CHAPTER FOUR

SNAP and Food Consumption

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Economists have a robust theoretical framework, as described in the following pages, through which to predict consumption responses to in-kind transfers such as SNAP. In this chapter, we review this framework and then present new evidence on food spending patterns among households that are eligible for SNAP, as well as other population groups. We compare these spending patterns to parameters used in the SNAP benefit formula and to average benefit levels. These data provide a rich description of the food spending patterns of low-income families and, importantly, an evaluation of the adequacy of the SNAP program. Additionally, they allow us to present new evidence on one of the oldest questions in the analysis of the program—how the provision of food benefits *in-kind* affects food spending in an absolute sense and relative to providing these benefits in cash.

SNAP is designed to supplement a family's ability to purchase food so that they are able to purchase at least a minimal-cost, nutritious diet. The cost of this diet is referred to as the "needs standard" and as described in the following discussion is an important parameter in the formula by which benefits are awarded. We find that the program's needs standard is close to median food spending among eligible and recipient households but that a substantial fraction of SNAP households spend more on food than the needs standard. We also show that the relationship between family size and food spending is steeper than the slope of the SNAP needs parameter. In other words, the actual spending of smaller families is higher compared with larger families than is assumed in the benefits calculation. This suggests that benefits may be relatively more generous for larger households. Finally, we show that most families spend more on food than their predicted benefit allotment. In this case, the neoclassical model implies that SNAP benefits are treated like cash.

A FRAMEWORK FOR CONSUMPTION RESPONSES TO SNAP

The Neoclassical Theory

We begin by presenting the neoclassical model of consumer choice and use this to discuss predictions for the effects of SNAP on family spending patterns.[1] Figure 4.1a presents the standard Southworth (1945) model, in which a consumer chooses to allocate a fixed budget between food and all other goods. The slope of the budget line is the relative price of food to other goods. In the absence of SNAP, the budget constraint is represented by the line AB. When SNAP is introduced, it shifts the budget constraint out by the food benefit amount B_F to the new budget line labeled ACD. The first, and most important, prediction of the neoclassical model is that the presence of, or increase in the generosity of, the SNAP transfer leads to a shift out in the budget constraint. The transfer does not alter the relative prices of different goods, so in the economic model it can be analyzed as a pure income effect, and as a result we predict an increase in the consumption level of all normal goods. Thus, the central prediction is that food stamps, like an increase in disposable income or a cash transfer, will increase both food spending and nonfood spending.

However, SNAP benefits are provided as a voucher that can be used only toward food purchases. Canonical economic theory predicts that in-kind transfers like SNAP are treated as if they are cash as long as their value is no larger than the amount that a consumer would spend on the good if she had the same total income in cash. Stated differently, SNAP benefits are like cash as long as the household wants to spend at least the benefit amount on food. Returning to our figure, there is a portion of the budget set that is not attainable with SNAP that would be attainable with the equivalent-value transfer in cash. In other words, because the benefits B_F are provided in the form of a food voucher, this amount is not available to purchase other goods, and thus we would expect a consumer to purchase at least B_F amount of food. As shown in Figure 4.1, paying benefits in the form of a food voucher leads to a nonlinear budget constraint, labeled ACD in our figure, which has a kink point at C.

Figure 4.1b illustrates how consumption responds to SNAP benefits. In accordance with standard economic theory, we assume that consumers have well-defined preferences that can be represented in a utility curve. In the absence of SNAP, a typical consumer purchases some mix of food and nonfood goods, choosing the bundle that maximizes her utility and exhausts her budget constraint. This is represented in panel B as point A_0*, with the consumer purchasing food in the amount F_0. After SNAP is introduced, the budget constraint shifts outward and the consumer chooses the consumption bundle represented by point A_1*. Note that consumption of both goods

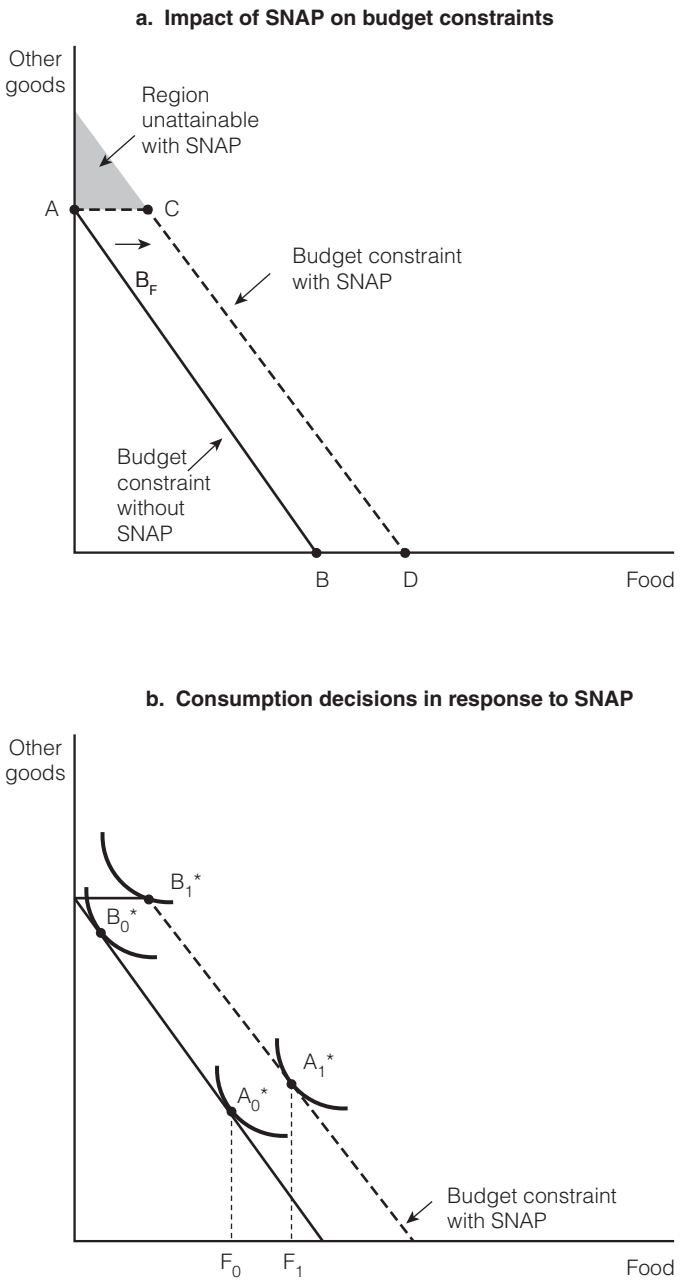


Figure 4.1. Economic frameworks for analyzing SNAP.

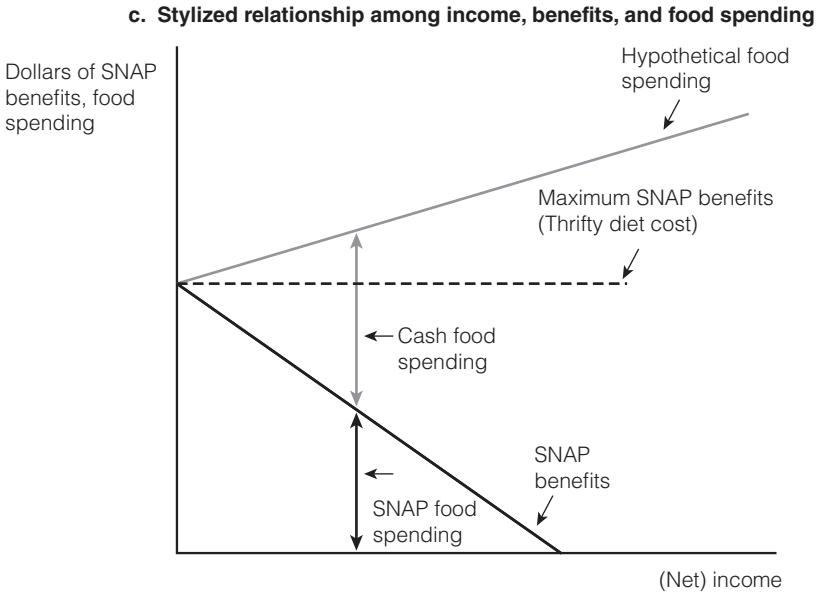


Figure 4.1. (*continued*)

increases, and food consumption goes up by less than the full SNAP benefit amount. Such a consumer is termed *inframarginal* because the preferred consumption bundle is below the margin where the in-kind benefits would need to be spent on food. The canonical model predicts that for these consumers SNAP will increase food spending by the same amount as if the benefits were paid in cash. As discussed further in the following pages, the predicted impacts of proposed policy changes, such as increases in benefit levels and calls to restrict purchases of certain goods with SNAP benefits, hinges on what proportion of recipients is inframarginal. We will show that the vast majority of SNAP recipients are inframarginal, meaning they spend more than their benefit amount on food.

