

Reconstructing the Supplemental Nutrition Assistance Program to More Effectively Alleviate Food Insecurity in the United States



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Although the central objective of the Supplemental Nutrition Assistance Program (SNAP) is to reduce food insecurity in the United States, the majority of SNAP households are food insecure. Higher benefits may lead these households to food security. To evaluate this possibility, we use a question from the Current Population Survey that asks respondents how much additional money they would need to be food secure. Food insecure SNAP households report needing an average of about \$42 per week to become food secure. Under a set of assumptions about the measurement of benefits and behavioral responses, we find that an increase in weekly benefits of \$42 for SNAP households would lead to a 62 percent decline in food insecurity at a cost of about \$27 billion.

Keywords: food insecurity, Supplemental Nutrition Assistance Program (SNAP), food stamp program, poverty

Food insecurity, described as “the uncertainty of having, or unable to acquire, enough food due to insufficient money or other resources” (Coleman-Jensen et al. 2016), has become a leading indicator of economic well-being in the United States for two central reasons. First, the extent of the problem is staggering—more than forty-two million Americans lived in food insecure households in 2015 (Coleman-Jensen et al. 2016). Second, a well-established set of negative

health outcomes is associated with food insecurity (for a review, see Gundersen and Ziliak 2015), which lead to dramatically higher health-care costs (Tarasuk et al. 2015). To reduce food insecurity, the U.S. Department of Agriculture (USDA) administers the Supplemental Nutrition Assistance Program (SNAP). Although a growing body of research has demonstrated that SNAP reduces food insecurity (see, for example, Gundersen, Kreider, and Pepper 2017),

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the majority of SNAP households are food insecure.

In this article, we provide new insights into the food insecurity of SNAP recipients. Whereas previous research studies the prevalence of food insecurity, our analysis focuses on the additional income households would require in order to become food secure. We label this measure the *resource gap*. Much of our analysis focuses on households participating in SNAP, but we also examine the resource gap for certain groups of currently ineligible low-income households. Throughout, we separately consider cases for all households and for the subset of households with children.

To measure the resource gap, we use questions in the 2014 Current Population Survey (CPS) that ask respondents how much more money they would need to become food secure. These self-reported amounts are subject to personal interpretation and potential mismeasurement. Nevertheless, such reports provide a useful starting point in assessing perceived food assistance shortcomings. After estimating the resource gap, we provide an exploratory analysis of the potential reductions in food insecurity rates that could result from different amounts of SNAP benefit increases. We then assess the resource gap for households with incomes just above the current eligibility threshold and consider potential reductions in food insecurity rates if eligibility was expanded.

This article contributes to our broader understanding of poverty and policies designed to reduce poverty. The prevalence of food insecurity is closely tied to household income and resources—poor households have substantially higher rates of food insecurity than non-poor households (Coleman-Jensen et al. 2016)—and many of the consequences associated with poverty are due, at least in part, to households being food insecure. As a result, anti-poverty policies in the United States have a direct impact on food security rates. Moreover, although the central goal of SNAP is to alleviate food inse-

curity (USDA 1999), the program also serves to mitigate the consequences of poverty. SNAP plays a role similar to cash in that it expands a household's budget opportunities. As such, SNAP leads to reductions in the depth and severity of poverty (Tiehen, Jolliffe, and Smeeding 2015).

BACKGROUND

We now turn to an overview of the two central concepts of this paper—SNAP and food insecurity. We then consider the relationship between them.

Supplemental Nutrition Assistance Program

SNAP began with the Food Stamp Act of 1964 and became a national program in 1974. Today, SNAP is the largest food assistance program in the United States. In 2015, more than forty-six million people received benefits totaling nearly \$70 billion (for a broader view of the program, see Bartfeld et al. 2015). Though states have discretion over various aspects of SNAP, such as the gross income and asset eligibility tests, all benefits are funded by the federal government.

The program has undergone numerous changes over the years, but its basic structure has stayed the same. SNAP benefits can be used to buy food in authorized retail food outlets, which include virtually all food stores. Benefits are calculated by subtracting 30 percent of the household's net income from the value of the Thrifty Food Plan (TFP), a low-cost nutritionally adequate food plan that varies by household size and composition.

To be eligible for SNAP, households must first meet a monthly gross income test—the household's income (before any deductions) typically cannot exceed 130 percent of the poverty line, though some states have set more lenient thresholds.¹ Net income, which is calculated as gross income less certain deductions, cannot exceed the poverty line, even in states that have set a higher gross income threshold.² The net income test is binding, regardless of

1. There are some exceptions. For instance, households with at least one elderly or disabled member are not required to meet this test.

2. The allowable deductions include a standard deduction for all households, a 20 percent earned income deduction, a dependent care deduction when care is necessary for work, training, or education, a child support payments deduction, a medical costs deduction for elderly and disabled people, and an excess shelter cost deduction.

the gross income threshold. Historically, a household's total assets could not exceed \$2,000 but most states now elect to waive this test.

Food Insecurity

Our central outcome of interest in this article is food insecurity. Food insecurity in the United States is measured through a series of questions in the Core Food Security Module (CFSM). The CFSM includes eighteen questions for households with children and a subset of ten questions for households without children. Examples follow. I worried whether our food would run out before we got money to buy more (the least severe item). Did you or the other adults in your household ever cut the size of your meals or skip meals because there wasn't enough money for food? Were you ever hungry but did not eat because you couldn't afford enough food? Did a child in the household ever not eat for a full day because you couldn't afford enough food (the most severe item for households with children)?³ Each question is qualified by the stipulation that the problem was caused by lack of money.

