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The Supplemental Nutrition Assistance Program and Food Security: Insights From Administrative Records

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Abstract

Studies that assess the effectiveness of the Supplemental Nutrition Assistance Program (SNAP) in improving food security have primarily been conducted using Federal survey data.[1] These surveys have high rates of SNAP misreporting. Research has shown that even small amounts of misreporting could impact estimates of the causal and noncausal relationships between SNAP participation and food security. In this context, we use administrative records from 19 States matched to the Current Population Survey (CPS) Food Security Supplement for the 2017–19 period to investigate misreporting and its consequences for understanding how SNAP impacts food security. SNAP underreporting is about 47 percent in these years, comparable to studies using previous years of CPS microdata. At the same time, overreporting is slightly higher than some other studies at 2 percent. We find the administratively matched SNAP sample is more food secure than the sample based on survey responses only. Our results indicate that SNAP has a potentially large and positive effect on food security. However, the estimates of the effect of SNAP on food security for the administrative sample are more precise than for the survey sample; estimates from the survey sample likely overestimate the efficacy of SNAP.

Keywords: SNAP, food security, misreporting, administrative records

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[1] Federal surveys that collect food security and SNAP data include are listed on the USDA, Economic Research Service website.

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A report summary from the Economic Research Service

The Supplemental Nutrition Assistance Program and Food Security: Insights From Administrative Records

Christian A. Gregory, Kegan O'Connor

Key Points

- This report investigates how survey misreporting of participation in the Supplemental Nutrition Assistance Program (SNAP) affects our understanding of the relationship between SNAP and food security.
- Many SNAP respondents do not identify themselves as program participants on Federal surveys, an obstacle this study overcomes by using Federal survey data from the Current Population Survey Food Security Supplement (CPS-FSS) linked to administrative data from 19 States for the 2017–19 survey years.
- The linked data show nearly half (47.3 percent) of all SNAP participants erroneously report that they did not receive SNAP on the 2017–19 CPS-FSS surveys.
- The data also show that the sample of SNAP households matched to administrative data is more food secure than the sample of SNAP households identified solely by responses to CPS-FSS.
- The study finds that SNAP participation has a positive effect on U.S. households' food security. However, using only survey-reported SNAP participation can lead to overestimating the effect of SNAP on food security by as much as 50 percent compared with using administrative records (38.4 percent versus 24.4 percent).

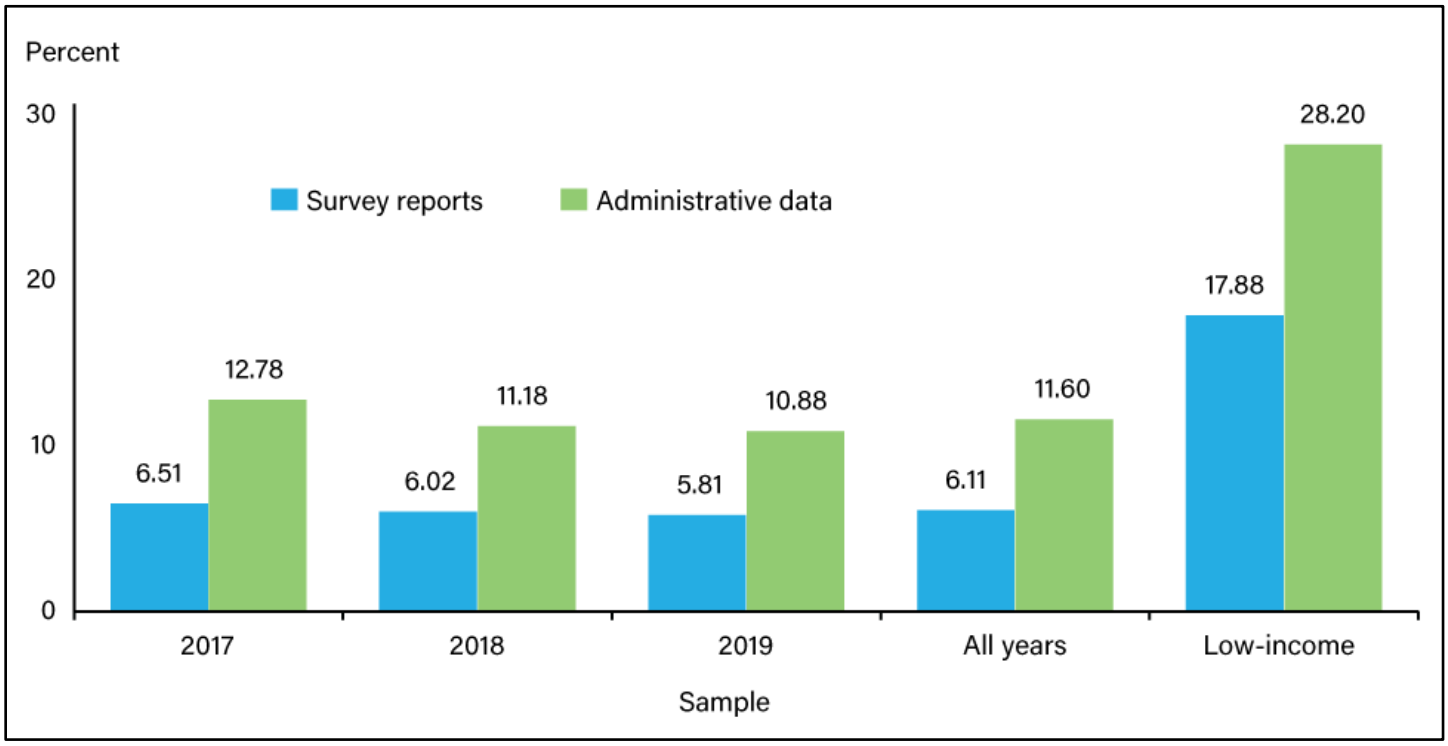
Why Does This Matter?

Almost all existing information about SNAP and its relation to food security comes from studies using Federal survey data. Depending on the survey and years of data used, respondents in these data collections are known to misreport participation in SNAP by as much as 50 percent. Research has shown that this misreporting has important consequences for understanding the relationship between SNAP participation and other significant program outcomes, such as poverty. This study examines how SNAP administrative records linked to the annual CPS-FSS improve understanding of the relationships between SNAP and food security.