There are two important exceptions to the SNAP-as-cash model, though. The first is for consumers who prefer relatively little food consumption. In the absence of SNAP, such a consumer may choose the consumption bundle labeled B_0* in Figure 4.1b. When SNAP is introduced, this consumer spends only his benefit amount on food, preferring to use all available cash resources to purchase other goods as represented at point B_1*. If benefits were paid in cash instead of as a food voucher, the consumer would opt to purchase less food and more of other goods and could obtain a higher level of utility. As a result, for this type of consumer, the canonical model predicts that SNAP will increase food spending by more than an equivalent

cash transfer would. Another exception to the standard model comes from behavioral economics and predicts that SNAP may not be equivalent to cash if households use a mental accounting framework that puts the benefits in a separate "category."[2]

The Benefit Formula

A stylized version of the benefit formula is presented in Figure 4.1c for a family of a fixed size. A key parameter of the formula is the cost of food under the USDA's Thrifty Food Plan, which we term the "needs standard" in this chapter. The maximum SNAP benefit amount (the horizontal line in the figure) is typically set equal to the needs standard, although sometimes Congress sets maximum benefits equal to some multiple of the needs standard. For example, the American Recovery and Reinvestment Act of 2009 temporarily raised maximum benefits to be 113.6 percent of the needs standard.

SNAP is designed to fill the gap between the needs standard and the cash resources available to a family that can be used to purchase food. A family with no income receives the maximum benefit amount and is expected to contribute nothing out-of-pocket to food purchases. Thus, total food spending (depicted by the upward sloping line "hypothetical food spending") equals maximum benefits for a family with no other income source. The food spending line is upward sloping based on the assumption that, as income increases, desired spending on food (and all other normal goods) increases. As a family's income increases, the SNAP formula expects them to be able to spend more of their own cash on food purchases, and SNAP benefits are reduced accordingly. The slope of the SNAP benefits line in Figure 4.1c is known as the benefit reduction rate and is currently set at 0.3. Therefore, the benefit formula can be described mathematically as follows:

$$\text{Benefits} = \text{Max\_Benefit} - 0.3 * \text{Income} \quad (1)$$

The SNAP benefit as a function of net family income is represented by the downward-sloping line on the figure. Finally, the family's out-of-pocket spending on food is the vertical distance between the SNAP benefits line and the food spending line. Important policy issues include whether the needs standard is set at an appropriate level and whether the benefit reduction rate is appropriate. We explore these issues in more detail in the empirical results following.

In practice, the SNAP benefit formula is somewhat more complicated than we have described, because benefit levels are a function of net income and not total income. Net income is calculated as total earned income plus any unearned income minus the following deductions: a standard deduction, a deduction of some of the earned income, an excess-housing-cost deduction, a deduction for child care costs associated with working/training, and

a medical-cost deduction that is available only to the elderly and disabled. Because of the mechanics of these deductions, in practice the benefit reduction rate out of gross income is somewhat lower than 0.3. It is worth pointing out that the SNAP benefit reduction rate is much lower than that used in other safety net programs such as disability and Temporary Assistance for Needy Families (TANF).

PRIOR RESEARCH ON CONSUMPTION RESPONSES TO SNAP

The first-order prediction of the model is that SNAP, by shifting out the budget set, should lead to an increase in food (and nonfood) spending. This is confirmed in the empirical literature. A large literature, mostly using data from more than twenty years ago, focuses on whether SNAP leads to larger increases in food spending than a similar sized cash transfer. Many papers have found that SNAP recipients consume more food out of their SNAP benefits than they would with an equivalent cash transfer. More recent papers, however, based on research designs that are better able to isolate causality, have found evidence of results more consistent with the standard predictions, namely, that SNAP benefits lead to consumption changes comparable to similar cash benefits for inframarginal households (Hoynes and Schanzenbach 2015).

Early observational studies (summarized in Fraker 1990 and Levedahl 1995) typically estimate the marginal propensity to consume food using the following linear equation (or a comparable one using log of food spending and/or log of income):

$$fspend_i = \beta_0 + \beta_1 cash_i + \beta_2 fstamp_i + Z_i\gamma + \varepsilon_i \quad (2)$$

where $fspend_i$ is expenditure on food for household i; $cash_i$ and $fstamp_i$ are income in cash and from food stamps, respectively; Z_i is a vector of covariates such as household size and age/gender makeup; and ε_i is an error term. Here the primary impact of food stamps is measured as the increased consumption out of food stamps compared to cash income, as measured by the differences in estimated coefficients by income type in equation (2).

This literature suffers from many of the standard shortcomings of observational studies conducted in the 1970s and 1980s. It is important that food stamp participation is taken as exogenous and the estimates are identified by comparing food stamp recipients to "similar" nonrecipients. Standard models of program participation (Moffitt 1983; Currie 2006), however, show that program participation is a choice variable and—in this case—positively correlated with tastes for food consumption. Critically, then, these naïve comparisons between participants and nonparticipants are expected to *overstate* the impact of the program on food consumption.

This upward bias seems evident in the literature. Fraker (1990), in his summary of the literature, reports that the estimates of the marginal propensity to consume (MPC) food out of food stamps are two to ten times higher than the estimated MPC food out of cash income. The median study in Fraker's literature review reports a marginal propensity to consume food out of food stamp income that is 3.8 times as large as that from cash income.[3] These findings are often interpreted as evidence that food stamps increase food spending by more than an equivalent cash-transfer system.

Another set of evidence comes from randomized experiments conducted by the USDA in the early 1990s. In those experiments, the treatment group received its food stamp benefits in cash while the controls received the standard food stamp voucher. The results of these experiments indicate that spending on food was only about 5 percent higher among the group that received benefits paid in stamps (Ohls et al. 1992; Fraker, Martini, and Ohls 1995). Schanzenbach (2007) finds that the mean treatment effect is a combination of no difference in food spending among inframarginal recipients and a substantial shift in consumption toward food for stamp recipients at the margin—that is, among those who would prefer to spend less on food than their benefit. Thus the experimental literature concludes that SNAP and cash payments would provide very similar effects on food spending. These experiments provide evidence on the difference between cash and vouchers but do not provide estimates for the broader question of how providing SNAP benefits, by increasing family disposable income, affects food spending or consumption more broadly.

Recent work by two of us (Hoynes and Schanzenbach 2009) provides the first quasi-experimental research on the effects of SNAP on food spending. We use the initial rollout of the program, which took place across the approximately 3,000 U.S. counties between 1961 and 1975. Our estimates use this "program introduction" design by comparing differences across counties over time in a difference-in-differences approach. We find that the introduction of the program leads to a decrease in out-of-pocket food spending and an increase in overall food expenditures, just as the model described in Figure 4.1 predicts. The estimated marginal propensity to consume food out of food stamp income is close to the marginal propensity to consume out of cash income. In addition, those predicted to be constrained (at the kink in Figure 4.1) experience larger increases in food spending with the introduction of food stamps.

Measuring Spending Patterns

The preceding discussion suggests that to understand the effect of SNAP on consumption we need to know the relationship between desired food

spending and the magnitude of SNAP benefits. Although there is little such evidence in the literature, we aim to address this by presenting a comprehensive description of the overall food spending patterns of SNAP households and how those have evolved over time. In particular, we analyze a time series of data from the Consumer Expenditure Survey, the most comprehensive source of microdata on spending in the United States. We document trends in spending on food among SNAP recipients and SNAP-eligible households and compare these both to the program's assumed needs standards and to benefit levels. Of course, we are not investigating the causal impact of the food stamp program because doing so would require a research design that accounts for selection into the program (for a discussion of issues related to selection into the program, see Chapters Three and Five in this volume), and we have not found a suitable approach to do so. Rather, we present the underlying consumption patterns to inform the predictions of the economic model.

We are interested in measuring how well the food stamp program's benefit formula matches the food consumption patterns of households. We investigate both how the needs standards and average benefit amounts correspond to food consumption patterns and more nuanced aspects of the program such as how family size adjustments correspond to observed consumption across different family sizes.