Under the official definition established by the USDA, a response is labeled affirmative if the answer is yes (rather than no) or sometimes or often (rather than never). Based on these responses to the CFSM, households are placed into three food insecurity categories under the assumption that the number of affirmative responses reflects the level of food hardship that the family experiences. If a household responds affirmatively to two or fewer questions, it is labeled *food secure* under the premise that all household members had access at all times to enough food for an active, healthy life. If a household responds affirmatively to three to seven questions, it is labeled *low food secure* in that at least some household members were uncertain of having, or unable to acquire, enough food because they had insufficient money and other resources for food. If a household responds affirmatively to eight or more questions, it is labeled *very low food secure* in

that one or more household members were hungry, at least sometime during the year, because they could not afford enough food. The measure we use in this article is *food insecure*, which holds if a household is either low food secure or very low food secure.

SNAP and Food Insecurity

The primary goal of SNAP is to alleviate food insecurity in the United States. Yet, the post-Great Recession increases in both the proportion of Americans receiving SNAP and the proportion residing in food insecure households have led some to question the efficacy of the program. In particular, from 2007 to 2013 the number of persons receiving SNAP increased from 26.3 million to a peak of 47.6 million in 2013.⁴ Meanwhile, the number of food insecure persons rose from 36.2 million to 49.1 million over the same period (Coleman-Jensen et al. 2016, table 1A). Moreover, it is well known that SNAP recipients have higher rates of food insecurity than eligible nonrecipients. In 2015, for example, SNAP participants had a food insecurity rate above 50 percent, whereas those with incomes below 130 percent of the poverty line but did not receive SNAP had a rate of 25.3 percent (Coleman-Jensen et al. 2016, table 8).

These trends and associations between SNAP participation and food insecurity rates, however, are not causally indicative of the efficacy of SNAP. The decision to participate in SNAP presumably is based in part on whether a household expects to be food insecure, and SNAP is designed to reach those who are most at risk of food insecurity. In fact, the success of SNAP in meeting its central goal of reducing food insecurity has been demonstrated in numerous studies. After controlling for the non-random selection of households into SNAP, participants are approximately 20 percent less likely to be food insecure than eligible nonparticipants (see, for example, Kreider et al. 2012). Thus, the observed increase in food insecurity since the Great Recession likely would have been substantially higher in the absence of SNAP.

3. For a complete list of questions, see, Coleman-Jensen et al. 2016.

4. See <https://www.fns.usda.gov/sites/default/files/pd/SNAPsummary.pdf>

THE RESOURCE GAP

In this section, we introduce a measure we call the resource gap. For a food insecure household, we define this gap to be the amount of additional income the household reports needing in order to become food secure. Households are asked this question in the CPS, the official data source for poverty and unemployment rates in the United States, as well as the official source for national food insecurity rates (Coleman-Jensen et al. 2016). In particular, we estimate the resource gap across households using data from the December supplement of the 2014 CPS. We focus on two main samples: households classified as income-eligible for SNAP (income below 130 percent of the poverty line) and SNAP recipients.⁵ These samples include 8,441 and 4,148 households, respectively. Within these samples, we also study the resource gap for the subset of households with children. The corresponding samples sizes are 3,225 and 2,147.⁶

For each household in the sample, we observe a rich set of socioeconomic indicators of well-being, including measures of income and SNAP receipt. Table 1 presents the SNAP participation rates by different socioeconomic factors using the 2014 CPS for each of the four samples described. Among households eligible for SNAP, the SNAP participation rate is 35 percent among all households (column 1) and 49 percent among households with children (column 3). The latter is roughly consistent with other studies using the CPS (for example, Gundersen et al. 2017). The SNAP participation rates are generally as expected across the categories. For example, it is not surprising that

participation rates fall with income given the lower benefit levels that would be received. Perhaps contrary to expectations, participation rates are higher among households in non-metro areas.

The second and fourth columns of table 1 display food insecurity rates among SNAP participants. Despite substantial variation in food insecurity rates within the broader low-income population (for example, food insecurity is less prevalent in higher income groups), these rates are quite similar across categories among SNAP recipients. The main areas where we see lower rates of food insecurity are among households headed by a married couple (versus a single parent) and those headed by someone with a college degree. Even in these cases, the differences are not large.

Importantly, the CPS also asks respondents how much additional money they would need to become food secure. Specifically, households responding that they need more money for food were asked the following question: “About how much more would you need to spend each week to buy just enough food to meet the needs of your household?” (for more on this question, see Gundersen and Ribar 2011). This question precedes the eighteen-item scale in the CFSM. We limit our attention to food insecure households.⁷

One important caveat with these data is that food insecurity is measured over the previous year rather than contemporaneously, while the question regarding the number of dollars necessary to become food secure is based on the respondent’s perception from the previous week when they may or may not have been food

5. Because the CPS does not provide enough information to measure net income and assets, we focus on gross income eligibility. Virtually all gross income eligible households with incomes below the 130 percent of the poverty threshold are also net income eligible. For states that set a higher gross income threshold (such as, 200 percent), most households turn out to be ineligible based on net income. Income in the December CPS is defined only in ranges. Consistent with Craig Gundersen and his colleagues (2017), we measure income using the midpoint of the income category divided by the poverty line as defined for the size of the household.

6. The SNAP recipient sample is not a subset of the sample of households with income below 130 percent of the FPL. Some SNAP households, based on information in the CPS, have incomes above 130 percent of the poverty line. We include those households in our estimations involving samples of SNAP participants but not in our estimations that limit the sample to those with incomes below 130 percent of the poverty line.

7. Some food secure households also report needing more money to purchase food. Many of these households fall into the marginal food secure category—that is, responding affirmatively to one or two questions in the CFSM.

