

Short Communication

Food insecurity patterns before and after initial receipt of Supplemental Security Income

Rajan A Sonik^{1,*}, Susan L Parish² and Monika Mitra³

¹Leonard Davis School of Gerontology and the Leonard D. Schaeffer Center for Health Policy & Economics, University of Southern California, Verna & Peter Dauterive Hall (VPD), Room 512A, 635 Downey Way, Los Angeles, CA 90089-3333, USA: ²Bouvé College of Health Sciences, Northeastern University, Boston, MA, USA: ³Lurie Institute for Disability Policy, Heller School for Social Policy and Management, Brandeis University, Waltham, MA, USA

Submitted 25 October 2018: Final revision received 9 January 2019: Accepted 31 January 2019: First published online 27 March 2019

Abstract

Objective: To assess patterns of food insecurity before and after initial receipt of Supplemental Security Income (SSI) benefits.

Design: We analysed data from a nationally representative sample. We estimated two difference-in-difference models comparing food insecurity patterns among eventual SSI recipients with patterns among eligible non-recipients during two time frames. The first model assessed changes in food insecurity immediately before SSI benefits were first received and the second model assessed changes in food insecurity after programme entry.

Setting: 2008 panel of the Survey of Income and Program Participation.

Participants: Non-institutionalized population of the USA.

Results: The percentage of eventual SSI recipients experiencing food insecurity rose from 18 to 30 % in the year before programme entry, compared with a change from 17 to 18 % for eligible non-recipients. Adjusting for sociodemographic covariates, the difference-in-difference estimator for this comparison was statistically significant ($P=0.01$). Additionally, the percentage of recipients experiencing food insecurity fell from 28 % in the year before programme entry to 16 % in the year after entry, compared with a change from 16 to 17 % for eligible non-recipients. Adjusting for sociodemographic covariates, the difference-in-difference estimator for this comparison was marginally significant ($P=0.07$).

Conclusions: Food insecurity rises prior to SSI entry but may be alleviated by programme benefits. Greater nutritional supports for SSI applicants awaiting decisions may reduce the burden of food insecurity in this population and improve health outcomes.

Keywords

Supplemental Security Income
Food insecurity
Disability
Public benefits

Nearly one in eight US households experiences food insecurity⁽¹⁾, defined as lacking the resources to reliably access adequate food (in terms of quantity or quality)⁽²⁾. People with disabilities are 2.8 times more likely to experience food insecurity than people without disabilities⁽³⁾, and the health of people with disabilities is especially sensitive to food insecurity given their reduced baseline health status and their elevated risk for having an underlying health condition exacerbated⁽⁴⁾. The Supplemental Nutrition Assistance Program (SNAP; formerly the Food Stamp Program) is the largest food assistance programme in the USA. Prior studies have found that food

insecurity rises before initial SNAP uptake⁽⁵⁾ and falls after receipt^(5–8). However, less is known about the relationship between food insecurity and Supplemental Security Income (SSI), a federal cash assistance programme benefiting individuals who have severe work-limiting disabilities and highly limited economic resources. Given the disproportionate impact of food insecurity on people with disabilities⁽⁴⁾ and the fact that SSI benefits – although not specifically tethered to food-related purchases – may be used to alleviate hunger, we hypothesized that food insecurity might fluctuate before and after initial SSI receipt as it does in relation to SNAP.

*Corresponding author: Email sonik@usc.edu

Methods

We utilized data from the 2008 panel of the nationally representative Survey of Income and Program Participation (SIPP)⁽⁹⁾. The 2008 panel was administered to approximately 42 000 US households over sixteen waves occurring every four months. Core questions about income, public benefits and other topics were asked every wave. Additional questions were covered during selected waves (e.g. assets: wave 7; food insecurity: waves 6 and 9; disability: wave 6). We generated two analytic samples from these data: one sample to assess food insecurity at two time points just prior to entry into the SSI programme ('pre-entry analysis') and one sample to assess food insecurity at time points both before and after entry ('pre-post analysis').