A Few More Details

USDA, Economic Research Service has partnered with USDA, Food and Nutrition Service and the U.S. Department of Commerce, Bureau of the Census (Census Bureau) to make administrative records of SNAP participants available for research purposes. The Census Bureau had developed the technology that links those records to census data collections through encryption of personal information. Using administrative records linked to the CPS-FSS for 19 States (including Arizona, Florida, Hawaii, Iowa, Idaho, Indiana, Kentucky, Massachusetts, Maryland, Montana, New Jersey, New York, North Carolina, North Dakota, Oregon, Tennessee, Utah, Wisconsin, and Wyoming) for the 2017–19 survey years, this study examines the relationships between participation in SNAP, food security, and survey misreporting.

Fraction of population participating in the Supplemental Nutrition Assistance Program (SNAP) according to survey reports and administrative data



Note: The Census Bureau has ensured appropriate access and use of confidential data and has reviewed these results for disclosure avoidance protection CBDRB-FY24-CES023-010.

Source: USDA, Economic Research Service using U.S. Department of Commerce, Bureau of the Census (Census Bureau), Current Population Survey Food Security Supplement data matched to SNAP administrative records for Arizona, Florida, Hawaii, Idaho, Iowa, Indiana, Kentucky, Massachusetts, Maryland, Montana, New Jersey, New York, North Carolina, North Dakota, Oregon, Tennessee, Utah, Wisconsin, and Wyoming for 2017, 2018, and 2019. The Census Bureau has ensured appropriate access and use of confidential data and has reviewed these results for disclosure avoidance protection CBDRB-FY24-CES023-010.

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The Supplemental Nutrition Assistance Program and Food Security: Insights From Administrative Records

Introduction

Federal survey data has been an important resource for understanding the relationship between participation in the Supplemental Nutrition Assistance Program (SNAP) and food security (Bitler, 2016; Gregory et al., 2013; Heflin & Ziliak, 2024; Meyerhoefer & Yang, 2011; Nord, 2011; Nord, 2012; Nord, 2013; Nord & Golla, 2009; Nord & Prell, 2011; Ratcliffe & McKernan, 2010; Yen et al., 2008).[2] However, Federal data collections rely on self-reported program participation, which is frequently incorrect. For example, Meyer et al. (2009) have demonstrated that using administrative totals for the Current Population Survey (CPS) shows SNAP benefits and participation are underreported by almost 50 percent in some years. Using estimates from microdata in the CPS linked to administrative data research has showed similar rates of misreporting (Meyer et al., 2018).

At the same time, researchers have become increasingly aware that even small amounts of measurement error affect estimates of the relationship between SNAP and food insecurity as well as other outcomes (Gundersen et al., 2017; Gundersen & Kreider, 2008; Kreider et al., 2012a). For example, Gundersen et al. (2008) showed that small amounts of misreporting can change our understanding of simple differences in food security status between SNAP and non-SNAP households.[3] Kreider et al. (2012a) also have shown that as little as 10 percent misreporting SNAP participation is enough to overturn inferences about the causal effect of SNAP on food insecurity among children. Gundersen et al. (2017) have shown similar results.

Understanding the relationship between SNAP and food security is critical for informing decisions related to public health and nutrition goals. SNAP is the U.S. Department of Agriculture's (USDA) largest food assistance program. In fiscal year (FY) 2023, it served roughly 42.1 million persons a month, with an average food benefit per household of $211.00 per month. Food insecurity, or the condition of not having enough food for an active, healthy life, is recognized as a critical public health issue. Research has shown that food insecurity is correlated with many health conditions among children, including anemia, cognitive problems, behavioral problems, and mental health problems. It is also strongly related to conditions among adults, including general health, hypertension, and depression (Gundersen & Ziliak, 2015). Food security has been strongly associated with chronic conditions including heart disease, asthma, hepatitis, stroke, cancer, diabetes, arthritis, chronic obstructive pulmonary disease, and kidney disease among adults between 18 and 64 years (Gregory & Coleman-Jensen, 2017). Although there has

[2] One study that does use administrative records to look at SNAP and food security is Depolt et al. (2009).

[3] This is true for the case where there are no errors in food security status misclassification. Household misclassification of food security for reasons other than recording error, while theoretically possible, is inconsistent with the assumptions of food security measurement.

been some research that suggests a causal relationship between food insecurity and child health outcomes (Gundersen & Kreider, 2009; Gundersen & Ziliak, 2015), understanding linkages between food insecurity and public health concerns highlights the importance of understanding the degree to which SNAP can directly and indirectly ameliorate food insecurity.

The measurement error in SNAP uptake (but also Government program participation more generally) has led researchers to underestimate its effectiveness in reducing poverty. Research using administrative data has shown that the poverty reducing effects of SNAP are doubled using administrative as opposed to Federal survey data (Meyer & Mittag, 2019). Additionally, work using State-based administrative records has shown that SNAP has been better at reaching low income households than Federal survey data suggest (Scherpf et al., 2015). This report followed a similar line of research to examine how administrative data improve our understanding of SNAP households' food security status and how these data might clarify our understanding of the causal effect of SNAP on food insecurity.

Data

The authors used two sources of data for this project: (1) the Current Population Survey Food Security Supplement (CPS-FSS) and (2) 19 States' administrative records of SNAP participation over 3 years, 2017–19.

Current Population Survey December Food Security Supplement

The CPS-FSS is part of the monthly Current Population Survey (CPS) administered by the U.S. Department of Labor, Bureau of Labor Statistics for the U.S. Department of Commerce, Bureau of Census; the CPS serves as the data source for U.S. household employment statistics and earnings and contains detailed demographic information. The CPS is collected every month with supplemental items rotating for each monthly survey cycle. The December Food Security Supplement (FSS) has been used since 1996 by USDA's Economic Research Service (ERS) to collect annual and the 30-day household food security status.[4] The December supplement also has collected information about food spending, charity food acquisition, and participation in the three largest USDA food assistance programs including SNAP, the Special Supplemental Food Program for Women, Infants, and Children (WIC), and the National School Lunch Program (NSLP).

This report uses CPS-FSS data for SNAP participation and household food security status. The survey is distributed every December during the week that contains the 11th. SNAP participation is measured in a series of items: the first measures any participation in the previous calendar year; the following

[4] USDA, ERS researchers use the December CPS to construct statistics in *Household Food Security in the United States* report, the annual publication detailing food security in the United States. For the most recent report, see Rabbitt et al. (2025).

questions ask about SNAP participation in each month of the calendar year.[5] Household food security status is assessed by household responses to a series of items that ask about conditions or behaviors associated with food hardship over the previous 12 months. Households without children are assessed based on the first 10 items in the CPS' Food Security Supplement (FSS); households with children are assessed based on an additional 8 items. Households without children are food insecure if they affirm three items and they are classified as having very low food security status if they affirm six or more items. Households with children are classified as being food insecure if they affirm three or more items and having very low food security if they affirm eight or more items. For more information about the coding and scoring of the food security module items, see box "Questions Used To Assess the Food Security of Households in the CPS Food Security Supplement."

