The Impacts of SNAP on Food Insecurity, Obesity, and Food Purchases: Who Misreports and Does it Matter?

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Motivation

Supplemental Nutrition Assistance Program (SNAP)

◦ Largest means-tested nutrition assistance program in US

◦ Goal is to improve food security (and therefore health and well-being) of low-income households

◦ Number of Americans receiving SNAP benefits rose from 17 million to 46 million from 2000-2014

◦ Total SNAP spending rose from $17 billion to $75 billion

Critical to have reliable evidence on whether SNAP achieves its goal and/or has unintended consequences (e.g. obesity)

◦ SNAP participation often found to be associated with greater food insecurity and obesity

◦ Evidence that aims to push toward causal effects generally finds that SNAP reduces food insecurity (Hoynes and Schanzenbach, 2015)

◦ Evidence on causal effect on obesity is mixed (Gundersen, 2015)

Motivation

Even studies that aim to address endogeneity of SNAP participation generally rely on self-reported participation measures

- Estimated "false negative" rates in various validation studies linking administrative data to ACS, CPS, SIPP, & NLSY are 20%-50% (Mittag, 2013)
- Estimated "false positive" rates range from 0.3-3% (Meyer et al., 2014)
- Estimated effect of misclassified binary explanatory variable may be substantially biased and yield "wrong signs" (Kreider, 2010; Kreider et al., 2012)
  - Even in an instrumental variables framework (Almada et al., forthcoming)
- FoodAPS offers a unique opportunity to examine misreporting and its consequences since it contains both self-reported and administrative participation measures

Our Questions … And Progress So Far

1) What are the causal effects of SNAP on food insecurity, obesity, and healthfulness of food purchases using administrative participation variables and accounting for endogenous selection?

◦ So far … What are the *associations* between SNAP and food insecurity, obesity, and healthfulness of food purchases using administrative participation variables?

2) What individual and community characteristics influence misreporting of SNAP participation?

◦ So far … What *individual* characteristics influence misreporting of SNAP participation?

3) How do the regression estimates of SNAP's impacts differ when self-reported participation variables are used instead of administrative variables?

◦ So far … Done but only for associations

4) How effective is the estimator developed by Ngimkeu et al. (2015) in mitigating the consequences of SNAP misreporting in the absence of validation data?

◦ Not yet done

Data and Sample Construction

FoodAPS:

◦ Sponsored by USDA's Economic Research Service and Food and Nutrition Service

◦ First nationally representative survey of U.S. households to collect comprehensive data about household food purchases as well as health and nutrition outcomes

◦ 4,826 households (SNAP, non-participating low-income, and higher income)

◦ Outcome variables

   ◦ Indicators for food insecurity, very low food security

   ◦ Healthy Eating Index

   ◦ Body mass index (BMI), Indicators for overweight/obese, obese (BMI≥30, severely obese (BMI≥35)

◦ Covariates

   ◦ Gender, race, marital status, household size, income, education, age, work, rural tract, WIC

Data and Sample Construction

SNAP participation variables:

◦ Self-reported

◦ Administrative: based on two types of matches

  ◦ ADMIN Matching (MATCHADMIN):

    ◦ Probabilistic matching of respondents to SNAP caseload data from 22 states covering March – November 2012
    ◦ Out of 3874 consenting households with caseload data, 1300 were matched and 2574 were unmatched

  ◦ ALERT Matching (MATCHALERT):

    ◦ Deterministic ALERT Matching: For households matched with caseload data with CASEIDS=ALERT EBT Account number, one-to-one matching was performed
    ◦ Probabilistic ALERT Matching: For other households, a probabilistic match to ALERT EBT data was performed
    ◦ Out of 4704 consenting households, 1262 were matched, 2328 were unmatched, and 1114 either had no acquisitions available for matching or did not have a match to caseload data that will provide a CASEID

  ◦ We construct a measure that involves both MATCHADMIN and MATCHALERT

MATCHALERT

	MATCHALERT =. (Valid Skip)	MATCHALERT= 0 (Not matched)	MATCHALERT=1 (matched, date of last receipt within last 36 days)	MATCHALERT=2 (matched, date of last receipt beyond last 36 days)	
MATCHADMIN=. (Valid Skip)	692	27	110	1	830
MATCHADMIN=0 (Not matched)	330	2136	107	1	2574
MATCHADMIN=1 (matched, date of last receipt within last 32 days)	65	84	772	10	931
MATCHADMIN=2 (matched, date of last receipt beyond last 32 days)	12	30	41	77	160
MATCHADMIN=9 (Dates unavailable in ADMIN data)	15	52	135	7	209
	1114	2329	1165	96	4704

