

Empirical Analysis

This section employs the tool from the previous section to measure the various components of the food stamp benefit formula using 1998 data from USDA's Food and Nutrition Service (FNS). The study analyzes the mean monthly food stamp benefit for all participants and for specific subpopulations defined by poverty status, demographic composition, household size, and region of residence.

In contrast with table 1, which reported mean food stamp benefits for two-person food stamp units, the subsequent analysis reports all monthly income and benefit variables on a per person basis. The report takes this approach because food stamp units of different sizes have very different income and benefit levels.

The alternative approach of reporting results on a per household basis makes it more difficult to distinguish the effect of household size from the effects of other variables. For the reader who would like to reconstruct the corresponding results on a per household basis, each table below reports the appropriate mean unit size variable that is needed for this calculation.

Data

Food Stamp Program Quality Control (FSPQC) data are generated from monthly quality control reviews of FSP cases. State agencies conduct these reviews to assess the accuracy of eligibility determinations and benefit calculations. Following a specified protocol, the State agencies send data files from these reviews to FNS. A contractor for FNS edits and compiles these files to produce nationally representative Quality Control (QC) data. In recent years, FNS has made these microdata available to the public on the agency's Web site.

These QC data "... are ideal for tabulations of the characteristics of food stamp units and for simulating the impact of various reforms to the FSP on current FSP units" (Brinkley, 1999). They contain detailed information about food stamp unit composition, income from various sources, each type of deduction, and food stamp benefit amounts. The 1998 QC data used in this report contain 47,145 food stamp unit observations, which may be used with sampling weights to represent approximately 8.2 million food stamp units nationally.

Full Sample

The mean monthly per person food stamp benefit in 1998 in our sample was \$69.25. The first column of [table 3](#) reports the decomposition of this mean benefit for the full sample, using the analytic tool described in the preceding section. In this subsection, we discuss each element of the decomposition in turn:

- First, the mean per person maximum benefit (M) was \$112.70. This value is a weighted average of the per capita maximum benefit for each family size, where the weights are the proportion of the population with that family size.

- Next, the mean per person gross cash income was \$297.57. If every dollar of income counted against food stamp benefits, this income would have reduced per capita benefits by \$89.27 (using the 30 percent benefit reduction rate), so the income effect (E1) equaled -\$89.27.

- However, not all income counted against benefits. On average, participant households were entitled to deductions from gross income totaling \$167.83 per person. The deductions effect (E2) equaled 0.3 times this sum, or \$50.35.

- Some food stamp units with sufficiently low income are entitled to more deductions than the total value of their cash income. In this case, some of their deductions are essentially unused, because net income is constrained to be greater than or equal to zero. This restriction also means that food stamp benefits may not ever exceed the maximum benefit for a particular family size. The impact of this limitation on benefits is called the maximum benefit effect (E3). In 1998, the mean per person value of E3 equaled -\$6.78.

- Finally, one- and two-person food stamp units that would otherwise have received very low benefit amounts benefited from the rule setting the minimum benefit level at \$10 per food stamp unit. The mean per person value of this minimum benefit effect (E4) was \$2.25.

Note that the mean per person food stamp benefit of \$69.25 equaled the sum of the mean maximum benefit plus these four main effects.

This decomposition shows how the deductions effects are central to determining the food stamp benefit level. About 56 percent of all income was eligible for one deduction or another (\$50.35/\$89.27). In the absence

Table 3—Composition of mean per capita benefits, by gross income category of food stamp unit

Symbol	Component name	Full sample	"Very poor" below 50% of poverty	"Poor" 50-100% of poverty	"Near poor" above 100% of poverty
<i>Dollars</i>					
M	Maximum benefit	112.70	111.01	113.89	112.70
E1	Income effect	-89.27	-31.65	-115.45	-168.70
E2	Deductions effect	50.35	37.71	56.52	65.48
E3	Maximum benefit effect	-6.78	-15.80	-1.47	-0.92
E4	Minimum benefit effect	2.25	0.00	1.21	16.56
	Total food stamp benefits	69.25	101.28	54.68	25.11
E2.1	Standard deduction effect	24.21	21.44	26.21	24.03
E2.2	Earned income deduction effect	3.77	0.86	4.17	12.77
E2.3	Dependent care deduction effect	0.60	0.16	0.61	2.17
E2.4	Medical deduction effect	1.17	0.03	1.12	5.81
E2.5	Child support payment deduction effect	0.09	0.02	0.11	0.26
E2.6	Shelter deduction effect	20.51	15.21	24.29	20.44
	Total deductions effect (E2)	50.35	37.71	56.52	65.48
E2.6.1	Raw shelter expense effect	50.65	26.88	63.43	72.75
E2.6.2	Half-income rule effect	-26.85	-7.18	-36.37	-50.80
E2.6.3	Shelter deduction cap effect	-3.29	-4.50	-2.77	-1.50
	Shelter deduction effect (E2.6)	20.51	15.21	24.29	20.44
	<i>Mean food stamp unit size</i>	2.42	2.69	2.24	2.36
	<i>Proportion of all food stamp units</i>	100.0	37.4	52.8	9.8
<i>Percent</i>					

