, those that are partially PIKed leading their administrative food stamp status to indicate non-receipt when they are recipients, have reporting rates higher than nonrecipients, but lower than recipient households with all members PIKed and who are likely to have only recipient members. Then, as shown in the Appendix, the false positive rate is biased upward and the false negative rate is biased downward. About 14 percent of ACS households with at least one PIK have members without a PIK, while 24 of CPS households in Illinois (15 percent in Maryland) have this situation. Thus, this bias could be substantial.

Second, a household that moved into the current state over the last year may have received food stamps in their previous state even if they did not in their current state of residence. The administrative data from their current state of residence would not report that receipt. Thus, mobility across state lines will lead to an understatement of true food stamp receipt. Under the assumption that such households that received in a previous state but not the current state have a reporting rate higher than those who received in neither the previous nor current state, but lower than those who received in the current state, the false positive rate will have been biased upward and the false negative rate biased downward (again see the Appendix for a proof). Since only about two percent of individuals move across state lines in a year, the likely bias is small.

Third, a small fraction of the administrative records do not have a PIK. As in the last two cases, this type of error will lead some true recipient households to not appear as recipients in the administrative data. Again, if such households have reporting rates higher than true nonrecipients, but lower than other true recipients, the false positive rate would be overstated and the false negative rate understated.

Fourth, a PIK may be incorrectly assigned to a survey household. If the household is a true administrative recipient household, then the situation is analogous to the third case above. The situation is different, however, if the household is a true nonrecipient household, a likely more common case since the vast majority of households do not receive food stamps. In this case, false negatives may be overstated since the incorrectly assigned PIK may be for a member of a household that is a recipient

household in the administrative data. Given that most households do not receive, this last possibility should be uncommon. Thus, the incorrect false negatives require the joint occurrence of two low probability events: an incorrectly assigned PIK and administrative food stamp receipt for that PIK.

Finally, in the ACS we consider a household to be a recipient household if food stamps are received anytime during a 13 month period rather than the 12 month period that is asked about in the ACS. The additional month added in the 13 month definition is the oldest of the 13 months. This convention leads more households to be classified as true recipient households than might be warranted. In principle, this convention could lead to either higher or lower false negative and false positive rates. A reasonable assumption, though, is that the households affected by this convention have reporting rates between those of the households that are either participants or non-participants under either definition. In this case, the false positive rate will be biased downward and the false negative rate biased upward. We can easily examine the magnitude of this potential bias by only defining administrative receipt based on the 12 months preceding the current month. When we do this exercise, false negative and false positive reports are only negligibly different under the two assumptions.

Overall, it seems likely that false negatives are understated and false positives are overstated. The first three cases likely lead to understatement of the false negative rate and overstatement of the false positive rate. The fourth case is hard to evaluate since the frequency of incorrectly assigned PIKs is not known, but the likely bias seems small. The final possible bias can be directly examined and is found to be very small.

V. What Affects the Agreement between the Survey Reports and the Administrative Records?

We next examine how misreporting of food stamp receipt differs across households. If misreporting does not depend on household characteristics, then it is fairly straightforward to correct estimates of takeup and the distributional effects of programs (examples of such corrections can be found in Meyer, Mok and Sullivan 2009, and Meyer

2009). However, if misreporting is correlated with household characteristics, we can use estimates of the relationships to adjust statistical analyses.

In the analyses of the determinants of misreporting, we examine those with income less than twice the poverty line, to focus on a group for whom food stamp receipt is especially relevant. In the first two columns of Table 5 we report probit equations for the determinants of false negative reporting in the ACS. Here the subsample is those who, according to the administrative data, are recipients of food stamps (true recipients). We report average derivatives of the probability of being a false negative reporter rather than coefficients to aid the interpretation of the magnitudes. We examine the association with family type, number of family members of various ages, age, gender, education, race and employment status of head, income relative to the poverty line for a family of a given composition, reliance on English at home and citizenship, geographic location, reported receipt of other programs, true receipt of TANF, and length of food stamp receipt from the administrative data.

Despite a fairly small sample for this analysis, there are some noticeable differences across households in false negative reporting. Households headed by a person 50 or older are more likely to be false negative reporters (not report) than younger households. This difference is significant in Illinois, but not quite so in Maryland. Recipients with a college education are much more likely to not report in Illinois, but in Maryland those with only a high school education are the most likely education group to not report. Males are significantly more likely to not report in Illinois, and the unemployed are less likely to fail to report in Maryland. Non-whites are more likely to be false negatives in both states.

Higher income increases the likelihood that a recipient will not report receipt. For example, an increase in income from half the the poverty line to 1.5 times the poverty line increases the likelihood of false negative reporting by over 10 percentage points in each state, on a base of under 30 percentage points. Rural households and those that report public assistance receipt are much less likely to fail to report receipt. Those recipients who speak only English at home in Illinois are much less likely to fail to report receipt. Non-U.S. citizens are also surprisingly less likely to fail to report in Illinois, and the difference is significant. The measures of disability have conflicting associations,

with disability having a weakly significant negative association with the false negative rate in Illinois, but disabled, not working has a positive and significant association with false negative reports in Maryland.

We also examine the association of not reporting with reported receipt of other transfer programs in the ACS. Quite uniformly, true recipients who report receipt of other programs (public assistance, housing assistance) are more likely to report food stamp receipt. The difference is nearly twenty percentage points for reported public assistance receipt in both states. Reflecting the high true and imputed receipt rate among those for whom whether or not they receive food stamps is imputed, these imputed observations are much less likely to be false negatives.

Agreeing with the idea that regularity of receipt is important, those who received food stamps in more months in the twelve month period prior to the survey month, are more likely to report receipt. This difference is very pronounced. An additional month of food stamp receipt is estimated to decrease the non-reporting probability by .03 in Illinois and .04 in Maryland. Finally, there is an insignificant relationship with true TANF receipt, once we have accounted for the reporting of program receipt.

We also examine the frequency of reporting receipt in the ACS by those who are truly nonrecipients in columns 3 and 4 of Table 5. The sample for this false positive analysis, those who are truly nonrecipients, is much larger than that used for the false negative analysis. However, the false positive rate is so low that the number of false positives is much smaller than the number of false negatives. Given the small number of “ones” in this probit analysis, there are fewer significant determinants of reporting in these equations. However, in both states, the disabled who don’t work, those with reported public assistance, and those with food stamp receipt imputed are significantly more likely to have reported receipt when not a recipient. In Illinois, nonwhite, less-educated, young household heads with many children under 18 are more likely to falsely report receipt.

Analogous results for the determinants of misreporting in the CPS are reported in Table 6, again conditioning on income below twice the poverty line, but they are somewhat less precise given the smaller samples. There are some clear areas of agreement between the CPS and ACS results, but there are notable differences as well.

First examining false negative reporting, those over 50 are weakly significantly more likely to fail to report in Illinois, but the relationship is the opposite in Maryland. More income relative to poverty is associated with a higher false negative rate in Illinois, but has an insignificant association in Maryland. In both states, reported housing assistance and a longer period of food stamp receipt are negatively related to false negative reporting, while true TANF receipt and the imputation of food stamp receipt are positively associated with false negative reporting. There is a noticeable increase in false negative reporting over the short sample time period, especially in Maryland.

As for false positive reporting in the CPS, in both states those with higher income are less likely to be false positives, while those with reported public assistance receipt or imputed food stamp receipt are more likely to be false positives. Additionally, in Illinois those under 50 and reporting public assistance or housing assistance are more likely to falsely report receipt, while in Maryland those households with fewer children under 18 and more members PIKed are more likely to falsely report. There is no discernable time trend in false positive reporting.

VI. The Effect of Misreporting on Estimates of Program Receipt

While the ACS data suggest that only 6.3 percent of Illinois households receive food stamps over the 2000-2001, the administrative data indicate that 8.1 percent do, a 29 percent increase. In Maryland the ACS data suggest 4.4 percent of households receive food stamps, while the administrative data indicate 6.1 percent do, a 41 percent increase. In the CPS, the differences are even sharper. In Illinois over 2001-2004, the CPS data suggest 6.0 percent of households receive, while the administrative data indicate 9.8 percent a 64 percent increase. In Maryland over 2001-2003, the survey data suggest a 2.9 percent receipt rate, while the administrative data indicate 5.3 percent, and 85 percent increase.

As well as looking at mean rates, having true food stamp receipt matched to survey data gives us the opportunity to directly examine if the use of administrative data provides a different understanding of the determinants of FSP receipt than we obtain from survey data alone. We first estimate the determinants of receipt using only survey

data. We then re-estimate the determinants of receipt, combining the survey data with the administrative data on food stamp receipt, using the administrative measure of receipt as the dependent variable. This approach combines the accurate dependent variable with the rich explanatory variables from the surveys. We then compare the two equations for the use of food stamps.

The determinants of food stamp receipt using only ACS survey data can be seen in Table 7 column 1 for Illinois and column 4 for Maryland. These estimates are from the sample that includes observations with an imputed dependent variable; we consider estimates that exclude imputed observations in the next section. We have restricted our sample to households with income below twice the poverty line to have a sample for which food stamp receipt is a likely possibility. In this low-income sample, 20 percent of ACS households in Illinois report that they receive food stamps in the survey, while 17 percent of those in Maryland do (see Appendix Table 3). The survey estimates suggest that, controlling for household income, a household headed by a single parent is about ten percentage points more likely to be a recipient than a married couple household in both states. Those 50 or older are much less likely to be participants than those ages 40-49 in Illinois, while in Maryland the effect is only evident for those 60 or older. The differences in receipt for these older groups are large: 10 percentage points in Illinois and 9 percentage points in Maryland compared to those 40-49.

The education and income coefficient have the expected signs, with high school dropouts 6 percentage points more likely to participate in Illinois and 7 percentage points more likely in Maryland than those with some college. Income is a strong predictor of food stamp receipt. In Illinois, households with income equal to half the poverty line are 7 percentage points more likely to receive food stamps than households with income 1.5 times the poverty line. In Maryland, the difference is 10 percentage points. The estimates also suggest that households with a non-employed or disabled head are much more likely to receive food stamps. In Illinois, non-whites are more likely to participate, while there is little difference by race in Maryland.