[5] Households that have incomes at or below 185 percent of the Federal poverty line or that affirm a food hardship screener are presented with the series of SNAP items. The item that we use to determine SNAP participation reads, "Sometimes people need help getting food for their household. There are many programs that can help. In the past 12 months, since December of last year, did (you/anyone in this household) get SNAP/Supplemental Nutrition Assistance Program or food stamp benefits?" We use affirmations to this item as a measure of reported participation.

Questions Used To Assess the Food Security of Households in the CPS Food Security Supplement

1. "We worried whether our food would run out before we got money to buy more." Was that often, sometimes, or never true for you in the last 12 months?
2. "The food that we bought just didn't last, and we didn't have money to get more." Was that often, sometimes, or never true for you in the last 12 months?
3. "We couldn't afford to eat balanced meals." Was that often, sometimes, or never true for you in the last 12 months?
4. In the last 12 months, did you or other adults in the household ever cut the size of your meals or skip meals because there wasn't enough money for food? (Yes/No)
5. (If yes to question 4) How often did this happen—almost every month, some months but not every month, or in only 1 or 2 months?
6. In the last 12 months, did you ever eat less than you felt you should because there wasn't enough money for food? (Yes/No)
7. In the last 12 months, were you ever hungry, but didn't eat, because there wasn't enough money for food? (Yes/No)
8. In the last 12 months, did you lose weight because there wasn't enough money for food? (Yes/No)
9. In the last 12 months did you or other adults in your household ever not eat for a whole day because there wasn't enough money for food? (Yes/No)
10. (If yes to question 9) How often did this happen—almost every month, some months but not every month, or in only 1 or 2 months?

(Questions 11–18 were asked only if the household included children aged 0–17)

11. "We relied on only a few kinds of low-cost food to feed our children because we were running out of money to buy food." Was that often, sometimes, or never true for you in the last 12 months?
12. "We couldn't feed our children a balanced meal, because we couldn't afford that." Was that often, sometimes, or never true for you in the last 12 months?
13. "The children were not eating enough because we just couldn't afford enough food." Was that often, sometimes, or never true for you in the last 12 months?
14. In the last 12 months, did you ever cut the size of any of the children's meals because there wasn't enough money for food? (Yes/No)

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15. In the last 12 months, were the children ever hungry but you just couldn't afford more food? (Yes/No)
16. In the last 12 months, did any of the children ever skip a meal because there wasn't enough money for food? (Yes/No)
17. (If yes to question 16) How often did this happen—almost every month, some months but not every month, or in only 1 or 2 months?
18. In the last 12 months did any of the children ever not eat for a whole day because there wasn't enough money for food? (Yes/No)

Coding of Responses

Questions 1–3 and 11–13 are coded as affirmative (i.e., possibly indicating food insecurity) if the response is often or sometimes. Questions 5, 10, and 17 are coded as affirmative if the response is almost every month or some months but not every month. The remaining questions are coded as affirmative if the response is yes.

Assessing Food Security Status in Households Without Children

Households without children are classified as food insecure if they report 3 or more indications of food insecurity in response to the first 10 questions; they are classified as having very low food security if they report 6 or more food insecure conditions out of the first 10 questions.

Assessing Food Security Status in Households with Children Age 0–17

Households with children are classified as food insecure if they report 3 or more indications of food insecurity in response to the entire set of 18 questions; they are classified as having very low food security if they report 8 or more food insecure conditions in response to the entire set of 18 questions.

Comparing the affirmation rates for the first 10 items for our sample of 19 States' administrative records and the 2017–19 CPS-FSS suggested that our working sample (matched to administrative records for 19 States) is similar to the national samples in the respective years (table 1).

Table 1

Prevalence of food security items, study sample, and full Current Population Survey (CPS) sample

	2017		2018		2019	
FSM item	**Full sample**	**Study sample**	**Full sample**	**Study sample**	**Full sample**	**Study sample**
Worried about food	15.6	14.7	14.6	14.1	13.9	13.8
Food didn't last	12.8	12.1	12.2	11.8	11.4	11.3
Couldn't afford balanced meals	12.7	12.3	12.2	11.8	11.8	11.4
Adult cut or skip meals	7	6.3	6.7	6.6	6.4	6.2
Adult ate less than should	5.3	4.9	5.1	4.9	4.9	4.8
Adult cut/skip in 3 or more months	7.2	6.5	6.6	6.5	6.7	6.4
Adult hungry couldn't afford food	3.7	3.5	3.7	3.6	3.5	3.3
Adult lost weight	2.4	2.2	2.2	2	2.2	2
Adult didn't eat for a whole day	1.4	1.4	1.4	1.3	1.5	1.4
Didn't eat for a whole day in 3 months	1.1	1.1	1.1	0.9	1.2	1
Unweighted *N*	37,389	13,500	37,300	13,500	34,334	12,500

FSM = Food security module Study sample = CPS records for 19 States linked to administrative records as listed below. Full Sample = CPS sample including all 50 States.

Note: All prevalences are weighted by the supplement interview weight. For the study sample, counts are rounded according to census disclosure rules. The U.S. Department of Commerce, Bureau of the Census (Census Bureau) has ensured appropriate access and use of confidential data and has reviewed these results for disclosure avoidance protection CBDRB-FY24-CES023-010.

Source: USDA, Economic Research Service using U.S. Department of Labor, Bureau of Labor Statistics and Census Bureau, 2017–19 Current Population Survey Statistical Supplement to Household Food Security in the United States; and U.S. Department of Commerce, Bureau of the Census, Current Population Survey Food Security Supplement data matched to SNAP administrative records for Arizona, Florida, Hawaii, Idaho, Iowa, Indiana, Kentucky, Massachusetts, Maryland, Montana, New Jersey, New York, North Carolina, North Dakota, Oregon, Tennessee, Utah, Wisconsin, and Wyoming for 2017, 2018, and 2019.