Measures of Food Consumption

The Consumer Expenditure Survey (CEX) tracks the expenditure patterns of a representative sample of Consumer Units, a unit conceptually similar to a household. In the survey, expenditures are included independent of the method of payment (for example, food stamps, cash out of pocket). Importantly for our analysis, the instructions specify that households are to include items paid for with SNAP. However, we cannot link individual items to their source of payment. In other words, we cannot identify which particular food items are purchased with SNAP benefits and which are purchased with other family resources. Note that the CEX measures expenditure, not consumption, so it does not capture food provided free of charge through other programs (school meals, emergency food) or by nonprofits and does not account for the fact that some food is thrown out or consumed at a later date. There are two subsurveys in the CEX—the Interview and the Diary. We rely almost exclusively on the Interview Survey because it asks about food expenditures over a longer time horizon (three months) than the Diary (one week), and we want to smooth over the substantial week-to-week variation in food purchases.[4]

We calculate three measures of monthly food expenditures for households in the survey. First is spending on food for at-home consumption.

SNAP benefits can be used only to purchase food intended for preparation and consumption at home. Prepared hot foods, fast food, or restaurant foods cannot be purchased with SNAP benefits. The CEX "food-at-home" concept is the one that is the closest (but still imperfect) match to the items that can be purchased with SNAP benefits.[5] This measure collects information on spending on food at grocery stores, convenience stores, specialty stores, farmers' markets, and home delivery services, minus the cost of paper products, cleaning supplies, pet food, and alcohol.

The second measure is total food spending, including both food at home and food away from home. Food away from home includes food purchased at restaurants, fast-food establishments, and cafeterias. Total food spending shows the role of food spending in the household's budget.

The third measure we use is an *adjusted* total food spending measure. Food away from home is typically more expensive than food at home, because the price of food away from home implicitly includes costs of preparation and service, whereas households typically provide their own labor to prepare and serve food at home. Although higher-income households spend a higher percentage of their food dollars away from home, low-income households also spend some money on food away from home. We would like to construct a measure that accounts for all food spending but adjusts the price of food away from home to a food-at-home equivalent. In other words, spending on dining out can be thought of as a combination of spending on food, preparation, and service, and our goal is to extract solely the food portion of away-from-home spending. Based on tabulations from Morrison, Mancino, and Variyam (2011) that provide information on the per calorie cost of food at home and away from home, we divide total spending on food away from home into the cost of preparation and service (37 percent) and the cost of food (63 percent). We then calculate our measure of "adjusted total food spending" as the cost of food at home plus the cost of only the food portion of spending on food away from home. We prefer this adjusted total food spending measure because we think it is the most accurate and comprehensive measure of food expenditure.

MEASURES OF SNAP

The CEX directly asks households about SNAP benefit receipt; however, total benefits received and participation are severely understated relative to administrative totals. The fraction of dollars reported in the interview surveys in the CEX ranges from 35 to 75 percent of administrative totals since 1990 (see McGranahan 2014). We provide some evidence on the relationship between spending and reported SNAP benefits, but, due to this underreporting, we focus our analysis on other SNAP measures.

We use four different concepts when considering SNAP benefit amounts. First is the needs standard, which is based on the Thrifty Food Plan budget for a family of four in a given year and is then adjusted by family size (we return to this family size adjustment later). Second is the maximum benefit level (MAXBEN), which is typically set by Congress to equal 99 to 103 percent of the needs standard. As part of the ARRA stimulus, maximum benefits were temporarily increased by 13.6 percent beginning in April 2009. Third, we use SNAP benefits reported by households in the survey, even though we are aware that this includes some underreporting of benefits. We call households that report benefit receipt "SNAP-recipient" households. Fourth, we impute benefits according to the SNAP benefit formula using information on a household's income, family size, age, disability status, and spending on child care, medical care, and shelter. We call households for which there is a positive imputed benefit level "SNAP-eligible" households.

Overall, our imputation procedure leads to an overestimate of total spending on the SNAP program compared to actual programmatic spending reported by the U.S. Department of Agriculture (USDA 2014). This is partly due to the fact that in the imputations we assume all eligible households receive benefits. This is a substantial overstatement of benefit receipt because on average over the years covered in this chapter only 63 percent of eligible households participated in the program.[6] People who are eligible for relatively small benefits are less likely to enroll in the program—on average participants took up approximately 80 percent of available benefits (Eslami 2014). However, our imputed SNAP spending is still higher than estimates of what programmatic spending would have been had all eligible households taken up all available benefits. We attribute the higher imputed benefits in the CEX to income underreporting. As a result, we impute benefit levels (as a function of reported income) that are too high, and we also deem some households to be income eligible based on reported income that would not have been eligible if we could observe actual income. A strength of our approach is presenting these four approaches that have different advantages and disadvantages.

Spending in Relation to the Needs Standard

An important parameter for SNAP benefit allotments is the needs standard, which is the level of expenditures necessary to purchase a "healthful and minimal cost meal plan." The needs standard is based on the USDA's Thrifty Food Plan (TFP), and the maximum benefit is a function of the TFP needs standard. We begin by comparing how *actual* spending compares with the needs standard in Figure 4.2. We tabulate adjusted total food spending—that is, food at home plus a fraction of food away from home as previ-

ously described—relative to the needs standards. Note that we use the needs standard instead of maximum benefit levels to abstract from the temporary 2009 ARRA benefit increase.

Figure 4.2a shows results for all households from 1990 to 2013. Approximately 32 percent of households spend less on food than the needs standard over the time period covered by our data. Another 30 percent spend between 100 and 150 percent of the needs standard. Eighteen and 20 percent of households, respectively, spend between 150 and 200 percent, and more than 200 percent of the needs standards.[7] Figure 4.2b limits the results to households with incomes less than 200 percent of the poverty line. Because these households have lower levels of income, we expect them to spend less on food (and other goods). Indeed, compared to panel A, a higher share—48 percent—report spending less than the needs standard, and 23 percent spend more than 150 percent of it. Among households that report receiving SNAP income (panel C), approximately 62 percent spend less than the needs standard, and only 12 percent spend more than 150 percent of it.

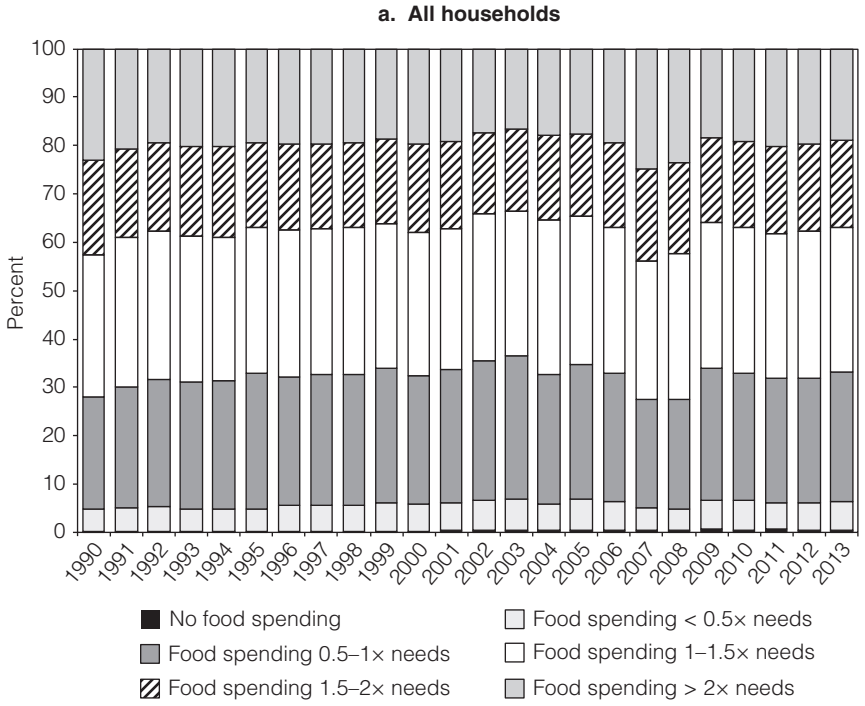


Figure 4.2. Adjusted total food spending relative to needs standards. Note: Adjusted total food spending includes spending on food at home plus 0.63 times food away from home.

SOURCE: Authors' calculations using CEX data.