Pre-entry analysis

To examine pre-SSI patterns in food insecurity, we identified 209 individuals who started receiving SSI in the year after the wave 9 measurement of food insecurity (i.e. in wave 10, 11 or 12). For this treatment group, the wave 6 measurement of food insecurity occurred 1–2 years before SSI entry and the wave 9 measurement occurred less than 1 year before entry (Table 1). Controls included 4454 eligible non-recipients: they did not receive SSI during the study period but met categorical requirements (here, as previously⁽¹⁰⁾, this meant reporting disability or age greater than 65 years based on data collected in wave 6) and income/asset requirements (for these, we relied on methods described by Davies *et al.*⁽¹¹⁾ utilizing variables in waves 6 and 7 of the SIPP).

Pre-post analysis

To examine potential effects of initial SSI entry on food insecurity, we identified seventy-seven individuals who started receiving SSI in the year between the wave 6 and wave 9 measurements of food insecurity (i.e. in wave 7 or 8). For the treatment group, the wave 6 measurement of food insecurity occurred less than 1 year before SSI entry and the wave 9 measurement occurred less than 1 year after entry (Table 1). Controls included 3856 eligible

non-recipients identified as in the pre-entry analysis described above. The waves utilized for the pre-entry and pre-post analyses differed slightly, however, causing the difference in sample sizes of the control groups.

Samples for both the pre-entry and pre-post analyses were limited to adults (18 years or over). To preserve sample size, we did not limit the sample to individuals present in all sixteen waves; rather, we only required that an individual be present in the waves required for the identification strategies identified above. Sensitivity analyses using data from all waves to assess trends pre- and post-SSI entry did not yield substantively different findings. Separately, sensitivity analyses using long-term SSI recipients as controls did not produce substantively different results either.

Measures

The SIPP measured food insecurity with a validated five-item screener⁽¹²⁾ that can categorize households as having food insecurity or not; this measure has previously been used to estimate the effects of SNAP benefits on food insecurity⁽¹³⁾. We counted individuals living in a household with food insecurity as having experienced food insecurity. A binary 'post' term indicated whether a measure of food insecurity was from wave 9 (*v.* wave 6) and a binary treatment variable indicated whether a person was in the treatment group (*v.* control). Additional covariates included binary measures of race/ethnicity (non-Hispanic White or not), gender, education (high-school diploma/equivalent or not) and marital status (married and living with spouse or not). Sensitivity analyses including further adjustment for concurrent enrolment in SNAP and other public benefit programmes did not alter findings.

Statistical approach

For both sets of analyses, we estimated logistic regression models with difference-in-differences estimators to compare changes in food insecurity between treatment and control groups, adjusting for all covariates. The coefficient on a post × treatment interaction was the term of interest in each model. The SIPP provides weights and we utilized

Table 1 Identification of treatment groups for the pre-entry and pre-post analytic samples

Sample	Wave of initial SSI receipt	Timing of wave 6 food insecurity measurement in relation to initial SSI receipt	Timing of wave 9 food insecurity measurement in relation to initial SSI receipt	<i>n</i>
Pre-entry analysis	10	16 months before receipt	4 months before receipt	46
	11	20 months before receipt	8 months before receipt	72
	12	24 months before receipt	12 months before receipt	91
			Total	209
Pre-post analysis	7	4 months before receipt	8 months after receipt	42
	8	8 months before receipt	4 months after receipt	35
			Total	77

SSI, Supplemental Security Income.