SNAP Administrative Records

The State administrative microdata are available through partnership between USDA, ERS, the Census Bureau, and USDA, Food and Nutrition Service (FNS). USDA, FNS administers all of USDA's domestic food assistance programs and has entered into partnership with States to make the administrative records of these programs available for research and statistical purposes. The Census Bureau has developed the security architecture that enables researchers to access these records securely and to link them to Census Bureau data collections. These microdata assets are unique in their scope, covering as many as 26 States in some years, and going back for 20 years. USDA, ERS; USDA, FNS; and the Census Bureau are actively engaged in research programs that use these data to inform policymaking.

Constructing the analytic sample for this research project centered on the technology for linking administrative microdata to survey records. The protected identification key (PIK) identifies a sample person in a given Census Bureau survey by encrypting respondents' personal identifying information. PIKs are also included in SNAP administrative files and are linkable to person identifiers in Census Bureau surveys (e.g., CPS-FSS). We used the following States in the report: Arizona, Florida, Hawaii, Idaho, Indiana, Iowa, Kentucky, Maryland, Massachusetts, Montana, New Jersey, New York, North Carolina, North Dakota, Oregon, Tennessee, Utah, Wisconsin, and Wyoming. Each State's administrative records were matched to the PIK file, which also contains identifiers for the CPS-FSS, facilitating the link between the administrative records and survey data.[6] Because State-based administrative records identify persons, we attributed SNAP participation to the survey household if any person in that household matched a record in the administrative data. The analytic sample for this project contained essential information on each household's survey responses to SNAP questions and food security items and linked administrative SNAP records.[7]

[6] The PIK rate for each year and the total sample is .91. Results are robust to correcting for missing PIKs by reweighting the sample using the inverse probability weighting (Wooldridge, 2007).

[7] Although the administrative records were potentially usable as a panel, we used them as repeated cross-sections with the CPS-FSS.

Survey Reporting Errors

Survey Errors

Survey reporting errors of Supplemental Nutrition Assistance Program (SNAP) participation happen when respondents fail to report or overreport their participation in SNAP. This can be due to social stigma, survey design, cognitive demands of the items (including memory), and respondent characteristics such as cooperativeness (Celhay et al., 2024; Hatton et al., 2024).[1] In studies that have matched Federal survey data collections to State-based administrative records, the administrative records have been considered to be true or definitive. False positives and false negatives are defined by comparing Federal survey responses with State-based administrative records. Where there is a record of SNAP participation for a person in the administrative data that is not matched by an affirmation of SNAP participation in the survey, that is known as a false negative. Where there is a response in the Federal survey data that asserts participation, but that record is not matched by an administrative record, that is known as a false positive. More often than not, misreports are reported as rates, as follows:

- The false negative rate is the fraction of true, administratively verified participants that fail to report participation in the survey; and
- The false positive rate is the fraction of administratively verified nonparticipants that reported participation in the survey.

To estimate the rate of false negatives, we took 1 minus the rate of true positives. For the false positive rate, we took 1 minus true negatives.

[1] We were unable to calculate false negative or positive rates for imputed observations, as the December supplement does not impute SNAP recipiency.

False Negatives

In table 2, we show the false negative rates for each year of our sample and for all years combined. This table uses the format of table 2 in Meyer et al. (2022), which enumerates and compares false negative rates for three surveys typically used in studies of income, wages, and demographics, the CPS, Survey of Income and Program Participation (SIPP), and the American Community Survey (ACS). The panel on the left shows unweighted counts of recipients and nonrecipients in the Federal survey reports and the linked administrative data files, respectively, for each of the 3 years of our survey and for the 3 survey years combined. The middle panel shows the weighted receipt rate for the survey reports and administrative records. The rightmost panel shows the false negative rates for the CPS-FSS sample in each year and for the sample in total.

Table 2

Survey reported and administrative records of Supplemental Nutrition Assistance Program (SNAP) receipt

		Receipt rate		
Sample	**Counts**	**Survey reports**	**Administrative data**	**False negative rate**
	Number	Percent		Percent
2017	13,500	6.51	12.78	49.06
2018	13,500	6.02	11.18	46.15
2019	12,500	5.81	10.88	46.60
All years	39,500	6.11	11.60	47.33
200 percent of the Federal poverty line	11,600	17.88	28.20	36.60

Note: The false negative rate is the fraction of administratively verified cases that do not report in the Federal survey that they have received benefits. We excluded false positives from the count of affirmations that are used to calculate the false negative rate. Counts in the table are rounded according to Census disclosure rules. All prevalences are weighted by the supplement interview weight. The U.S. Department of Commerce, Bureau of the Census (Census Bureau) has ensured appropriate access and use of confidential data and has reviewed these results for disclosure avoidance protection CBDRB-FY24-CES023-010.

Source: USDA, Economic Research Service using Census Bureau, Current Population Survey Food Security Supplement data matched to SNAP administrative records for Arizona, Florida, Hawaii, Idaho, Iowa, Indiana, Kentucky, Massachusetts, Maryland, Montana, New Jersey, New York, North Carolina, North Dakota, Oregon, Tennessee, Utah, Wisconsin, and Wyoming for 2017, 2018, and 2019.

The underreporting rates for each of the 3 years and for the full sample were comparable to findings in Meyer et al. (2022). The sample used in Meyer et al. (2022) was from 2 States (Illinois and Maryland), using the CPS (CPS March supplement) from 2002–05, while our sample was from 19 States (Arizona, Florida, Hawaii, Idaho, Iowa, Indiana, Kentucky, Massachusetts, Maryland, Montana, New Jersey, New York, North Carolina, North Dakota, Oregon, Tennessee, Utah, Wisconsin, and Wyoming) and from 2017–19. Additionally, the CPS Annual Social and Economic Supplements collects information on SNAP participation for the year in a single question, whereas the CPS-FSS collects it in a series of questions that ask about each month of the previous calendar year as well as the year as a whole.

Table 3

The Current Population Survey Food Security Supplement study sample false positive rates (rate of nonparticipants who claimed to participate in the Supplemental Nutrition Assistance Program SNAP)

2017	2018	2019	2017–19	Households asked SNAP questions
		Percent		
2.61	2.15	1.93	2.23	7.87

Study sample = U.S. Department of Labor and U.S. Department of Commerce Current Population Survey Food Security Supplement (CPS-FSS) data linked to State-based administrative microdata as detailed below.