Table 1. SNAP Participation Rates and Food Insecurity Rates

	All Households		Households with Children	
	SNAP Participation Rates Among Eligible Households	Food Insecurity Rates Among SNAP Participants	SNAP Participation Rates Among Eligible Households	Food Insecurity Rates Among SNAP Participants
All	0.35	0.54	0.49	0.52
Income-poverty line				
0-0.50	0.44	0.54	0.65	0.53
0.51-1.00	0.37	0.56	0.48	0.54
1.01-1.30	0.22	0.56	0.30	0.53
Less than high school	0.40	0.54	0.51	0.53
High school	0.37	0.53	0.51	0.52
Some college	0.35	0.56	0.52	0.53
College	0.17	0.49	0.31	0.46
Married	0.27	0.50	0.36	0.47
Single	0.39	0.55	0.61	0.55
Own	0.23	0.52	0.33	0.48
Rent	0.43	0.55	0.57	0.54
Nonmetro	0.41	0.54	0.57	0.48
Metro	0.34	0.54	0.48	0.53
White	0.32	0.54	0.45	0.51
African American	0.48	0.53	0.63	0.53
Other (non-white, non-African American)	0.24	0.53	0.36	0.52
Hispanic	0.37	0.50	0.43	0.49
Non-Hispanic	0.35	0.55	0.53	0.53
Unweighted N	8,441	4,148	3,225	2,147

Source: Authors' calculations based on data from the 2014 December supplement of the CPS.

Note: Eligible households are those with incomes less than 130 percent of the poverty line. SNAP participants are those who report currently receiving SNAP. Sample estimates are weighted using the household-level weight defined for the December supplement.

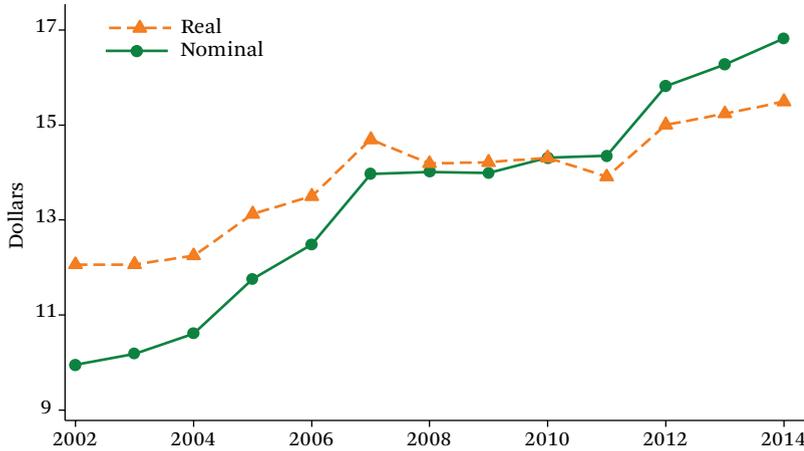
insecure.⁸ Consistent with this discrepancy, 42 percent of food insecure SNAP participants with children report not needing additional dollars in the previous week to become food secure. We do not attempt to account for the difference in timing between these two measures. Rather, we treat the self-reported measures of the resource gap in the previous week as informative about the resource gap during the previous year. In addition, we do not address the possibility that households may inaccurately perceive or report how many dollars they would actually need to become food se-

cure. Some may underreport their need for assistance if ashamed to admit heading a food insecure household, while others may exaggerate their need for additional dollars if worried that doing otherwise could jeopardize the amount of SNAP benefits they receive. As such, our self-reported measure of the average resource gap among food insecure SNAP households may be biased in either direction. Future analyses of the resource gap is needed to address these issues.

As the resource gap has not been extensively studied, we provide some general background

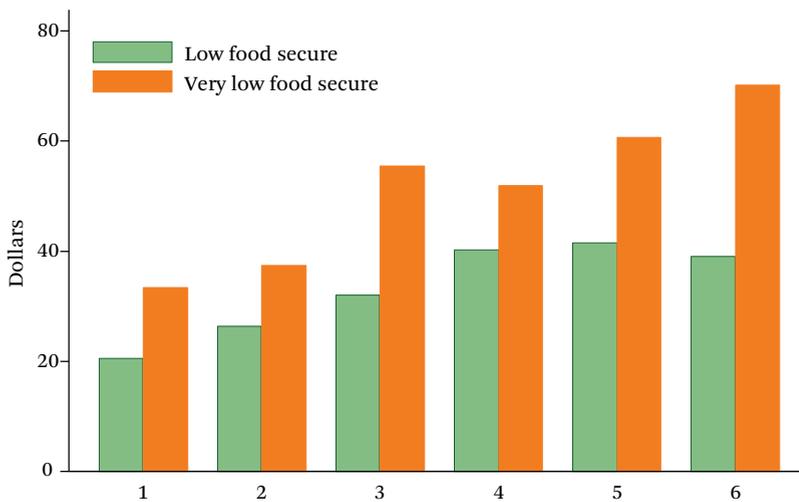
8. SNAP participation is measured over the same time frame as food insecurity. That is, a household is defined as a SNAP participant if it received SNAP within the past twelve months.

Figure 1. Per Capita Dollars Needed for Food Security



Source: Authors' calculations based on data from the 2002 to 2014 December supplements of the CPS.
 Note: The sample from each year is composed of food insecure households.

Figure 2. Dollars Needed per Week for Food Security



Source: Authors' calculations based on data from the 2014 December supplement of the CPS.
 Note: The sample from each year is composed of food insecure households.

followed by information specific to SNAP participants. In figure 1, we display the average nominal and real (2010 dollars) per-capita average resource gaps when the sample is made up of all food insecure households, regardless of income or SNAP participation. These gaps increase markedly from 2002 to 2014 in real dollars (see Gundersen et al. 2013, figure 1). This is not a secular increase, however. Coinciding with the sharp increase in food insecurity rates from 2007 to 2008, reports of additional re-

quired dollars first fell, then stayed relatively constant through 2010, fell again from 2010 to 2011, and more recently have been on the rise again.

