How Well Do Individuals Report Supplemental Nutrition Assistance Program (SNAP) Take Up in Household Surveys?

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ABSTRACT

This paper assesses the quality of survey-based reporting of SNAP participation by using linked administrative records from three states, Illinois, Maryland, and Virginia, covering the years 2009-2012. We compare reports of SNAP participation from the 2008 panel of the Survey of Income and Program Participation (SIPP) with SNAP administrative records, evaluating the consistency of reported SNAP participation across the two data sources and identifying characteristics of individuals associated with conflicting reports.

We find evidence of a slight over reporting of SNAP participation in the SIPP for the combined states and years evaluated. Though the vast majority of responses in the survey align with the administrative data, approximately 4.5 percent of the observations can be classified as either a false positive or a false negative. False positives, defined as occurring when a survey respondent reports that they receive benefits, but do not appear in the administrative data, are more likely to occur for the foreign born relative to those born in the U.S, for non-Hispanic Blacks and Hispanics than for non-Hispanic Whites, and for unmarried adults and married adults without children. Conversely, rural residents, those with less than a high school education, women, unmarried parents, and the unemployed are more likely to have false negative responses (appearing as a beneficiary in the administrative data, but not reporting receipt in the survey). Both false positives and false negatives are more likely to occur when survey data on SNAP participation are imputed, raising the possibility that current imputation methods for this survey could be improved by incorporating administrative data.

INTRODUCTION

The Supplemental Nutrition Assistance Program (SNAP) is one of the largest income support programs in the United States, providing food assistance to over 44 million individuals in 2015 at a cost of just under 80 billion dollars (USDA FNS 2016). Though SNAP is federally funded and available nationwide, the program is administered at the state and local level, and allows each jurisdiction to customize some aspects of their program to best serve the needs of their state's population. Studies linking state administrative records of SNAP to household survey data have examined the accuracy of survey-based SNAP participation measures, including respondent's reports of participation in this program and the amount of benefits that they receive. Restricted access to state agency data on program administration, however, has limited these comparisons to select states and years.

This analysis contributes to the existing literature assessing the quality of survey-based reports of SNAP participation by using linked administrative records from three states, Illinois, Maryland, and Virginia, covering the years 2009-2012. We compare reports of SNAP participation from the 2008 panel of The Survey of Income and Program Participation (SIPP) with SNAP administrative records, evaluating the consistency of reported SNAP participation across the two data sources and identifying characteristics of individuals associated with conflicting reports.

We find evidence of a slight over reporting of SNAP participation in the SIPP for the combined states and years evaluated. Though the vast majority of responses in the survey align with the administrative data, approximately 4.5 percent of the observations can be classified as either a false positive or a false negative. False positives, defined as occurring when a survey respondent reports that they receive benefits, but do not appear in the administrative data, are

more likely to occur for the foreign born relative to those born in the U.S, for non-Hispanic Blacks and Hispanics than for non-Hispanic Whites, and for unmarried adults and married adults without children. Conversely, rural residents, those with less than a high school education, women, unmarried parents, and the unemployed are more likely to have false negative responses (appearing as a beneficiary in the administrative data, but not reporting receipt in the survey). Both false positives and false negatives are more likely to occur when survey data on SNAP participation are imputed, raising the possibility that current imputation methods for this survey could be improved by incorporating administrative data.

BACKGROUND

Supplemental Nutrition Assistance Program (SNAP)

The SNAP program, formerly referred to as Food Stamps, provides benefits aimed at reducing hunger for individuals and households with limited income. Unlike other government transfer programs targeted toward specific populations (the Women, Infants, and Children (WIC) program supports only expectant mothers and children under age 5, for example), SNAP benefits are available to any individuals and households meeting the program eligibility requirements. Eligibility requirements are based largely on income guidelines. Those households having a monthly gross income of less than 130 percent of the Federal poverty threshold for their household size, a monthly net income of less than 100 percent of their respective poverty threshold, and assets totaling less than $2,000 qualify to receive benefits. Households that include disabled individuals, individuals aged 60 and over, and participants in other benefit programs like Temporary Assistance for Needy Families (TANF) and Supplemental Security Income (SSI) are subject to different eligibility requirements. Additional non-income criteria,

related to citizenship and employment, are also used to determine eligibility for potential recipients.

Participation rates for the Food Stamp/SNAP program have varied throughout its roughly 40 years of existence in response to changes in the broader economy and program administration, rules, and policies. In recent years, the diminished labor market conditions brought on by the Great Recession among other factors have bolstered the number of SNAP recipients (Ganong and Liebman 2013). In 2008, there were just over 28 million participants; by 2013, that number increased to 47.6 million. In subsequent years, the number of participants has decreased slightly, down to 43.5 million in May of 2016. Approximately one in seven U.S. residents received SNAP benefits in that month (FRAC 2016).