The strongest relationship is found for an indicator of reported receipt of public assistance or housing assistance. Those reporting housing assistance receipt are more

than 1.5 times as likely to be recipients than an average individual, while those reporting public assistance receipt are more than twice as likely to be recipients.

Replacing the mis-measured ACS survey receipt variable with the administrative measure of receipt gives us a different picture of determinants of food stamp participation. Column 2 and 5 of Table 7 repeat the participation analysis substituting an administrative dependent variable for the poorly reported survey measure of receipt. In the administrative data, 24 percent of low-income households in Illinois receive food stamps, while 23 percent of those in Maryland do (see Appendix Table 3). There are many notable differences between these specifications and the previous ones. Columns 3 and 6 of Table 7 report p-values for tests of equality of the derivatives based on the survey data alone and those based on the survey and administrative combined data. Households headed by a single individual or parent are much more likely to be recipient households in the combined data. In Illinois the difference is 4-5 percentage points while in Maryland it is 6-9 percentage points, and these differences are at least marginally statistically significant in most cases. The average derivative for race is also significantly different, with the specifications with the administrative dependent variable indicating that participation is four percentage points greater for non-whites than the survey data only specifications in both states. The derivatives for reported receipt of public assistance or housing benefits are significantly different in most cases, as are those for having more family members with a PIK.

In Illinois, the coefficients on age, particularly for age 50-59, are quite different in the combined data, and the difference is statistically significant. The association with speaking English only is also significantly different. For Maryland, the association with income is quite different in the combined data, indicating substantially larger differences in participation by income. Overall, one can reject that the combined data yield the same estimates as the ACS survey data alone at a level below 0.0001 in Illinois and at 0.0004 in Maryland.¹¹

We report the determinants of food stamp participation using the CPS data in Table 8. Again, columns 1 and 4 of this Table provide the average derivatives for the

¹¹We have also examined the coefficients (as opposed to the average derivatives) for each of the specifications. The overall results are very similar for the coefficients, though the differences between the combined and survey data estimates are smaller in some cases, but not uniformly so.

survey data only samples. In our sample of households with income less than twice the poverty line 19 percent of households report food stamp receipt in Illinois and 12 percent do in Maryland (see Appendix Table 4). There are quite a few similarities with the ACS data results. Again single parent households are more likely to be recipients, holding constant income and other characteristics, though the relationship is not significant in Maryland. Households with many children are more likely to receive food stamps, and this difference is significant in both states. Households headed by a person 70 or older are less likely to receive food stamps, while those that have very low income, a non-employed head, who report receipt of public assistance or housing benefits, are significantly more likely to receive food stamps in both states according to the CPS data. In Illinois, those without a high school degree are more likely, and those with a college degree less likely to receive than those with some college. There is some tendency toward higher receipt in rural areas, though the evidence is fairly weak. The survey data alone do not suggest that food stamp receipt has been rising over time in either of the states.

When we substitute the administrative measure of receipt for the poorly reported survey measure, the determinants of reporting change in important ways. These estimates are reported in columns 2 and 5 of Table 8. In the administrative data, 27 percent of low-income households in Illinois receive food stamps, while 17 percent of those in Maryland do (see Appendix Table 4). The difference in participation between single parents and a married parent changes from 5 percentage points to 13 in Illinois and from 1 percentage point to 8 in Maryland with the administrative data measure. In Illinois the change is statistically significant while it is not in Maryland. Participation is also much higher among non-whites and lower income households than it is in the survey data alone in Illinois. In neither state would one detect the rising use of food stamps using the survey data alone. In the combined data there is significant evidence of increasing receipt in Illinois, and strong and significant evidence in Maryland.

One of the differences between the combined administrative and survey data and the survey data alone that is worth emphasizing is the differences in participation by age. Haider et al. (2003) and Wu (2010) emphasize lower food stamp takeup by older households in survey data. Gunderson and Ziliak (2008) find a more complicated pattern

by age. In some cases, the sharp differences in misreporting by age carry over to imply that the combined data show much less of a difference between the aged and the non-aged, thus explaining a significant part of the puzzle in past work. We see this pattern in our largest sample, that for Illinois using ACS data. This pattern is not evident in the CPS data though.

We should also emphasize that while the survey data alone would lead one to make incorrect inferences in some cases, the overall picture obtained from the survey data is fairly accurate. Most of the significant derivatives remain significant and changes in the sign of derivatives in the participation equations are rare when one goes from the survey data alone to the combined data. This pattern holds even in the CPS where half of true food stamp recipients fail to report. A high priority for future research should be to explore through analytical models and simulations the generality of this result.

VII. Evaluating Food Stamp Imputation in the ACS and CPS

When responses regarding receipt or amounts are missing in surveys, components of income are often predicted using other information. A large share of government payments to individuals are imputed in most household surveys in this way. In 2005, 24 percent of reported food stamp dollars were imputed in the CPS, and 17 percent were imputed in the ACS (Meyer, Mok and Sullivan 2009). In 2004, 36 percent of reported dollars were imputed in the SIPP. In our 2001 ACS data, 23 percent of reported recipients were imputed in Illinois and 18 percent in Maryland. In our 2002-5 CPS data for Illinois, the rate is 8 percent, while it is 11 percent in Maryland. In a review of recent issues of leading social science journals, we found that authors were about equally split between including and excluding observations with imputed values. We use the unique data we have to evaluate the quality of food stamp imputations in the ACS and the CPS and to provide guidance for researchers who appear to be uncertain about the choice of whether or not to rely on imputed data.

Food stamp receipt in the ACS and CPS is, as in other Census data sets, imputed using hot deck methods. In the ACS, households (not in group quarters) are classified by state into one of twenty cells, defined by full interactions of family type, presence of children, poverty status, and the race of the reference person. The data go through what

is called a “geosort” before the imputation process. The most recent nonmissing response from a given cell at the smallest level of geography available is substituted for a missing response. The CPS hot deck procedure differs from that in the ACS in some important ways. Households are classified into a much larger number of cells based on non-geographic characteristics, but at the national level. The cells are defined by full interactions of number of people in the household (6 categories), household income (9 categories), household type (3 categories), age of head (2 categories) and receipt of public assistance (2 categories) for a total of 648 cells.

It is unclear how to evaluate the accuracy of the ACS and CPS imputations. That a non-random set of respondents have their responses imputed complicates any analysis. Those who do not answer the food stamp question are very likely to be recipients, particularly in the ACS. Thus, the share of imputed observations for which food stamp receipt is incorrectly imputed will be higher than a sample with a low food stamp rate (such as a random sample) where errors could be kept low by never imputing a positive response to the receipt question. We settled on the idea that an appropriate test of the accuracy of imputations really depends on the use to which one is putting the potentially imputed data. In our case, we are interested in the determinants of program receipt. A natural test of the imputation process is whether or not the survey based estimates of the determinants of program receipt are closer to our estimate of truth, the combined data estimates with an administrative dependent variable, when the imputed observations are included. Comparing the estimates with and without the imputed values also provides an implicit test of the decision to include or exclude these observations. As previously noted, professional practice at the highest level is divided as to whether or not to include observations with imputed values.

In Tables 9 and 10 we directly compare the derivatives from food stamp receipt equations with and without observations with imputed values for food stamp receipt. We compare the derivatives for this survey based participation equation with one based on the administrative measure of food stamp receipt. Table 9 indicates that in the ACS in Illinois there is not a great advantage to using the imputed values. In nine of twenty-three cases, the specification with imputed values is closer to the one relying on administrative data. In fourteen cases the reverse is true. Maryland, however, provides fairly strong

evidence in favor of including the imputed values, with twenty of twenty-three derivatives from the specification including imputed values being closer to the administrative data specification. To conduct a joint test on the full set of derivatives we use the chi-square statistic that measures the distance between the estimates of the determinants of program participation, weighting by the precision of the individual estimates and accounting for the covariances. Chi-square statistics for the difference in derivatives indicate that a variance weighted average of the derivatives is considerably closer to the administrative data estimates when the imputed values are included. In both states, the statistics are about 20 points smaller with the imputed values, with 23 degrees of freedom. Thus, we find that including the ACS imputed observations leads to estimates that are closer to those based on the combined data with an administrative dependent variable.

We performed similar analyses for the CPS that we report in Table 10. In Illinois there is little advantage to including the imputed values. In ten of twenty-one cases, the specification including the imputed values is closer to the administrative one, while in the other eleven cases the reverse is true. In Maryland, the derivatives from the specification with the imputed values are closer for five variables, but further away for the other sixteen variables. Thus, the specification excluding the imputed values seems to perform better. Looking at the chi-square statistics for the joint test on all of the derivatives at once indicates little difference between the specifications with and without the imputed values. Overall, in the CPS, the survey estimates with the imputed values and without the imputed values are about equally far from the combined data estimates.

The result that we our estimates are better including the imputed observations in the ACS analyses than excluding them, prompts the question of why the imputed values are better in the ACS than in the CPS. This question is especially appropriate since we are including a very large set of controls in the probit equation for receipt of food stamps in the first place. We speculate that the use of fine geographic information in the ACS imputation process leads to the more accurate imputations. This imputation process can be thought of as a way of bringing very detailed information from fine geographic detail into the publicly released ACS data in a way that does not disclose any sensitive

information.¹² Much less fine geographic detail is available in the CPS given the smaller sample. It is also true that the type of households that are imputed in the ACS is quite different from those in the CPS. For example, ACS imputed households are more than twice as likely to be true recipient households as those in the CPS. Thus, the imputation method may interact with other survey characteristics to produce the result we find.

VII. Conclusions and Possible Extensions

Benefit receipt in major household surveys is often underreported. This misreporting has important implications for our understanding of the economic circumstances of disadvantaged populations, program takeup, the distributional effects of government programs, and studies of other program effects. We use administrative data on Food Stamp Program (FSP) participation matched to American Community Survey (ACS) and Current Population Survey (CPS) household data. We show that over thirty percent of true recipient households do not report receipt in the ACS and approximately fifty percent do not report receipt in the CPS. Misreporting, both false negatives and false positives, varies with individual characteristics. We examine the determinants of program receipt using our combined administrative and survey data. The combined data allow us to examine accurate participation using individual characteristics missing in administrative data. Our food stamp participation results differ from conventional estimates using only survey data, in several important ways. Food stamp participation is higher among single parents, non-whites, and those with lower income than the survey data alone suggest. Participation by age and the patterns of multiple program participation are also different using the administrative data. The results indicate that in one of our key samples under-reporting is part of the explanation for the low receipt rate among the elderly. Lastly, using only the CPS survey data, one would miss much of the rise in food stamp participation in the first half of this decade.