In figure 2, we show how the average resource gap for households with children, as reported in the 2014 survey, varies by the degree of food insecurity and household size. As might be expected, households reporting higher degrees of food insecurity (that is, very low versus low food security) report a larger average re-

Table 2. Average Additional Dollars per Week Needed to Become Food Secure Among Food Insecure SNAP Participants

	All Households		Households with Children	
	Dollars	Dollars as a Proportion of Maximum SNAP Benefits	Dollars	Dollars as a Proportion of Maximum SNAP Benefits
All	\$41.62	0.42	\$45.69	0.29
Income-poverty line				
0-0.50	47.39	0.39	50.39	0.31
0.51-1.00	37.13	0.42	40.64	0.27
1.01-1.30	44.92	0.48	50.30	0.31
Less than high school	45.15	0.45	46.99	0.29
High school	41.14	0.41	48.35	0.31
Some college	40.62	0.42	41.11	0.27
College	34.30	0.34	46.77	0.32
Married	44.42	0.31	46.23	0.25
Single	40.73	0.45	45.90	0.31
Own	39.34	0.38	43.32	0.26
Rent	42.43	0.43	46.38	0.30
Nonmetro	37.71	0.41	43.39	0.27
Metro	42.55	0.42	46.16	0.30
White	38.15	0.38	42.42	0.26
African American	48.82	0.52	50.69	0.35
Other (non-white, non-African American)	44.27	0.33	55.90	0.30
Hispanic	44.43	0.36	47.77	0.29
Non-Hispanic	40.87	0.43	44.93	0.29

Source: Authors' compilation based on data from the 2014 December supplement of the CPS.

Note: SNAP participants are those who report currently receiving SNAP. Sample estimates are weighted using the household-level weight defined for the December supplement.

source gap and, in general, reported levels of need increase as household size increases.

In table 2, the first and third columns display the resource gap among food insecure SNAP recipients for the same categories shown in table 1 for all households (N = 2,209) and households with children (N=1,099). The average resource gap is \$41.62 per week across all households and \$45.69 for households with children. In most categories, differences in the average resource gap are minimal, despite several exceptions. For example, the gap is substantially smaller for those with a college degree. In the second and fourth column, we normalize the number of dollars needed to become food secure by expressing them as a proportion of the maximum SNAP benefit level.

This fraction is 0.42 among all households and 0.29 among households with children.

In table 3, we use a linear mean regression model to estimate how the average resource gap varies across the socioeconomic categories displayed in table 2. Columns (1) and (2) display the estimates for the sample of all households, and columns (3) and (4) those for households with children. For these regressions, household size and income are treated as separate variables rather than being combined as the income-to-poverty line measure presented in table 2. In columns (1) and (3), we include all of the variables in table 2. The coefficients are imprecisely estimated and statistically insignificant, with the exception of household size and, for households with children, households

Table 3. Mean Regressions of Additional Dollars Needed per Week to Be Food Secure Among SNAP Participants

	All Households		Households with Children	
	(1)	(2)	(3)	(4)
Income	0.013 (0.646)	-0.163 (0.646)	-0.666 (1.06)	-0.895 (1.05)
Household size	5.24** (0.70)	5.54** (0.69)	6.91** (1.24)	7.29** (1.23)
Less than high school	5.98 (4.62)	6.52 (4.62)	-8.20 (7.71)	-7.77 (7.65)
High school	3.23 (4.47)	3.27 (4.48)	-2.44 (7.34)	-2.66 (7.35)
Some college	1.47 (4.53)	1.49 (4.54)	-11.3 (7.41)	-11.6 (7.43)
Married	-1.30 (2.69)	-2.22 (2.68)	-5.63 (3.81)	-6.50 (3.78)
Homeowner	-2.25 (2.41)	-3.21 (2.40)	-1.04 (3.93)	-2.76 (3.90)
Nonmetro	-0.25 (2.51)	-1.76 (2.43)	3.29 (4.08)	1.38 (3.92)
White	-6.20 (4.77)		-13.8* (6.80)	
African American	3.60 (5.07)		-3.37 (7.26)	
Hispanic	3.77 (3.03)		7.55 (4.32)	
Constant	26.3** (6.50)	23.82** (4.54)	35.4** (10.6)	27.2** (8.13)
n	2,209	2,209	1,099	1,099

Source: Authors' compilation based on data from the 2014 December supplement of the CPS.

Note: Columns (1) and (3) include commonly used determinants of food insecurity drawn from the 2014 December supplement of the Current Population Survey. Columns (2) and (4) exclude race-ethnicity variables that are unlikely to be used in a restructuring of the SNAP benefit formula. Standard errors are in parentheses.

** $p < .01$, * $p < .05$

headed by a white person. For the household size variable, each additional household member is estimated to increase the resource gap by \$5.24 among all households and by \$6.91 among households with children. In columns (2) and (4), we restrict the set of variables that could be used to redirect benefits. In these restricted regressions, household size still has a statistically significant association with the expected resource gap with coefficients of 5.54 and 7.29.

