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Food Stamp Benefits and Child Poverty in the 1990s

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Abstract

In 2000, 8.8 million children received food stamps, making the Food Stamp Program a crucial component of the social safety net. Despite its importance, little research has examined the effect of food stamps on children's overall well-being. Using the Current Population Survey from 1989 to 2001, we consider the impact of food stamps on three measures of poverty—the headcount, the poverty gap, and the squared poverty gap. These measures portray the incidence, depth, and severity of poverty. We find that in comparison to the headcount measure, food stamp benefits lead to large reductions in the poverty gap and squared poverty gap measures. We then simulate the effects of several changes in the distribution of food stamps and find that a general across-the-board increase in benefits has little impact on poverty reduction. In contrast, targeted changes can greatly reduce the depth and severity of poverty—increasing benefits to the poor results in a greater reduction in the depth of poverty than expanding participation rates, at a similar cost, among poor households.

Keywords: Food stamps, children, poverty, Current Population Survey, sample design

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Summary

The Food Stamp Act of 1977 declares that, "in order to promote the general welfare," it is the policy of Congress "to safeguard the health and well-being of the Nation's population by raising levels of nutrition among low-income households" (Title 7, Section 2011 of the U.S. Code of Law). There are many studies on the effectiveness of food stamps in raising levels of nutrition among low-income households, but relatively few assessments of their use as a policy instrument to promote the general welfare.

One common indicator of general welfare is the incidence of poverty, and this study examines the impact of food stamp benefits on poverty, with a focus on children. An important methodological difference between the present study and the few others that have examined the effect of food stamps is that we analyze the effect not only on the incidence of poverty, but on two additional measures—the poverty gap and squared poverty gap indexes. The poverty gap index is considered to measure the depth of poverty because it is sensitive to changes in the average income of the poor. The squared poverty gap measures the severity of poverty because it is sensitive to changes in the inequality of income distribution of the poor.

The use of these three measures can be illustrated by a transfer of money from a rich person to a poor one. If the transfer is insufficient to lift the poor person out of poverty, it has no effect on the incidence of poverty. It has, however, raised the income of the poor person, and this improvement in well-being is reflected in a reduction of both the poverty gap and squared poverty gap indexes. These two measures are particularly relevant to an analysis of food stamps and poverty because food stamp benefits decline as a household's income increases. Many poor families receive benefits insufficient to raise them above the poverty line, but these transfers do improve their well-being.

Using data from the 1989 to 2001 March Supplement of the Current Population Survey, we examine the effect on poverty and child poverty of adding the value of food stamps to household income. Our results show that the incidence of poverty and child poverty, as measured by the headcount index, is not reduced much by food stamps. In contrast, the depth and severity of child and overall poverty are significantly reduced. The average decline in the child poverty gap index was 20 percent, while in the child squared poverty gap index it was 28 percent. These results demonstrate that examining only the incidence of poverty leads to the incorrect conclusion that food stamps do not have an important impact on child poverty. Our analysis of the poverty gap and squared poverty gap indexes clarifies the role of the Food Stamp Program in improving the welfare of children in low-income households.

In the final section, we consider potential changes to the Food Stamp Program and simulate their effect on child poverty. In the first simulation, our results show that increasing benefits by 10 and 20 percent would not result in a large reduction of child poverty. The primary reason is that a general increase would not be well-targeted toward children in poor households. We then simulate the effect on child poverty of targeting food stamp increases to specific subpopulations of the poor.

We also consider increasing benefit levels to poor and extreme-poor households, and then targeting this increase only to poor and extreme-poor households with children. All four of these potential policy changes would be very effective in further decreasing the depth and severity of child poverty. Not surprisingly, the decrease is greatest when the increased benefits are targeted to the extreme-poor households with children.

Food Stamp Benefits and Child Poverty in the 1990s

Dean Jolliffe, Laura Tiehen, Craig Gundersen, and Joshua Winicki[1]

Introduction

The goal of this study is to better understand how well the Food Stamp Program performs in improving the welfare of low-income people in general and children in particular. In 2000, 17.1 million people in low-income households received food stamps, 8.8 million of them children (Cunnyngham, 2001, table A-34). In this report, we measure the poverty-reduction benefits of the Food Stamp Program, the largest U.S. food assistance program, and explore how potential modifications to the program would alter the well-being of low-income individuals.

There are many studies on the effectiveness of food stamps in raising levels of nutrition among low-income households, the direct goal of The Food Stamp Act of 1977. For example, Breunig et al. (2001) examine the impact of food stamps on food expenditures, Wilde, McNamara, and Ranney (1999) analyze whether food stamps improve dietary quality, and Gundersen and Oliveira (2001) look at the links between food stamps and food insecurity. Relatively fewer analyses have been done on the effectiveness of food stamps as a policy instrument to promote the general welfare of the population.

One commonly used indicator of general welfare is the incidence of poverty. This report examines the impact of food stamp benefits on poverty, with a focus on child poverty. There has been some research on this issue, including that by Cunnyngham (2001, table 3.2) and Dalaker and Proctor (2000), who examine the incidence of poverty after the inclusion of food stamp and other in-kind benefits.[2] Bishop, Formby, and Zeager (1996) also examine the effect of food stamps on reducing poverty in 1982 and 1990.