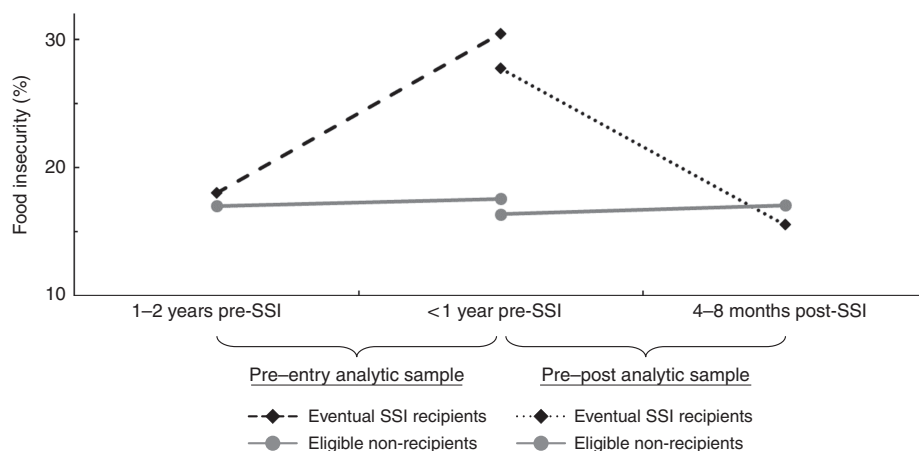


Fig. 1 Graphical representation of observed food insecurity patterns among treatment and control groups immediately before and after the treatment groups' initial Supplemental Security Income receipt; non-institutionalized US adults aged ≥ 18 years, 2008 panel of the Survey of Income and Program Participation

these in the calculation of all point estimates and statistical models.

Results

Figure 1 summarizes findings for both the pre-entry and pre-post analyses. In the pre-entry analysis, the percentage of individuals experiencing food insecurity rose from 18 (95% CI 13, 24)% at 16–24 months before SSI entry to 30 (95% CI 24, 38)% just before SSI entry, compared with a change from 17 (95% CI 16, 18)% to 18 (95% CI 16, 19)% among eligible non-recipient controls over the same period. In the pre-post analysis, the percentage of individuals experiencing food insecurity fell from 28 (95% CI 18, 41)% just before SSI entry to 16 (95% CI 8, 27)% after SSI entry, compared with a change

from 16 (95% CI 15, 18)% to 17 (95% CI 15, 19)% among controls.

The difference-in-difference estimator was significant in the weighted logistic regression model for the pre-entry analysis ($P=0.01$), adjusting for covariates, indicating food insecurity increased just prior to SSI entry among eventual SSI recipients above and beyond secular changes among controls (Table 2). In the pre-post analysis, the difference-in-difference estimator was marginally significant ($P=0.07$), providing modest evidence for a decline in food insecurity after SSI receipt (Table 2).

Discussion

We have found evidence that food insecurity rises before initial SSI receipt and falls afterwards, similar to patterns

Table 2 Logistic regression models including difference-in-difference estimators assessing patterns of food insecurity before and after initial receipt of Supplemental Security Income (SSI) benefits among non-institutionalized US adults aged ≥ 18 years, 2008 panel of the Survey of Income and Program Participation

Variable	Log-odds of experiencing food insecurity			
	Pre-entry sample†	95% CI	Pre-post sample‡	95% CI
Eventual SSI recipient§	−0.03	−0.44, 0.37	0.58*	0.00, 1.15
Post	0.04	−0.08, 0.16	0.05	−0.08, 0.19
Eventual SSI recipient × Post¶	0.68*	0.16, 1.21	−0.80 ^(*)	−1.67, 0.07
Non-Hispanic White	−0.57***	−0.69, −0.44	−0.64***	−0.78, −0.5
Female	−0.01	−0.14, 0.11	0.02	−0.12, 0.17
$\geq$ High-school level education	−0.01	−0.15, 0.12	0.04	−0.11, 0.19
Married, living with spouse	−0.16*	−0.29, −0.03	−0.18*	−0.32, −0.04

^(*) $P < 0.10$, * $P < 0.05$, *** $P < 0.001$.