Note: Column entries are rounded to two significant digits after the decimal.

Source: Author's calculations from 1998 Quality Control data.

of deductions, the mean food stamp benefit would have been reduced by over half.¹⁰ The standard deduction effect (E2.1) and the shelter deduction effect (E2.6) are by far the largest, accounting for 89 percent of the total deductions effect.

The earned income deduction effect (E2.2)—the third largest—had a mean per person value of only \$3.77 for the full sample. The final two deductions effects, the child support deduction effect (E2.3) and medical deduction effect (E2.4), do not have a large impact on mean food stamp benefits, but they may be important to those food stamp units that receive them. For example, only 4 percent of food stamp units receive any medical deduction effect (E2.4), but for those who receive this deduction the mean effect is \$28.56 (not shown in [table 3](#)).

The further decomposition of the shelter deduction effect (E2.6) is similar to the main decomposition of

food stamp benefits. The mean per person value of eligible shelter expenses in the 1998 QC data was \$168.83 per month, leading to a raw shelter expense effect (E2.6.1) of \$50.65.

However, not all shelter expenses are counted in the shelter deduction. Only shelter expenses over 50 percent of intermediate net income count toward the shelter deduction. This half-income rule effect (E2.6.2) equaled -\$26.85. Finally, the cap on the shelter deduction further reduced benefits by \$3.29 per person on average.

Income Groups

It is well understood that food stamp benefits vary inversely with gross cash income because the benefit reduction rate of 0.3 is a central component of the benefit formula. It is less widely understood how other stipulations of the benefit formula have differential effects on participants with different income levels.

In [table 3](#), we consider three categories of food stamp units, according to whether the unit has gross income below 50 percent of the poverty guideline (very poor),

¹⁰Calculating the mean benefit under the hypothetical case where no deductions are permitted is not quite as simple as subtracting the deductions effect (E2) from the mean benefit. Recall that some deductions are "unused," and therefore are counted under the maximum benefit effect (E3).

between 50 and 100 percent of the guideline (poor), or greater than 100 percent of the guideline (near-poor).

The income effect (E1) is naturally largest in absolute value for the near-poor food stamp units (-\$168.70 for near-poor units in comparison to -\$31.65 for very poor units). This income effect reflects the fact that near-poor units have 5.3 times the mean per person gross income of very poor units.

The total deductions effect (E2), by contrast, is smallest for the poorest households. The earned income deduction effect (E2.2), for example, is \$12.77 for near-poor units, but less than a dollar for very poor units (which have the lowest labor market earnings). The shelter deduction effect is also smaller for very poor food stamp units than for other units. Very poor food stamp units have much lower shelter expenses—only 37 percent of the per person shelter expenses that near-poor units have.

With lower shelter expenses, the very poor units cannot claim as much benefit from the shelter deduction. The shelter deduction cap effect is also largest for the poorest units. These patterns are only partially offset by the half-income rule—the rule that only shelter expenses above half of intermediate net income count toward the shelter deduction. This rule affects units with more income to a greater extent than other units.

The very poor food stamp units not only have a lower total deduction effect (E2), but they have the most substantial maximum benefit effect (E3) (a negative effect). This effect is -\$15.80 for the very poor units, but just -\$0.92 for the near-poor units. A greater amount of the deductions that the very poor units would otherwise have been entitled to goes unused due to lower gross income levels. As a result, only the very poor units have a substantial maximum benefit effect (E3). Likewise, the minimum benefit effect provides no help in raising the mean per person benefit for very poor units, and it is just \$1.21 for poor units. By contrast, the minimum benefit effect is \$16.56 for near-poor units.