The present study extends this limited literature in three ways. First, we focus on the influence of food stamp benefits on child poverty rates.[3] Second, we consider the effect of food stamps on several measures that reflect the depth and severity of poverty in addition to just its incidence. This extension is particularly relevant because food stamp benefits decline as a household's income increases. Third, we move beyond previous work by examining the potential influence on poverty of changes in the Food Stamp Program. That is, what would happen under alternative distributions of food stamp benefits or if the number of households participating increased?

We examine the incidence, depth, and severity of poverty from 1988 to 2000. This allows us to analyze how the effects of food stamps might differ during economic expansions compared with recessions, as well as before and after implementation of the Personal Responsibility and Work Opportunity Reconciliation Act of 1996 (welfare reform). We also assess the impact of food stamps on poverty under the current benefit structure and distribution and consider scenarios with alternative distributions of benefits and changes in the household composition.

Program Details and the Data

The Food Stamp Program

The Food Stamp Program is the largest U.S. food assistance program, serving approximately 17.1 million individuals in 2000 with an annual benefit distribution of $15 billion, or approximately $73 in monthly benefits per person.[4] Between 1988 and 2000, 47 percent of all food stamp recipients were children, and in

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[2]The Cunnyngham paper is the latest in a series of reports from the Food and Nutrition Service (FNS) that document the characteristics of food stamp households. Many of these reports include a table that lists the incidence of poverty based on cash plus food stamps. The poverty lines used in these reports are the guidelines set by the Department Health and Human Services, not the U.S. Bureau of Census lines used in this paper. Also, the definition of cash income used in these FNS reports is based on data from the Food Stamp Program Quality Control sample, and not on the Current Population Survey data that serves as the basis for the official U.S. poverty rates.

[3]This study also adds some insight to the National Academy of Sciences Panel on Poverty and Family Assistance's recommendation that the value of food stamp benefits should be included in the definition of family resources for the estimation of poverty (Citro and Michael, 1995, p. 66). While the panel recommends several changes, the analysis in this paper illustrates the marginal impact of this change alone on the official poverty rate.

[4]Total Federal expenditures on the Food Stamp Program, including the Federal share of State administrative expenses, amounted to $18.9 billion in 2001, or almost 60 percent of the total expenditure on all domestic food and nutrition assistance programs. The next two largest food assistance programs are the National School Lunch and Breakfast Programs ($9.3 billion) and Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) ($4.0 billion).

2000 approximately 57 percent of food stamp households included children.

With a few exceptions, this cornerstone of food assistance programs is available to all citizens who meet income and asset tests. The benefits enable participants to purchase food in authorized, privately run retail food outlets patronized by both participants and nonparticipants. While authorized stores may also sell nonfood products, food stamps cannot be used to purchase items such as soap, toiletries, household paper products, prepared foods, or medicines.[5] Through 1988, food stamp benefits were issued as paper coupons. Beginning in 1989, selected States implemented a pilot version of a new method of distribution, the Electronic Benefit Transfer (EBT) card. The EBT card works much like an ATM card. While not all benefits are paid via EBT, by the end of the 2002 fiscal year, 45 States had switched to this method.

To receive food stamps, households must meet three financial criteria: the gross-income test, the net-income test, and the asset test. A household's gross income before taxes in the previous month must be at or below 130 percent of the poverty line ($1,533 per month in fiscal year 2000 for a three-person household, the most common food stamp unit). Households with anyone over the age of 60 are exempt from this test, though they still face the other tests. In addition to the gross income test, a household must have a net monthly income at or below the poverty line.[6] Finally, income-eligible households with assets less than $2,000 qualify for the program ($3,000 for households with someone over age 60, and as of 2002, for households with a disabled member). The value of a vehicle above $4,650 is considered an asset unless it is used for work or for the transportation of disabled people. The value of a home is not considered an asset. Households in which all members receive Temporary Assistance for Needy Families (TANF) or Supplemental Security Income (SSI) are categorically eligible for food stamps and do not have to meet these three tests.

The Current Population Survey

To measure the effect of food stamps on poverty, we use data from the March Supplement of the Current Population Survey (CPS). The CPS is administered monthly by the Census Bureau for the Bureau of Labor Statistics to approximately 50,000 households. It is the primary source of information on the U.S. labor force. The survey collects data from a nationally representative sample of households on employment, unemployment, earnings, occupation, and hours of work. It also collects demographic data, such as the race, ethnicity, educational attainment, marital status, age, immigration status, and parental status of respondents. Respondents to the CPS provide information on more than 50 sources of income, including noncash income sources such as the Food Stamp Program, the National School Lunch Program, and energy assistance.

The study used the CPS information because it is the data source for official U.S. poverty estimation, and our analysis focuses on how food stamps affect poverty. We considered the effect of adding the value of food stamps to household income and compared several measures of poverty with and without food stamp benefits. In performing the analysis we were particularly concerned about matching the official poverty estimates, and the CPS allowed us to do this.