Note: False positive rates are the fraction of the sample that were verified nonparticipants that claimed to participate in Supplemental Nutrition Assistance Program (SNAP). All prevalences were weighted by the supplement interview weight. Households with incomes less than 185 percent of the Federal poverty line or that have respondents who affirm a food hardship screener are presented with the series of SNAP questions in CPS-FSS. The screener reads, "People do different things when they are running out of money for food in order to make their food or their food money go further. In the last 12 months, since December of last year, did you ever run short of money and try to make your food or your food money go further?" Households with income above 185 percent of the Federal poverty line, or that have respondents that do not affirm the screener are assumed to be nonparticipants. The Census Bureau has ensured appropriate access and use of confidential data and has reviewed these results for disclosure avoidance protection CBDRB-FY24-CES023-010.

Source: USDA, Economic Research Service using Census Bureau, Current Population Survey Food Security Supplement data matched to SNAP administrative records for Arizona, Florida, Hawaii, Idaho, Iowa, Indiana, Kentucky, Massachusetts, Maryland, Montana, New Jersey, New York, North Carolina, North Dakota, Oregon, Tennessee, Utah, Wisconsin, and Wyoming for 2017, 2018, and 2019.

False Positives

Table 3 shows the probability of false positives in each of the 3 years of the survey that we use and for the sample of households in CPS-FSS that are asked questions about SNAP participation. As has been the case in many studies, the rate of false positives was far lower than the rate of false negatives for this sample, although the rate in our sample was higher than in Meyer et al. (2022). In CPS-FSS, the questions about SNAP are administered only to a subsample of households. For the subsample, we found a higher rate of false positives of 7.87 percent.

Although the rates of false positives and false negatives appeared to vary in size, the size of these rates was partly due to the denominator of the fraction used to calculate the rates. We calculated the false negatives rate as 1 minus true positives, and the false positives rate was calculated as 1 minus true negatives. As true negatives (non-SNAP participants) made up more than 85 percent of the sample, even if the probability of a false positive was the same as a false negative, the rate (or conditional probability) would be much lower.

SNAP and Food Security

Demonstrating the ways that administrative data enhanced our understanding of the relationship between SNAP participation and food security is a goal of this report. For tables 4 and 5, we selected the income cutoffs for the samples illustrated to match the level of income that tables in the USDA,

Economic Research Service (ERS) annual *Household Food Insecurity in the United States* use. Table 4 shows the correlation between food security and SNAP participation measured in months for the 2017–19 study period. We separate statistics in the State-based administrative records for SNAP participation (SNAP Admin) from the reports in the CPS-FSS survey. There are four vertical columns in the table that show the percentage of the sample of low-income households (i.e., less than 130 percent of the Federal poverty line)[8] at each level of food security, given the degree of SNAP participation indicated in the left margin.[9] The first row of table 4 shows the food security levels of households that are administratively confirmed to participate or reported any SNAP participation (1–12 months). This part of the table shows that food security is about 8 percentage points (about 16 percent) higher in the State-based administrative records (58.83 percent) than households that reported participation in CPS-FSS (50.45 percent). In other words, households that we confirmed in the State-based administrative records as having any SNAP participation were more food secure than the households that reported the same degree of SNAP participation in CPS-FSS. These were borne out at each of the levels of food security. The administrative data showed lower levels of food insecurity at each level of SNAP participation. For instance, these households have lower levels of food insecurity overall (41.17 versus 49.55 percent), lower levels of low food security (23.13 versus 26.80 percent), and lower levels of very low food security (19.04 versus 22.75 percent).

[8] For the statistics shown in tables 4 and 5, we have chosen the same income cutoffs as those in the annual household food security report.

[9] Readers are invited to compare this table to the top panel of table 8 of the annual *Household Food Security in the United States*. See, for example, Rabbitt et al. (2022), p. 39.

Table 4

Food security status conditional on Supplemental Nutrition Assistance Program (SNAP) participation

	Food secure		Food insecure		Low food secure		Very low food security	
Households with income less than 130 percent of Federal poverty level	**Administrative records**	**Current Population Survey data**	**Administrative records**	**Current Population Survey data**	**Administrative records**	**Current Population Survey data**	**Administrative records**	**Current Population Survey data**
				Percent				
Any SNAP receipt in last 12 months	58.83	50.45	41.17	49.55	23.13	26.8	19.04	22.75
SNAP receipt for all 12 months	58.67	51	41.36	49	22.67	25.9	18.69	23.1
SNAP receipt for 1–11 months	56.61	49.1	43.39	50.9	23.82	29.01	19.57	21.89
Did not receive SNAP benefits	81.58	83.18	18.42	16.82	11.06	10.28	7.37	6.54
Observed gap (any SNAP - no SNAP)	–22.75	–32.73	22.75	32.73	12.07	16.52	11.67	16.21

Note: All prevalences are weighted by the supplement interview weight. The U.S. Department of Commerce, Bureau of the Census has ensured appropriate access and use of confidential data and has reviewed these results for disclosure avoidance protection CBDRB-FY24-CES023-010.

Source: USDA, Economic Research Service using U.S. Department of Commerce, Bureau of the Census, Current Population Survey Food Security Supplement data matched to SNAP administrative records for Arizona, Florida, Hawaii, Idaho, Iowa, Indiana, Kentucky, Massachusetts, Maryland, Montana, New Jersey, New York, North Carolina, North Dakota, Oregon, Tennessee, Utah, Wisconsin, and Wyoming for 2017, 2018, and 2019.

The remaining rows of table 4 show evidence of the same pattern: Households with participation confirmed by administrative records are more food secure and less food insecure, in general, than those in the survey data at any given level of SNAP participation. However, households that did not receive SNAP benefits are marginally less likely to be food secure and more likely to be food insecure in the administrative data relative to the CPS-FSS data.

The last row in the table shows the observed gap between any SNAP participation (treated) and no SNAP participation (untreated) for each of the respective outcomes (i.e., food security, food insecurity, low food security, and very low food security). The gap is negative for food security, and it is positive for different levels of food insecurity. This is a naïve estimate of the effect of SNAP participation on each of these outcomes because it treats participation in SNAP as randomly assigned. This difference shows that SNAP participation is associated with a 22.75-percentage-point decrease in food security in the administrative data and a 32.73-percentage-point decrease in food security for the CPS-FSS survey records. Similarly, SNAP participation is associated with increased levels of food insecurity for households in the administrative data. These estimates are naïve because they do not account for the selection of households into SNAP–that is, the fact that households that choose to be on SNAP are probably systematically different than those that do not.