The net consequence of these effects is that the benefit formula provides higher mean food stamp benefits to the poorest food stamp units (due to E1), but not as much higher as one might expect. One might anticipate (from the benefit reduction rate of 30 percent) that food stamp benefits would fall 30 cents for every dollar of additional income, but in fact the gradient is not so steep. The deductions effect (E2), maximum

benefit effect (E3), and minimum benefit effect (E4) each have the least positive value for the poorest food stamp units. As a consequence, food stamp benefits generally fall by less than 30 cents if income increases by \$1.00.

Demographic Categories

Patterns of food stamp benefit receipt differ substantially by demographic category. For example, some stipulations of the benefit formula apply only to food stamp units that contain an elderly or disabled person. Food stamp units that contain a single female parent with children are most likely to participate in the cash welfare program Temporary Assistance for Needy Families (TANF), so they differ from other food stamp units on a variety of demographic and economic characteristics. Food stamp units without children, elderly, or disabled members face a combination of time limits and work requirements that may complicate their participation in the Food Stamp Program.

In this subsection, we compare the benefit decomposition for five major demographic categories: units that are composed entirely of elderly or disabled persons (28.5 percent of the full sample), units that contain an elderly or disabled person living with other persons (11.1 percent), units without an elderly or disabled person that contain a single female parent with children (31.7 percent of the full sample), other food stamp units with children (16.9 percent), and other food stamp units without children (11.9 percent). Fewer than 6 percent of food stamp units simultaneously contain an elderly or disabled person and a single female with children, so this division of the sample into non-overlapping demographic categories seemed superior to a yet more disaggregated classification.

The food stamp units composed entirely of elderly or disabled persons have more than twice as much gross cash income per person as units in the categories without an elderly or disabled person (table 4 shows that the income effect E1 is more than twice as large for the former group). For many elderly or disabled persons, the main source of cash income is Social Security or Supplemental Security Income (SS/SSI). Units with an elderly or disabled member are exempted from the gross income test, so in the presence of sufficient deductions they could in principle have comparatively high gross income and still be eligible to participate. For the first demographic category alone, the absolute value of the income effect (E1) is greater than the mean maximum benefit (M), so the receipt of

Table 4—Composition of mean per capita benefits, by demographic category of food stamp unit

Symbol	Component name	Full sample	Elderly or disabled persons only	Elderly or disabled and others	With single female parent and no elderly or disabled	Other units with children	Other units with no children
<i>Dollars</i>							
M	Maximum benefit	112.70	121.60	105.82	107.08	106.06	122.13
E1	Income effect	-89.27	-158.61	-80.99	-58.16	-63.63	-50.39
E2	Deductions effect	50.35	79.10	28.99	32.89	35.50	68.90
E3	Maximum benefit effect	-6.78	-3.66	-1.43	-3.12	-5.07	-31.40
E4	Minimum benefit effect	2.25	6.97	0.42	0.23	0.17	1.01
	Total food stamp benefits	69.25	45.40	52.80	78.92	73.03	110.25
E2.1	Standard deduction effect	24.21	38.49	13.82	14.51	14.99	38.61
E2.2	Earned income deduction effect	3.77	0.45	1.54	5.61	7.40	3.75
E2.3	Dependent care deduction effect	0.60	0.19	0.29	1.34	0.50	0.02
E2.4	Medical deduction effect	1.17	3.90	0.52	0.00	0.00	0.00
E2.5	Child support payment deduction effect	0.09	0.09	0.07	0.05	0.16	0.12
E2.6	Shelter deduction effect	20.51	35.99	12.76	11.39	12.45	26.40
	Total deductions effect (E2)	50.35	79.10	28.99	32.89	35.50	68.90
E2.6.1	Raw shelter expense effect	50.65	87.57	39.38	30.71	35.35	47.60
E2.6.2	Half-income rule effect	-26.85	-51.58	-26.62	-15.52	-17.70	-11.09
E2.6.3	Shelter deduction cap effect	-3.29	N/A	N/A	-3.81	-5.21	-10.11
	Shelter deduction effect (E2.6)	20.51	35.99	12.76	11.39	12.45	26.40
	<i>Mean food stamp unit size</i>	2.42	1.09	3.39	3.12	3.63	1.11
<i>Percent</i>							
	<i>Proportion of all food stamp units</i>	100.0	28.5	11.1	31.7	16.9	11.9

NA=Households with an elderly or disabled person do not face a cap on the shelter deduction.