A shortcoming of the CPS is that it underestimates the number of food stamp recipients and the value of food stamp benefits. Figure 1 compares the CPS estimate of total, month-weighted participation with the estimates from administrative data.[7] On average, the CPS underestimates total participation, in comparison with the administrative estimates, by 13 percent. The relative difference between the two estimates is fairly constant between 1988 and 2000. Figure 1 also shows the CPS estimate of the number of children in households that received food stamps.

The CPS data also underestimate the value of food stamp benefits (fig. 2). The data indicate that between 1988 and 2000, the total value of food stamp benefits was equal to 82 percent of the value estimated by the administrative data. Figures 1 and 2 both indicate that food stamp recipients and benefit levels are underestimated by the CPS in all years from 1988 to 2000, although the difference is somewhat more pronounced in later years.

[5]The information used in this description can be found in various issues of Food Review and at http://www.ers.usda.gov/briefing/foodnutritionassistance/foodstamps/.

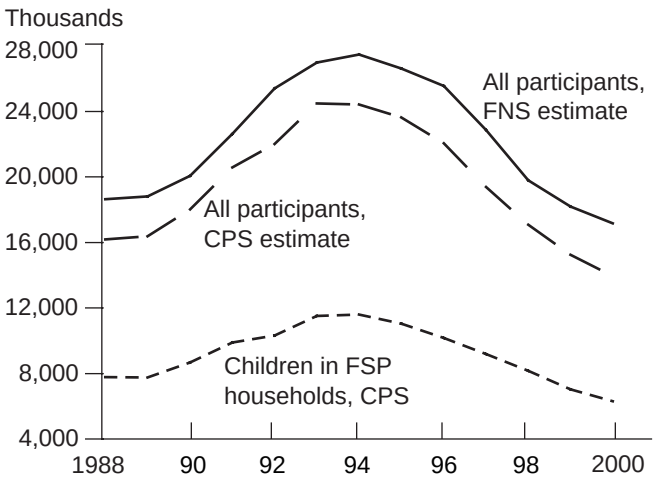
[6]Net income is calculated by subtracting a standard deduction from household gross income. In addition to this standard deduction, households with earnings from the labor market deduct 20 percent of these earnings from their gross income. Deductions are also taken for child care, child support payments to nonhousehold members, and care for disabled dependents, medical expenses, and excessive shelter expenses.

[7]The administrative estimate is based on the average value of participation rates for each month of the year. The CPS estimates are based on a month-weighted average of all participants during the year. For the case of someone who participated for 6 months of the year, the CPS estimate weights this observation by one-half, and in the case of the FNS data, this person would be observed in 6 of the 12 months.

In interpreting our results, it is necessary to be aware of this measurement issue. Under-reporting of food stamp recipients is not unique to the CPS. For example, the 1984 Survey of Income and Program Participation (SIPP) underestimates participation by 13 percent, which is approximately the same value we find for the CPS from 1988 to 2000 (Bollinger and David, 1997). This comparison is noteworthy because the SIPP is explicitly designed for analyzing the effects of participation in government assistance programs. To check the sensitivity of our results to this underestimation, we replicate some of the analysis with food stamp benefits increased by 10 and 20 percent.

Figure 1

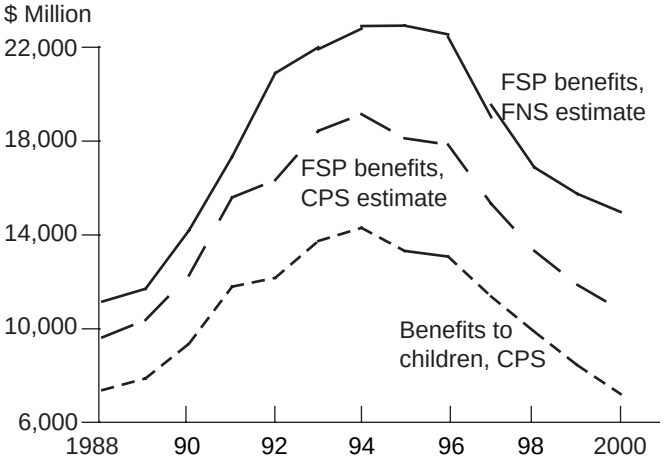
Food Stamp Program participation: CPS versus administrative data of FNS



Sources: Current Population Survey (CPS) estimate calculated by ERS from CPS data. USDA's Food and Nutrition Service (FNS) estimate calculated by FNS from Food Stamp Program quality control administrative data.

Figure 2

Value of food stamp benefits, total and children: Comparing CPS and administrative data of FNS



Note: Estimated food stamp benefits to a child are calculated as a pro rata share of household benefits.
Sources: Current Population Survey (CPS) estimate calculated by ERS from CPS data. USDA's Food and Nutrition Service (FNS) estimate calculated by FNS from Food Stamp Program quality control administrative data.