It is also worth noting that the size of the estimated outcome differences is larger for households in absolute value in the CPS-FSS data compared with the administrative data, reflecting the impact of SNAP misreporting on these differences. That is, the observed gap in food security status between households participating in SNAP and those not participating in SNAP is larger for households in the CPS-FSS survey data compared with those in administrative data. This is important because the observed outcomes gap between SNAP participants and nonparticipants serves as a way to measure the efficacy of treatment for this sample. The gap between the probabilities is greater for SNAP households in the CPS-FSS survey than in State-based administrative data. This suggests that, using the mismeasured CPS-FSS survey data, there is more scope for reducing food insecurity, or increasing food security, than in the State-based administrative data.

Table 5

Supplemental Nutrition Assistance Program (SNAP) participation among food insecure households

Sample	Food insecure households participating in SNAP in the previous 30 days	Households with very low food security participating in SNAP in the previous 30 days
	Percent	
CPS-FSS, all States	42.5	46.8
CPS -FSS, 19 study States	40.0	45.9
Administrative records, 19 study States	33.9	36.0

CPS-FSS = Current Population Survey Food Security Supplement.

Note: For the households in the CPS-FSS, we count any household that reports SNAP as receiving SNAP in the previous 30 days after the calendar date of the interview in November or in December before the CPS-FSS interview of that year. For the State-based administrative records, we similarly count any household as receiving SNAP in the previous 30 days for households that have a record of receipt in November or December of the 2017–19 study years. All prevalences are weighted by the supplement interview weight. Sample includes households at or below 185 percent of the Federal poverty line. The U.S. Department of Commerce, Bureau of the Census has ensured appropriate access and use of confidential data and has reviewed these results for disclosure avoidance protection CBDRB-FY24-CES023-010 and CBDRB-FY25-CES014-009.

Source: USDA, Economic Research Service using U.S. Department of Commerce, Bureau of the Census, Current Population Survey Food Security Supplement data matched to SNAP administrative records for Arizona, Florida, Hawaii, Idaho, Iowa, Indiana, Kentucky, Massachusetts, Maryland, Montana, New Jersey, New York, North Carolina, North Dakota, Oregon, Tennessee, Utah, Wisconsin, and Wyoming for 2017, 2018, and 2019.

Table 5 reports the level of SNAP participation in the previous 30 days for households that reported food insecurity or very low food insecurity in the CPS-FSS survey. Although table 4 shows the level of food insecurity given the number of months of SNAP participation, table 5 shows SNAP participation in the previous 30 days given the level of food insecurity. The first row in the table shows the arithmetic mean of SNAP participation from table 9 of the USDA, ERS *Household Food Security in the United States* report for 2017, 2018, and 2019 (Coleman-Jensen et al., 2018a; Coleman-Jensen et al., 2019a; Coleman-Jensen et al 2020a). The second row shows the values for SNAP participation in the previous 30 days for the CPS-FSS only for the 19 States in our sample given the level of food insecurity. The third row shows the rate of SNAP participation as measured by State-based administrative records. The table shows a divergence between CPS-FSS data and administrative records. For food insecure households, the level of SNAP participation in the previous month is 10 percentage points higher in CPS-FSS data compared with State-based administrative records. The observed gap was larger for households with very low food security the CPS-FSS data suggests that more households participated in SNAP in the previous 30 days compared with State-based administrative records by 15 percentage points. This suggests that, as found in the State-based administrative records, food insecure households that participate in SNAP participate less than was reported by households in CPS-FSS data.

Understanding the Effect of SNAP on Food Security

It is important to understand errors in SNAP participation because even small amounts of misreporting can introduce biases into our understanding of SNAP participation and the relationships (both descriptive and causal) between SNAP participation and food insecurity. Unlike reporting

problems for which the probabilities of misreporting are known with certainty, misreporting in most economic applications involves unknown misreporting probabilities and processes. This means that correcting misreported data—which is possible when those probabilities are known with certainty—is not really possible for researchers. Even in the case where consistent estimates of misreporting are available, adjustments to accompanying variances are sometimes mathematically intractable.[10]

In recent years, a large literature has grown in many social sciences around the problem of using mismeasured variables in statistical and econometric estimation. In the classical measurement framework, the observed, imperfect variable (i.e., SNAP participation in the Federal survey) is modeled given the true values of the imperfect variable (for example, as recorded in administrative data).[11] However, the classical framework involves several simplifications that are not appropriate with a binary misreported variable such as SNAP participation. Foremost among these is the assumption that the true value of the observed variable is independent from the error in measuring the variable (Bound et al., 2001; Buonaccorsi, 2010).[12] In the case of a misreported binary variable, this assumption does not hold because the true value is always negatively correlated with mismeasured value. However, correcting the model including mismeasured binary variables in the linear context depend on this assumption. For more information, see Bound et al. (2001).

It is equally important to understand that SNAP is not randomly assigned to households: those that are SNAP participants are systematically different from those that do not participate in the program. Holding aside measurement issues, the positive correlation that we often see between food insecurity and SNAP participation is evidence of this difference, not of SNAP's effect on food security. USDA, ERS' annual *Household Food Security in the United States* report makes clear that the descriptive statistics relating food insecurity with SNAP should not be mistaken for statements about the causal effect of SNAP.[13]

Often, the methods for examining the causal effects of any program with endogenous participation have appealed to the highest standard of causal effect science, the randomized controlled trial (RCT). In an RCT, the treatment (in this case, SNAP participation) would be randomly assigned to eligible households and their outcomes observed. From this evidence, we would draw conclusions about the causal effect of the treatment on the outcomes. In the social sciences, RCTs are rare, usually for logistical or ethical reasons, notable exceptions notwithstanding (Aron-Dine et al., 2013; Baicker et al., 2013).[14] Instead, sometimes economic researchers have relied on what are known as quasi-randomization methods. These methods mimic the experimental randomization structure by appealing to random changes in the policy environment that might induce participation from households that would otherwise participate but have not participated. Three of the most common

[10] This is particularly important when the mismeasured variable is the dependent variable in the model. For more information, see Hausman et al. (1998).

[11] The other framework that treats the true values as conditional on the observed (mismeasured) variables is called the Berkson measurement framework. For more information, see chapters 1–3 in Buonaccorsi (2010).

[12] Most often, in the classical errors-in-variable framework, attenuation bias is of concern when using a linear regression model with a mismeasured continuous predictor. Attenuation bias is still a concern in linear models in which the mismeasured regressor is binary (Gustafson, 2004).

[13] For more information and an example, see Rabbitt et al. (2022).

[14] For example, it would not be possible to randomize households into SNAP, since households that did not receive benefits (i.e., the treatment) would observe their treatment status. Because this knowledge could lead to changes in behavior, it would compromise the randomization.

quasi-randomization research designs are natural experiments, instrumental variables, and difference-in-difference methods (Angrist & Pischke, 2010).