In tables 2 and 3, we provide estimates for all SNAP participants regardless of income. In part to facilitate comparisons between SNAP participants and eligible nonparticipants, it is common in the literature to limit the sample to households with incomes below 130 percent of the poverty line.⁹ For comparison purposes, then, we do so in table 4. The results are substantively similar to those in table 3. In particular, the estimated coefficients on household

9. In certain circumstances, a household is eligible for SNAP even if income exceeds 130 percent of the poverty line. The gross income criterion is waived, for example, if someone in the household has a disability. Other ex-

Table 4. Mean Regressions of Additional Dollars per Week Needed to Be Food Secure Among SNAP Participants, Incomes Less Than 130 Percent of the Poverty Line

	All Households		Households with Children	
	(1)	(2)	(3)	(4)
Income	-0.469 (1.77)	-0.927 (1.77)	-1.28 (2.20)	-1.65 (2.19)
Household size	5.46** (0.86)	5.91** (0.85)	7.95** (1.46)	8.41** (1.46)
Less than high school	9.76 (5.74)	10.39 (5.74)	-7.44 (9.32)	-6.72 (9.29)
High school	7.08 (5.65)	7.08 (5.66)	-2.37 (9.09)	-2.51 (9.10)
Some college	3.13 (5.74)	2.90 (5.75)	-13.3 (9.22)	-13.7 (9.24)
Married	-2.23 (3.21)	-2.81 (3.20)	-9.80* (4.42)	-10.1* (4.40)
Homeowner	-3.32 (2.89)	-4.54 (2.87)	-2.13 (4.64)	-3.75 (4.60)
Nonmetro	0.38 (2.85)	-1.18 (2.76)	4.85 (4.58)	2.92 (4.40)
White	-7.38 (5.51)		-15.6* (7.68)	
African American	1.50 (5.84)		-6.35 (8.22)	
Hispanic	5.74 (3.50)		9.68* (4.83)	
Constant	24.9** (7.79)	21.2** (5.70)	34.6** (12.4)	24.7** (9.86)
n	1,683	1,683	866	866

Source: Authors' compilation based on data from the 2014 December supplement of the CPS.
 Note: Columns (1) and (3) include commonly used determinants of food insecurity drawn from the 2014 December supplement of the Current Population Survey. Columns (2) and (4) exclude race-ethnicity variables that are unlikely to be used in a restructuring of the SNAP benefit formula. Standard errors are in parentheses.
 ***p* < .01, **p* < .05

size, at 5.91 for all households and 8.41 for households with children when estimated without race-ethnicity variables, are similar to the estimates in table 3.

Tables 5 and 6 are analogous to tables 3 and 4 except that household size is separated into

discrete categories instead of a continuous measure of the number of household members.¹⁰ These results suggest a nonlinear relationship between household size and the resource gap. For example, in column (2), a three-person household reports needing \$12.60

amples include having net income below the poverty line while residing in a state with a gross income threshold above 130 percent of the poverty line, or having annual income above 130 percent but current monthly income below the threshold.

10. The sample for these tables is restricted to households with fewer than six people due to small sample sizes for larger households.

Table 5. Mean Regressions of Additional Dollars per Week Needed to Become Food Secure Among SNAP Participants

	All Households		Households with Children	
	(1)	(2)	(3)	(4)
Income	0.116 (0.664)	-0.063 (0.664)	-0.478 (1.13)	-0.726 (1.13)
Two-person household	6.87* (3.04)	6.92* (3.05)		
Three-person household	11.7** (3.29)	12.6** (3.28)	8.53 (5.57)	9.08 (5.58)
Four-person household	16.1** (3.58)	17.2** (3.55)	15.8** (5.70)	16.8** (5.70)
Five-person household	18.5** (4.19)	19.5** (4.16)	19.6** (6.24)	20.7** (6.23)
Six-person household	27.6** (5.51)	29.1** (5.48)	29.8** (7.38)	31.7** (7.35)
Less than high school	5.28 (4.60)	5.97 (4.59)	-9.71 (7.71)	-9.10 (7.65)
High school	2.42 (4.43)	2.54 (4.44)	-3.75 (7.31)	-3.84 (7.31)
Some college	1.71 (4.50)	1.80 (4.51)	-10.8 (7.40)	-10.9 (7.41)
Married	0.007 (2.74)	-0.93 (2.74)	-3.69 (3.95)	-4.63 (3.93)
Homeowner	-2.56 (2.43)	-3.46 (2.42)	-1.24 (4.03)	-2.81 (4.00)
Nonmetro	-0.85 (2.52)	-2.56 (2.44)	1.88 (4.17)	-0.418 (3.99)
White	-3.14 (4.84)		-9.31 (7.04)	
African American	6.71 (5.14)		1.07 (7.49)	
Hispanic	4.00 (3.06)		7.70 (4.41)	
Constant	28.4** (6.50)	29.1** (4.52)	44.3** (10.6)	41.0** (8.17)
n	2,209	2,209	1,099	1,099

Source: Authors' compilation based on data from the 2014 December supplement of the CPS.

Note: Columns (1) and (3) include commonly used determinants of food insecurity drawn from the 2014 December supplement of the Current Population Survey. Columns (2) and (4) exclude race-ethnicity variables that are unlikely to be used in a restructuring of the SNAP benefit formula. Standard errors are in parentheses.

** $p < .01$, * $p < .05$

Table 6. Mean Regressions of Additional Dollars Needed to Become Food Secure Among SNAP Participants, Incomes Less Than 130 Percent of the Poverty Line

	All Households		Households with Children	
	(1)	(2)	(3)	(4)
Income	-1.11 (1.91)	-2.25 (1.30)	-2.59 (2.41)	-2.85 (2.41)
Two-person household	5.76 (3.61)	7.97** (2.50)		
Three-person household	11.5** (3.81)	12.4** (2.60)	6.55 (6.47)	7.70 (6.46)
Four-person household	14.7** (4.18)	14.3** (2.87)	14.6* (6.63)	16.3* (6.61)
Five-person household	19.0** (4.93)	18.1** (3.38)	21.5** (7.30)	23.2** (7.28)
Six-person household	27.9** (6.523)	28.3** (4.45)	31.1** (8.67)	33.2** (8.62)
Less than high school	8.37 (5.69)	6.62 (3.86)	-10.1 (9.30)	-9.04 (9.25)
High school	5.63 (5.60)	3.90 (3.80)	-4.98 (9.05)	-4.86 (9.06)
Some college	3.13 (5.70)	3.64 (3.89)	-13.3 (9.21)	-13.4 (9.23)
Married	-0.219 (3.28)	-0.51 (2.26)	-7.06 (4.60)	-7.55 (4.58)
Homeowner	-3.65 (2.91)	-3.88* (1.98)	-2.26 (4.76)	-3.78 (4.73)
Nonmetro	-0.29 (2.86)	-2.58 (1.90)	3.78 (4.67)	1.29 (4.48)
White	-3.02 (5.60)		-9.38 (7.96)	
African American	5.96 (5.92)		-0.310 (8.46)	
Hispanic	6.16 (3.53)		10.3* (4.94)	
Constant	27.9** (7.83)	20.6** (3.95)	49.2** (12.6)	45.3** (10.1)
n	1,683	1,683	866	866

Source: Authors' compilation based on data from the 2014 December supplement of the CPS.