The period 1988-2000 is a useful timeframe for the analysis, since it covers a recession and recovery, as well as a large increase, and then a decline, in Food Stamp Program participation.[8] These large changes in program enrollment rates are recorded both in administrative and CPS data. Figure 3 focuses on child participation rates and FSP benefits and shows a significant variation in both these characteristics between 1988 and 2000.

Measures of Poverty

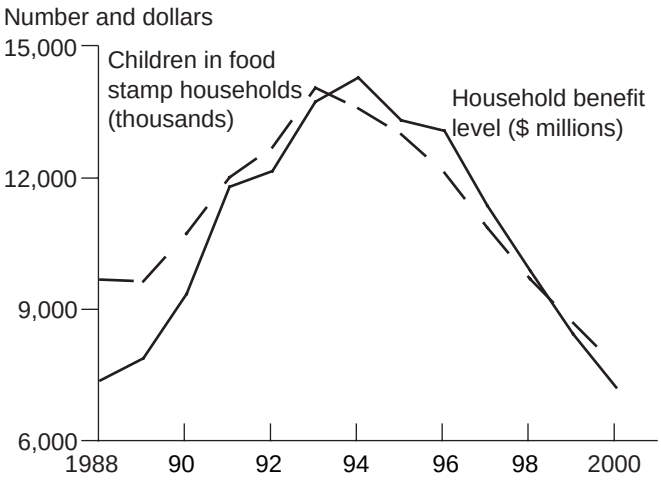
To understand the effect of food stamps on poverty, we examined how supplementing income with the value of food stamps affects the headcount, poverty gap, and squared poverty gap indexes. These three measures are from the frequently used Foster-Greer-Thorbecke (hereafter referred to as FGT) family of poverty indexes (Foster, Greer, and Thorbecke, 1984).[9] The headcount

[8]For more on the decline in food stamp caseloads see, for example, Food and Nutrition Service (2001), Figlio, Gundersen, and Ziliak (2000), and Wilde et al. (2000).

[9]The FGT indexes have been more widely used in the international poverty literature. See, for example, Gibson (2001), Howes and Lanjouw (1998), and Kakwani (1993). There has been significantly less use of these indexes in the U.S. poverty literature. The U.S. examples are limited to DeFina and Thanawala (2001), Cushing and Zheng (2000), and Zheng et al. (1995).

Figure 3

Food stamps and children: Number of child recipients and household benefit level



Source: Calculated by ERS from Current Population Survey data.

is the standard measure and is defined as the proportion of persons living in poverty, or the **incidence** of poverty. The poverty gap index measures the **depth** of poverty and is defined by the mean distance below the poverty line (expressed as a proportion of the poverty line), where the mean is formed over the entire population and counts the nonpoor as having zero poverty gap. The third measure is the squared poverty gap index, which provides a measure of the **severity** of poverty, and is defined as the mean of the squared proportionate poverty gaps.

The FGT class of poverty indexes, also referred to as P_α, can be represented as:

$$P_\alpha = 1/n \sum_i I(y_i < z)[(z - y_i)/z])^\alpha \qquad \alpha \geq 0 \qquad (1)$$

where n is the sample size, i subscripts the household, family or individual, y is the relevant measure of welfare, z is the poverty line, and I is an indicator function that takes the value of one if the statement is true and zero otherwise. When $\alpha = 0$, the resulting measure is the headcount index, or P_0. When $\alpha = 1$, the FGT index results in the poverty gap index, or P_1, and the squared poverty gap index (P_2) results when $\alpha = 2$. Appendix 1 provides a derivation of the standard errors for P_α used in this report.

The class of FGT poverty measures possesses several desirable characteristics. For example, all the FGT poverty measures are additively decomposable, so a national FGT estimate can be represented as the weighted average of, say, county-level FGT estimates. For $\alpha > 0$, the FGT measure also satisfies the property of monotonicity; in other words, if a poor person is made less well off and everyone else stays the same, then the poverty index increases. For $\alpha > 1$, the FGT measure satisfies the transfer principle, which means that any regressive transfer (a transfer from a poor person to a less poor person) increases poverty.

To illustrate the utility of these measures, consider a transfer of money from a rich person to a poor one that is not large enough to lift the poor person above the poverty line. This transfer has no effect on the headcount index, but the poor person is better off, and this welfare improvement is reflected in a reduction of both the poverty gap and squared poverty gap indexes. As another example, a transfer of income from a poor person to a poorer person will not alter either the headcount or the poverty gap index, but it improves the distribution of income of the poor, and this change is reflected by a reduction of the squared poverty gap index.[10] These examples point to an important reason to consider the poverty gap and squared poverty gap indexes in addition to the commonly reported headcount index. While the Food Stamp Program mitigates the negative effects of poverty, the benefit level typically declines as income increases. The progressive design of the benefits implies that this policy of benefit delivery is likely to have a greater impact on reducing the depth and severity of poverty than on the incidence.

Results

Poverty Levels With and Without Food Stamp Benefits

Table 1 shows poverty and child poverty rates from 1988 to 2000. These form a baseline for comparisons with later tables. Table 1 verifies the well-known result that the proportion of children living in poverty, or the child headcount index, is much higher than for the entire population. For example, in 2000, 16 percent of all children were poor compared with 11.3 percent of the total population. Between 1988 and 2000, the child headcount index was on average 50 percent higher than the headcount index for the population.