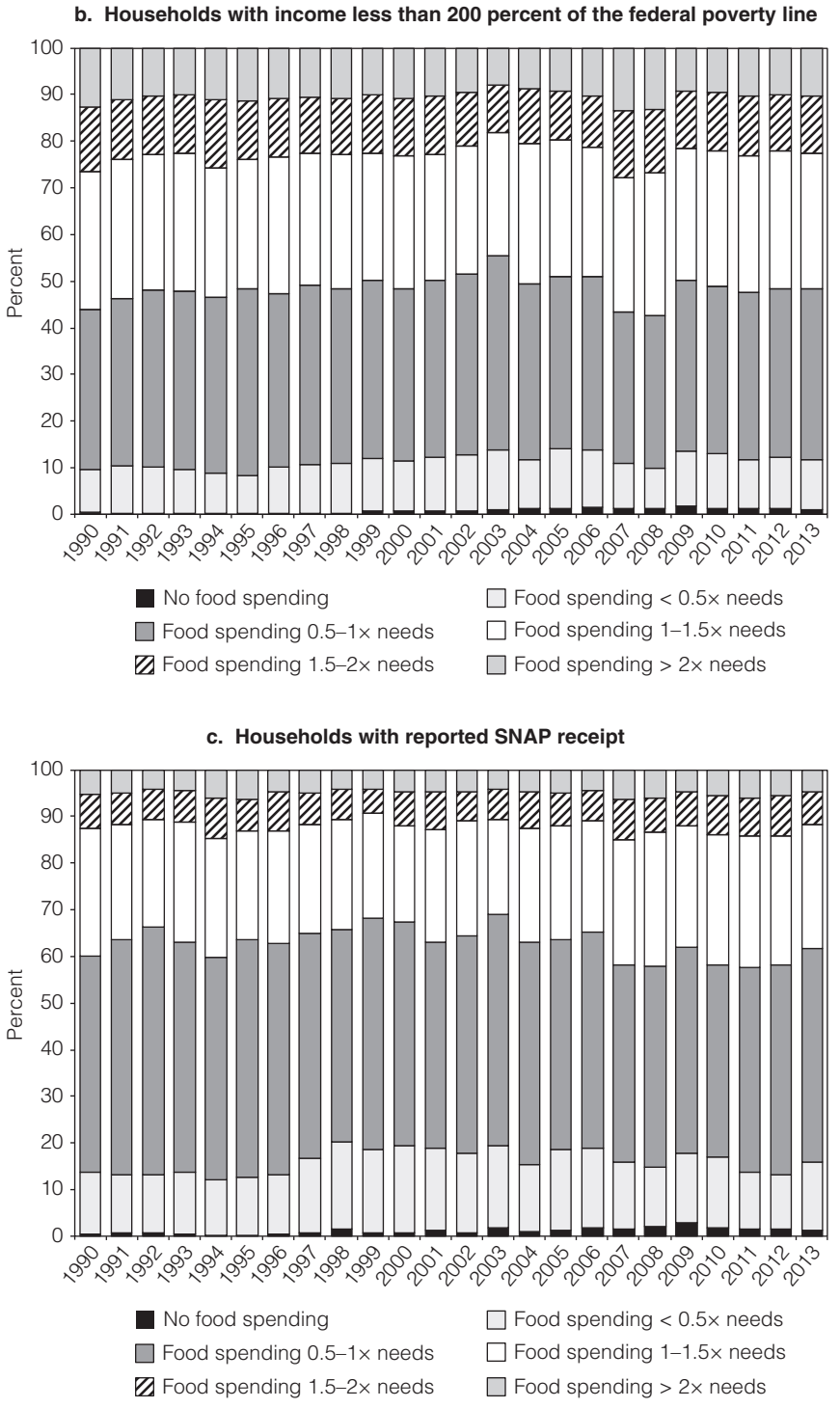


Figure 4.2. (*continued*)

TABLE 4.1
Adjusted food spending as a percentage of the needs standard, 1990–2013

	All households	*Households less than 200 percent of federal poverty line*	*Households eligible for SNAP*			
			Overall	*HH with children*	*Elderly member*	*SNAP recipients*
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
No reported spending	0.3%	0.8%	1.0%	0.5%	1.2%	1.2%
0–50	5.5%	10.6%	13.0%	16.2%	8.8%	14.4%
50–100	26.4%	36.9%	38.4%	50.8%	32.5%	46.4%
100–150	30.2%	28.8%	26.8%	23.4%	30.0%	25.6%
150–200	17.9%	12.5%	11.1%	5.9%	14.3%	7.4%
200+	19.7%	10.4%	9.7%	3.2%	13.2%	4.9%
Sample size *N*	1,695,679	599,447	336,176	134,465	100,327	117,653

SOURCE: Authors' calculations using Consumer Expenditures Survey (CEX) data.

The percentage of households falling into each expenditure bin (averaged across all years) is shown in Table 4.1.

In Figure 4.3, we display median adjusted total food spending relative to the needs standards for all households and various subsets of interest. For SNAP-eligible households, at the median, food spending is fairly close to the needs standard throughout the sample period. The ratio rises above 1.0 (higher food spending) when the measures of spending on food away from home are improved beginning in 2007. Spending among all households with income less than 200 percent of the poverty line follows a similar pattern, with median spending ratios that hover around 1.0. Mean benefit ratios are quite a bit higher reflecting the fact that the distribution is skewed—that is, there is a small group of households that spend substantially more than the needs standard.

Figure 4.4a displays the distribution of spending relative to the needs standard among the population eligible for SNAP and those reporting SNAP receipt. In Figure 4.4b, we show the distribution of the ratio of food to needs for SNAP-eligible households with children and those with an elderly member. This graph shows that elderly households are more likely to have food spending above the needs threshold. Overall, these results document that the needs standards are fairly close to the median food expenditure patterns of SNAP-eligible households and low-income households more broadly. We also document that a substantial fraction of households spends more than the needs standard and that this fraction differs across household type.

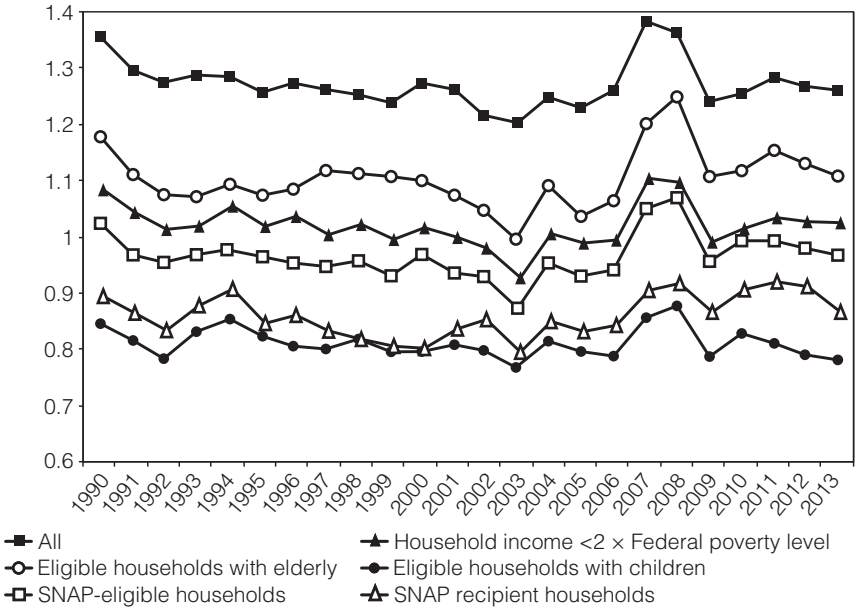


Figure 4.3. Ratio of median adjusted total food spending to needs standard, by household type.
SOURCE: Authors' calculations using CEX data.

Food spending in the CEX is widely thought to be underreported. For example, only 64 percent of reported food spending in the personal consumption expenditures (PCE) portion of the National Income and Product Accounts (which are part of the official GDP calculations) is picked up in the CEX measures (Bureau of Labor Statistics 2014).[8] If we could account for this measurement error, it would imply that even *fewer* families spend less than the needs standard.

Family-Size Adjustments

Because each member of a household has food needs, the SNAP needs standards for a household increase as family size increases. However, the needs standard increases by less than an amount that would keep the per capita needs standard fixed because there are assumed to be economies of scale in the consumption and preparation of meals at home. For example, the needs standard for a household with four people is 182 percent of the level of a household with two people, or about 9 percent less per person. In this section, we document how the family size adjustments used in the SNAP benefit formula compare to the observed differences in the spending amounts of households of different sizes.