¹² We confirmed that the ACS imputed responses do not include people who gave an amount but didn't check the "yes" box on the questionnaire. If such cases were recorded as imputed and coded as recipients it would make the imputations seem surprisingly accurate.

It is also possible to think of the glass as half full, rather than half empty. It is striking that the signs and significance of most determinants of food stamp receipt in the survey data alone match those in the combined administrative and survey data. This result is found even in the CPS where half of true food stamp recipients are not recorded as recipients.

To evaluate the use of imputed ACS and CPS data, we examine whether our estimates of the determinants of participation using survey data alone are closer to those using the accurate combined data when imputed survey observations are excluded. Interestingly, excluding the imputed observations leads to worse estimates in the ACS, but estimates that are a similar distance from the combined estimates in the CPS. We speculate that the difference is due to the fine geographic detail that is used in the ACS imputations.

There are many possible extensions to this work. It is likely that the under-reporting of food stamps has large effects on estimates of the distribution of resources at or below the poverty line. This issue is particularly important as poverty calculations that incorporate food stamps are increasingly reported. For example, the ACS is currently being used to calculate state level poverty rates that incorporate in-kind transfers such as food stamps (Levitan et al. 2010, Smeeding et al. 2010, Zedlewski et al. 2010). Starting in 2011, the Census Bureau will release a national Supplemental Poverty Measure using the CPS that will rely on food stamp reporting (Interagency Technical Working Group 2010). The data described here along with extensions of these methods can be used to design appropriate imputations to account for the pronounced and increasing under-reporting of food stamps that we have found. Other useful extensions of our results would include analyzing the extent and implications of misreporting of other government programs, in other survey datasets, and time periods.

References

- Bishop, John, John Formby, and Lester Zeager (1996). "The Impact of Food Stamps on US Poverty in the 1980s: A Marginal Dominance Analysis," *Economica*, 63:250, S141-S162.
- Bitler, M., J. Currie and J. K. Scholz. 2003. "WIC Eligibility and Participation," *Journal of Human Resources*, 38:S, 1139-1179.
- Blank, Rebecca M. and Patricia Ruggles (1996): "When Do Women Use AFDC & Food Stamps? The Dynamics of Eligibility vs. Participation," *Journal of Human Resources* 31, 57-89.
- Blundell, Richard and Luigi Pistaferri. 2003. "Income Volatility and Household Consumption" *Journal of Human Resources*, 38:S, 1032-1050.
- Bollinger, Christopher and Martin David (1997). "Modeling Discrete Choice with Response Error: Food Stamp Participation." *Journal of the American Statistical Association*, 92 (439) pp. 827-835.
- Bollinger and David (2001), Estimation with Response Error and Nonresponse: Food-Stamp Participation in the SIPP, *Journal of Business and Economic Statistics*, 19:2, 129-141.
- Bound, John, Charles Brown, and Nancy Mathiowetz (2001), "Measurement Error in Survey Data," in *Handbook of Econometrics. Volume 5*, ed. by J.J Heckman and E. Leamer. Elsevier: Amsterdam.
- Brick, J. Michael and Douglas Williams (2009). "Reasons for Increasing Nonresponse in U.S. Household Surveys." Paper prepared for CNSTAT meeting, Westat, December.
- Card, David, Andrew K.G. Hildreth and Lara D Shore-Sheppard (2001), "The Measurement of Medicaid Coverage in the SIPP: Evidence from California 1990-1996" NBER Working Paper 8514.
- Center for Economic Opportunity (2008). "The CEO Measure of Poverty." New York City, Center for Economic Opportunity.
- Cody, S. and C. Tuttle (2002): "The Impact of Income Underreporting in CPS and SIPP on Microsimulation Models and Participating Rates," Washington, D.C.: Mathematica Policy Research, Inc, July 24.
- Cunningham, Karen E., Laura A. Castner, and Allen L. Schirm. 2008. "Reaching Those in Need: State Food Stamp Participation Rates in 2006." Alexandria, VA: U.S. Department of Agriculture, Food and Nutrition Service.
- Currie, Janet. 2006. "The Take-up of Social Benefits," in Alan J. Auerbach, David Card, and John M. Quigley, eds. *Public Policy and the Income Distribution*, Russell Sage Foundation: New York.
- Fraker, Thomas and Robert Moffitt. 1988. "The Effect of Food Stamps on Labor Supply: a Bivariate Selection Model." *Journal of Public Economics*, February.
- Guell, Maria and Luojia Hu. 2006. "Estimating the Probability of Leaving Unemployment Using Uncompleted Spells from Repeated Cross-Section Data," *Journal of Econometrics* 133: 307-341.
- Gundersen, Craig and James P. Ziliak. 2003. "The Role of Food Stamps in Consumption Stabilization" *Journal of Human Resources*, 38:S, 1051-1079.

- Haider, Steven, Robert Schoeni and Alison Jackowitz. 2003. "Food Stamps and the Elderly: Why is Participation so Low?" *Journal of Human Resources*, 38:S, 1180-1220.
- Hotz, V. Joseph and John Karl Scholz. 2002. "Measuring Employment and Income for Low-Income Populations With Administrative and Survey Data." In Studies of Welfare Populations: Data Collection and Research Issues, eds. Michele Ver Ploeg, Robert A. Moffitt, and Constance F. Citro, 275-313. Washington, DC: National Academy Press.
- Interagency Technical Working Group (2010). "Observations from the Interagency Technical Working Group on Developing a Supplemental Poverty Measure." March. Jolliffe, Dean, Craig Gundersen, Laura Tiehen, and Joshua Winicki (2005). "Food Stamp Benefits and Child Poverty," *American Journal of Agricultural Economics*, August, 569-581.
- Keane, Michael and Robert Moffitt (1998): "A Structural Model of Multiple Welfare Program Participation and Labor Supply," *International Economic Review* 39 (August), 553-589.
- Levitan, Mark, Christine D'Onofrio, John Krampner, Daniel Scheer and Todd Seidel (2010). "The CEO Poverty Measure, 2005-2008." New York City, Center for Economic Opportunity.
- Marquis, Kent H. and Jeffrey C. Moore. 1990. "Measurement Errors in SIPP Program Reports." In Proceedings of the 1990 Annual Research Conference, 721-745. Washington, DC.: U.S. Bureau of the Census.
- Meyer, Bruce D. and James X. Sullivan. 2003. "Measuring the Well-Being of the Poor Using Income and Consumption." *Journal of Human Resources*, 38:S, 1180-1220.
- Meyer, Bruce D., Wallace K.C. Mok, and James X. Sullivan. 2009. "The Underreporting of Transfers in Household Surveys: Its Nature and Consequences" NBER Working Paper No. 15181.
- Meyer, Bruce D. and James X. Sullivan. 2006. "Consumption, Income, and Material Well-Being After Welfare Reform." NBER Working Paper, 11976.
- Moore, Jeffrey C., Kent H. Marquis, and Karen Bogen. 1996. "The SIPP Cognitive Research Evaluation Experiment: Basic Results and Documentation." The Survey of Income and Program Participation, Working Paper No. 212. Washington D.C.: U.S. Census Bureau.
- Moore, J. C., Stinson, L.L. and Welniak, E. J. Jr. 2000. "Income Measurement Error in Surveys: A Review." *Journal of Official Statistics*, 14:4, 331-361.
- Peytchev, Andy (2009). "Consequences of Survey Nonresponse." Paper prepared for CNSTAT Meeting, RTI International, December.
- Primus, Wendell, Lynette Rawlings, Kathy Larin, and Kathryn Porter. 1999. "The Initial Impacts of Welfare Reform on the Incomes of Single-Mother Families," Washington, DC: Center on Budget and Policy Priorities.
- Roemer, Marc I. 2000. "Assessing the Quality of the March Current Population Survey and the Survey of Income and Program Participation Income Estimates, 1990-1996." Staff Papers on Income, Housing and Household Economic Statistics Division. Washington D.C.: U.S. Census Bureau.

- Smeeding, Timothy, Julia Isaacs, and Joanna Marks (2010). "The Wisconsin Poverty Measure: A First Look." Working Paper, University of Wisconsin.
- Taeuber, Cynthia, Dean M. Resnick, Susan P. Love, Jane Stavely, Parke Wilde, and Richard Larson. 2004. "Differences in Estimates of Food Stamp Program Participation Between Surveys and Administrative Records" working paper, U.S. Census Bureau.
- U.S. Census Bureau. (2006). "The Effects of Government Taxes and Transfers on Income and Poverty: 2004," February.
- U.S. Census Bureau. (2003). "Codebook for the Current Population Survey: Annual Demographic File, 2002," February.
- U.S. Department of Agriculture (USDA). Various Years. "Characteristics of Food Stamp Households: Fiscal Year 2001." Alexandria, VA: The Food and Nutrition Service.
- U.S. Department of Agriculture (USDA). 2003. "Trends in Food Stamp Participation Rates." Alexandria, VA: The Food and Nutrition Service.
- U.S. General Accounting Office (GAO). 2004. "Food Stamp Program: Steps Have Been Taken to Increase Participation of Working Families, but Better Tracking of Efforts is Needed." GAO-04-346. Washington, DC: GAO.
- Wu, Yanyuan (2010). "Essays on the Economic Well-Being of the Elderly and Public Policy." Ph.D. Dissertation, University of Chicago.
- Zedlewski, S., & Brauner, S. (1999). *Are the steep declines in food stamp participation linked to falling welfare caseloads?* (Series B, No. B-3). Washington, DC: The Urban Institute.
- Zedlewski, Sheila, Linda Giannarelli, Laura Wheaton, and Joyce Morton. 2010. "Measuring Poverty at the State Level." Low-Income Working Families paper

Appendix

Bias in Error Rates with Partial PIKed Data and Migration

Let the 2x2 matrix of potentially biased but observed response probabilities conditional on administrative receipt be

	Survey Data	
Administrative Data	p_{00}	p_{01}
	p_{10}	p_{11}

where p_{ij} is the probability of j being reported in the survey given that i is recorded in the administrative data. Thus, the row probabilities sum to 1. A subscript of 1 means food stamp receipt for a household, while 0 means no food stamp receipt for a household.