Research has shown that the food assistance provided by SNAP benefits is associated with a variety of positive benefits for those participating in the program. Low-income children's participation in the program is associated with positive health outcomes, including a decrease in failure to thrive and inadequate nutrition, and lower levels of child abuse and neglect (Lee and Mackey-Bilaver 2007). Receipt of SNAP benefits is also associated with decreased food insecurity (Nord and Golla 2009) and reductions in poverty (Tiehen, Jolliffe, and Gunderson 2012) for participating families relative to those who are income eligible but do not receive SNAP benefits.

Linking SNAP Administrative Records to Survey Data

Much of what is known about program dynamics and the characteristics of program beneficiaries is derived from analyses of household survey data. Researchers use these data to examine characteristics of recipients, rates of program participation, and the effects of program

participation on a variety of economic, social, and well-being outcomes. Recent studies, however, have highlighted some concerns regarding the quality of household survey data, including increasing nonresponse rates, high proportions of imputed data, and measurement error within major household surveys (Groves 2006; Meyer, Mok and Sullivan 2015). These issues may affect the results and conclusions of studies using household survey data, and subsequently skew our understanding of who is participating in government benefit programs and how successful these programs are in achieving their objectives.

While with its own unique flaws, data collected in the administration of program benefits can serve as a benchmark for measuring the accuracy of self-reported program participation data in household surveys. Most researchers comparing administrative data to survey responses either assess aggregate values from the program data with the weighted estimates, or link individual microdata across the two sources. Aggregate comparisons are useful for looking at how well the surveys measure participation levels and benefit amounts, while comparisons at the individual level are useful in identifying characteristics of individuals whose recorded program participation in survey data does not align with the administrative records.

Researchers employing these techniques to evaluate food stamp/SNAP participation have found evidence of misreporting in a variety of household surveys for a handful of states where administrative data were available. One of the first of these types of studies was conducted by Marquis and Moore (1990) on the 1984 SIPP panel. The results of this study, which compared food stamp records from FL, PA, and WI found relatively good match rates between survey and administrative data, with only 1.2 percent response error. However, this response error was associated with 13 percent underreporting of SNAP participation in the survey. Underreporting has also been found in other survey data using estimates that are more recent from other states.

Meyer and Goerge (2011) compared food stamp records from MD and IL to the 2001 American Community Survey (ACS) data and 2002-2005 Current Population Survey (CPS) data, and found that survey data underreported SNAP participation for certain subgroups of the population, including single parents, lower-income households and race groups other than non-Hispanic White. Using administrative data from TX (2008 – 2010) and NY (2006 -2009) linked to the ACS, Harris (2014) found geographic differences in reporting, with some counties in these states demonstrating a tendency toward false negative reporting, and others toward higher levels of false positives.

DATA AND METHODS

In this analysis, we evaluate SNAP reports from the 2008 panel of the SIPP Survey[1]. SIPP is a longitudinal survey that tracks individuals over time, providing detailed information on a wide variety of economic, demographic, and social characteristics of respondents including income and program participation for members of households included in the initial wave 1 sample, and on individuals that reside with initial sample members in subsequent waves of data collection. The SIPP is ideal for analyzing the accuracy of SNAP participation reports for a number of reasons: 1) SIPP collects information on the program participation of all members of a household as opposed to just a household head; 2) SIPP collects information on the intensity of use for members of the household with measures of the number of months benefits were received and the amount of the benefits; and 3) SIPP also provides information on who within a survey household share benefits with one another. Other major household surveys like the American

[1] The data are subject to error arising from a variety of sources, including sampling error and nonsampling error. For more information, please visit http://www.census.gov/programs-surveys/sipp/tech-documentation/source-accuracy-statements/source-accuracy-statements-2008.html

Community Survey (ACS) and the Current Population Survey (CPS) do not provide the same level of detail regarding SNAP participation.

The analyses presented here are based on a subset of the SIPP sample corresponding to the states where the Census Bureau had access to administrative records for the years 2009-2012: IL, MD, and VA. For the purposes of this paper, we compare an annual SNAP participation measure from the SIPP indicating whether a respondent received SNAP benefits at any point during the year, with administrative records measuring the same concept. This simple comparison of the data sources provides a starting point for our evaluation of SNAP reporting in the SIPP.

SIPP data are linked to the administrative records through a probabilistic matching technique. This method assigns a unique identification number (called a protected identification key or PIK) to each individual based on their social security number, name, date of birth and address (See Wagner and Lane (2014) for a detailed description of the process used to assign the identification numbers). The Census Bureau assigns these identifiers to survey respondents and to individuals in administrative data. Because the numbers are unique to individuals, they can be used to link data from the same individual across different data sources. To create our analytic sample of matched records, we merged the SIPP data with the administrative records using these unique identifiers. Since our measures were based on an annual measure of participation, we kept only those observations with 12 months of data in both of the sources.