Given the large difference between the headcount indexes for children and for all individuals, one may expect the child poverty gap and squared poverty gap indexes to also be higher than for the population in general. Nonetheless, to our knowledge, there exists no documentation of child poverty rates in terms of these alternate measures; table 1 provides this new information. In every year the poverty gap and squared poverty gap indexes are higher for children than for the total population. For example, in 1991 the poverty gap index for children was 0.102, while the estimate for all individuals is 0.062, or a difference of 65 percent. During this period the squared poverty gap index for children was on average 52 percent higher than for all people, and the poverty gap index was, on average, 56 percent higher.

Appendix table 1 examines the difference in child and national poverty rates, but sets the poverty line at 130 percent of the official poverty line. We select an alternate poverty line to examine the sensitivity of the results to our selection of the official poverty line. The

[10]Unlike the Sen (1976) or Kakwani (1980) distribution-sensitive measures of poverty, the squared poverty gap index also satisfies the "subgroup consistency" property, which means that if poverty increases in any subgroup, and it does not decrease elsewhere, then aggregate poverty must also increase (Foster and Shorrocks, 1991).

choice of 130 percent also coincides with the cutoff used for the gross income eligibility requirement of the Food Stamp Program. Our findings in table 1 are robust to the choice of poverty lines. Figure 4 plots the yearly estimates of the three child poverty indexes. The temporal change in child poverty holds under all three measures, insofar as they all peaked in the first half of the 1990s and have all been declining during the later years of the decade.

Our next step is to examine the impact of food stamps on poverty and child poverty. Table 2 lists the national estimates for each of the three poverty measures with food stamps added to total income. More precisely, the columns labeled "Income + Stamps" in table 2 report:

$$P'_\alpha = 1/n \sum_i I(\{y_i + fsb_i\} < z)[(z - \{y_i + fsb_i\})/z])^\alpha \quad (2)$$

where fsb_i is the value of food stamp benefits for household i, and all other terms are defined as in equation (1). The next column reports the percentage decline in poverty from including food stamp benefits, $[(P_\alpha - P'_\alpha)/P_\alpha]*100$; in other words, the percentage difference between the results from equation (2) and

Table 1—Rates of poverty and child poverty,1988-2000

	Headcount index		Poverty gap		Squared poverty gap	
Year	Children	All persons	Children	All persons	Children	All persons
1988	19.5	13.0	9.1	5.7	5.7	3.5
	(0.41)	(0.21)	(0.24)	(0.12)	(0.18)	(0.09)
1989	19.6	12.8	8.8	5.5	5.4	3.4
	(0.39)	(0.20)	(0.22)	(0.11)	(0.16)	(0.08)
1990	20.6	13.5	9.3	5.8	5.7	3.6
	(0.40)	(0.20)	(0.22)	(0.11)	(0.16)	(0.08)
1991	21.8	14.2	10.2	6.2	6.4	3.9
	(0.41)	(0.21)	(0.23)	(0.12)	(0.18)	(0.09)
1992	21.9	14.5	10.4	6.5	6.6	4.1
	(0.41)	(0.21)	(0.24)	(0.12)	(0.19)	(0.09)
1993	22.7	15.1	10.7	6.8	6.7	4.4
	(0.42)	(0.22)	(0.24)	(0.12)	(0.18)	(0.09)
1994	21.8	14.5	10.2	6.5	6.4	4.2
	(0.43)	(0.22)	(0.25)	(0.12)	(0.19)	(0.09)
1995	20.8	13.8	9.4	6.1	5.8	3.9
	(0.42)	(0.22)	(0.24)	(0.12)	(0.18)	(0.09)
1996	20.5	13.7	9.4	6.0	5.9	3.9
	(0.42)	(0.22)	(0.24)	(0.12)	(0.18)	(0.09)
1997	19.9	13.3	9.3	6.0	6.0	4.0
	(0.43)	(0.22)	(0.25)	(0.12)	(0.20)	(0.10)
1998	18.9	12.7	8.7	5.8	5.6	3.9
	(0.41)	(0.21)	(0.23)	(0.12)	(0.19)	(0.10)
1999	16.9	11.8	7.7	5.3	4.9	3.5
	(0.39)	(0.20)	(0.22)	(0.11)	(0.17)	(0.09)
2000	16.0	11.3	7.2	5.1	4.6	3.4
	(0.39)	(0.20)	(0.21)	(0.11)	(0.17)	(0.09)

Notes: All poverty indexes are multiplied by 100. The first column under each of the three indexes lists the child poverty rates and the second-column lists the poverty rate for the full sample.