Now some households that are true food stamp recipient households will not be recorded as recipient households in the administrative data. Such errors will occur because in some cases not all household members have a PIK and those members may receive food stamps even when others in the household do not. These households will appear in the first row of the above matrix, but should be in the second row. Thus, the number of recipient households will be understated in the administrative data. Let p_1 be the probability that a household reports receipt in the survey when it is one of these true recipient households that is misclassified in the administrative data as a nonrecipient household.

Let the matrix for households that are not subject to this misclassification be

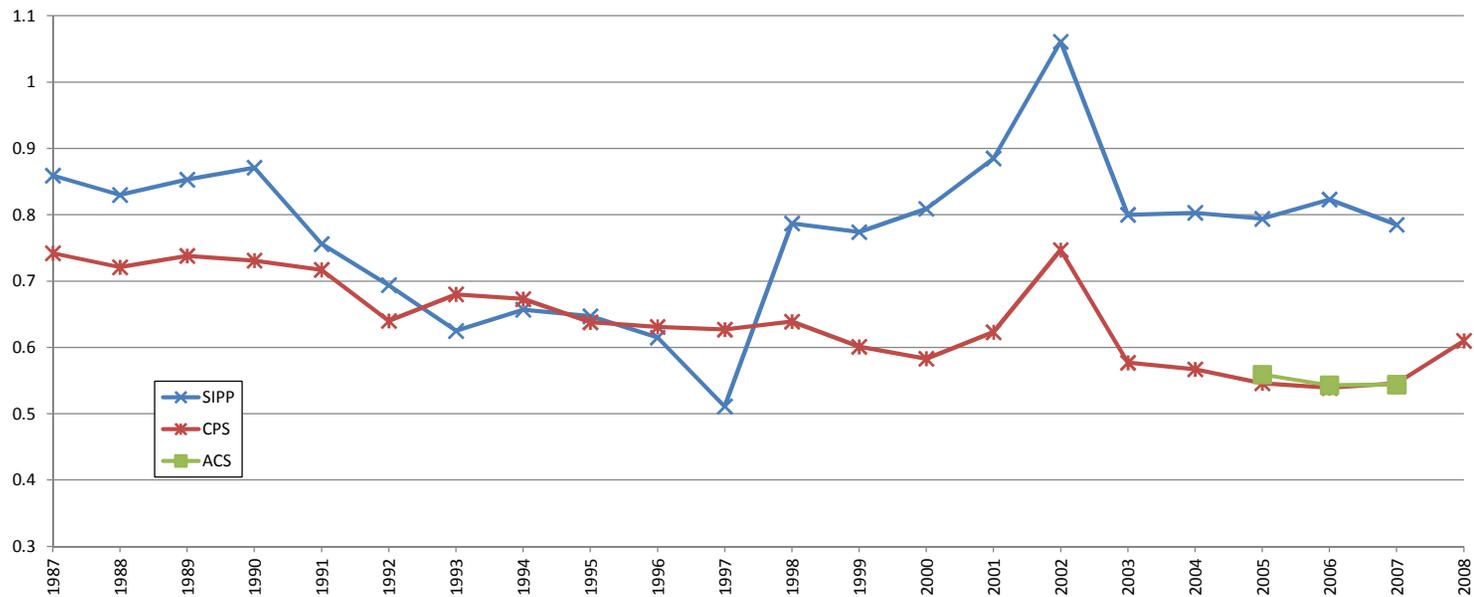
	Survey Data	
Administrative Data	\tilde{p}_{00}	\tilde{p}_{01}
	\tilde{p}_{10}	\tilde{p}_{11}

The observations subject to the misclassification in the administrative data are those where some, but not all household members received food stamps and some but not all household members have a PIK. It seems reasonable to assume that such households are more likely to report food stamp receipt than households where no-one receives food stamps, given that they are true recipient households. However, such households seem less likely to report receipt than households where everyone is PIKed and at least one household member receives food stamps. In these latter households, the dominant case will be that everyone receives food stamps. Thus, it seems very likely that the former households where some members do and some do not receive food stamps are less likely to report receipt than households not subject to administrative misclassification.

In inequalities, these assumptions mean that $\tilde{p}_{01} < p_1 < \tilde{p}_{11}$.

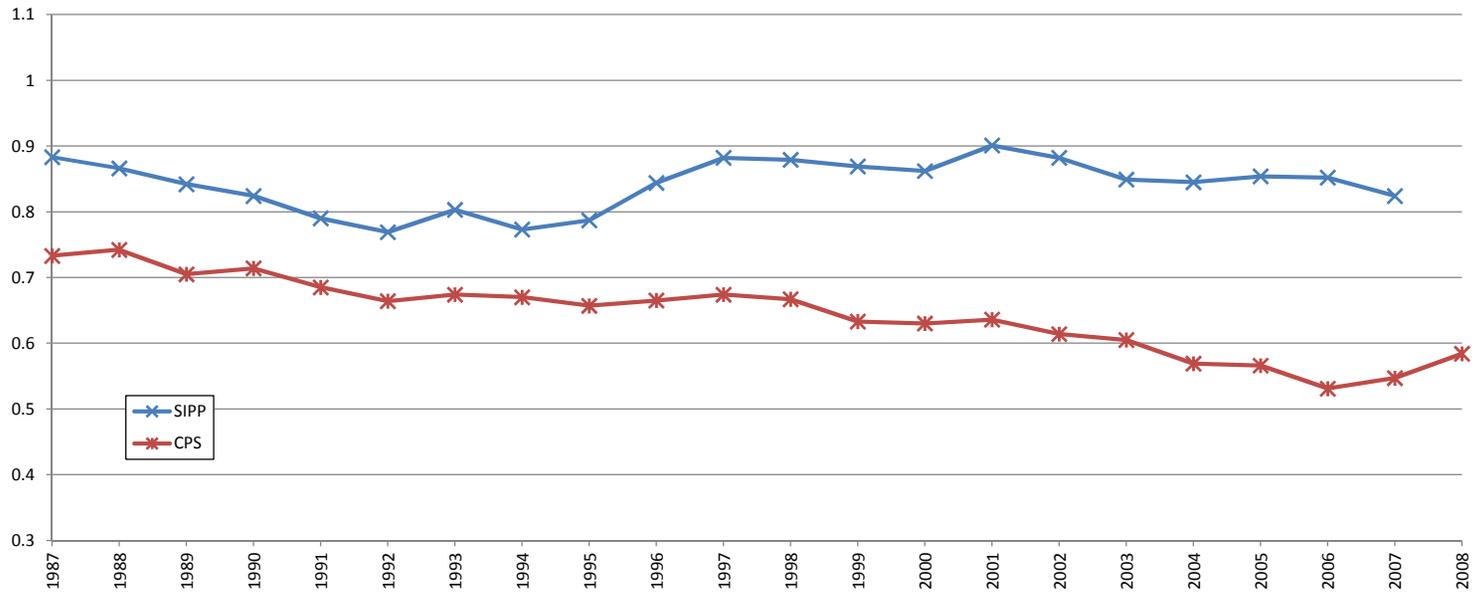
Under these conditions, it is easy to show that the true false positive rate $p_{01}^* = \tilde{p}_{01}$ will be lower than the observed rate p_{01} , and the true false negative rate p_{10}^* will be higher than the observed rate $p_{10} = \tilde{p}_{10}$. These conclusions follow because the observed false positive rate p_{01} is a weighted average of the true rate $p_{01}^* = \tilde{p}_{01}$ and p_1 which is larger than \tilde{p}_{01} . Similarly, the true false negative rate p_{10}^* is a weighted average of $p_{10} = \tilde{p}_{10}$ and $1 - p_1$ which is larger than \tilde{p}_{10} since $p_1 < \tilde{p}_{11}$ and $\tilde{p}_{10} = 1 - \tilde{p}_{11}$.

Figure 1
Reporting Rates for Food Stamp Dollar Amounts, 1987-2008



Notes: Data are from Meyer, Mok and Sullivan (2011). Reporting rates for each year are calculated as the ratio of the total weighted dollars reported in the given survey divided by the administrative aggregate. Sources for the administrative numbers are reported in Meyer, Mok, and Sullivan (2011).

Figure 2
Reporting Rates for Average Months of Receipt, 1987-2008



Notes: Data are from Meyer, Mok and Sullivan (2011). Reporting rates for each year are calculated as the ratio of the total weighted months reported in the given survey divided by the administrative aggregate. Sources for the administrative numbers are reported in Meyer, Mok, and Sullivan (2011).

Table 1 – Mis-reporting of Food Stamp Receipt, 2001 ACS, Full Sample

Administrative Receipt		ACS Report		
		No Food Stamps	Food Stamps	Total
<i>Illinois</i>				
No Food Stamps	Sample Count	19,630	88	19,718
	Population Est.	4,193,387	34,883	4,228,270
	Overall %	91.15	0.76	91.91
	Row %	99.18	0.83	100.00
	Column %	97.24	12.10	91.91
Food Stamps	Sample Count	321	728	1,049
	Population Est.	118,834	253,289	372,123
	Overall %	2.58	5.51	8.09
	Row %	31.93	68.07	100.00
	Column %	2.76	87.90	8.09
Total	Sample Count	19,951	816	20,767
	Population Est.	4,312,222	288,172	4,600,393
	Overall %	93.74	6.26	100.00
	Row %	93.74	6.26	100.00
	Column %	100.00	100.00	100.00
<i>Maryland</i>				
No Food Stamps	Sample Count	9,042	33	9,075
	Population Est.	1,880,871	9,615	1,890,485
	Overall %	93.39	0.48	93.86
	Row %	99.49	0.51	100.00
	Column %	97.66	10.92	93.86
Food Stamps	Sample Count	163	296	459
	Population Est.	45,121	78,454	123,574
	Overall %	2.24	3.90	6.14
	Row %	36.51	63.49	100.00
	Column %	2.34	89.08	6.14
Total	Sample Count	9,205	329	9,534
	Population Est.	1,925,991	88,069	2,014,060
	Overall %	95.63	4.37	100.00
	Row %	95.63	4.37	100.00
	Column %	100.00	100.00	100.00

Notes: Estimates are weighted by household weight adjusted for PIK probability.