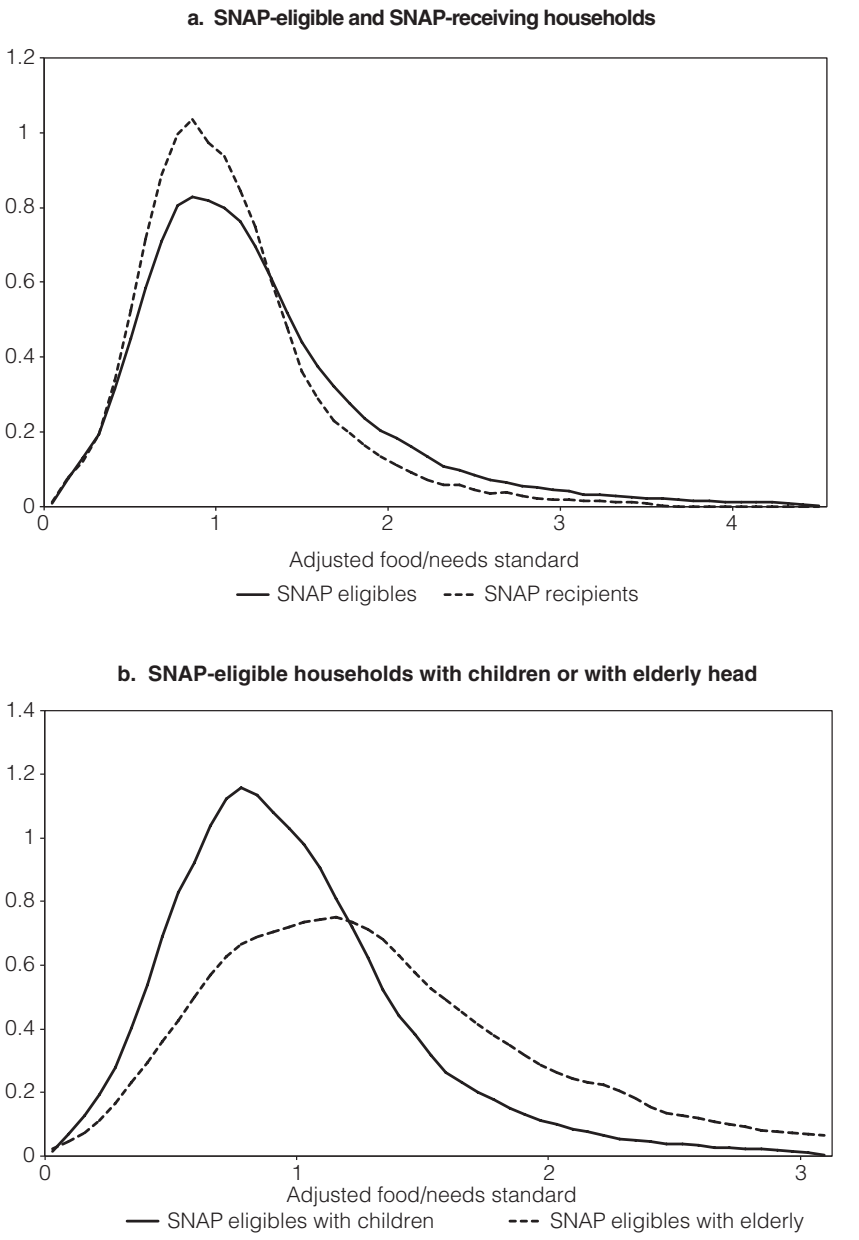


Figure 4.4. Distribution of total adjusted food spending as a fraction of needs standard, 1990–2013.

NOTE: Figure represents the kernel density of the 1st to 99th percentile of each distribution.

SOURCE: Authors' calculations using CEX data.

Table 4.2 lays out the SNAP program benefit multipliers across different family sizes (in columns 1 to 3) for 2010. The reference family contains four persons, and the TFP is estimated to cost $588 per month (that is, $139.50 per person per month). Because of the ARRA increase, benefits in 2010 were set at 113.6 percent of the needs standard, so maximum benefits for a four-person family were increased to $668 per month or $167 per person. To account for economies of scale, the SNAP formula multiplies the *per person* benefit in the reference family by different multipliers for each family size. For example, the multiplier for a one-person family is 1.2, so the maximum per-person benefit is 1.2 times the per person benefit in the reference family. All families with five or more people have the same per person multiplier (0.95). These multipliers have been the same for all the years of the modern food stamp program. Benefits for a family are equal to the per person benefit for a family of four, times the multiplier for the family's size, times the number of people in the family. The per person benefit level is displayed in column 2. Multiplying column 2 by the family size yields the maximum benefits (column 3).

In Figure 4.5a, we graph average adjusted total food spending per capita for families of sizes ranging from one to eight members relative to spending per capita of a four-person family for different types of families, averaging across all the years in the sample. (Although not shown here, these patterns have been similar over time.) We compare this to the multiplier used by the program to adjust benefits, which we label "program parameter." For example, the line for all families attains the value of 1.46 for a two-person household because, on a per person basis, the average two-person household spent 1.46 times the amount spent by a four-person family. The program multiplier allows individuals in a two-person household a budget that is only 1.1 times as much per person. We note that, for all family types, the spending gradient is far steeper, with respect to family size, than the program parameters capture. Households eligible for SNAP and those reporting receipt of SNAP follow a pattern similar to households overall. For families with children, we include data for family sizes of two or more because "child-only" cases are rare in the data. For small families with children, the gradient is less steep than for other family types. This may be the result of the lower food needs of children or due to a greater gap between the food expenditure and consumption of children due to other programs such as the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) and school lunch (which is not counted in CEX food expenditures). Figure 4.5b repeats the exercise using spending on food at home only because we are concerned that the pattern in Figure 4.5a may be driven by the propensity of small households to spend more on meals out. Although the

TABLE 4.2

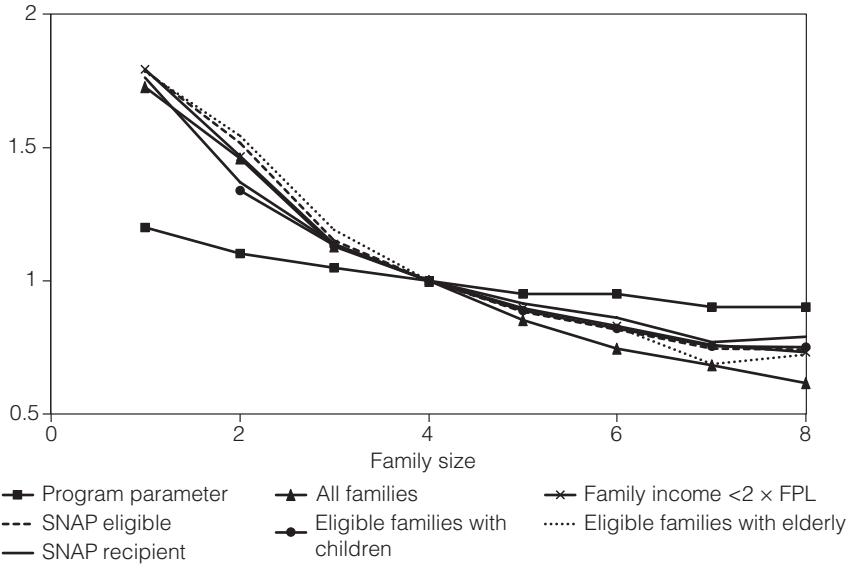
Benefit formula multipliers, spending patterns, and food insecurity by household size

		SNAP formula		*Per-person spending relative to family of four*					
Household size	*SNAP formula multiplier*	*Maximum per person*	*Maximum monthly benefits*	*Average adjusted total food spending*	*Median adjusted total food spending*	*Average food at home spending*	*Median food at home spending*	*Food insecurity rate*	*Sample size (columns 4–7)*
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*
1	1.20	200	200	1.81	1.70	1.68	1.57	0.14	25,528
2	1.10	184	367	1.48	1.44	1.41	1.34	0.11	26,007
3	1.05	175	526	1.15	1.13	1.13	1.11	0.14	12,638
4 (reference)	—	167	668	1.00	1.00	1.00	1.00	0.16	11,390
5	0.95	159	793	0.83	0.83	0.85	0.82	0.21	5,387
6	0.95	159	952	0.74	0.74	0.79	0.72	0.22	2,210

SOURCES: Columns 4 through 7 are authors' calculations from CEX data. Column 8 is authors' calculations from the December 2010 Current Population Survey.