Note: Columns (1) and (3) include commonly used determinants of food insecurity drawn from the 2014 December supplement of the Current Population Survey. Columns (2) and (4) exclude race-ethnicity variables that are unlikely to be used in a restructuring of the SNAP benefit formula. Standard errors are in parentheses.

** $p < .01$, * $p < .05$

more than a one-person household, a four-person household reports needing \$17.20 more, and a five-person household reports needing \$19.50 more. The respective gaps in households with children, compared with a two-person household, are \$9.08, \$16.80, and \$20.70. When the sample is restricted to households with incomes below 130 percent of the poverty line (table 6), the results are closer to a linear relationship for households with children but are similar to table 5 for the sample of all households.

REDUCING FOOD INSECURITY BY CHANGING THE SNAP BENEFIT FORMULA

In this section, we provide an exploratory analysis of how changes to the SNAP benefit formula might lead to further reductions in the food insecurity rate. We do not undertake a formal benefit-cost analysis of the impact of changing the SNAP benefit formula. Instead, we present a descriptive exploration of the potential links between the resource gap, SNAP, and food insecurity. In doing so, we use information on the reported resource gap to study how changes in the SNAP benefit formula might reduce food insecurity rates. We assume that additional SNAP benefits reduce the resource gap dollar for dollar; for example, \$50 in extra benefits is assumed to reduce the resource gap by \$50. Thus, in this model, an extra \$50 in SNAP benefits would result in all households reporting resource gaps of less than \$50 to become food secure. Households with resources gaps in excess of \$50 would remain food insecure.

Although the basic idea is simple, intended and actual effects may differ for several practical and theoretical reasons. Basic microeconomic theory tells us that any increase in benefit levels would likely lead SNAP recipients to spend more on nonfood items and may induce changes in the participation decisions of non-participants. Modeling these behavioral

changes is beyond the scope of this article. On a more practical level, the resource gap is a self-reported measure that may not accurately measure the resources households need to become food secure. Respondents may not have a clear idea how to answer this question, the answer might change over time and, as noted, the questions about the resource gap are asked for a different period than questions about food insecurity.

In table 7, we present the potential reduction in food insecurity if SNAP benefits were to be strategically increased along with the costs associated with doing so. We consider three scenarios. The first involves giving each recipient the exact number of dollars they report needing to become food secure. In this first scenario, we assume all food insecure households would use these resources to become food secure; the food insecurity rate among SNAP recipients would drop to zero. Although this case is a useful benchmark, it would not be practical from a policy perspective to simply augment each household's SNAP benefits by whatever deficit amount a household reported. Among other issues, households would likely learn to modify their responses to maximize their benefits.

Scenario 2 provides an across-the-board increase in SNAP benefit levels that is equal to the average reported resource gap, \$41.62 for all households and \$45.69 for households with children, as found in table 2.¹¹ Under this proposal, both food secure and insecure households receive additional benefits. Moreover, some food insecure households might receive sufficient funds to become food secure while others would not.

The third scenario provides an increase in SNAP benefits equal to the adjustment based on household size from the estimates in tables 3 and 5. In particular, we use the predicted resource gap for each household size when the other variables are set at the average values for the sample.¹² We confine our attention to using

11. One could consider other uniform increases in the benefit level, ranging from zero dollars where the food insecurity rates would not change, to the maximum resource gap where the food insecurity rates might fall to zero.

12. Consider a comparison of a one-person household and a three-person household when the results for the full population of food insecure SNAP recipients are used. Based on the information from column (2) in table 3,

Table 7. Potential Impacts and Costs of Increases in SNAP Benefits, Households Receiving SNAP

	All Households		Households with Children	
	Percent Decline in Food Insecurity Rate Among SNAP Recipients	Additional Benefits (Billions of Dollars)	Percent Decline in Food Insecurity Rate Among SNAP Recipients	Additional Benefits (Billions of Dollars)
Scenario 1				
Exact dollars to be food secure for all participants	100.0	20.1	100.0	12.0
Scenario 2				
Average dollars to be food secure	61.8	27.0	56.6	16.1
Scenario 3				
Benefits directed by household size	61.7	26.9	58.7	16.3
Benefits directed by household size categories	60.4	25.2	58.5	14.6

Source: Authors' calculations from the 2014 December supplement of the CPS.

Note: The dollar values for scenario 2 are found in the first row of table 2. The dollar values for the two cases under scenario 3 are found in columns (2) and (4) from table 3 and columns (2) and (4) from table 5. The costs are based on the assumption that SNAP recipients would receive these increases in benefits for the full year.

household size and not other variables for several reasons. First, across all of the models, household size is the only variable that has statistically significant effects and, in each case, the estimated effect is large. Second, the SNAP benefit formula already takes into consideration household size, rendering this change in the benefit formula relatively straightforward. Finally, it may be problematic to alter the benefit formula based on characteristics like marital status, even though the effects may be statistically significant in some specifications. While marital decisions are unlikely to be influenced by small benefit changes, the public at large may have a negative reaction to this type of modification to the benefit formula.