Source: ERS estimates are based on Current Population Survey March Supplement data and standard errors (in parentheses) are corrected for sample design effects following Jolliffe (forthcoming).

equation (1). The variance, V, of the relative decline in poverty is a second-order approximation and is estimated as:

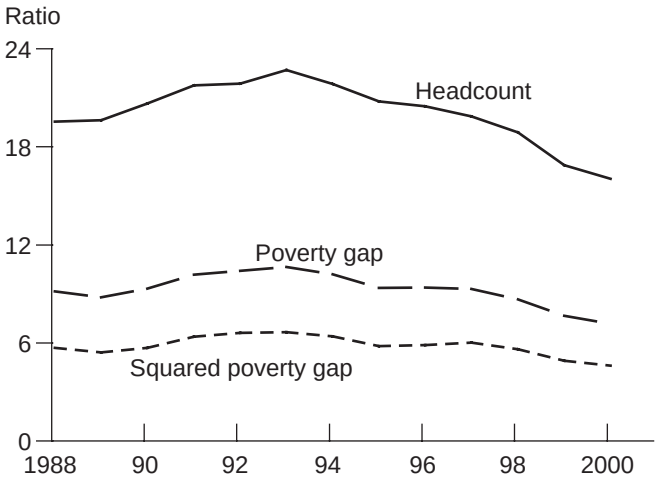
$$V[(P_\alpha - P_\alpha^{'}) / P_\alpha] = \frac{1}{P_\alpha^2} V(P_\alpha^{'}) + \frac{P_\alpha'^2}{P_\alpha^4} V(P_\alpha) - \left\{ \frac{P_\alpha'}{P_\alpha^3} V(P_\alpha) \right\}^2 \quad (3)$$

The peak caseload years for the Food Stamp Program were from 1991 to 1996. During this time, the decline in the poverty rate from food stamp benefits was between 5.1 and 6.2 percent. As seen in table 2, before and after this period the percentage decline was less than 5 percent, and in both 1988 and 2000 the decline was not even statistically significant. In 2000, the poverty rate was 11.3 percent and this drops to 10.9 percent when food stamp benefits are added. This 3.3-percent decline represents the raising of 1 million people over the poverty line. Providing enough supplemental income to achieve this reduction is qualitatively significant. However, when placed in the context that in 2000 there were 33.1 million poor people and the total value of all food stamp transfers was approximately $10.8 billion,[11] the change in the headcount index does not reflect most of the poverty alleviation properties of the transfers.

[11]We are using the CPS estimate of food stamp benefits because this is the amount used for the results reported in table 2. The FNS estimate for 2000, based on administrative data, is that total food stamp benefits were approximately $15 billion.

Figure 4

Child poverty rates, 1988-2000: Squared poverty gap, poverty gap, and headcount indexes of poverty



Source: Calculated by ERS from Current Population Survey data.

Adding Food Stamp Program benefits to income results in a small decrease in the incidence of poverty because the benefit structure is set up so that as household income increases, food stamp benefits fall. A simple example demonstrates this. Suppose that the poverty line is $100; that everyone with income less than $130 qualifies for food stamps; and that for every dollar decrease in income, there is a 30-cent increase in food stamp benefits. All benefits paid to households with gross incomes between $100 and $130, whose incomes are not below the poverty line, will not effect a change in the headcount index. Only households with incomes between $87 and $100 will be moved above the poverty line. Households with incomes below $87 will not receive enough in food stamp benefits to lift them above the poverty line, and so will not create any change in the headcount index. The benefits these households receive will, however, be reflected in both the poverty gap and squared poverty gap measures. In general, then, only a subset of households below the poverty line will receive enough in food stamp benefits to raise them above it. The decrease in the head count index arises only because the income cutoff for food stamps is higher than the poverty line (resembling the actual benefit formula).

Not only is the effect of food stamp benefits on the headcount index limited to a proportion of potential food stamp recipients, but participation rates among households with higher incomes are lower than for poorer households.[12] Using data from the 1991 and 1992 panels of the Survey of Income and Program Participation, figure 5 illustrates that eligible higher income households participate in the Food Stamp Program at much lower rates than lower income households. For households in the lowest quintile among those eligible, participation rates exceed 60 percent, compared with households in the upper two quintiles, where participation rates are less than 20 percent. Cunnyngham (2002, table 5) shows that qualitatively the same pattern continues through the rest of the 1990s, with the higher income FSP-eligible households having lower participation rates, but the magnitude of the relative difference declines in the mid- to late 1990s. It is the higher income FSP-eligible households that are most likely to be lifted out of poverty after the inclusion of the food stamp benefits, but these are the households least likely to participate. In

[12]Nonparticipation by eligible households has generally been ascribed to the participation costs (in the form of stigma and transactions costs) exceeding the benefits from participation. See, for example, Moffitt (1983) and Ranney and Kushman (1987).

contrast, lower income households have higher participation rates, but the addition of food stamp benefits to their income is unlikely to lift them out of poverty and will therefore have no impact on the headcount index.