While these methods have proven very effective at accounting for selection into treatments, they often require strong assumptions to point-identify the causal effect of the program or policy under attention.[15] For example, in order to be able to say that the treatment effect of SNAP on food security is *X* percent, frequently strong and untestable assumptions are needed. Additionally, these methods do require at least one variable that can establish the quasi-randomization of the treatment sample in question (e.g., an instrument or a running variable). As our sample does not have such a variable, we use weaker assumptions to identify the treatment effect of SNAP on food security. However, these weaker assumptions require a tradeoff: instead of being able to offer a single number as the estimate of the treatment effect (i.e., 10 percentage points), we are only able to say something about the region where the treatment effect is found (i.e., between 0 and 20 percentage points). Although we have chosen to employ monotonicity restrictions that partially identify treatment effects, many of the ways that we understand the noncausal relationships between SNAP and food security have relied on statistics that are partially identified without further assumptions or data.[16] That is, although mismeasured variables and imperfect data collections do convey information, they also call for external information or expertise from economic theory, statistics, auxiliary data, or institutional knowledge to make point estimates of the quantities in question (Buonaccorsi, 2010; Gustafson, 2004; Gustafson, 2015; Manski, 1995; Manski, 2003; Manski, 2005; Tamer, 2010; Yi, 2017). Although we have been able to use administrative records to remove the need for partial identification methods in the case of our descriptive statistics, in the absence of that data, we would be constrained to estimating sets of estimates with bounds that may or may not have been informative. There are three assumptions to which we appeal in identifying bounds for the average treatment effect (ATE) of SNAP on food security.

Monotone Treatment Selection

Monotone treatment selection (MTS) implies that the treated group has weakly better (or worse) outcomes than the untreated group, regardless of their treatment status. Weakly here implies that they are better (worse) or equal to the outcomes of the alternate group. For example, adverse or negative MTS for this application means that even when SNAP households participate in SNAP, they have weakly lower average levels of food security than households that never used SNAP. In other words, MTS implies that the highest average food security status of households participating in SNAP

[15] For example, instrumental variables methods generally require an exclusion restriction in the estimation set up (i.e., the variable that is mimicking the structure of randomization must have exactly zero correlation with the outcome at issue). This has rarely been the case and frequently the subject of controversy in applications (Conley et al., 2012; Kraay, 2012). Difference-in-difference methods have required researchers to make counterfactual assumptions about pretreatment and posttreatment trends for the treated and untreated variables. Regression discontinuity has relied on the assumption that the potential outcome is continuous near the treatment threshold (Bärnighausen et al., 2017).

[16] Slightly more formally, we might say that full identification implies a one-to-one mapping of the observed data to the parameters in question (i.e., there is only one answer in the parameter set that is consistent with the observed data). Partial identification implies that the data might yield more than one—in fact, a whole set—of parameter estimates consistent with the data. Hence the need for more data, stronger assumptions, or institutional knowledge if point-identification is required or needed.

would still be no higher than the lowest average food security status of households that do not participate in SNAP.

Monotone Treatment Response

Monotone treatment response (MTR) means that the treatment has a nonnegative (or nonpositive) effect on the outcome for each treated unit. In this application, MTS implies that SNAP participation never harms the household food security status. This is an assumption that enjoys wide acceptance in the research community as food is a normal good (i.e., its demand increases as income increases) and the food security module questions ask about adequate quantities of food, so increases in income via SNAP ought to be reflected in food spending.[17] Recent empirical work suggested that the marginal propensity to consume food from SNAP benefits was between .5 and .6—that is, each dollar of SNAP benefits yields between 50 and 60 cents of extra food spending (Hastings & Shapiro, 2018).

Monotone Instrumental Variable

Monotone instrumental variables (MIV) are variables that vary (weakly) monotonically with the outcome in question—in this case, food security. Conventional instrumental variables work on the principle of mean independence: The mean of the instrument is uncorrelated with the value outcome variable, although it is strongly correlated with the choice or policy that the researcher wants to randomize. In this application, an instrument for SNAP would have to be related to SNAP participation but mean independent of food security. In recent years, some researchers have used State SNAP policy options, SNAP monthly timing, differential access policies, or changes in income as instruments for SNAP participation in different contexts (Hastings et al., 2021; Hastings & Shapiro, 2017; Ratcliffe et al., 2011; Schanzenbach, 2023). But the independence assumption (also known as the excludability assumption, i.e., mean independence as above) is strong and untestable (Conley et al., 2012; Kraay, 2012). For this application, we employ a monotone instrument (i.e., household income-to-poverty ratio), which relaxes the mean independence assumption and adopts a much weaker one—particularly, that the instrument varies (weakly) monotonically with outcome for each treatment group. This weaker assumption comes with a lack of identifying power on its own. However, it is effective in narrowing bounds identified by other assumptions (MTS, MTR). For example, Kreider et al. (2012b) identified the effect of SNAP on child health outcomes using only MIV and MTS assumptions.

Error Probabilities

The causal effect estimates of SNAP on food security incorporate the probability of reporting error into the interval bounds. The need to incorporate this error stems from the fact that we want to know the probability of food security given true participation less the probability of food security given true nonparticipation.[18] However, in the absence of State-based administrative records (or other validation data), we do not observe this; instead, we observe the survey records, which have been prone to error. We include the error probability in the estimates for this application to highlight what we learned (e.g., how much more precise we can be) about causal effects with State-based administrative records.

[17] For an overview of issues in estimating SNAP's effect on consumption, see Hoynes et al. (2016)

[18] A naïve estimate of this quantity, not accounting for selection, is to be found the bottom row of table 4, particularly the first two columns.

Nonparametric Bounds on the Causal Effect of SNAP on Food Security

The average treatment effect (ATE) is defined as the expected difference in outcome (i.e., food security) that is caused by the treatment (i.e., SNAP) for a random person in the population.[19] The difficulty is that, in observational data, generally one only observes the treated or untreated state for each unit. The selection problem suggests that the untreated are systematically different in ways that the researcher doesn't observe than the those who chose to be treated. This likely means that those households' outcomes are different for reasons that we do not observe. This implies that simple mean differences in food security status for those who are SNAP participants and those who are not are accurate estimates of ATE under the assumption that SNAP participation is as good as randomly assigned when it comes to food security.