Table 2 – Mis-reporting of Food Stamp Receipt, 2001 ACS, Imputed Food Stamp Receipt Sample

Administrative Receipt		ACS Report		
		No Food Stamps	Food Stamps	Total
<i>Illinois</i>				
No Food Stamps	Sample Count	146	37	183
	Population Est.	29,905	14,181	44,086
	Overall %	30.74	14.58	45.32
	Row %	67.83	32.17	100.00
	Column %	94.55	21.60	45.32
Food Stamps	Sample Count	6	154	160
	Population Est.	1,723	51,463	53,186
	Overall %	1.77	52.91	54.68
	Row %	3.24	96.76	100.00
	Column %	5.45	78.40	54.68
Total	Sample Count	152	191	343
	Population Est.	31,629	65,644	97,273
	Overall %	32.52	67.48	100.00
	Row %	32.52	67.48	100.00
	Column %	100.00	100.00	100.00
<i>Maryland</i>				
No Food Stamps	Sample Count	60	9	69
	Population Est.	12,060	2,494	14,553
	Overall %	42.26	8.74	51.00
	Row %	82.86	17.14	100.00
	Column %	96.54	15.54	51.00
Food Stamps	Sample Count	3	56	59
	Population Est.	432	13,553	13,985
	Overall %	1.51	47.49	49.00
	Row %	3.09	96.91	100.00
	Column %	3.46	84.46	49.00
Total	Sample Count	63	65	128
	Population Est.	12,491	16,047	28,538
	Overall %	43.77	56.23	100.00
	Row %	43.77	56.23	100.00
	Column %	100.00	100.00	100.00

Notes: Estimates are weighted by household weight adjusted for PIK probability.

Table 3 – Mis-reporting of Food Stamp Receipt, CPS, Full Sample

Administrative Receipt		CPS Report		
		No Food Stamps	Food Stamps	Total
<i>Illinois 2002-2005</i>				
No Food Stamps	Sample Count	6,836	78	6,914
	Population Est.	17,267,477	170,642	17,438,119
	Overall %	89.32	0.88	90.21
	Row %	99.02	0.98	100.00
	Column %	94.98	14.84	90.21
Food Stamps	Sample Count	452	459	911
	Population Est.	912,736	980,703	1,918,714
	Overall %	4.72	5.07	9.80
	Row %	48.21	51.79	100.00
	Column %	5.02	85.18	9.80
Total	Sample Count	7,288	537	7,825
	Population Est.	18,180,213	1,151,345	19,331,558
	Overall %	94.04	5.96	100.00
	Row %	94.04	5.96	100.00
	Column %	100.00	100.00	100.00
<i>Maryland 2002-2004</i>				
No Food Stamps	Sample Count	2,884	13	2,897
	Population Est.	5,921,409	24,700	5,946,109
	Overall %	94.32	0.39	94.71
	Row %	99.58	0.42	100.00
	Column %	97.09	13.77	94.71
Food Stamps	Sample Count	103	90	193
	Population Est.	177,371	154,684	332,055
	Overall %	2.83	2.46	5.29
	Row %	53.42	46.58	100.00
	Column %	2.91	86.23	5.29
Total	Sample Count	2,987	103	3,090
	Population Est.	6,098,780	179,384	6,278,164
	Overall %	97.14	2.86	100.00
	Row %	97.14	2.86	100.00
	Column %	100.00	100.00	100.00

Notes: Estimates are weighted by household weight adjusted for PIK probability.

Table 4 – Mis-reporting of Food Stamp Receipt, CPS, Imputed Food Stamp Receipt Sample

Administrative Receipt		CPS Report		
		No Food Stamps	Food Stamps	Total
<i>Illinois 2002-2005</i>				
No Food Stamps	Sample Count	195	27	222
	Population Est.	510,438	56,398	566,834
	Overall %	68.62	7.58	76.20
	Row %	90.05	9.95	100.00
	Column %	78.19	61.96	76.20
Food Stamps	Sample Count	68	22	90
	Population Est.	142,388	34,918	177,006
	Overall %	19.14	4.65	23.80
	Row %	80.44	19.56	100.00
	Column %	21.81	38.04	23.80
Total	Sample Count	263	49	312
	Population Est.	652,826	91,016	743,842
	Overall %	87.76	12.24	100.00
	Row %	87.76	12.24	100.00
	Column %	100.00	100.00	100.00
<i>Maryland 2002-2004</i>				
No Food Stamps	Sample Count	56	7	63
	Population Est.	136,636	12,705	149,341
	Overall %	75.62	7.03	82.65
	Row %	91.49	8.51	100.00
	Column %	85.31	61.89	82.65
Food Stamps	Sample Count	12	6	18
	Population Est.	23,526	7,825	31,350
	Overall %	1302.00	4.33	17.35
	Row %	75.04	24.96	100.00
	Column %	14.69	38.11	17.35
Total	Sample Count	68	13	81
	Population Est.	160,162	20,530	180,692
	Overall %	88.64	11.36	100.00
	Row %	88.64	11.36	100.00
	Column %	100.00	100.00	100.00

Notes: Estimates are weighted by household weight adjusted for PIK probability.

Table 5 - The Determinants of Mis-reporting, 2001 ACS, Probit Average Derivatives, Households with Income Less Than Twice the Poverty Line

	False Negative		False Positive	
	Illinois	Maryland	Illinois	Maryland
Single, no children	-0.0862 (0.0716)	0.0437 (0.0877)		
Single, with children	-0.0802 (0.0539)	0.1203 (0.0753)		
Multiple adults, no children	-0.1036 (0.0857)	-0.0135 (0.1067)		
Number of members under 18	-0.0306 (0.0264)	-0.0185 (0.0329)	0.0069 (0.0033)	-0.0020 (0.0036)
Number of members 18 or older	-0.0248 (0.0341)	0.0405 (0.0363)	-0.0024 (0.0034)	0.0053 (0.0050)
Number of members PIKed	0.0308 (0.0268)	0.0358 (0.0333)	-0.0085 (0.0038)	0.0060 (0.0040)
Age >= 50	0.1514 (0.0513)	0.1319 (0.0663)	-0.0225 (0.0075)	-0.0063 (0.0086)
Male	0.0877 (0.0356)	-0.0335 (0.0483)	-0.0106 (0.0061)	0.0032 (0.0080)
Less than high school	0.0688 (0.0431)	0.0659 (0.0589)	0.0140 (0.0068)	0.0063 (0.0099)
High School graduate	-0.0001 (0.0425)	0.1147 (0.0576)	-0.0032 (0.0085)	0.0111 (0.0126)
College graduate and beyond	0.2197 (0.0745)	-0.0586 (0.1201)		
White	-0.0897 (0.0368)	-0.1110 (0.0422)	-0.0239 (0.0071)	-0.0082 (0.0083)
Employed			-0.0054 (0.0066)	-0.0261 (0.0151)
Unemployed	-0.0206 (0.0554)	-0.2504 (0.0668)		
Not in labor force	-0.0077 (0.0404)	-0.0627 (0.0513)		
Income/poverty line	0.0010 (0.0003)	0.0008 (0.0004)	-0.0001 (0.0000)	-0.0001 (0.0001)
Disabled	-0.0637 (0.0386)	-0.0333 (0.0584)	0.0076 (0.0084)	-0.0069 (0.0084)
Disabled, not working	-0.0382 (0.0465)	0.1179 (0.0505)	0.0159 (0.0082)	0.0226 (0.0097)
Speaks English only	0.0455 (0.0507)	-0.1448 (0.0838)		
Non-U.S. Citizen	-0.1545 (0.0327)	0.0697 (0.1011)		
Rural	-0.1000 (0.0472)	-0.1079 (0.0476)	-0.0051 (0.0088)	
Reported public assistance receipt	-0.2693 (0.0549)	-0.2453 (0.0632)	0.0442 (0.0091)	0.0622 (0.0186)
Reported housing assistance receipt	-0.0336 (0.0397)	-0.0248 (0.0481)	0.0108 (0.0070)	0.0007 (0.0081)
FS receipt imputed	-0.3115 (0.0647)	-0.3833 (0.0899)	0.0700 (0.0110)	0.0447 (0.0139)
Length of FS receipt spell	-0.0275 (0.0034)	-0.0384 (0.0036)		
Administrative TANF receipt	0.0658 (0.0446)	0.0273 (0.0514)		
Observations	789	344	3,357	1,455

Notes: Delta-method standard errors in parentheses. All specifications also include controls for mode of interview (mail-back, CATI, CAPI). All analyses conducted using household weights adjusted for PIK probability. For the false negative probits, the unreported omitted family type is multiple adults with children, the education category is some college, the employment category is employed, the race group is nonwhite, and the geographic area is within-MSA. The unreported omitted education category for the false negative probits is some college or more, the race group is nonwhite, the employment category is not employed, and the geographic area is within-MSA. Rural status was also controlled for in the false positive Maryland regression.