As seen in table 7, the most effective way to reduce food insecurity among SNAP recipients—give each household the exact amount of money reportedly needed to become food

secure—is naturally the least expensive option: \$20.1 billion and \$12 billion for all households and households with children, respectively.¹³ These benefits would be provided, respectively, to 6.7 million food insecure SNAP households and 3.5 million food insecure SNAP households with children. Based on total SNAP expenditures of about \$80 billion, this policy change would amount to a substantial increase in the cost of SNAP.

If the average value needed to become food secure is offered as a lump sum transfer—scenario 2—the estimated reductions in food security and associated costs are 61.8 percent and \$27.0 billion for all households, or 56.6 percent and \$16.1 billion for households with children. For scenario 3, when benefits increase linearly with respect to household size, the costs and reductions in food insecurity are similar to scenario 2. When household size is entered in a

this results in increases in SNAP benefit levels of, respectively, \$30.50 and \$41.59. When the information from column (2) in table 5 is used, the values are similar: \$30.13 and \$42.74.

13. The estimated costs of these scenarios are based on the assumption that households would receive SNAP for the full year.

categorical way, the impacts on food insecurity are roughly similar to the linear case. However, the costs decline to \$25.2 billion (versus \$26.9 billion) and \$14.6 billion (versus \$16.3 billion).

The previous analyses considered increases in benefit levels as a path to reducing food insecurity through SNAP. A substantial number of food insecure households, however, are not far from the eligibility threshold. For example, among households with gross income between 130 and 185 percent of the poverty line, the food insecurity rate was 25.3 percent in 2015 (see Coleman-Jensen et al. 2016, table 2). Using methods identical to those just cited, we consider providing SNAP benefits to those with incomes between 130 and 185 percent of the poverty line.¹⁴

As before, we provide separate results for households with children, a particularly relevant subpopulation. There have been recent proposals to distribute benefits to children who receive subsidized school meals during the summer (when they are not in school) through mechanisms similar to those used in SNAP. These benefits are primarily designed for children who are not currently eligible for SNAP—that is, those with incomes between 130 and 185 percent of the poverty line.

The average resource gap among all food insecure households with incomes between 130 and 185 percent is \$30.91. For food insecure households with children, this value rises to \$39.67. The potential costs and benefits of expanding SNAP are displayed in table 8 and are akin to those presented in table 7.¹⁵ Under scenario 1, in which only food insecure households receive SNAP benefit levels which are set at the reported resource gap, the costs are \$7.1 billion for all households and \$3.5 for households with children. These benefits would be given, respectively, to 2.4 million food insecure households and 0.9 million food insecure households with children, substantially fewer than the numbers for SNAP recipients noted above. These estimates are substantially smaller than the increases in SNAP costs estimated in table

7 resulting from both fewer food insecure households and smaller resource gaps.

Under scenario 2 for the full population in this income category, however, the costs slightly more than triple compared with scenario 1, but only a relatively small increase when considering the population of food insecure SNAP recipients (see table 7). The comparative increase for households with children is also high—it more than doubles. Scenario 3, which adjusts benefit levels to account for family size, looks roughly similar to scenario 2. The relatively large costs in scenarios 2 and 3 reflect, in part, our assumption that all households in the income-ineligible population would take up these new SNAP benefits—13.8 million households and 4.2 million households with children. In contrast, the primary analysis summarized in table 7 is restricted to SNAP recipients, not all eligible households. The take-up rate among eligible households is only 35 percent for all households and 49 percent for households with children (see table 1).

DISTRIBUTION OF IMPACTS ON FOOD INSECURITY

The impacts of anti-poverty programs are often distributed unevenly throughout the population. This unevenness may also hold for changes to the SNAP benefit formula. In table 9, we consider how the lump sum increase in benefits proposed in scenario 2 might be associated with declines in food insecurity across various socioeconomic categories. For the sample of all households, the projected decline in food insecurity among SNAP participants in column (1) is similar across nearly all demographic groups. A notable exception is households headed by an African American, which would see an estimated 56.1 percent decline in food insecurity versus households headed by whites (64.3 percent) or racial groups other than white or African American (64.1 percent). Given that household size is one of the key indicators of the resource gap, it follows that a

14. As discussed, we included all SNAP participants in our calculations in table 7 even if their incomes exceeded 130 percent of the poverty line. In what follows, we only include SNAP nonparticipants, even if their income falls between 130 and 185 percent of the poverty line.

15. The regression results used to generate this table are available on request.

Table 8. Potential Impacts and Costs of Expanding Eligibility, Households Not Receiving SNAP

	All Households		Households with Children	
	Percent Decline in Food Insecurity Rate	Additional Benefits (Billions of Dollars)	Percent Decline in Food Insecurity Rate	Additional Benefits (Billions of Dollars)
Scenario 1				
Exact dollars to be food secure for new participants	100.0	7.1	100.0	3.5
Scenario 2				
Average dollars to be food secure	63.5	22.2	58.1	8.7
Scenario 3				
Benefits directed by household size	62.5	20.6	59.3	8.2
Benefits directed by household size categories	58.3	25.2	60.3	7.3

Source: Authors' calculations from the 2014 December supplement of the CPS.

Note: For scenario 2, the average dollars are \$30.91 for all households and \$39.67 for households with children. The costs are based on the assumption that currently non-SNAP recipients would receive benefits for the full year. The results for scenario 3, estimated in a manner similar to table 7, are available from the authors upon request.

uniform benefit increase is likely have a larger impact on smaller households. For example, single-person households would see a 74.1 percent decline and six-person households would see a 47.3 percent decline.