Note: Column entries are rounded to two significant digits after the decimal.

Source: Author's calculations from 1998 Quality Control data.

positive amounts of food stamp benefits for this category may be attributed almost entirely to the deductions effect (E2).

The deductions effect is highest for units composed entirely of elderly or disabled members, for several reasons. First, the mean per person standard deduction effect (E2.1) is higher for this category and for other units with no children, simply because household size tends to be smaller for these categories (the effect of household size is discussed at length in the next subsection).

Also, units composed entirely of elderly or disabled members are the only ones with a medical deduction effect (E2.4) exceeding \$1.00. Most importantly, units composed entirely of an elderly or disabled member have the highest shelter deduction effect (E2.6). They have the highest mean per person shelter expenses, leading to a higher raw shelter expense effect (E2.6.1). Also, they are specifically exempted from the shelter

deduction cap, which would otherwise limit the shelter deduction for many of these units (E2.6.3). Because of lower labor force participation, units with an elderly or disabled member benefit less from the earned income deduction (E2.2), but this pattern only slightly offsets the higher deductions noted above. The mean per person total deductions effect (E2) is \$79.10 for units composed entirely of elderly or disabled members, compared with \$32.89 for the single female parent category and \$35.50 for other food stamp units with children.

Food Stamp Unit Size

The decomposition of food stamp benefits works in distinct ways for food stamp units of different sizes (table 5). Here, for tractability, we compare and contrast food stamp units with one to five members (only 4 percent of all food stamp units have more than five members).

To some extent, differences among different sizes of food stamp units result from purposeful program design decisions. For example, the benefit formula adjusts the maximum benefit by household size, and the formula explicitly sets the standard deduction at a fixed value for the food stamp unit (not per person in the unit). In part, however, differences by household size may proxy for other demographic or economic variables. For example, 67 percent of one-person units are composed of an elderly or disabled person alone, and most of the remaining one-person units are in the category "other adults without children." Thus, phenomena that appear related to unit size could in part be due to the demographic characteristics addressed in the previous subsection. However, an analysis that cross-tabulates family size and other demographic characteristics simultaneously is beyond the scope of this report.

Mean per person gross income declines steeply with unit size. In this sense, larger food stamp units tend to be poorer than smaller food stamp units. One-person units have the largest income effect (in absolute value),

at -\$126.90. However, several of the other effects are larger for small food stamp units, with the net consequence that mean per person food stamp benefits remain quite nearly constant in the neighborhood of \$70 for all food stamp units with one to four members (declining slightly for five-person units).

The mean per person maximum benefit (M) is higher for smaller units because the Thrifty Food Plan on which the maximum benefit is based explicitly allows for economies of scale in food purchase and preparation. The deductions effect (E2) is also highest for smaller units. For example, the mean per person standard deduction effect (E2.1) falls with unit size because the standard deduction (\$134 per food stamp unit in 1998) is constant regardless of the number of members. Shelter costs exhibit strong economies of scale because common areas of a house or apartment may be shared among several unit members. Smaller food stamp units have a much higher per person raw shelter expense effect (E2.6.1). Even after the partially offsetting influence of the half-income rule effect (E2.6.2), the smaller units have a much larger overall

Table 5—Composition of mean per capita benefits, by food stamp unit size

Symbol	Component name	Full sample	Food stamp unit size				
			1	2	3	4	5
					Dollars		
M	Maximum benefit	112.70	122.69	112.43	107.50	102.48	97.70
E1	Income effect	-89.27	-126.90	-78.73	-62.94	-57.53	-55.33
E2	Deductions effect	50.35	79.53	43.47	31.61	24.59	20.20
E3	Maximum benefit effect	-6.78	-13.03	-4.92	-2.52	-1.60	-0.90
E4	Minimum benefit effect	2.25	5.27	1.03	0.00	0.00	0.00
	Total food stamp benefits	69.25	67.57	73.29	73.64	67.94	61.68
E2.1	Standard deduction effect	24.21	40.39	20.18	13.46	10.09	8.09
E2.2	Earned income deduction effect	3.77	1.54	4.48	5.54	5.54	5.67
E2.3	Dependent care deduction effect	0.60	0.17	0.87	1.09	0.86	0.55
E2.4	Medical deduction effect	1.17	2.54	0.77	0.11	0.02	0.02
E2.5	Child support payment deduction effect	0.09	0.08	0.09	0.12	0.08	0.10
E2.6	Shelter deduction effect	20.51	34.80	17.09	11.30	8.00	5.76
	Total deductions effect (E2)	50.35	79.53	43.47	31.61	24.59	20.20
E2.6.1	Raw shelter expense effect	50.65	77.78	43.46	33.27	27.06	23.79
E2.6.2	Half-income rule effect	-26.85	-39.33	-22.66	-18.27	-16.84	-16.20
E2.6.3	Shelter deduction cap effect	-3.29	-3.64	-3.71	-3.71	-2.22	-1.82
	Shelter deduction effect (E2.6)	20.51	34.80	17.09	11.30	8.00	5.76
	<i>Mean food stamp unit size</i>	2.42	1.00	2.00	3.00	4.00	5.00
					Percent		
	<i>Proportion of all food stamp units</i>	100.0	38.6	21.0	17.9	12.3	6.0