Table 6 - The Determinants of Mis-reporting, CPS, Probit Average Derivatives, Households with Income Less Than Twice the Poverty Line

	False Negative		False Positive	
	Illinois	Maryland	Illinois	Maryland
Single, no children	-0.1312 (0.0779)	0.0558 (0.1755)		
Single, with children	-0.0227 (0.0620)	-0.0323 (0.1203)		
Multiple adults, no children	-0.0245 (0.0739)	0.0668 (0.1416)		
Number of members 18 or over	0.0391 (0.0371)	0.0370 (0.0794)	0.0092 (0.0067)	-0.0170 (0.0130)
Number of members under 18	-0.0230 (0.0224)	-0.0968 (0.0616)	0.0044 (0.0049)	-0.0251 (0.0120)
Number of members PIKed	-0.0171 (0.0194)	0.0484 (0.0433)	-0.0047 (0.0044)	0.0222 (0.0118)
Age >= 50	0.0881 (0.0525)	-0.1418 (0.0832)	-0.0382 (0.0147)	-0.0010 (0.0109)
Male	-0.0603 (0.0446)	0.0195 (0.0858)	-0.0130 (0.0104)	0.0106 (0.0094)
Less than high school	-0.0695 (0.0479)	-0.0620 (0.1111)	0.0193 (0.0134)	
High School graduate	-0.0293 (0.0463)	-0.0002 (0.0926)	-0.0001 (0.0117)	0.0008 (0.0079)
College graduate and beyond	0.0373 (0.1103)	-0.0295 (0.1223)		
White	-0.0503 (0.0415)	-0.0509 (0.0810)	0.0046 (0.0098)	0.0094 (0.0096)
Employed			-0.0016 (0.0117)	0.0012 (0.0089)
Unemployed	0.0396 (0.0664)	0.0235 (0.1532)		
Not in labor force	0.0199 (0.0447)	-0.0074 (0.0832)		
Income/poverty line	0.0010 (0.0004)	-0.0003 (0.0008)	-0.0003 (0.0001)	-0.0002 (0.0001)
Rural	-0.0276 (0.0548)	-0.0684 (0.1346)		
Reported public assistance receipt	-0.3293 (0.0722)		0.0957 (0.0197)	0.0872 (0.0332)
Reported housing assistance receipt	-0.1753 (0.0409)	-0.2732 (0.0871)	0.0571 (0.0146)	-0.0032 (0.0116)
FS receipt imputed	0.3580 (0.0552)	0.1932 (0.1103)	0.0544 (0.0113)	0.0443 (0.0156)
Length of FS receipt spell	-0.0281 (0.0051)	-0.0196 (0.0086)		
Administrative TANF receipt	0.0986 (0.0580)	0.2466 (0.0766)		
Linear time trend	0.0222 (0.0157)	0.0980 (0.0373)	0.0018 (0.0047)	-0.0000 (0.0056)
Observations	689	136	1462	504

Notes: Delta-method standard errors in parentheses. Samples are pooled across all years for both states (IL:2002-2005, MD:2002-2004). All analyses conducted using household weights adjusted for PIK probability. For the false negative probits, the unreported omitted family type is multiple adults with children, the education category is some college, the employment category is employed, the race group is nonwhite, and the geographic area is within-MSA. The unreported omitted education category for the false negative probits is some college or more, the race group is nonwhite, and the employment category is not employed. Reported public assistance receipt was controlled for in the Maryland false negative regression. Less than high school was controlled for in the Maryland false positive regression. Disabled status was controlled for in all false positive regressions.

Table 7 – Food Stamp Receipt in Survey Data and Combined Data, 2001 ACS, Probit Average Derivatives, Households with Income less than Twice the Poverty Line

	Illinois			Maryland		
	Survey Food Stamp Measure	Admin. Food Stamp Measure	Equality Test p-value	Survey Food Stamp Measure	Admin. Food Stamp Measure	Equality Test p-value
Single, no children	0.0670 (0.0320)	0.1164 (0.0361)	0.0901	0.0861 (0.0461)	0.1485 (0.0515)	0.1685
Single, with children	0.1076 (0.0247)	0.1429 (0.0272)	0.0941	0.1083 (0.0351)	0.1965 (0.0389)	0.0294
Multiple adults, no children	0.0696 (0.0344)	0.0959 (0.0392)	0.3628	0.0547 (0.0500)	0.0975 (0.0547)	0.3601
Number of members under 18	0.0188 (0.0099)	-0.0066 (0.0145)	0.0420	0.0202 (0.0144)	0.0027 (0.0191)	0.2658
Number of members 18 or older	0.0027 (0.0111)	-0.0201 (0.0138)	0.0562	0.0039 (0.0174)	0.0153 (-0.0208)	0.6115
Number of members PIKed	0.0145 (0.0076)	0.0692 (0.0131)	0.0000	0.0165 (0.0118)	0.0612 (0.0183)	0.0082
Age 16-29	-0.0208 (0.0231)	-0.0055 (0.0264)	0.4209	0.0274 (0.0300)	0.0141 (0.0332)	0.6357
Age 30-39	0.0061 (0.0221)	0.0061 (0.0262)	0.9956	-0.0386 (0.0288)	-0.0454 (0.0323)	0.8105
Age 50-59	-0.0981 (0.0261)	-0.0405 (0.0294)	0.0245	-0.0315 (0.0366)	-0.0375 (0.0369)	0.8662
Age 60-69	-0.1144 (0.0278)	-0.0806 (0.0320)	0.2454	-0.0856 (0.0358)	-0.0702 (0.0384)	0.6623
Age >= 70	-0.1641 (0.0278)	-0.1619 (0.0321)	0.9656	-0.1346 (0.0359)	-0.1354 (0.0386)	0.9984
Less than high school	0.0648 (0.0184)	0.0687 (0.0218)	0.7580	0.0739 (0.0237)	0.1089 (0.0271)	0.0969
High School graduate	0.0239 (0.0186)	0.0318 (0.0212)	0.5690	0.0130 (0.0232)	0.0510 (0.0255)	0.1081
College graduate and beyond	-0.0584 (0.0313)	-0.0569 (0.0329)	0.9905	0.0114 (0.0361)	-0.0147 (0.0407)	0.4343
White	-0.0380 (0.0178)	-0.0801 (0.0191)	0.0053	0.0055 (0.0187)	-0.0355 (0.0211)	0.0204
Employed	-0.0380 (0.0164)	-0.0217 (0.0188)	0.2792	-0.0488 (0.0227)	-0.0078 (0.0247)	0.0832
Income/poverty line	-0.0007 (0.0001)	-0.0007 (0.0001)	0.5801	-0.0010 (0.0001)	-0.0013 (0.0002)	0.0338
Disabled	0.0906 (0.0182)	0.0774 (0.0209)	0.4844	0.0773 (0.0235)	0.0933 (0.0249)	0.4667
Disabled, not working	0.0271 (0.0193)	0.0086 (0.0224)	0.3507	0.0093 (0.0242)	0.0465 (0.0266)	0.1086
Speaks English only	0.0343 (0.0207)	0.0850 (0.0245)	0.0048	0.0716 (0.0306)	0.0772 (0.0393)	0.8855
Rural	0.0293 (0.0191)	0.0458 (0.0189)	0.2486	0.0499 (0.0183)	0.0491 (0.0225)	0.9462
Reported public assistance receipt	0.3189 (0.0240)	0.2386 (0.0315)	0.0197	0.3020 (0.0324)	0.3728 (0.0408)	0.1119
Reported housing assistance receipt	0.1461 (0.0184)	0.1811 (0.0217)	0.0457	0.1021 (0.0198)	0.1337 (0.0241)	0.1356
Observations	4,591	4,146		1945	1799	
Joint significance test P-value			0.0000			0.0004

Notes: Delta-method standard errors in parentheses. All analyses conducted using household weights adjusted for PIK probability. The unreported omitted family type is multiple adults with children, the age group is 40-49, the education group is some college, the race group is nonwhite, the employment group is not employed, and the geographic area is within MSA.

Table 8 – Food Stamp Receipt in Survey Data and Combined Data, 2001 CPS, Probit Average Derivatives, Households with Income less than Twice the Poverty Line

	Illinois			Maryland		
	Survey Food Stamp Measure	Admin. Food Stamp Measure	Equality Test p-value	Survey Food Stamp Measure	Admin. Food Stamp Measure	Equality Test p-value
Single, no children	-0.0119 (0.0256)	0.0001 (0.0386)	0.7372	-0.0687 (0.0511)	-0.0229 (0.0623)	0.4302
Single, with children	0.0547 (0.0214)	0.1333 (0.0308)	0.0164	0.0133 (0.0437)	0.0775 (0.0491)	0.1847
Multiple adults, no children	0.0192 (0.0226)	0.0664 (0.0346)	0.1803	-0.0509 (0.0413)	0.0235 (0.0560)	0.1533
Number of members under 18	0.0227 (0.0058)	0.0309 (0.0087)	0.4445	0.0235 (0.0117)	0.0541 (0.0181)	0.0725
Number of members 18 or older	-0.0069 (0.0104)	0.0128 (0.0143)	0.1745	-0.0213 (0.0258)	0.0055 (0.0246)	0.3562
Age 16-29	-0.0111 (0.0198)	-0.0378 (0.0291)	0.3634	-0.0086 (0.0287)	-0.0428 (0.0431)	0.3599
Age 30-39	-0.0118 (0.0194)	0.0040 (0.0280)	0.5257	-0.0285 (0.0257)	-0.0043 (0.0419)	0.5404
Age 50-59	0.0016 (0.0228)	0.0287 (0.0369)	0.4431	0.0249 (0.0291)	0.0382 (0.0461)	0.7735
Age 60-69	-0.0110 (0.0240)	-0.0625 (0.0353)	0.1389	0.0372 (0.0344)	-0.0052 (0.0519)	0.3747
Age >= 70	-0.1313 (0.0254)	-0.1579 (0.0352)	0.5931	-0.0714 (0.0353)	-0.1675 (0.0599)	0.0714
Less than high school	0.0503 (0.0165)	0.0455 (0.0248)	0.7299	-0.0056 (0.0262)	0.0073 (0.0405)	0.6685
High School graduate	0.0266 (0.0158)	0.0409 (0.0236)	0.5613	0.0031 (0.0241)	-0.0085 (0.0360)	0.6934
College graduate and beyond	-0.0892 (0.0267)	-0.1557 (0.0442)	0.1836	0.0191 (0.0300)	-0.0420 (0.0510)	0.1491
White	-0.0211 (0.0133)	-0.0762 (0.0196)	0.0038	0.0048 (0.0182)	-0.0118 (0.0261)	0.4967
Employed	-0.0399 (0.0141)	-0.0665 (0.0207)	0.2421	-0.0391 (0.0191)	-0.0633 (0.0280)	0.3914
Income/poverty line	-0.0009 (0.0001)	-0.0015 (0.0002)	0.0011	-0.0003 (0.0001)	-0.0003 (0.0002)	0.7260
Disabled	0.0466 (0.0451)	0.0377 (0.0719)	0.8699	0.1046 (0.0629)	0.0022 (0.0867)	0.0602
Rural	0.0275 (0.0167)	0.0383 (0.0262)	0.7132	0.0495 (0.0278)	0.0682 (0.0388)	0.5421
Reported public assistance receipt	0.2179 (0.0268)	0.2077 (0.0432)	0.6018	0.1934 (0.0327)	0.2246 (0.0590)	0.6295
Reported housing assistance receipt	0.1517 (0.0147)	0.1999 (0.0243)	0.1054	0.1378 (0.0221)	0.1593 (0.0364)	0.5765
Linear time trend	0.0039 (0.0053)	0.0180 (0.0079)	0.0606	-0.0002 (0.0096)	0.0329 (0.0164)	0.0190
Observations	2981	2151		808	640	
Joint significance test P-value			0.0000			0.0085

Notes: Delta-method standard errors in parentheses. Samples are pooled across all years (2002-2005). All analyses conducted using household weights adjusted for PIK probability. The unreported omitted family type is multiple adults with children, the age group is 40-49, the education group is some college, the race group is nonwhite, the employment group is not employed, and the geographic area is within MSA.