Not all records in the survey were assigned a PIK. Past studies evaluating the process used to assign PIKs have found that some sociodemographic groups are less likely than others to be assigned PIK values (NORC 2011). We ran logistic regression models to determine whether differences between those respondents with and without PIKs were non random. Results,

presented in Table 1[2], reveal systematic differences between the two groups. Rural residents are more likely to have PIK values relative to urban residents, those aged 65 and older are more likely to have PIK values compared to those in the working age, and the college educated are more likely than those with a high school diploma. Additional differences in the likelihood of having a PIK were found based on race and origin (non-Hispanic Whites are more likely to have PIK values than non-Hispanic Blacks and Hispanics), nativity (those born in the U.S. are more likely to have PIK values than those born in other countries), and gender (males are more likely to have PIK values than females). Most importantly for our analyses, there are no significant differences in reported SNAP participation or in the number of months that benefits were received between the PIK'd and not PIK'd sample. However, those with imputed SNAP responses in the survey are 42 percent less likely to be assigned a PIK than respondents who reported their participation. Because of these differences, we cannot claim that the results presented here apply to the entire SIPP sample for these states and years; rather, the results are limited in applicability to the linked observations only.

RESULTS

There are four possible outcomes for SNAP reporting in the linked data sources. Recipients can be listed as participating in SNAP in both data sources, as not participating in SNAP in either data sources, or as participating in one data source, but not in the other. Mismatches in reporting are the primary focus of this paper, as we seek to understand characteristics associated with what we refer to as false negatives (defined as those that do not

[2] All comparative statements made in this report have undergone statistical testing, and, unless otherwise noted, all comparisons are statistically significant at the 10 percent significance level. Data are not weighted and, therefore, are not representative of the population.

report receiving SNAP benefits in the survey, but that appear as beneficiaries in the administrative data) and false positives (those who report receiving SNAP benefits in the survey, but who do not appear as recipients in the administrative data).

Table 2 shows the distribution of these outcomes for each of the states separately and for all of the states combined. The first panel of Table 2 shows reported SNAP participation in the SIPP and in the administrative data for each of the three states. In each state, self-reported status in the SIPP is significantly associated with SNAP participation estimates derived from the administrative data. The relationship between reporting in the SIPP and reporting in the administrative data is not statistically significant across all of the states. In general, mismatches between the administrative data are relatively rare for all of the states, with the vast majority of survey responses mirroring the administrative records. False negatives represent between about 2 to 3 percent of the sample in each state, while false positives account for between 1 and 3 percent of the observations in each state.

The second panel of Table 2 shows the same information, but excludes responses where the SIPP participation values were imputed. For all of the states, IL, MD and VA, the relationship between SNAP administrative data and SIPP survey data varies based on imputation status. Imputed measures of SNAP participation in the SIPP do not correspond to the administrative data in the same manner as those that are self-reported, however caution must be used in interpreting these results because cell sizes fall to below 50 when the observations are broken down by imputation status and reporting patterns within each state. Table 2A shows that misreporting in each of these is uncommon, with mismatches accounting for less than 5 percent of all cases in each of the states.

In the third panel of Table 2, we show the reporting pattern for all states combined. Small sample sizes prohibit us from analyzing each state individually, so all subsequent analyses are based on the combined sample. The combined values are consistent with the trends observed in the individual states. SNAP participation measurements in the SIPP are significantly associated with SNAP participation measurements derived from the administrative data, and the relationship between the two variables differs based on whether the SIPP responses are self-reported or imputed. In the full sample, 4.5 percent of responses are classified as misreports (either false negative or false positive). For self-reported values, this number is 4.1, while for imputed responses 14.2 percent of responses are classified as misreports.

To address the question of which characteristics are associated with misreporting SNAP participation in the SIPP, we begin by creating cross tabulations of reporting status and sociodemographic variables from the survey. The basic reporting pattern shown in Table 2 is largely replicated for most variables, as demonstrated in Table 3; the majority of respondents are not SNAP beneficiaries in either data source, with the next most common status being SNAP participation recorded in both data sources. There are relatively few observations with mismatched reporting statuses, but the mismatches appear to be associated with particular characteristics.

We evaluate the significance of these associations through two logistic regression models; one for false negatives, and the other for false positives. Looking first at the false negative model (Table 4), there are a number of variables significantly associated with the likelihood of being a false negative. In this model, the sample is limited to those with administrative data, meaning that the comparisons are between those that accurately report receiving benefits in the sample and appear as such in the administrative data and those that

report not receiving benefits in the sample, but are listed as beneficiaries in the administrative data. Holding all other variables constant, individuals in rural areas are 45 percent less likely to be false negatives than individuals in metro areas, while individuals with less than high school education are 31 percent less likely to be false negatives than those with a high school diploma. Those that have not worked during the year are 47 percent less likely to be false negatives than those that have worked, and females are 28 percent less likely to be false negatives than males. Regarding race and Hispanic origin, non-Hispanic individuals identifying as races other than Black or White are 52 percent less likely to report false negatives than non-Hispanic Whites are. Single individuals with children are 46 percent less likely to be false negative than those who are married with children, and single individuals without kids are 79 percent more likely to be false negative than married with children. Each additional person in the household decreases the odds of being a false positive by 6.6 percent, and those with imputed SNAP responses are 159 percent more likely to be false negatives than those that reported their own SNAP participation.

