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Bounding the Effect of Joint Participation in SNAP and Private Food Charities on Food Security

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Background

- Households are food insecure if they face uncertainties regarding access to food or are unable to access enough food to meet the needs of household members for active and healthy living due to insufficient funds (Coleman-Jensen et al, 2017). In 2018, 11.1% of households in the United States were reported to be food insecure.
- The Supplemental Nutrition Assistance Program (SNAP) is the largest and most important governmental anti-hunger food program. SNAP has existed for over 40 years (Coleman-Jensen et al., 2019).
- Private food charities are local, not for profit organizations that provide relief for the hungry. These include food banks, food pantries, soup kitchens, kids' cafés and shelters.
- A key research question regards the effectiveness of joint participation in SNAP and private food charities in reducing food insecurity, as its prevalence among participants of these programs is still very extensive. Estimating the impact of food assistance programs is quite challenging because of endogeneity issues due to households' self-selection into the programs and misreporting of participation (Bollinger and David 1997).

Objectives

The main objective of this study is the estimation of the causal effect of participation in both SNAP and private food charities on food security relative to the participation in the SNAP only.

Data

- This study uses data from the National Household Food Acquisition and Purchase Survey (FoodAPS), a nationally representative survey of 4286 households in the United States.
- This study is focused on FoodAPS low income households (below 130% of poverty threshold). This group comprise a total of 1714 households out of the 4826 households that were surveyed.
- The data contain information about SNAP and private food charities participation.

Econometric Procedure

- To measures the change in food security level of households if they participated in both SNAP and private food charities compared of SNAP only, we use the Average Treatment Effect (ATE) (Jensen et al., 2019):

$$ATE_{31} = P[FS(3) = 1] - P[FS(1) = 1],$$

which is the difference between the mean outcome (i.e., food security) of participants in both programs and participants in SNAP only.

- The model procedures with components of misreporting and self –selection errors:

$$-1 + P(FS = 1, S = 3) + P(FS = 0, S = 1) + \delta_{3,1}^{LB} \leq ATE_{3,1} \leq 1 - P(FS = 0, S = 3) - P(FS = 1, S = 1) + \delta_{3,1}^{UB},$$

where $\delta_{3,1}^{LB}$ and $\delta_{3,1}^{UB}$ are components of misreporting errors (Jensen et al., 2019).

- Estimating of the Average Treatment Effect was carried out by imposing restrictions on the nature of misreporting and selection errors (Jensen et al., 2019).

Assumption on Misreporting and Selection errors

- **No false positive assumption**: This implies that no household will report participating in both programs without participating in it(reported participation is true).
- **Non-differential errors assumption**: This assumes that underreporting from the participating households is independent of the food security status, i.e. food secure and insecure households are equally likely to underreport.
- **Exogenous selection assumption:** This assumes that the outcome (food security) does not depend on the treatment (participation), i.e. participation is random.

Monotonicity assumptions

- **Monotone Treatment Selection (MTS):** This assumption posits that there are latent variables that affects food security, and they have a positive relation with the decision to participate in food assistance programs.
- **Monotone Treatment Response (MTR):** assumes that response function (food security) is weakly increasing in treatment(s) i.e. food security level of participants of both programs cannot be less than that of participants of SNAP only.
- **Monotone Instrumental Variable (MIV):** this proposes that the latent food security level monotonically varies with a covariate. In this case we use income to poverty ratio.
- It is assumed that $P[FS(j) = 1]$ is weakly increasing in income to poverty ratio.
- This MIV assumption does not have identifying power on its own, it is combined with the MTS and MTR assumptions to get more instructive bounds (Jensen et al., 2019).

Results

- **Table 1. Sharp bounds on ATE of participation in SNAP and private food charities compared to participating in SNAP alone**

		Lower bound, Upper bound
MTS-MIV	Point estimates	(-0.8658, 0.9293)
	Confidence interval	[-0.9189, 0.9449]
MIV-MTR	Point estimates	(0.0000, 0.1255)
	Confidence interval	[-0.8093,0.2133]
MTS-MTR-MIV	**Point estimates**	**(0.0448, 0.0849)**
	Confidence interval	[0.0291, 0.2216]

- Making consecutive assumptions and restricting the nature classification and selection error did not given us informative bounds about the ATE.
- Only the combination of MTS-MTR-MIV identifies a strictly positive ATE that is also statistically different than zero (5% level). The estimated bounds on ATE varies from [0.0448, 0.0849](Table 1). The width of the bounds is 0.04 which indicate the bounds are very instructive. These results suggest that participating in both programs improves the probability of being food secure compared to SNAP alone.
- This result is within the range of estimated effects of participation on other food assistance programs, e.g., SNAP on food security (Mabli & Ohls, 2015).

Conclusions

- Results from this study provide evidence that both SNAP and private food charities contribute to alleviate food insecurity. More importantly, the result gives the effect of private food charities participation to be at least 4.5%, and shows that it is useful in reducing food insecurity.

References

- Bollinger, C. R., & David, M. H. (1997). Modeling discrete choice with response error: Food Stamp participation. *Journal of the American Statistical Association*, *92*(439), 827-835.
- Coleman-Jensen, A., Rabbitt, M., Gregory, C., & Singh, A. 2017. Household food security in the United States in 2016. *USDA-ERS Economic Research Report*, (237).
- Coleman-Jensen, A., Rabbitt, M., Gregory, C., & Singh, A. 2019. Household food security in the United States in 2018. *USDA-ERS Economic Research Report*, (270).
- Jensen, H. H., Kreider, B., & Zhylyevskyy, O. 2019. Investigating treatment effects of participating jointly in SNAP and WIC when the treatment is validated only for SNAP. *Southern Economic Journal*.
- Mabli, J., & Ohls, J. 2015. Supplemental Nutrition Assistance Program Participation Is Associated with an Increase in Household Food Security in a National Evaluation1, 2. *The Journal of Nutrition*, *145*(2), 344.

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