Estimated variation across demographic categories is higher if benefits are given to non-SNAP recipients with incomes within 130 to 185 percent of the poverty line. Hispanic households, for example, would see a 53 percent decline in food insecurity, and those headed by a non-Hispanic would see a 68 percent decline. Households in nonmetro areas would see a 76.7 percent decline, and those in metro areas would see a 62.8 percent decline. The results are broadly similar for households with children, a few exceptions notwithstanding. For example, among food insecure SNAP recipients, those with some college would see a 61 percent decline in food insecurity and those with a high school degree 52.9 percent (62.0 percent and 61.4 percent for all households). Among currently ineligible households, those with less than a high school education would see a 67.2 percent decline and those with some

college 53.3 percent (62.1 percent and 62.8 percent for all households).

CONCLUSION

SNAP is a critical component of the social safety net, primarily because of its demonstrated impact on reducing food insecurity in the United States. Yet a majority of SNAP participants remain food insecure. One way to decrease food insecurity rates among these participants would be to raise the benefit level. In this article, we study an underutilized measure of need we call the resource gap. Based on their self-assessments, food insecure SNAP households would require an additional \$41.62 per week in income, on average, to become food secure. This amounts to a 42 percent increase in benefits for a household currently receiving the maximum SNAP benefit level (that is, a household with zero net income), proportional increases for those with positive net incomes being larger.

In an exploratory analysis, we find that targeted increases in SNAP benefits could eliminate food insecurity at a cost of about \$20 bil-

Table 9. Percent Declines in Food Insecurity Rates Under Scenario 2

	All Households		Households with Children	
	SNAP Participants	SNAP Nonparticipants with Incomes Between 130 and 185 Percent of the Poverty Line	SNAP Participants	SNAP Nonparticipants with Incomes Between 130 and 185 Percent of the Poverty Line
All	61.8	63.5	56.6	58.1
Income-poverty line				
0-0.50	57.1		54.6	
0.51-1.00	66.0		58.8	
1.01-1.30	61.8		56.8	
Less than high school	60.8	62.1	57.2	67.2
High school	61.4	67.8	52.9	59.7
Some college	62.0	62.8	61.0	53.3
College	67.6	71.0	53.6	61.5
Married	58.5	60.8	56.0	59.9
Single	62.9	68.5	56.8	55.8
Own	64.6	63.8	59.0	55.3
Rent	60.8	66.6	55.9	60.5
Nonmetro	63.1	76.7	55.3	78.3
Metro	61.5	62.8	56.9	52.8
White	64.3	65.6	58.4	59.6
African American	56.1	62.6	52.7	54.1
Other (non-white, non-African American)	64.1	73.8	57.3	57.1
Hispanic	58.6	53.0	54.8	52.2
Non-Hispanic	62.7	68.0	57.2	60.0
Household size				
1	74.1	74.8		
2	64.2	67.7	67.2	59.7
3	59.6	56.2	62.1	59.0
4	55.9	65.3	56.6	64.6
5	51.9	53.9	51.7	51.7
6	47.3	46.6	46.0	48.7

Source: Authors' calculations from the 2014 December supplement of the CPS.

Note: SNAP participants are those who report currently receiving SNAP. Scenario 2 refers to tables 7 and 8 in which the increase in SNAP benefits is assumed to be the same for all participants.

lion, whereas an across-the-board increase of SNAP benefits of \$41.62 per week for all households could lead to a 62 percent decline in food insecurity among SNAP participants at a cost of about \$27 billion. James P. Ziliak considers a related policy change that would increase the maximum SNAP benefit level from 100 to 120

percent of the Thrifty Food Plan (2016). Compared with the proposal evaluated in Ziliak's analysis, our scenario 2 increase in SNAP benefits (across-the-board increase equal to the average reported resource gap) is substantially greater, whereas our scenario 1 increase (personalized adjustments equal to the reported

resource gap) is smaller. We also consider expansions of eligibility to those with incomes between 130 and 185 percent of the poverty line and find that giving these households SNAP benefits of \$30.91 per week could lead to a 63.5 percent decline in food insecurity among this near-eligible group at a cost of slightly more than \$22 billion.

Our analysis should be viewed as a starting point for future discussions and analyses of a policy to increase SNAP benefits to reduce food insecurity. Scenario 1 is useful as a baseline consideration but, for moral hazard and other reasons, it would not be practical to implement. Among the other two scenarios, one strength of scenario 3 is that it would limit leakage of benefits to single-person households and undercoverage of larger households; therefore either of the scenario 3 variants based on household size would seem more promising than the lump sum transfer considered in scenario 2. A more refined scenario might adjust the additional benefits to account for the observed heterogeneity revealed in table 9.

In any case, much additional research needs to be undertaken to understand the full impact that increasing benefits would have on food insecurity and other health outcomes, accounting for a host of measurement issues along with potential behavioral responses to changes in policy. At least four key issues are unresolved:

Labor supply effects of a notch. Each of our scenarios entails increases in benefit levels that are independent of household income. As a result, this would generate notch effects where losing eligibility would result in a discrete loss in these extra benefits. The resulting high marginal tax rate would presumably have labor supply implications for those near the threshold (for a discussion of marginal tax rates in SNAP plus other taxes, see Kosar and Moffitt 2016). The size of the labor supply distortions would need to be studied.

Take-up and participation rates. An increase in benefits is likely to lead to increases in

participation and take-up rates in SNAP, all else equal. This would lead to an increase in expenditures on SNAP and, depending on the composition of households entering the program, a change in the proportion of SNAP recipients who become food secure. We have not modeled this change in participation rates.¹⁶

Marginal propensity to consume food. Our analysis assumes that all additional benefits are used to reduce the resource gap. However, it may be that households use some of the additional benefits on nonfood items.

Measuring the resource gap. Our estimates of the impact of benefit increases rely on households' self-reports of the resource gap. The accuracy of these reports should be studied along with a consideration of the influences of differences in timing of the food insecurity and reporting of the resource gap.

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