Turning to the false positive model (Table 4), the sample for these results is restricted to those who are in the SIPP, but are not in the administrative data. We compare those who are not in the administrative data and who report that they do not receive SNAP benefits with those who report participating in SNAP in the survey but who are not in the administrative data. We find a 49 percent higher likelihood of being false positive in non-metro areas relative to metro areas. It is 75 percent less likely for the younger group to have a false positive relative to the working age, and the college-educated are 41 percent less likely to have a false positive than those with high school education. Those born outside of the U.S. are 61 percent more likely to have a false positive than those born in the US, while those with imputed values are 124 percent more likely to be a false positive than those who report their own SNAP participation. There are significant

differences by race and Hispanic origin – non-Hispanic Blacks are 363 percent more likely to be false positive than non-Hispanic Whites, non Hispanic other races 41 percent less likely to be false positive than non-Hispanic Whites, and Hispanics are 78 percent more likely to be false positive than non-Hispanic Whites. There are also significant differences by family composition, with individuals who are married with children being less likely to be classified as false positive relative to all other family composition types. Similarly, there are significant differences by other measures of household and family composition. Each additional family in the household is associated with a 65 percent increase in the odds of being a false positive, while each additional person in the household is associated with a 43 percent increase in the odds of being a false positive.

CONCLUSION

We compared SNAP administrative data with SIPP survey data to estimate the degree of misreporting in the survey data, and to identify characteristics associated with two types of misreporting: false negatives and false positives. While misreporting of status occurred in a relatively small fraction of our analytic sample, there did appear to be some differences in the characteristics associated with each type of misreporting.

Characteristics associated with a lower likelihood of false negative classification, are those that are also associated with higher levels of poverty. Rural residents, females, non-Hispanic Blacks, those with less than a high school education, and those who were unemployed during the year had a lower likelihood of false negative reporting (DeNavas-Walt and Proctor 2015). Considering that the reference group for the false negative analysis was those who reported participation and who were listed as beneficiaries in the sample, one possible

interpretation of these findings is that there is a social desirability element involved in this type of misreporting. Members of groups who are less typically associated with poverty are less likely to report their program participation in social surveys and one reason for this could be the perceived social stigma associated with program participation.

A different set of characteristics were associated with false positive reporting. False positives occur when individuals report program participation in the survey, but do not appear in the administrative data. False positives could result from misreporting of survey respondents, but they could also occur because of inconsistencies in the administrative data, or as a result of the matching process. For example, many of the characteristics that were associated with false positives in the linked data were also characteristics associated with the odds of having a PIK in the SIPP sample in our study, and in other studies evaluating the procedure used to assign PIKs (NORC 2011). The foreign born were less likely to have PIK values in the SIPP, and were also more likely to be classified as false positives. The same is true for non-Hispanic blacks and Hispanics. Though we did not test this in our analyses, it could be that some share of these individuals actually receive SNAP benefits but do not appear in the administrative data because their records are not PIK'd.

One of the most consistent findings throughout these analyses was the role of imputations in increasing the likelihood of misreporting. Imputed SNAP data was associated with an increased likelihood of both false positive and false negative reporting. Although SNAP administrative records are available in only a handful of states, the results of our analyses suggest that there could be a role for using administrative data to improve the current method for imputing SNAP participation in the SIPP. This is something that we will explore in more detail in future studies. We also plan on expanding this research, using similar methods to examine

differences in other characteristics of SNAP participation including months of receipt, SNAP benefit amount, and the size and composition of the SNAP unit. Further, the administrative data for these states contain information on the participants' income and participation in other government transfer programs that we would like to use to evaluate these measures in the survey.

Table 1 - Logistic Regression Results: PIK assignment in the SIPP Survey Data

Variables	Odds Ratios
Metro	
Rural (Metro omitted)	1.172**
Age (18-24 omitted)	
0-17	1.17
65 and Older	1.42***
Education (High School omitted)	
Out of Universe	1.28
Less than High School	0.96
Some College or More	1.57***
Employment (Employed omitted)	
Out of Universe	0.71
Not Employed	0.90*
Nativity (U.S. Born omitted)	
Foreign Born	0.23***
Language (English only omitted)	
Out of Universe	0.18***
Other Language Spoken	0.78***
Sex (Male omitted)	
Female	0.90*
SNAP Imputation (Not imputed omitted)	
Imputed	0.58***
SNAP participation (No SNAP omitted)	
SNAP	1.15
Race and Origin (Non Hispanic White omitted)	
Non Hispanic Black	0.75***
Non Hispanic Other Races	1.07
Hispanic	0.51***
Number of Families in Household	0.67***
Number of People in Household	0.99
Number of Months SNAP Received	0.98
-2loglikelihood	23,884.31
N	27,913