†Model included 209 eventual SSI recipients and 4454 eligible non-recipients.

‡Model included seventy-seven eventual SSI recipients and 3856 eligible non-recipients.

§The reference group was eligible non-recipients. In the pre-entry model, the food insecurity of eventual SSI recipients was measured 1–2 years before programme entry and then < 1 year before programme entry. In the pre-post model, the food insecurity of eventual SSI recipients was measured < 1 year before programme entry and then < 1 year after programme entry.

|| Dummy variable indicating the time of the second measurement of food insecurity. The first measurement occurred around June 2010, the second occurred 1 year later around June 2011.

¶ This difference-in-difference estimator represents the difference between eventual recipients and eligible non-recipients in how the log-odds of food insecurity changed between the two measurements of food insecurity. This compares the change in log-odds of experiencing food insecurity of eventual SSI recipients with that of eligible non-recipients.

observed in relation to SNAP^(5–8). Family, health and employment shocks typically drive the rise in food insecurity seen before SNAP application and receipt⁽¹⁴⁾, indicating relatively direct lines between crisis, need and benefits-seeking. Such processes likely occur among eventual SSI recipients as well. However, SSI applications can take 6 months to several years to process, whereas SNAP applications are usually processed more quickly. The longer wait between applying for and receiving SSI benefits suggests the pre-SSI increase in food insecurity may also stem from economic vulnerabilities escalating over time as applicants await benefits. Investigations with longitudinal data may be needed to more fully examine potential mechanisms underlying the increase in food insecurity observed here.

Self-reporting in the SIPP was a limitation, particularly given stigma around SSI, disability and food insecurity, although these stigmas would likely not have affected our comparison groups differentially over time. However, the SIPP has previously been used to examine the relationship between SNAP receipt and food insecurity⁽¹³⁾, and it has been used by the US Census Bureau to produce national estimates for the prevalence of disability in the USA⁽¹⁵⁾. Separately, small sample sizes were also a key limitation, particularly affecting statistical power in the pre–post analysis.

The SSI programme serves over 8 million individuals⁽¹⁶⁾. These recipients are socially vulnerable and have elevated health-care needs⁽¹⁷⁾. As food insecurity is particularly problematic for this population⁽⁴⁾, a sharp rise in food insecurity at any time may drive negative health and health-care outcomes. Many states have interim benefit programmes for individuals awaiting SSI decisions⁽¹⁸⁾. Expansions of these programmes may reduce economic hardships and improve outcomes for this population. Additionally, although food insecurity fell after SSI receipt, it was not eliminated. Thus, future research should examine whether increasing SSI benefit levels (as has been suggested for SNAP⁽¹⁹⁾) and fostering greater coordination between the SSI and SNAP programmes may also be warranted by these findings, particularly given past findings that SNAP also partially reduces food insecurity^(5–8).

Acknowledgements

Financial support: This work was supported by a Social Security Administration Disability Determination Process Small Grant Program grant and a Heller Annual Fund grant. The funders had no role in the design, analysis or writing of this article. **Conflict of interest:** None. **Authorship:** R.A.S. led the formulation of the research questions, the study design, the analysis and the writing. S.L.P. and M.M. provided feedback and contributed to the formulation of the research questions, the study design

and the writing. **Ethics of human subject participation:** Not applicable; because the study utilized de-identified secondary data, the Brandeis University Institutional Review Board deemed it exempt from ethical review under exemption 4.