NOTES: Average (median) adjusted food spending for a family of four is $171 ($155) per person. Average (median) food-at-home spending for a family of four is $136 ($130) per person.

a. Average adjusted total food spending per capita, by selected household types



b. Average spending on food at home per capita, by selected household types

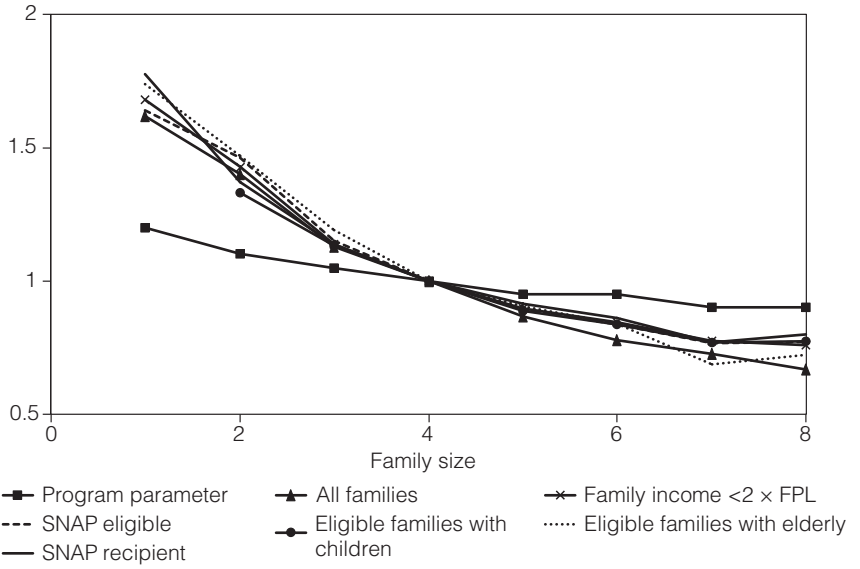


Figure 4.5. Spending per capita by family size, relative to four-person households.
SOURCE: Authors' calculations using CEX data.

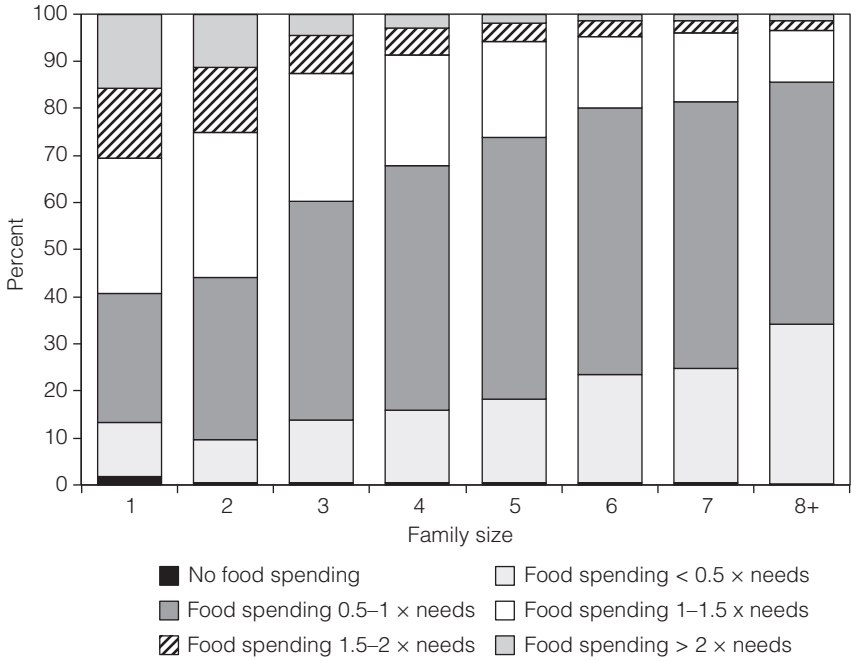


Figure 4.6. Adjusted total spending relative to needs standards, by family size for eligible households.

SOURCE: Authors' calculations using CEX data.

gradient here is flattened somewhat relative to total adjusted food spending, it continues to be substantially steeper than the benefits multipliers.

Returning to Table 4.2, in columns 4 through 7 we use the 2010 CEX and present average and median per person spending by family size, separately for adjusted total food spending and food-at-home spending, as a ratio of per person spending in a four-person family. Although the exact estimates vary somewhat across specifications, in all cases they reflect spending differentials that are steeper, with respect to family size, than those used to adjust SNAP benefits. Column 8 presents rates of food insecurity in 2010 by household size, which shows that larger families are not less likely to be food insecure than smaller families. This disparity likely reflects the fact that larger households are more likely to be poor (that is, have less non-SNAP income).

In Figure 4.6, we summarize adjusted total food spending relative to the needs standard, separately for each family size one through eight and up for those who are imputed to be SNAP eligible. We see that food spending is far more likely to be above the needs standards in smaller households. For some of the larger family sizes (six and up), the fraction that spends less than

the needs standard is nearly twice as large as the level for the one- and two-person families. Note that the average SNAP household is fairly small, averaging 2.2 overall and 3.3 among households with children (Eslami, Filion, and Strayer 2011).

Our investigation into family size adjustments shows that per capita spending decreases with family size more dramatically than is assumed in the benefits calculation. This is true both for families overall and within family types. This finding does not necessarily imply that the benefit multipliers are inappropriate, because the multipliers are designed to account for economies of scale rather than to reflect actual spending patterns. We have furthermore documented that the relatively larger transfers to larger families does not translate into lower overall food insecurity rates for them. However, it does suggest that food stamp benefits may play a different role in the budgets of small and large households.

Estimated Benefits

We next compare imputed monthly SNAP benefits to both the maximum benefit level and food spending. Using data from the interview survey, we predict SNAP benefit levels based on the benefit formula. This prediction is based on the following information:

1. Program parameters from each year: maximum benefits, the standard deduction, minimum benefits for one- and two-person households, and the caps on dependent care and excess-shelter-cost deductions.
2. Household demographics and income: family size, family income, earnings, and indicators for whether household contains an elderly member or someone who is disabled or receives SSI or TANF.[9]
3. Expenditure patterns: spending on shelter, child care, and health care to calculate deductions for net income.

We do not use standard medical deductions (available to the elderly) as they vary by state and are implemented late in our sample time period. We also do not have consistent data on child support payments over time. However, we capture most of the other measures used to calculate benefits.

Figure 4.7 shows a smoothed version of the median of the ratio of predicted SNAP benefits to maximum benefits by year.[10] These are less than 1.0 because most families have positive net income and are therefore not eligible for the maximum benefit. Recall that these are predicted benefits (that is, assuming universal take-up), so variation over time is driven primarily by differences in income and deductions. As Ziliak shows in Chapter One, actual take-up rates are less than 100 percent and vary across the business cycle. In

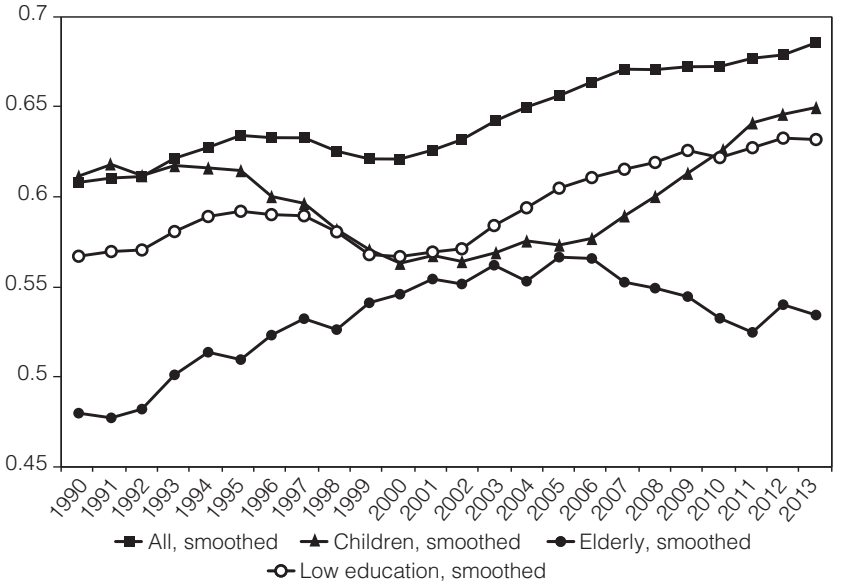


Figure 4.7. Median of estimated SNAP benefits as a fraction of maximum SNAP benefits.