Notes: The sample for each state includes all respondents with 12 months of data for a given year in the years 2009 - 2012 of the 2008 SIPP Panel.
Statistical significance is indicated by the asterisks, with corresponding p-values of: * = 0.05; ** = 0.01; *** = 0.001

Table 2 - Misreporting of SNAP Benefit Receipt, 2008 SIPP Panel

Administrative Data		SIPP Report		
		No SNAP	SNAP	Total
Illinois	No SNAP	8123	255	8378
		82.95	2.60	85.86
		96.96	3.04	100.00
		97.12	17.84	85.86
	SNAP	241	1174	1415
		2.46	11.99	14.45
		17.03	82.97	100.00
		2.88	82.16	14.45
	Total	8364	1429	9793
		85.41	14.59	100.00
		85.41	14.59	100.00
		100.00	100.00	100.00
Maryland	No SNAP	4484	141	4625
		87.19	2.74	89.93
		96.95	3.05	100.00
		98.59	23.70	89.93
	SNAP	64	454	518
		1.24	8.83	10.07
		12.36	87.64	100.00
		1.41	76.30	10.07
	Total	4548	595	5143
		88.43	11.57	100.00
		88.43	11.57	100.00
		100.00	100.00	100.00
Virginia	No SNAP	9036	206	9242
		86.63	1.97	88.60
		97.77	2.23	100.00
		97.32	17.98	88.60
	SNAP	249	940	1189
		2.39	9.01	11.40
		20.94	79.06	100.00
		2.68	82.02	11.40
	Total	9285	1146	10431
		89.01	10.99	100.00
		89.01	10.99	100.00
		100.00	100.00	100.00

Notes: Entries in each cell from top to bottom represent sample count, overall percent, row percent, and column percent.
The sample for each state includes all respondents with 12 months of data for a given year in the years 2009-2012 of the 2008 SIPP panel.
Estimates with a sample size of less than 30 are not reliable because there is not sufficient sample size in these subgroups.

Table 2A - Misreporting of SNAP Benefit Receipt, 2008 SIPP Panel Excluding Imputed SNAP Responses

Administrative Data		SIPP Report		
		No SNAP	SNAP	Total
Illinois	No SNAP	7743	207	7950
		83.34	2.23	85.57
		97.40	2.60	100.00
		97.29	15.54	85.57
	SNAP	216	1125	1341
		2.32	12.11	14.43
		16.10	83.89	100.00
		2.71	84.46	14.43
	Total	7959	1332	9291
		85.66	14.34	100.00
		85.66	14.34	100.00
		100.00	100.00	100.00
Maryland	No SNAP	4212	108	4320
		87.53	2.24	89.78
		97.5	2.50	100.00
		98.66	19.89	89.78
	SNAP	57	435	492
		1.18	9.04	10.22
		11.59	88.41	100.00
		1.34	80.11	10.22
	Total	4269	543	4812
		88.72	11.28	100.00
		88.72	11.28	100.00
		100.00	100.00	100.00
Virginia	No SNAP	8546	148	8694
		87.42	1.51	88.93
		98.30	1.70	100.00
		97.61	14.50	88.93
	SNAP	209	873	1082
		2.14	8.93	11.07
		19.32	80.68	100.00
		2.39	85.50	11.07
	Total	8755	1021	9776
		89.56	10.44	100.00
		89.56	10.44	100.00
		100.00	100.00	100.00

Notes: Entries in each cell from top to bottom represent sample count, overall percent, row percent, and column percent.
The sample for each state includes all respondents with 12 months of data for a given year in the years 2009-2012 of the 2008 SIPP panel.
Estimates with a sample size of less than 30 are not reliable because there is not sufficient sample size in these subgroups.

Table 2B - Misreporting of SNAP Benefit Receipt by Imputation Status, 2008 SIPP Panel Sample States Combined

Administrative Data		SIPP Report		
		No SNAP	SNAP	Total
full sample	No SNAP	21643 85.32 97.29 97.50	602 2.37 2.71 18.99	22245 87.69 100.00 87.69
	SNAP	554 2.18 17.74 2.50	2568 10.12 82.26 81.01	3122 12.31 100.00 12.31
	Total	22197 87.50 87.50 100.00	3170 12.50 12.50 100.00	25367 100.00 100.00 100.00
Imputed Sample Data	No SNAP	1142 76.75 89.15 94.07	139 9.34 10.85 50.72	1281 86.09 100.00 86.09
	SNAP	72 4.84 34.78 5.93	135 9.07 65.22 49.27	207 13.91 100.00 13.91
	Total	1214 81.59 81.59 100.00	274 18.41 18.41 100.00	1488 100.00 100.00 100.00
Not Imputed Sample Data	No SNAP	20501 85.85 97.79 97.70	463 1.94 2.21 15.99	20964 87.79 100.00 87.79
	SNAP	482 2.19 16.54 2.30	2433 10.19 83.46 84.01	2915 12.21 100.00 12.21
	Total	20983 87.87 87.87 100.00	2896 12.13 12.13 100.00	23879 100.00 100.00 100.00

Notes: Entries in each cell from top to bottom represent sample count, overall percent, row percent, and column percent.
The sample for each state includes all respondents with 12 months of data for a given year in the years 2009-2012 of the 2008 SIPP panel.
Estimates with a sample size of less than 30 are not reliable because there is not sufficient sample size in these subgroups.