Table 9 – Food Stamp Receipt in Survey Data and Combined Data Compared, with and without Imputed Observations, 2001 ACS, Probit Average Derivatives, Households with Income less than Twice the Poverty Line

	Illinois				Maryland			
	Difference with imputed (survey-admin)	Equality test p-value	Difference without imputed (survey-admin)	Equality test p-value	Difference with imputed (survey-admin)	Equality test p-value	Difference without imputed (survey-admin)	Equality test p-value
Single, no children	-0.0494	0.0901	-0.0470	0.1051	-0.0624	0.1685	-0.0728	0.1157
Single, with children	-0.0353	0.0941	-0.0438	0.0424	-0.0882	0.0294	-0.1085	0.0086
Multiple adults, no children	-0.0263	0.3628	-0.0447	0.1519	-0.0428	0.3601	-0.0553	0.2487
Number of members under 18	0.0254	0.0420	0.0196	0.1415	0.0175	0.2658	0.0233	0.1653
Number of members 18 or older	0.0228	0.0562	0.0227	0.0529	-0.0114	0.6115	-0.0254	0.2977
Number of members PIKed	-0.0547	0.0000	-0.0544	0.0000	-0.0447	0.0082	-0.0476	0.0082
Age 16-29	-0.0153	0.4209	-0.0253	0.2197	0.0133	0.6357	0.0167	0.5723
Age 30-39	0.0000	0.9956	-0.0209	0.3472	0.0068	0.8105	-0.0079	0.7884
Age 50-59	-0.0576	0.0245	-0.0538	0.0440	0.0060	0.8662	0.0217	0.5483
Age 60-69	-0.0338	0.2454	-0.0199	0.5427	-0.0154	0.6623	-0.0130	0.7232
Age >= 70	-0.0022	0.9656	0.0212	0.3037	0.0008	0.9984	0.0066	0.8646
Less than high school	-0.0039	0.7580	-0.0165	0.2863	-0.0350	0.0969	-0.0562	0.0114
High School graduate	-0.0079	0.5690	-0.0057	0.6594	-0.0380	0.1081	-0.0408	0.0941
College graduate and beyond	-0.0015	0.9905	0.0028	0.8972	0.0261	0.4343	0.0328	0.3433
White	0.0421	0.0053	0.0383	0.0153	0.0410	0.0204	0.0397	0.0333
Employed	-0.0163	0.2792	-0.0057	0.7497	-0.0410	0.0832	-0.0484	0.0533
Income/poverty line	0.0000	0.5801	0.0000	0.8840	0.0003	0.0338	0.0005	0.0002
Disabled	0.0132	0.4844	0.0043	0.9183	-0.0160	0.4667	-0.0190	0.4044
Disabled, not working	0.0185	0.3507	0.0165	0.4215	-0.0372	0.1086	-0.0367	0.1327
Speaks English only	-0.0507	0.0048	-0.0533	0.0041	-0.0056	0.8855	-0.0248	0.4957
Rural	-0.0165	0.2486	-0.0134	0.3731	0.0008	0.9462	0.0070	0.6907
Reported public assistance receipt	0.0803	0.0197	0.0584	0.0969	-0.0708	0.1119	-0.0974	0.0279
Reported housing assistance receipt	-0.0350	0.0457	-0.0489	0.0068	-0.0316	0.1356	-0.0394	0.0644
Chi-square test of equality	84.94	0.0000	105.59	0.0000	52.68	0.0004	72.23	0.0000

Notes: Delta-method standard errors in parentheses. All analyses conducted using household weights adjusted for PIK probability. The unreported omitted family type is multiple adults with children, the age group is 40-49, the education group is some college, the race group is nonwhite, the employment group is not employed, and the geographic area is within MSA.

Table 10 – Food Stamp Receipt in Survey Data and Combined Data Compared, with and without Imputed Observations, 2001 CPS, Probit Average Derivatives, Households with Income less than Twice the Poverty Line

	Illinois				Maryland			
	Difference with imputed (survey-admin)	Equality test p-value	Difference without imputed (survey-admin)	Equality test p-value	Difference with imputed (survey-admin)	Equality test p-value	Difference without imputed (survey-admin)	Equality test p-value
Single, no children	-0.0120	0.7372	-0.0043	0.9046	-0.0458	0.4302	-0.0193	0.7301
Single, with children	-0.0786	0.0164	-0.0652	0.0555	-0.0642	0.1847	-0.0486	0.3169
Multiple adults, no children	-0.0472	0.1803	-0.0547	0.1142	-0.0744	0.1533	-0.0514	0.3028
Number of members under 18	-0.0197	0.1745	-0.0170	0.2500	-0.0268	0.3562	-0.0245	0.4055
Number of members 18 or older	-0.0082	0.4445	-0.0100	0.3328	-0.0306	0.0725	-0.0270	0.0869
Age 16-29	0.0267	0.3634	0.0155	0.6204	0.0342	0.3599	0.0293	0.4319
Age 30-39	-0.0158	0.5257	-0.0100	0.6845	-0.0242	0.5404	-0.0285	0.4558
Age 50-59	-0.0271	0.4431	-0.0302	0.3836	-0.0133	0.7735	-0.0179	0.6789
Age 60-69	0.0515	0.1389	0.0568	0.1007	0.0424	0.3747	0.0226	0.6237
Age >= 70	0.0266	0.5931	0.0317	0.4952	0.0961	0.0714	0.0860	0.0964
Less than high school	0.0048	0.7299	-0.0063	0.8844	-0.0129	0.6685	-0.0159	0.5944
High School graduate	-0.0143	0.5613	-0.0138	0.5754	0.0116	0.6934	0.0005	0.9914
College graduate and beyond	0.0665	0.1836	0.0431	0.4246	0.0611	0.1491	0.0442	0.2782
White	0.0551	0.0038	0.0486	0.0103	0.0166	0.4967	0.0159	0.5070
Employed	0.0266	0.2421	0.0269	0.2391	0.0242	0.3914	0.0178	0.5114
Income/poverty line	0.0006	0.0011	0.0006	0.0009	0.0000	0.7260	0.0000	0.7191
Disabled	0.0089	0.8699	0.0046	0.9226	0.1024	0.0602	0.0677	0.2960
Rural	-0.0108	0.7132	-0.0148	0.5668	-0.0187	0.5421	-0.0149	0.6224
Reported public assistance receipt	0.0102	0.6018	0.0106	0.5924	-0.0312	0.6295	-0.0472	0.3745
Reported housing assistance receipt	-0.0482	0.1054	-0.0409	0.1878	-0.0215	0.5765	-0.0193	0.6110
Linear time trend	-0.0141	0.0606	-0.0111	0.1429	-0.0331	0.0190	-0.0281	0.0448
Chi-square test of equality	62.10	0.0000	58.35	0.0000	39.52	0.0085	39.72	0.0079

Notes: Delta-method standard errors in parentheses. Samples are pooled across all years (2002-2005). All analyses conducted using household weights adjusted for PIK probability. The unreported omitted family type is multiple adults with children, the age group is 40-49, the education group is some college, the race group is nonwhite, the employment group is not employed, and the geographic area is within MSA.

Appendix Table 1 – The Determinants of a Household having a PIK,
ACS, Probit Average Derivatives

	Illinois	Maryland
Single, no children	-0.0124 (0.0119)	-0.0032 (0.0169)
Single, with children	0.0215 (0.0122)	0.0039 (0.0138)
Multiple adults, no children	0.0032 (0.0126)	0.0115 (0.0166)
Number of members under 18	0.0243 (0.0053)	0.0207 (0.0076)
Number of members 18 or older	0.0322 (0.0047)	0.0219 (0.0052)
Age 16-29	-0.0130 (0.0084)	0.0240 (0.0104)
Age 30-39	-0.0084 (0.0080)	-0.0027 (0.0087)
Age 50-59	0.0065 (0.0082)	0.0080 (0.0089)
Age 60-69	-0.0022 (0.0092)	0.0152 (0.0104)
Age >= 70	-0.0192 (0.0093)	0.0187 (0.0106)
Less than high school	-0.0000 (0.0075)	-0.0184 (0.0100)
High School graduate	0.0052 (0.0064)	-0.0172 (0.0084)
College graduate and beyond	0.0071 (0.0065)	-0.0220 (0.0075)
Hispanic	-0.0435 (0.0104)	-0.0782 (0.0151)
Black	-0.0298 (0.0075)	-0.0082 (0.0071)
Other	-0.0710 (0.0107)	-0.0779 (0.0113)
Unemployed	-0.0101 (0.0125)	0.0023 (0.0158)
Not in the labor force	-0.0019 (0.0066)	-0.0243 (0.0080)
Income/poverty line	0.0000 (0.0000)	0.0000 (0.0000)
Disabled	-0.0119 (0.0067)	0.0165 (0.0090)
Disabled, not working	-0.0080 (0.0081)	-0.0048 (0.0091)
Speaks English only	0.0162 (0.0092)	-0.0048 (0.0111)
Speaks English poorly	0.0097 (0.0110)	-0.0107 (0.0141)
Non-U.S. Citizen	-0.0300 (0.0102)	0.0055 (0.0123)
Rural	0.0142 (0.0077)	-0.0042 (0.0078)
Reported housing assistance receipt	-0.0106 (0.0106)	0.0110 (0.0125)
Observations	21,957	9,996

Notes: Delta-method standard errors in parentheses. All specifications also include controls for mode of interview (mail-back, CATI, CAPI). All analyses conducted using household weights. For the false negative probits, the unreported omitted family type is multiple adults with children, the education category is some college, the age category is 40-49, the employment category is employed, the race group is non-Hispanic white, and the geographic area is within-MSA.