SOURCE: Authors' calculations using CEX data.

the full sample of eligible households, the median predicted benefit has consistently been around 65 percent of the maximum benefit. There is a modest upward trend in this ratio due to increases in the value of the shelter and medical deductions and the temporary ARRA increase in benefits. The ratio of median predicted benefits to maximum benefits is lower for households with children and elderly households, reflecting higher net incomes among these groups. We estimate that nearly 30 percent of eligible households are predicted to qualify for the maximum benefit across all our years of data. The high share of households eligible for the maximum benefit is the result of the numerous deductions to net income, particularly the shelter deduction. SNAP program data report that 46 percent of participant households received the maximum benefit in FY2011 (Eslami 2014).

We next compare estimated benefits to adjusted total food spending among eligible households. This is of interest because, referring back to the economic framework outlined in Figure 4.1, it empirically shows how likely a household is to be inframarginal and therefore how likely a household is to treat their SNAP benefits as cash. Figure 4.8 shows that, overall, fewer than 30 percent of eligible households spend less on food than their predicted benefit amount and approximately a third of households spend more than twice their predicted benefit amount. Note that spending relative to average

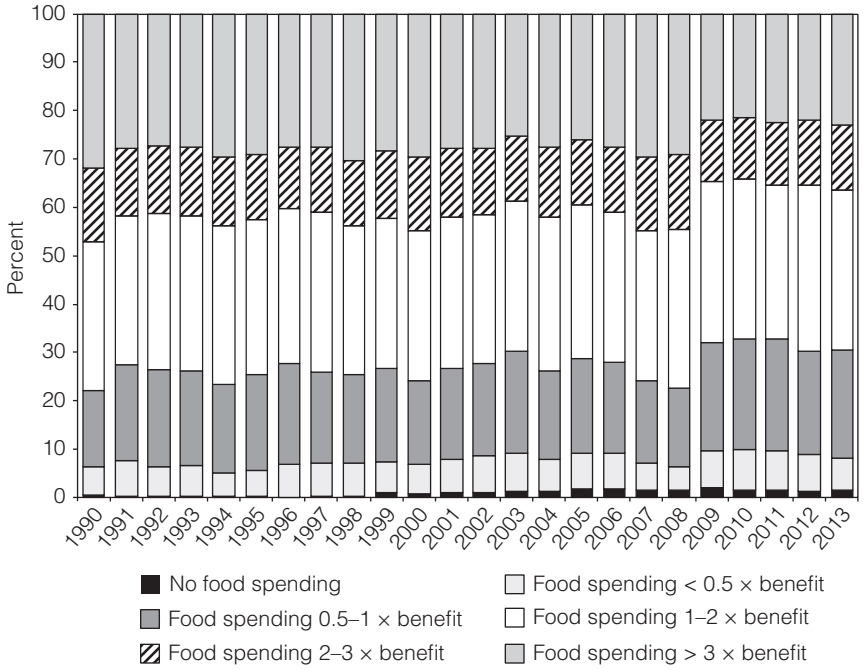


Figure 4.8. Adjusted total food spending relative to estimated benefits, all SNAP-eligible households.

SOURCE: Authors' calculations using CEX data.

TABLE 4.3
Adjusted total food spending as a percentage of SNAP benefits

	All eligible households	*Eligible households with children*	*Eligible households with elderly*	*Eligible households less than 200 percent of federal poverty line*	*Recipient households (relative to reported benefits)*
	(1)	*(2)*	*(3)*	*(4)*	*(5)*
No spending	1.0%	0.6%	1.2%	1.0%	1.2%
0–50	6.8%	7.3%	4.0%	6.8%	2.9%
50–100	19.8%	25.3%	14.8%	19.9%	12.1%
100–150	32.0%	34.8%	29.5%	32.1%	28.5%
150–200	13.9%	13.4%	14.3%	13.8%	11.6%
200+	26.5%	18.5%	36.2%	26.3%	43.7%
Sample size *N*	336,176	134,465	100,327	330,994	117,653

SOURCE: Authors' calculations using CEX data.

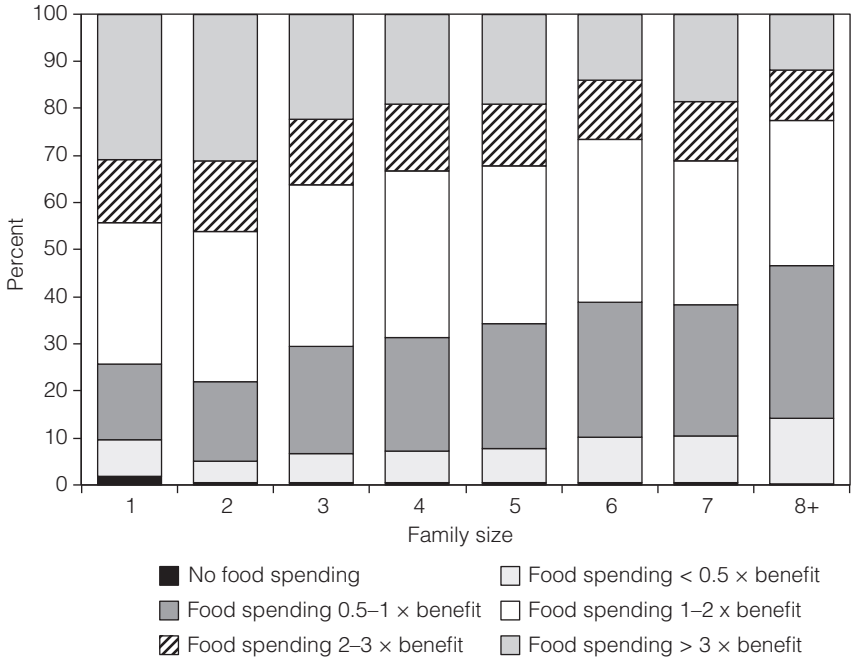


Figure 4.9. Adjusted food spending relative to estimated benefits, by family size.
SOURCE: Authors' calculations using CEX data.

benefits falls sharply in 2009 when benefit allotments were raised as part of the economic stimulus. Table 4.3 shows the average ratio of adjusted total food spending to estimated benefit levels over all years pooled for different groups of SNAP households. Among eligible households with children, about a third of households spend less on food than their estimated benefits. Fewer than 20 percent of elderly spend less than their estimated food stamp allotment. Among households that report receiving food stamps, only 16 percent spend less than their reported allotment, and nearly half spend more than twice their reported allotment. Recall that because of measurement error, our data understate food spending and income (and thus overstate predicted benefits), and thus these are likely to be upper bounds on the fraction of families spending less than predicted benefit amounts. Figure 4.9 displays the relationship between adjusted total food spending and benefits by family size for SNAP-eligible households. Benefit levels are more likely to be above food spending for the larger households, but even among the largest families fewer than half of households spend less on food than their benefits are predicted to be worth.