Even if we were to believe that SNAP is randomly assigned, table 4 also illustrates part of the value of having administrative records. The table shows that the difference in food security status between SNAP participant and nonparticipant households is larger for the survey sample, which suggests a larger potential scope for SNAP to improve food security. The difference in the food insecurity gap is due to two characteristics of the samples that include the following: (1) as the data make clear, there are measurement errors in SNAP participation; and (2) the SNAP data including CPS-FSS data and State-based administrative records are different regarding food security. Households in the survey data, including instances of misreported participation, have higher food insecurity (lower food security) than households in State-based administrative data.[20]

Table 6 shows the results of nonparametric estimation of SNAP's ATE on food security, where we employ MTS, MTR, and MIV for the case where there are false positive and false negative errors. With respect to selection, we assumed adverse selection of households participating in SNAP. In other words, households participating in SNAP were assumed to be less likely to be food secure than households not participating in SNAP in our data, which includes households at less than 200 percent of the Federal poverty line (FPL).[21] We used household income-to-poverty ratio as the MIV, and show the lower and upper bounds on ATE for each probability of error 0.0, 0.02, 0.05, and 0.10. The top panel shows estimates for the SNAP sample in CPS-FSS; the bottom panel shows the results for the administratively matched sample (table 6).

At all levels of error probability, the lower bound of the ATE is 0.0. This is a function of the MTR assumption; we assumed that receiving SNAP cannot harm a household's food security status. Since food is a normal good and the food security module measures adequate quantities of food,[22] the results in the top panel suggest that the uncertainty attendant to measurement error alone is responsible for a 10-percentage-point difference in the upper bounds (.38 (Error=.1) -.28 (Error = 0)) on

[19] For more on details on partial identification using monotonicity assumptions, see Morgan and Winship (2015). We employ the Stata estimator written by McCarthy et al. (2015). The *Stata Journal* essay accompanying the software contains an excellent and thorough enumeration of the principles involved in estimation with misclassification.

[20] This is known as differential or endogenous misreporting. For an econometric treatment, see Nguimkeu et al. (2019). The results we show using monotonicity assumptions are robust to non-random misreporting.

[21] We choose this level of income as it includes households that are potentially eligible under broad based categorical eligibility rules.

[22] A normal good is a good for which quantity demanded increases when income increases. The only item in the FSM not focused on quantities of food is item 3, "We couldn't afford to eat balanced meals."

the ATE. A similar difference holds for the administrative data (.35 (Error=.1) -.25 (Error = 0)). However, the difference between the CPS-FSS data estimate that is most plausible (CPS sample, error = .1) and that for State-based administrative data (Administrative data, error = 0) is 13 percentage points (.38-.25). Ten percentage points (10/13 ≈ 77 percent) of that difference is due to measurement error, the rest (23 percent) is due to sample selection, that is, to the difference between CPS-FSS data and State-based administrative SNAP data samples.

Table 6

Imbens-Manski bounds on average treatment effect, Supplemental Nutrition Assistance Program (SNAP), on food security

MIV, MTR, MTS (adverse selection) arbitrary errors, 95-percent confidence intervals		
Current Population Survey Food Security Supplement sample		
Error probability	LB	UB
0	0	0.284
0.02	0	0.304
0.05	0	0.334
0.1	0	0.384
State-based administration records sample		
Error probability	LB	UB
0	0	0.25
0.02	0	0.27
0.05	0	0.3
0.1	0	0.35

MIV = Monotone instrumental variable. MTR = Monotone treatment response. MTS = Monotone treatment selection. LB = Lower bound. UB = Upper bound.

Note: All estimates are weighted by the supplement interview weight. The sample includes households at or below 200 percent of the Federal poverty line. The U.S. Department of Commerce, Bureau of the Census has ensured appropriate access and use of confidential data and has reviewed these results for disclosure avoidance protection CBDRB-FY24-CES023-010.

Source: USDA, Economic Research Service using U.S. Department of Commerce, Bureau of the Census, Current Population Survey Food Security Supplement data matched to SNAP administrative records for Arizona, Florida, Hawaii, Idaho, Indiana, Iowa, Kentucky, Massachusetts, Maryland, Montana, New Jersey, New York, North Carolina, North Dakota, Oregon, Tennessee, Utah, Wisconsin, and Wyoming for 2017, 2018, and 2019.

Discussion

This study harnesses data made available to USDA, Economic Research Service (ERS) through the USDA, Food and Nutrition Service, USDA, ERS, and U.S. Department of Commerce, Bureau of the Census (Census Bureau) joint project on State-based administrative records. We linked these data that contain SNAP participants in each of 19 States by year and month to the Current Population Survey Food Security Supplement (CPS-FSS) data to examine the relationship between Supplemental Nutrition Assistance Program (SNAP) participation and food insecurity. We find that underreporting rates in the CPS-FSS data are similar to those estimated using other Census Bureau microdata and administrative totals at about 47 percent (Meyer et al., 2022). False positives are comparable to rates

found in other studies, though perhaps a little higher than in some other surveys. In replicating tables 8 and 9 from USDA, ERS' annual *Household Food Security in the United States* report, we find that the State-based administrative data show that SNAP households are less food insecure and more food secure than the CPS-FSS data have indicated. This is true at all levels of SNAP participation. The observed food insecurity gap between SNAP participants and nonparticipants was larger in CPS-FSS than in the administrative data. In addition, conditional on being food insecure, households in the administratively linked sample are less likely to be enrolled in SNAP. Finally, estimates of Imbens-Manski bounds on the average treatment effect (ATE) of SNAP on food security show, first, that SNAP has had a potentially large, positive effect on food security (between 0 and 25 percentage points) and that the bounds on the estimates from the linked administrative data are narrower than CPS-FSS data by about 50 percent.

These results affirm that SNAP impacts food security in a positive way, but they suggest that causal estimates of food security made with survey data alone may significantly overstate the ATE of participation. Additionally, they point to several research paths for work on SNAP using both survey and administrative data to meaningfully address misreporting and misclassification (Almada et al., 2016; I. M. McCarthy & Tchernis, 2011; Nguimkeu et al., 2019). Kreider (2010) shows that even small amounts of measurement error can overturn statistical inference in regression settings, so having administrative data linked to, for example, health data can assist in examining how misreporting affects our understanding of SNAP and its relation to diet and health outcomes. Finally, as Celhay et al. (2024) have shown, understanding the reasons for misreporting can provide valuable insights to Federal agencies designing data collections in the future. Mitigating measurement error in SNAP data collection may allow researchers to focus on how SNAP program participation impacts multiple outcomes.

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