Appendix Table 2 – The Determinants of a Household Having
PIK, CPS, Probit Average Derivatives

	Illinois	Maryland
Single, no children	-0.2860 (0.0263)	-0.1697 (0.0447)
Single, with children	-0.0269 (0.0252)	-0.0648 (0.0393)
Multiple adults, no children	-0.2737 (0.0230)	-0.1307 (0.0398)
Number of members under 18	0.0610 (0.0118)	0.0553 (0.0217)
Number of members 18 or over	0.0248 (0.0089)	0.0034 (0.0129)
Age 16-29	-0.0282 (0.0165)	-0.0098 (0.0271)
Age 30-39	-0.0034 (0.0148)	-0.0219 (0.0235)
Age 50-59	-0.0168 (0.0149)	-0.0448 (0.0224)
Age 60-69	-0.0380 (0.0178)	-0.0318 (0.0277)
Age >= 70	-0.0322 (0.0190)	-0.0343 (0.0291)
Less than high school	-0.0194 (0.0165)	0.0257 (0.0252)
High School graduate	-0.0299 (0.0123)	-0.0270 (0.0203)
College graduate and beyond	-0.0071 (0.0128)	-0.0274 (0.0196)
Hispanic	-0.0268 (0.0157)	-0.1032 (0.0290)
Black	0.0428 (0.0126)	-0.0150 (0.0154)
Other	0.0537 (0.0237)	-0.0056 (0.0345)
Unemployed	0.0702 (0.0246)	0.0045 (0.0524)
Not in labor force	0.0223 (0.0133)	-0.0158 (0.0212)
Poverty index	0.0000 (0.0000)	0.0000 (0.0000)
Disabled	0.0172 (0.0456)	0.1547 (0.0805)
Rural	0.0922 (0.0151)	0.0828 (0.0278)
Reported housing assistance receipt	0.1844 (0.0278)	0.0481 (0.0320)
Linear time trend	-0.0307 (0.0041)	-0.0484 (0.0084)
Observations	10836	3744

Notes: Delta-method standard errors in parentheses. Samples are pooled across all years for both states (IL:2002-2005, MD:2002-2004). All analyses conducted using household weights. The unreported omitted family type is multiple adults with children, the age category is 40-49, the education category is some college, the employment category is employed, the race group is non-Hispanic white, and the geographic area is within-MSA.

Appendix Table 3 – Summary Statistics, 2001 ACS, PIKed Households with Income Less than Twice the Poverty Line

Variable	Illinois			Maryland		
	Mean	Standard Deviation	Sample Size	Mean	Standard Deviation	Sample Size
Administrative food stamp receipt	0.2432	0.4291	4,146	0.2323	0.4224	1,799
ACS-reported food stamp receipt	0.2035	0.4027	4,146	0.1745	0.3797	1,799
CATI	0.0927	0.2900	4,146	0.0962	0.2949	1,799
CAPI	0.4625	0.4987	4,146	0.4138	0.4927	1,799
Mail-back	0.4448	0.4970	4,146	0.4900	0.5000	1,799
Unemployed	0.0676	0.2511	4,146	0.0674	0.2508	1,799
Not in labor force	0.5061	0.5000	4,146	0.5359	0.4988	1,799
Noncitizen	0.1113	0.3145	4,146	0.0631	0.2433	1,799
Number of months of food stamp receipt	9.1006	4.1855	789	8.9877	4.2661	344
Administrative TANF receipt	0.0634	0.2438	4,146	0.0787	0.2694	1,799
Age >= 50	0.4494	0.4975	4,146	0.4751	0.4995	1,799
Single, no children	0.5227	0.4995	4,146	0.5515	0.4975	1,799
Single, with children	0.1944	0.3958	4,146	0.2258	0.4182	1,799
Multiple adults, no children	0.1263	0.3323	4,146	0.1046	0.3062	1,799
Multiple adults, with children	0.1566	0.3635	4,146	0.1180	0.3227	1,799
Male	0.4043	0.4908	4,146	0.3585	0.4797	1,799
Number of members under 18	0.8757	1.3459	4,146	0.8510	1.3016	1,799
Number of members over 18	1.5941	0.8070	4,146	1.4988	0.7065	1,799
Number of members PIKed	2.1410	1.4885	4,146	2.1357	1.4431	1,799
Age 17-29	0.2034	0.4025	4,146	0.1699	0.3756	1,799
Age 30-39	0.1796	0.3839	4,146	0.1896	0.3921	1,799
Age 40-49	0.1677	0.3736	4,146	0.1655	0.3717	1,799
Age 50-59	0.1134	0.3171	4,146	0.1157	0.3199	1,799
Age 60-69	0.1112	0.3144	4,146	0.1316	0.3381	1,799
Age >= 70	0.2249	0.4176	4,146	0.2278	0.4195	1,799
Less than high school	0.3436	0.4750	4,146	0.3330	0.4714	1,799
High school	0.3264	0.4690	4,146	0.3409	0.4741	1,799
Some college	0.2298	0.4207	4,146	0.2319	0.4222	1,799
College graduate and beyond	0.1002	0.3003	4,146	0.0942	0.2922	1,799
Non-Hispanic white	0.5762	0.4942	4,146	0.5149	0.4999	1,799
Employed	0.4263	0.4946	4,146	0.3967	0.4894	1,799
Income/poverty line	111.67	56.62	4,146	114.14	55.63	1,799
Disabled	0.3038	0.4599	4,146	0.3475	0.4763	1,799
Disabled, not working	0.1790	0.3834	4,146	0.2018	0.4015	1,799
Speaks English only	0.7738	0.4184	4,146	0.8836	0.3208	1,799
Rural	0.1852	0.3885	4,146	0.1286	0.3349	1,799
ACS-reported public assistance receipt	0.0601	0.2377	4,146	0.0565	0.2310	1,799
ACS-reported housing assistance receipt	0.1429	0.3500	4,146	0.1732	0.3785	1,799
Food stamp receipt imputed	0.0512	0.2205	4,146	0.0426	0.2020	1,799

Notes: All analyses conducted using household weights corrected for PIK probability. Reported demographic characteristics are for the household head.

Appendix Table 4 – Summary Statistics, CPS, PIKed Households with Income Less than Twice the Poverty Line

	Illinois			Maryland		
	Mean	Standard Deviation	Sample Size	Mean	Standard Deviation	Sample Size
Age 40-49	0.1467	0.3539	2,151	0.1442	0.3516	640
Number of members PIKed	2.0670	1.4670	2,151	1.8763	1.3195	640
Age >= 50	0.4937	0.5001	2,151	0.5724	0.4951	640
Male	0.3912	0.4881	2,151	0.3939	0.4890	640
Non-Hispanic white	0.5917	0.4916	2,151	0.6033	0.4896	640
Employed	0.3894	0.4877	2,151	0.3707	0.4834	640
Unemployed	0.0517	0.2215	2,151	0.0372	0.1894	640
Not in labor force	0.5588	0.4966	2,151	0.5921	0.4918	640
Food Stamp receipt imputed	0.0963	0.2951	2,151	0.0793	0.2704	640
Number of months of food stamp receipt	9.4111	3.3482	689	8.7004	4.0234	136
Administrative TANF receipt	0.0416	0.1998	2,151	0.0482	0.2144	640
CPS-reported food stamp receipt	0.1947	0.3960	2,151	0.1175	0.3223	640
Single adult, no children	0.4194	0.4936	2,151	0.4861	0.5002	640
Single adult, with children	0.1358	0.3426	2,151	0.1143	0.3184	640
Multiple adults, no children	0.2014	0.4011	2,151	0.2119	0.4090	640
Multiple adults, with children	0.2435	0.4293	2,151	0.1877	0.3907	640
Number of members over 18	1.5845	0.7965	2,151	1.5087	0.7572	640
Number of members under 18	0.8709	1.3472	2,151	0.6069	1.0789	640
Age 17-29	0.1775	0.3821	2,151	0.1220	0.3275	640
Age 30-39	0.1821	0.3860	2,151	0.1614	0.3682	640
Age 50-59	0.1041	0.3055	2,151	0.1370	0.3441	640
Age 60-69	0.1331	0.3397	2,151	0.1151	0.3195	640
Age >= 70	0.2565	0.4368	2,151	0.3203	0.4670	640
Less than high school	0.3024	0.4594	2,151	0.2827	0.4507	640
High school graduate	0.3658	0.4818	2,151	0.3921	0.4886	640
College graduate and beyond	0.1063	0.3083	2,151	0.1508	0.3581	640
Income/poverty line	116.93	54.61	2,151	116.35	56.57	640
Disabled	0.0113	0.1055	2,151	0.0129	0.1130	640
Rural	0.2118	0.4087	2,151	0.0653	0.2472	640
CPS-reported public assistance receipt	0.0415	0.1995	2,151	0.0349	0.1838	640
CPS-reported housing assistance receipt	0.1348	0.3416	2,151	0.1713	0.3771	640
Linear time trend	3.5455	1.1136	2,151	3.0543	0.8323	640
Administrative food stamp receipt	0.2744	0.4463	2,151	0.1721	0.3777	640
Some college	0.2255	0.4180	2,151	0.1744	0.3798	640

Notes: All analyses conducted using household weights corrected for PIK probability. Samples are pooled across all years for both states (IL:2002-2005, MD:2002-2004). Reported demographic characteristics are for the household head.