These estimates indicate that most families spend more than their benefit amount. As discussed earlier, such families are considered "inframarginal,"

TABLE 4.4
Food spending by type of food and SNAP eligibility, 2010

	Households eligible for SNAP		*Households ineligible for SNAP*	
	Mean	*Standard deviation*	*Mean*	*Standard deviation*
	(1)	*(2)*	*(3)*	*(4)*
PANEL A: SPENDING LEVEL				
Food at home	226.7	308.6	345.8	338.8
Healthier foods	95.9	122.1	123.1	134.1
Unhealthy foods	27.2	45.8	39.2	56.1
Sugar-sweetened beverages	16.3	28.8	18.0	32.0
N	2,288		10,678	
PANEL B: SPENDING AS A PERCENTAGE OF FOOD-AT-HOME SPENDING				
Healthier foods	36.2%		35.8%	
Unhealthy foods	11.2%		11.9%	
Sugar-sweetened beverages	7.7%		6.2%	
N	1,973		9,642	

SOURCE: Authors' calculations using CEX data.

and this finding implies that policies to restrict purchase of certain foods with SNAP benefits (such as proposed bans of soda purchase) will do little to alter consumption behavior. The neoclassical model predicts no change in consumption behavior as long as the benefit level is less than preferred household spending on the allowable products (after any additional restrictions are enacted). In Table 4.4, we show the breakdown in food-at-home spending according to the 2010 CEX Diary data into healthful food, unhealthful food, and sugar-sweetened beverages for both SNAP-eligible households and ineligible households.[11] The "healthier foods" category includes bread (other than white), poultry, fish and shellfish, eggs, milk, cheese, other non–ice cream dairy foods, fruit (excluding juice), vegetables, dried fruit, nuts, prepared salads, and baby food. The "unhealthful foods" category comprises ice cream, candy, gum, hot dogs, potato chips and other snacks, and bakery goods and prepared desserts such as cakes, cupcakes, doughnuts, pies, and tarts. The sugar-sweetened beverages group includes colas, other carbonated drinks, and noncarbonated fruit-flavored and sports drinks. We note that sugar-sweetened beverages and unhealthful foods represent a small portion of the spending of both eligible and ineligible households. As a result, for the majority of eligible households, spending on allowable products is likely to exceed benefit levels, and therefore the proposed restrictions on the purchase of particular goods are unlikely to alter behavior.

CONCLUSIONS

This chapter presents new descriptive information on food consumption patterns among households overall, the SNAP-eligible population, and other subgroups of policy relevance. We begin by reviewing the neoclassical model's predictions for the food stamp program. The first-order effect of SNAP is to shift out the budget set, and thus the program will increase food and nonfood spending. For households that desire a low level of spending on food, providing the SNAP benefit as a food voucher may induce higher food consumption than would an ordinary cash transfer. Our results show that a substantial fraction of SNAP-eligible households spend an amount that is above the program benefit levels and also above the "needs-standard" level on which benefits are based. This suggests that many households are inframarginal and are therefore predicted to treat their benefits like cash. We also show that per capita food spending declines more sharply with increases in family size than the program assumes in its benefits formula and that large families are more likely to spend less on food than the needs standard amount.

NOTES

This paper was prepared for the Five Decades of Food Stamps Conference held at the Brookings Institution on September 20, 2013. The authors would like to thank Tom DeLeire, Jonathan Schwabish, and the editors for useful comments.

1. See also Currie and Gahvari (2008) for an excellent overview of the economics of in-kind transfer programs.

2. There are other reasons that may explain why SNAP leads to different effects on food consumption compared to ordinary case income. It is possible that the family member with control over food stamp benefits may be different from the person who controls earnings and other cash income. If the person with control over food stamps has greater preferences for food, then we may find that food stamps leads to larger increases in food consumption compared to cash income. Alternatively, families may perceive that food stamp benefits are a more permanent source of income compared to earnings. Finally, Shapiro (2005) finds evidence of a "food stamp cycle" whereby daily caloric and nutritional intake declines with weeks because their food stamp payment suggests a significant preference for immediate consumption.

3. The MPC out of cash is estimated to be 0.03 to 0.17 (with most estimates between 0.05 and 0.10), and the MPC out of food stamps is estimated to be 0.17 to 0.47.

4. We performed nearly all of the analysis using the Diary data as well, and patterns are similar.

5. For example, hot foods intended for immediate consumption such as rotisserie chickens cannot be purchased with SNAP benefits, but we cannot separate spending on such items in the CEX data.

6. Take-up rates vary over the business cycle and in response to policy changes.

7. The drop in 2007 and 2008 is the result of increases in reported spending on food away from home, which was the result of changes in the interview question rather than the result of a real increase in spending. The responses in 2007 and beyond are closer to the responses in the Diary and likely reflect an improvement in the survey instrument (Henderson 2014).

8. For food and beverages away from home the ratio was 60 percent. These ratios were measured in 2012, but they have not varied substantially over time. These ratios are primarily based on Diary data. Using information from Henderson (2014), we estimate that the 2012 ratios in the Interview portion of the CEX are approximately 80 percent (home) and 51 percent (away). Although some of this is due to coverage differences between the PCE and CEX, much is likely due to underreporting in the CEX. As already stated, the CEX measures food expenditures, not consumption. In particular, we do not capture the consumption of no-cost food such as school meals, emergency food, and so on. This suggests that expenditures understate consumption. But for our analysis here, and the implications for the adequacy of the SNAP benefit, it is important to point out that the unmeasured elements are absent from both the numerator (spending) and denominator (benefit level). Using aggregate statistics, we estimate that SNAP represents 76 percent of total food program benefits.

9. We use annual income data in the CEX that cover the same period as the expenditure data.

10. We calculate a five-year moving average.

11. The detailed expenditure data required for such breakdowns are available only in the Diary.

REFERENCES

Bureau of Labor Statistics. 2014. "Comparing Expenditures from the Consumer Expenditure Survey with the Personal Consumer Expenditures: Results of the CE/PCE Concordance." Tabulated June 4. Available at www.bls.gov/cex/cepceconcordance.htm.

Currie, J. 2006. "The Take-up of Social Benefits." In A. Auerbach, D. Card, and J. Quigley, eds., *Poverty, the Distribution of Income, and Public Policy*. New York: Russell Sage Foundation.

Currie, J., and F. Gahvari. 2008. "Transfers in Cash and In-Kind: Theory Meets the Data." *Journal of Economic Literature* 46(2): 333–383.

Eslami, E. 2014. "Trends in Supplemental Nutrition Assistance Program Participation Rates: Fiscal Year 2010 to Fiscal Year 2012." *Current Perspectives on SNAP Participation*. Washington, DC: USDA Food and Nutrition Service.

Eslami, E., K. Filion, and M. Strayer. 2011. *Characteristics of Supplemental Nutrition Assistance Program Households: Fiscal Year 2010*. Washington, DC: U.S. Department of Agriculture, Food and Nutrition Service, Office of Research and Analysis.

Fraker, T. 1990. *Effects of Food Stamps on Food Consumption: A Review of the Literature*. Washington, DC: Mathematica Policy Research, Inc.

Fraker, T. M., A. P. Martini, and J. C. Ohls. 1995. "The Effect of Food Stamp Cashout on Food Expenditures: An Assessment of the Findings from Four Demonstrations." *Journal of Human Resources* 30(4): 633–649.

Henderson, S. 2014 (September 18). "Comparing Global Questions and Answers to Results from Detailed Specific Questions: Data on Food Expenditures from the Consumer Expenditure Survey." Washington, DC: Bureau of Labor Statistics, Note.

Hoynes, H. W., and D. Whitmore Schanzenbach. 2009. "Consumption Responses to In-Kind Transfers: Evidence from the Introduction of the Food Stamp Program." *American Economic Journal: Applied Economics* 1(4): 109–139.

———. 2014. "U.S. Food and Nutrition Programs." NBER Working Paper.

Levedahl, J. 1995. "A Theoretical and Empirical Evaluation of the Functional Forms Used to Estimate the Food Expenditure Equation of Food Stamp Recipients." *American Journal of Agricultural Economics* 77 (November): 960–968.

McGranahan, L. 2014. "A Primer on the Food Stamp Information in the Consumer Expenditure Survey." Mimeo. Chicago: Federal Reserve Bank of Chicago.

Moffitt, R. 1983. "An Economic Model of Welfare Stigma." *American Economic Review* 73(5): 1023–1035.

Morrison, R., L. Mancino, and J. Variyam. 2011. "Will Calorie Labeling in Restaurants Make a Difference?" *Food Choices and Health*, US ERS, March 14.

Ohls, J. C., T. M. Fraker, A. P. Martini, and M. Ponza. 1992. *The Effects of Cash-Out on Food Use by Food Stamp Program Participants in San Diego*. Princeton, NJ: Mathematica Policy Research.

Schanzenbach, D. W. 2007. "What Are Food Stamps Worth?" Working Paper. Chicago: University of Chicago.

Shapiro, J. 2005. "Is There a Daily Discount Rate? Evidence from the Food Stamp Nutrition Cycle." *Journal of Public Economics* 89(2–3): 303–325.

Southworth, H. M. 1945. "The Economics of Public Measures to Subsidize Food Consumption." *Journal of Farm Economics* 27 (February): 38–66.

U.S. Department of Agriculture (USDA), Food and Nutrition Service. 2014. "Supplemental Nutrition Assistance Program Participation and Costs." November 7. Available at www.fns.usda.gov/sites/default/files/pd/SNAPsummary.pdf.