References

1. Coleman-Jensen A, Rabbitt MP, Gregory CA *et al.* (2017) *Household Food Insecurity in the United States in 2017. Economic Research Report* no. ERR-256. Washington, DC: US Department of Agriculture, Economic Research Service; available at <https://www.ers.usda.gov/webdocs/publications/90023/err-256.pdf?v=0>
2. Coleman-Jensen A, Gregory CA & Rabbitt MP (2018) Definitions of Food Security. <https://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-us/definitions-of-food-security.aspx> (accessed January 2019).
3. Coleman-Jensen A & Nord M (2013) Disability is an Important Risk Factor for Food Insecurity. <https://www.ers.usda.gov/amber-waves/2013/may/disability-is-an-important-risk-factor-for-food-insecurity> (accessed October 2018).
4. Coleman-Jensen A & Nord M (2013) *Food Insecurity Among Households with Working-Age Adults with Disabilities. Economic Research Report* no. ERR-144. Washington, DC: US Department of Agriculture, Economic Research Service; available at http://ageconsearch.umn.edu/bitstream/142955/2/err_144.pdf
5. Nord M & Golla AM (2009) *Does SNAP Decrease Food Insecurity? Untangling the Self-Selection Effect. Economic Research Report* no. ERR-85. Washington, DC: US Department of Agriculture, Economic Research Service; available at https://www.ers.usda.gov/webdocs/publications/46295/10977_err85_1_.pdf?v=42317
6. Mabli J & Ohls J (2015) Supplemental Nutrition Assistance Program participation is associated with an increase in household food security in a national evaluation. *J Nutr* **100**, 344–351.
7. Shaefer HL & Gutierrez IA (2013) The Supplemental Nutrition Assistance Program and material hardships among low-income households with children. *Soc Serv Rev* **87**, 753–779.
8. Ratcliffe C, McKernan S-M & Zhang S (2011) How much does the Supplemental Nutrition Assistance Program reduce food insecurity? *Am J Agric Econ* **93**, 1082–1098.
9. US Census Bureau (n.d.) Survey of Income and Program Participation: Methodology. <http://www.census.gov/programs-surveys/sipp/methodology/sampling.html> (accessed October 2018).
10. Gettens J, Lei P & Henry A (2016) *Accounting for Geographic Variation in DI and SSI Participation. DRC Working Paper* no. 2016-03. Princeton, NJ: Mathematica Center for Studying Disability Policy; available at <https://www.mathematica-mpr.com/-/media/publications/pdfs/disability/2016/drc-wp-geographic-variation.pdf>
11. Davies PS, Huynh M, Newcomb C *et al.* (2001) Modeling SSI financial eligibility and simulating the effect of policy options. *Soc Secur Bull* **64**, 16–45.
12. Nord M (2006) Survey of Income and Program Participation 2001 Wave 8 Food Security Data File Technical Documentation and User Notes. http://www.nber.org/sipp/food_security/2001.pdf (accessed October 2018).
13. Gundersen C, Kreider B & Pepper J (2017) Partial identification methods for evaluating food assistance programs: a case study of the causal impact of SNAP on food insecurity. *Am J Agric Econ* **99**, 875–894.

14. Leete L & Bania N (2010) The effect of income shocks on food insufficiency. *Rev Econ Househ* **8**, 505–526.
15. Taylor DM (2018) Americans with disabilities: 2014. Current Population Reports no. P70-152. <https://www.census.gov/content/dam/Census/library/publications/2018/demo/p70-152.pdf> (accessed January 2019).
16. Office of Retirement and Disability Policy (2016) Fast Facts & Figures About Social Security, 2016. https://www.ssa.gov/policy/docs/chartbooks/fast_facts/2016/fast_facts16.html (accessed October 2018).
17. Riley GF & Rupp K (2015) Cumulative expenditures under the DI, SSI, Medicare, and Medicaid programs for a cohort of disabled working-age adults. *Health Serv Res* **50**, 514–536.
18. Commonwealth of Massachusetts (2018) Check EAEDC Eligibility and How to Apply. <https://www.mass.gov/service-details/check-eaedc-eligibility-and-how-to-apply> (accessed October 2018).
19. Gundersen C, Kreider B & Pepper J (2018) Reconstructing SNAP to more effectively alleviate food insecurity in the US. *Russell Sage Found J Soc Sci* **4**, 113–130.