Consistent with the foregoing discussion, the estimates in table 2 reveal little change in the headcount index after the inclusion of food stamp benefits but significant changes in both the poverty gap and squared poverty gap indexes. During the early and mid-1990s, supplementing income by the value of food stamps had the effect of reducing the poverty gap index by 16 to 17 percent and the squared poverty gap index by 21 to 23 percent. These poverty reductions are much greater than if we consider just the change in the headcount index. The poverty gap index can be interpreted as the product of the headcount index and the income gap, where the income gap is the average shortfall of

Table 2—Percentage reduction in poverty from food stamps, 1988-2000

Year	Headcount index		Poverty gap		Squared poverty gap	
	Income + stamps	Percent decline	Income + stamps	Percent decline	Income + stamps	Percent decline
1988	12.6	3.5	4.8	15.2***	2.8	21.1***
	(0.21)	(2.27)	(0.10)	(2.48)	(0.07)	(2.87)
1989	12.3	4.4**	4.6	15.6***	2.7	21.4***
	(0.20)	(2.13)	(0.09)	(2.32)	(0.07)	(2.68)
1990	12.9	4.4**	4.8	16.4***	2.8	22.2***
	(0.20)	(2.07)	(0.09)	(2.21)	(0.07)	(2.55)
1991	13.4	5.4***	5.2	17.2***	3.0	23.4***
	(0.21)	(2.01)	(0.10)	(2.19)	(0.07)	(2.49)
1992	13.7	5.6***	5.4	16.7***	3.2	22.7***
	(0.21)	(1.99)	(0.10)	(2.18)	(0.07)	(2.48)
1993	14.3	5.4***	5.7	16.6***	3.4	22.4***
	(0.22)	(2.00)	(0.11)	(2.16)	(0.08)	(2.46)
1994	13.7	6.1***	5.4	17.1***	3.2	22.7***
	(0.22)	(2.07)	(0.10)	(2.23)	(0.08)	(2.53)
1995	13.0	6.2***	5.1	16.4***	3.0	21.2***
	(0.22)	(2.17)	(0.10)	(2.4)	(0.08)	(2.80)
1996	13.0	5.1**	5.1	15.7***	3.0	21.2***
	(0.21)	(2.18)	(0.10)	(2.38)	(0.08)	(2.74)
1997	12.6	4.8**	5.2	13.4***	3.3	17.9***
	(0.21)	(2.24)	(0.11)	(2.54)	(0.09)	(2.98)
1998	12.1	4.7**	5.1	11.6***	3.3	14.8***
	(0.21)	(2.26)	(0.11)	(2.58)	(0.08)	(3.03)
1999	11.3	4.3*	4.8	10.6***	3.1	13.8***
	(0.20)	(2.35)	(0.10)	(2.69)	(0.08)	(3.17)
2000	10.9	3.3	4.6	9.4***	3.0	12.5***
	(0.2)	(2.44)	(0.10)	(2.81)	(0.08)	(3.30)

Notes: All poverty indexes are multiplied by 100. The first column under each of the three poverty indexes lists the poverty estimates with food stamp benefits added to income. Standard errors for all poverty estimates are corrected for sample design effects, following Jolliffe (forthcoming), and are in parentheses. The second column under each of the poverty measures lists the percentage decline in the poverty index after inclusion of food stamp benefits. The estimated percent reduction is superscripted with *, **, or *** if the p-value is less than 0.1, 0.05, or 0.01, respectively. Standard errors for the percent decline are listed in parentheses and are second-order approximations.

Source: Calculated by ERS from Current Population Survey data.

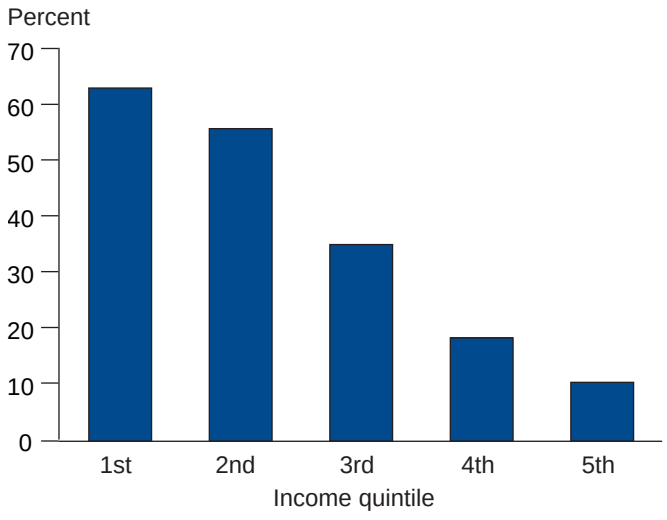
the poor as a fraction of the poverty line. The results in table 2 indicate that, for example, in 1992 the average shortfall of the poor was 45 percent of the poverty line, but when income was supplemented with food stamps the average shortfall declined to 39 percent.

Table 3 reports results similar to those in table 2, but focuses on children. Again the data indicate that supplementing income with food stamp benefits results in a mild reduction in the incidence of poverty. The headcount index declined from 4 to 7 percent between 1988 and 2000 when food stamps were included as income. Somewhat surprisingly, the decline of 4 percent in 2000 is not even statistically significant. In terms of the poverty gap index, the decline in child poverty ranged from 14 to 23 percent. The drop in the poverty gap index was much larger than that observed for the headcount index, and all percentage declines were statistically significant. The decline in poverty from food stamps was largest for the squared poverty gap index, averaging 28 percent from 1988 to 2000.