Table 3 - Summary Statistics by Reporting of SNAP Participation in 2008 SIPP Panel and Administrative Data

	Total	SNAP Benefits in Administrative Data				No SNAP Benefits in Administrative Data			
		SNAP in SIPP		No SNAP in SIPP		SNAP in SIPP		No SNAP in SIPP	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent
Metro Status									
Metro	21,085	2,135 (2,049 - 2,220)	10.13 (9.72 - 10.53)	498 (455 - 543)	2.36 (2.16 - 2.58)	509 (466 - 552)	2.41 (2.21 - 2.62)	17,943 (17,842 - 18,045)	85.1 (84.62-85.58)
Not Metro	4,282	433 (394 - 472)	10.11 (9.21 - 11.02)	56 (42 - 71)	1.31 (0.97 - 1.65)	93 (75-112)	2.17 (1.74 - 2.61)	3,700 (3,656 - 3,744)	86.41 (85.38 - 87.43)
Age									
Under 17	5,805	1,045 (987 - 1,102)	18 (17.01-18.99)	213 (185 - 241)	3.67 (3.19-4.15)	102 (82 - 122)	1.76 (1.42-2.10)	4,445 (4,382 - 4,508)	76.57 (75.48-77.66)
18-64	15,972	1,311 (1,243 - 1,378)	8.21 (7.78-8.63)	315 (281 - 351)	1.97 (1.76-2.20)	425 (385 - 465)	2.66 (2.41-2.91)	13,921 (13,838 - 14, 004)	87.16 (86.64-87.68)
65 and Over	3,590	212 (184 - 240)	5.91 (5.13-6.68)	26 (16 - 36)	0.72 (0.45-1.00)	75 (58 - 92)	2.09 (1.62-2.56)	3,277 (3,244 - 3,310)	91.28 (90.36-92.20)
Education									
Out of Universe	4,637	890 (837 - 943)	19.19 (18.06-20.33)	171 (146 - 196)	3.69 (3.15-4.23)	81 (64 - 98)	1.75 (1.37-2.12)	3,495 (3,437 - 3,552)	75.37 (74.13-76.61)
Less than High School	3,163	595 (552 - 638)	18.81 (17.45-20.17)	106 (86 - 126)	3.35 (2.72-3.98)	116 (95 - 137)	3.67 (3.01-4.32)	2,346 (2,298 - 2,388)	74.17 (72.64-75.70)
High School	4,887	529 (486 - 572)	10.82 (9.95-11.70)	122 (101 - 143)	2.5 (2.06-2.93)	175 (150 - 200)	3.58 (3.06-4.10)	4,061 (4,010 - 4,112)	83.1 (82.05-84.15)
Some College and Higher	12,680	554 (508 - 599)	4.37 (4.01-4.72)	155 (131 - 179)	1.22 (1.03-1.41)	230 (200 - 260)	1.81 (1.58-2.05)	11,741 (11,683 - 11,799)	92.59 (92.14-93.05)
Employment									
Out of Universe	4,676	893 (840 - 945)	19.1 (17.97-20.22)	171 (146 - 196)	3.66 (3.12-4.19)	82 (65 - 100)	1.75 (1.38-2.13)	3,530 (3,472 - 3,587)	75.49 (74.26-76.72)