MATCHADMIN

Legend

	Cannot confirm SNAP status
	confirmed nonparticipant
	confirmed participant
	inconsistent results (Resolved by USDA)

Data and Sample Construction

Start with 4,826 households
- ◦ SNAP, non-participating low-income, and higher income

Sample Restrictions
- ◦ Consenting households with primary respondents with non-missing age>=18 (4696)
- ◦ Exclude 687 households with valid skips for both administrative SNAP variables
- ◦ Exclude 67 households with no dates available in state caseload data and no match in EBT data
- ◦ Exclude 80 households that did not match with Healthy Eating index 2010 scores data
- ◦ Exclude 76 households with missing values for at least one explanatory/dependent variable
- ◦ Final analysis sample: 3,786 households

What Determines Misreporting?

	ADMINISTRATIVE: NO	ADMINISTRATIVE: YES	TOTAL
SELF-REPORTED: NO	2320	245	2565
SELF-REPORTED: YES	86	1135	1221
TOTAL	2406	1380	3786
FALSE NEGATIVES		245/1380 =0.177536232	
FALSE POSITIVES	86/2406 =0.035743973		

Determinants of False Negatives (Dependent Variables: False Negatives (=1))			
Age	-0.000130		0.000423
Female(=1)	-0.0321		-0.0245
Black(=1)	0.00385		-0.00577
Other Race (nonwhite,nonblack)	-0.0276		-0.0279
Married(=1)	0.106***		0.106***
Formerly Married(=1)	-0.00221		-0.00972
Number of people at residence, excluding guests	-0.00717		-0.0108
Rural census tract	-0.0334		-0.0328
High School Grad(=1)		0.0212	0.0216
Some College(=1)		0.0208	0.0217
College Degree or Higher (=1)		0.0651*	0.0606
Worked Last Week (=1)		0.127***	0.139***
WIC Participant(=1)		-0.0625	-0.0605
Family Monthly Income (imputed)		0.00000803	0.00000635
Constant	0.216***	0.0986***	0.124*
Adjusted R^2	0.011	0.035	0.048
Observations	1380	1380	1380

Determinants of False Positives (Dependent Variables: False Positives (=1))			
Age	0.000365		-0.000161
Female(=1)	0.0101		0.00759
Black(=1)	0.0182		0.0148
Other Race (nonwhite, nonblack)	-0.00662		-0.00900
Married(=1)	-0.0677***		-0.0578***
Formerly Married(=1)	-0.0247		-0.0208
Number of people at residence, excluding guests	0.0195***		0.0182***
Rural census tract	-0.00910		-0.0126
High School Grad(=1)		-0.0399*	-0.0318
Some College(=1)		-0.0373*	-0.0355*
College Degree or Higher (=1)		-0.0460**	-0.0379*
Worked Last Week (=1)		-0.0268***	-0.0383***
WIC Participant(=1)		0.0424	0.00748
Family Monthly Income (imputed)		-0.00000328***	-0.00000267***
Constant	-0.000727	0.100***	0.0877**
Adjusted R^2	0.030	0.021	0.050
Observations	2406	2406	2406

Associations Between SNAP Participation and Food Insecurity/HEI

	Household Food Insecure (=1)	Household Highly Food Insecure (=1)	HEI 2010 Scores
Self-Reported SNAP	0.129*** (0.0191)	0.0571*** (0.0143)	-1.383** (0.507)
Administrative SNAP	0.150*** (0.0182)	0.0672*** (0.0137)	-1.812*** (0.488)
Dependent Variable Mean (Std. Dev)	0.17 (0.38)	0.07 (0.25)	52.69 (13.77)
Observations	3786	3786	3786

Notes: *** statistically significant at 1% level, ** 5% level, * 10% level. Standard errors are in parentheses. All control variables included.

Associations Between SNAP Participation and Weight-Related Outcomes

	BMI	UNDER-WEIGHT	OVERWEIGHT/ OBESE	OBESE	SEVERELY OBESE
Self-Reported SNAP	1.541*** (0.283)	-0.000126 (0.00606)	0.0884*** (0.0175)	0.0918*** (0.0191)	0.0572*** (0.0152)
Administrative SNAP	1.576*** (0.268)	-0.00148 (0.00594)	0.0899*** (0.0172)	0.0846*** (0.0183)	0.0595*** (0.0145)
Dependent Variable Mean (Std. Dev)	28.19 (6.57)	0.02 (0.14)	0.65 (0.48)	0.34 (0.47)	0.13 (0.34)
Observations	3786	3786	3786	3786	3786

Notes: *** statistically significant at 1% level, ** 5% level, * 10% level. Standard errors are in parentheses. All control variables included.