Note: Column entries are rounded to two significant digits after the decimal

Source: Author's calculations from 1998 Quality Control data.

shelter deduction effect (E2.6). In all, the mean per person total deductions effect (E2) is almost four times as large for one-person food stamp units as for five-person units. This effect almost entirely offsets the differences in the income effect by unit size, leading small food stamp units to receive almost the same mean food stamp benefit as four-person units despite the smaller units' much higher income per person.

Census Regions

The two components that most strongly affect differences in food stamp benefits across regions of the country are the income effect (E1) and the shelter deduction effect (E2.6). Food stamp participants in the Northeast have comparatively high per person gross income, leading to an income effect of -\$102.96 (table 6). Income is lowest in the South and West, with a cor-

responding income effect in each region of approximately -\$80 (table 6).

Partly offsetting the income effect, food stamp units in the Northeast have the highest shelter expenses and likewise the highest shelter deduction effect (E2.6). These shelter expenses reflect higher property values in much of the Northeast, and also higher utility costs. The mean per person raw shelter expense effect (E2.6.1) is \$77.37 in the Northeast, in contrast with about \$41 in the South and West.

This difference is only partly compensated by the higher half-income rule effect (E2.6.2) and shelter deduction cap effect (E2.6.3) in the Northeast. Overall, the shelter deduction effect raises mean per person food stamp benefits by \$34.93 in the Northeast, and by approximately \$16 in the South and West.

Table 6—Composition of mean per capita benefits, by census region

Symbol	Component name	Full sample	Census region			
			1 Northeast	2 Midwest	3 South	4 West
Dollars						
M	Maximum benefit	112.70	113.50	112.84	111.67	113.75
E1	Income effect	-89.27	-102.96	-94.65	-84.01	-79.60
E2	Deductions effect	50.35	65.16	50.84	45.43	44.04
E3	Maximum benefit effect	-6.78	-7.45	-6.72	-6.58	-6.55
E4	Minimum benefit effect	2.25	3.34	3.16	1.38	1.88
	Total food stamp benefits	69.25	71.59	65.46	67.90	73.53
E2.1	Standard deduction effect	24.21	26.28	25.31	23.43	22.41
E2.2	Earned income deduction effect	3.77	2.61	3.79	4.21	4.11
E2.3	Dependent care deduction effect	0.60	0.59	0.42	0.74	0.51
E2.4	Medical deduction effect	1.17	0.63	2.04	1.36	0.42
E2.5	Child support payment deduction effect	0.09	0.12	0.09	0.09	0.06
E2.6	Shelter deduction effect	20.51	34.93	19.19	15.61	16.53
	Total deductions effect (E2)	50.35	65.16	50.84	45.43	44.04
E2.6.1	Raw shelter expense effect	50.65	77.37	49.91	41.55	41.48
E2.6.2	Half-income rule effect	-26.85	-33.92	-28.47	-24.32	-22.71
E2.6.3	Shelter deduction cap effect	-3.29	-8.52	-2.25	-1.61	-2.24
	Shelter deduction effect (E2.6)	20.51	34.93	19.19	15.61	16.53
	<i>Mean food stamp unit size</i>	2.42	2.21	2.32	2.48	2.64
Percent						
	<i>Proportion of all food stamp units</i>	100.0	20.6	20.8	39.3	19.4

Note: Column entries are rounded to two significant digits after the decimal.
Source: Author's calculations from 1998 Quality Control data.