Employed	14,175	760 (707 - 812)	5.36 (4.99-5.73)	222 (193 - 251)	1.57 (1.36-1.77)	353 (316 - 390)	2.49 (2.23-2.75)	12,840 (12,772 - 12,908)	90.58 (90.10-91.06)
Unemployed	6,516	915 (860 - 970)	14.04 (13.20-14.89)	161 (136 - 186)	2.47 (2.09-2.85)	167 (142 - 192)	2.56 (2.18-2.95)	5,273 (5,211 - 5,335)	80.92 (79.97-81.88)
Nativity									
Foreign Born	2,455	158 (134 - 182)	6.44 (5.47-7.41)	35 (24 - 46)	1.43 (0.96-1.89)	89 (71 - 107)	3.63 (2.89-4.36)	2,173 (2,142 - 2,204)	88.51 (87.25-89.77)
Born in U.S.	22,912	2,410 (2,319 - 2,502)	10.52 (10.12-10.92)	519 (474 - 564)	2.27 (2.07-2.46)	513 (470 - 557)	2.24 (2.05-2.43)	19,470 (19,363 - 19,471)	84.98 (84.51-85.44)
Number of Families in Household									
1	21,487	1,902 (1,820 - 1,983)	8.85 (8.47-9.23)	418 (378 - 458)	1.95 (1.76-2.13)	323 (288 - 359)	1.50 (1.34-1.67)	18,844 (18,750 - 18,939)	87.7 (87.26-88.14)
2	3,325	578 (535 - 621)	17.38 (16.10-18.67)	126 (104 - 148)	3.79 (3.14-4.44)	234 (205 - 263)	7.04 (6.17-7.91)	2,387 (2,336 - 2,438)	71.79 (70.26-73.32)
3 or More	555	88 (71 - 105)	15.86 (12.82-18.89)	10 (4 - 16)	1.8 (0.70-2.91)	45 (32 - 58)	8.11 (5.84-10.38)	412 (392 - 432)	74.23 (70.60-77.87)
Number of People in Household									
1	2,483	236 (207 - 265)	9.5 (8.35-10.66)	38 (26 - 50)	1.53 (1.05-2.01)	25 (15 - 35)	1.01 (0.61-1.40)	2,184 (2,152 - 2,216)	87.96 (86.68-89.24)
2	6,238	324 (289 - 358)	5.19 (4.64-5.74)	89 (70 - 107)	1.43 (1.13-1.72)	71 (54 - 87)	1.14 (0.87-1.40)	5,754 (5,713 - 5,795)	92.24 (91.58-92.90)
3	4,667	451 (412 - 491)	9.66 (8.82-10.51)	97 (78 - 116)	2.08 (1.67-2.49)	110 (90 - 130)	2.36 (1.92-2.79)	4,009 (3,962 - 4,056)	85.9 (84.90-86.90)
4	5,819	513 (471 - 555)	8.82 (8.09-9.54)	126 (104 - 148)	2.17 (1.79-2.54)	71 (55 - 87)	1.22 (0.94-1.50)	5,109 (5,060 - 5,158)	87.8 (86.96-88.64)
5 or More	6,160	1,044 (986 - 1,101)	16.95 (16.01-17.88)	204 (176 - 232)	3.31 (2.86-3.76)	325 (291 - 359)	5.28 (4.72-5.83)	4,587 (4,520 - 4,654)	74.46 (73.38-75.55)
Other Language Spoken at Home									
Out of Universe	1,095	264 (236 - 292)	24.11 (21.58-26.64)	23 (14 -32)	2.1 (1.25-2.95)	14 (7 - 21)	1.28 (0.61-1.94)	794 (765 - 823)	72.51 (69.87-75.16)

No	21,289	2,048 (1,963 - 2,133)	9.62 (9.22-10.02)	460 (419 - 502)	2.16 (1.97-2.36)	499 (456 - 543)	2.34 (2.14-2.55)	18,282 (18,183 - 18,381)	85.88 (85.41-86.34)
Yes	2,983	256 (226 - 286)	8.58 (7.58-9.59)	71 (55 - 87)	2.38 (1.83-2.93)	89 (71 - 107)	2.98 (2.37-3.59)	2,567 (2,530 - 2,604)	86.05 (84.81-87.30)
Sex									
Female	13,060	1,566 (1,493 - 1,639)	11.99 (11.43-12.55)	282 (57 - 315)	2.16 (1.91-2.41)	292 (259 - 325)	2.24 (1.98-2.49)	10,920 (10,837 - 11,003)	83.61 (82.98-84.25)
Male	12,307	1,002 (943 - 1,061)	8.14 (7.66-8.62)	272 (240 - 304)	2.21 (1.95-2.47)	310 (276 - 345)	2.52 (2.24-2.80)	10,723 (10,650 - 10,796)	87.13 (86.54-87.72)
SNAP Participation Imputed									
No	23,879	2,433 (2,343 - 2,524)	10.19 (9.81-10.57)	482 (439 - 525)	2.02 (1.84-2.20)	463 (420 - 504)	1.94 (1.76-2.11)	20,501 (20,395 - 20,608)	85.85 (85.41-86.30)
Yes	1,488	135 (113 - 157)	9.07 (7.61-10.53)	72 (56 - 88)	4.84 (3.75-5.93)	139 (117 - 161)	9.34 (7.86-10.82)	1,142 (1,110 - 1,174)	76.75 (74.60-78.89)
Race and Hispanic Origin									
Non Hispanic White	16,789	962 (903 - 1,021)	5.73 (5.38-6.08)	182 (156 - 208)	1.08 (0.93-1.24)	230 (200 - 259)	1.37 (1.19-1.54)	15,416 (15,347 - 15,486)	91.82 (91.41-92.24)
Non Hispanic Black	4,989	1,217 (1,157 - 1,277)	24.39 (23.20-25.59)	294 (261 - 327)	5.89 (5.24-6.55)	278 (245 - 309)	5.57 (4.92-6.19)	3,201 (3,135 - 3,267)	64.16 (62.83-65.49)
Non Hispanic Other Races	1,880	133 (111 - 155)	7.07 (5.92-8.23)	14 (7 - 21)	0.74 (0.36-1.13)	28 (18 - 38)	1.49 (0.94-2.04)	1,705 (1,680 - 1,730)	90.69 (89.38-92.00)
Hispanic	1,709	256 (227 - 285)	14.98 (13.29-16.67)	64 (49 - 79)	3.74 (2.84-4.65)	68 (52 - 84)	3.98 (3.05-4.91)	1,321 (1,287 - 1,355)	77.3 (75.31-79.28)
Family Type									
Single with Children	1,067	396 (365 - 427)	37.11 (34.21-40.01)	44 (31 - 57)	4.12 (2.93-5.32)	53 (39 - 67)	4.97 (3.66-6.27)	574 (542 - 606)	53.8 (50.80-56.79)
Single no Children	12,599	1,689 (1,614 - 1,764)	13.41 (12.81-14.00)	409 (370 - 449)	3.25 (2.94-3.56)	350 (314 - 386)	2.78 (2.49-3.06)	10,151 (10,064 - 10,238)	80.57 (79.88-81.26)
Married with Children	4,946	310 (276 - 343)	6.27 (5.59-6.94)	64 (48 - 80)	1.29 (0.98-1.61)	82 (64 - 99)	1.66 (1.30-2.01)	4,490 (4,450 - 4,530)	90.78 (89.97-91.59)

Married no Children	6,755	173 (147 - 199)	2.56 (2.18-2.94)	37 (25 - 49)	0.55 (0.37-0.72)	117 (96 - 138)	1.73 (1.42-2.04)	6,428 (6,394 - 6,463)	95.16 (94.65-95.67)
Individual Income									
No Annual Income	5,911	1,111 (1,052 - 1,170)	18.8 (17.80-19.79)	250 (220 - 280)	4.23 (3.72-4.74)	111 (90 - 131)	1.88 (1.53-2.22)	4,439 (4,374 - 4,504)	75.1 (73.99-76.20)
$1 - $9,999	4,238	735 (687 - 783)	17.34 (16.20-18.48)	132 (110 - 154)	3.11 (2.59-3.64)	156 (132 - 180)	3.68 (3.11-4.25)	3,215 (3,160 - 3,270)	75.86 (74.57-77.15)
$10,000 - $24,999	5,020	613 (568 - 659)	12.21 (11.31-13.12)	102 (82 - 121)	2.03 (1.64-2.42)	176 (151 - 201)	3.51 (3.00-4.01)	4,129 (4,076 - 4,182)	82.25 (81.19-83.31)
$25,000 - $39,000	3,343	88 (70 - 106)	2.63 (2.09-3.18)	53 (39 - 67)	1.59 (1.16-2.01)	91 (73 - 109)	2.72 (2.17-3.27)	3,111 (3,082 - 3,140)	93.06 (92.20-93.92)
$40,000 or More	6,855	21 (12 - 30)	0.31 (0.18 - 0.44)	17 (9 - 25)	0.25 (0.13 - 0.37)	68 (52 - 84)	0.99 (0.76 - 1.23)	6,749 (6,729 - 6,769)	98.45 (98.16 - 98.75)

Notes: Sample includes respondents from IL, MD, and VA with 12 months of data in a given year for the years 2009-2012 from the 2008 SIPP panel linked with state-based administrative SNAP records.
Numbers in parentheses represent the 95 % confidence interval associated with each estimate.
Estimates with a sample size of less than 30 are not reliable because there is not sufficient sample size in these subgroups.

Table 4 - Logistic Regression Results: False Negative and False Positive Misreporting of SNAP Participation in the SIPP

Variables	False Negative Response Odds Ratios	False Positive Response Odds Ratios
Metro		
Rural (Metro omitted)	0.555***	1.49**
Age (18-24 omitted)		
0-17	1.35	0.253***
65 and Older	0.64	0.87
Education (High School omitted)		
Less than High School	0.686*	1.21
Some College or More	1.27	0.59***
Employment (Employed omitted)		
Not Employed	0.528***	1.21
Nativity (U.S. Born omitted)		
Foreign Born	0.91	1.61**
Language (English only omitted)		
Other Language Spoken	1.43	0.8
Sex (Male omitted)		
Female	0.718**	0.92
SNAP Imputation (Not Imputed omitted)		
Imputed	2.593***	2.24***
Race and Origin (Non Hispanic White omitted)		
Non Hispanic Black	1.16	4.63***
Non Hispanic Other Races	0.476*	0.59*
Hispanic	1.09	1.78**
Number of Families in Household	0.98	1.65***
Number of People in Household	0.934*	1.43***
Family Compostition (Married with Children omitted)		
Single with Children	0.542**	2.99***
Single no Children	1.789**	2.49***
Married no Children	1.43	1.50*
-2loglikelihood	2,733.96	4495.45
N	3,122	22245

Notes: Sample includes respondents from IL, MD, and VA with 12 months of data in a given year for the years 2009-2012 from the 2008 SIPP panel linked with state-based administrative SNAP records.
Statistical significance is indicated by the asterisks, with corresponding p-values of: * = 0.05; ** = 0.01; *** = 0.001

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