In comparing the results from table 2 and table 3, one difference is noticeable: For each of the three poverty measures, food stamps have a larger impact on child poverty than on poverty for all people. There are also similarities; in both table 2 and table 3, food stamps reduce the poverty gap and squared poverty gap indexes by a large amount, but have relatively little effect on the headcount index. The magnitude of the difference in percentage declines across the three measures is readily observed in figures 6 and 7. Figure 6 plots the percent reduction for each measure of child poverty by year, while figure 7 does the same except that the poverty line is at 130 percent the official rate. In both figures the percent decline is largest for the squared poverty gap, followed by that for the poverty gap index, and both of these declines are significantly greater than the decline in the headcount index.

Figure 5

Food Stamp Program participation rates among eligible households by income quintile



Source: Calculated by ERS from from the 1991 and 1992 panels of the Survey of Income and Program Participation.

Figures 6 and 7 also suggest an important change over time. The effectiveness of food stamps in reducing the depth and severity of poverty peaked between 1991 and 1994, when the FSP caseload was high, and then declined during the post-welfare reform period and the years of economic expansion. The greatest change occurred immediately after welfare reform. In 1996, food stamps reduced the child squared poverty gap by 29 percent, but by 1998 the reduction was only 22 percent.

Two factors help explain this temporal pattern. The first is that overall FSP participation declined significantly between 1994 and 2000. This decline is consistent with the general downward trend in the effectiveness of food stamps in reducing the depth and severity of poverty indexes, as shown in figure 6. In addition, figure 6 reveals that this declining effectiveness is largest for the severity of poverty. An important explanatory factor is that the decline in participation rates has disproportionately come from people with lower incomes. For example, Cunnyngham (2002, table 5) shows that participation rates for those whose income was between 100 and 130 percent of the poverty line declined slightly from 29 percent in 1995 to 26 percent in 1999. In contrast, participation rates declined by much more (from 105 percent in 1995 to 83 percent in 1999) for FSP-eligible individuals with incomes between 1 and 50 percent of the poverty line. The decline in the effectiveness of food stamps in reducing poverty was greatest for the severity of poverty because the squared poverty gap is more sensitive to income changes of the poorest people, and after the mid-1990s the FSP participation rates declined the most for this group.

Policy Simulations of Food Stamp Program Changes

The previous section demonstrates how the current structure of food stamp benefits helps alleviate child poverty in the United States. Here we simulate how the impact of food stamps may differ if benefits are targeted more towards children lower in the income distribution and if a larger number of households

participate.[13] For all simulations, we estimate the impact of the proposed change in the FSP on each of the three poverty measures for all years from 1988 to 2000. For brevity's sake, we report results only for every third year, beginning in 1988. These 5 years allow us to compare 3 years before the 1996 welfare reform with 2 years afterward. The 5-year coverage also includes the recession of the early 1990s, which can be compared to the later expansionary years.

The first simulation is an across-the-board increase in the value of benefits by 10 and 20 percent. Postulating an untargeted increase in the size of the Food Stamp Program serves two purposes. First, it allows us to

[13]We refer to the transfers to lower income persons as targeted simulations because in this paper we are examining the impact of food stamps on poverty. This does not necessarily mean that the simulated transfers are better targeted to attain the direct goal of the program, that is, to raise the level of nutrition to low-income households.

Table 3—Percentage reduction in child poverty from food stamps, 1988-2000

Year	Headcount index		Poverty gap		Squared poverty gap	
	Income + stamps	Percent decline	Income + stamps	Percent decline	Income + stamps	Percent decline
1988	18.8	3.7	7.3	19.9***	4.1	28.4***
	(0.41)	(2.92)	(0.20)	(3.00)	(0.14)	(3.35)
1989	18.6	5.0*	7.0	20.6***	3.8	29.3***
	(0.38)	(2.71)	(0.18)	(2.80)	(0.12)	(3.13)
1990	19.6	5.1*	7.3	21.8***	4.0	30.5***
	(0.39)	(2.63)	(0.18)	(2.66)	(0.13)	(2.98)
1991	20.5	5.9**	7.9	22.6***	4.4	31.7***
	(0.40)	(2.53)	(0.19)	(2.55)	(0.13)	(2.8)
1992	20.5	6.4**	8.1	21.8***	4.6	30.8***
	(0.40)	(2.53)	(0.20)	(2.63)	(0.14)	(2.85)
1993	21.3	5.9**	8.3	21.6***	4.6	30.6***
	(0.41)	(2.50)	(0.20)	(2.57)	(0.14)	(2.85)
1994	20.4	6.7**	7.9	22.7***	4.4	31.8***
	(0.42)	(2.63)	(0.20)	(2.69)	(0.14)	(2.95)
1995	19.2	7.4***	7.3	21.7***	4.1	29.6***
	(0.41)	(2.74)	(0.20)	(2.87)	(0.14)	(3.28)
1996	19.2	6.0**	7.4	20.8***	4.2	29.3***
	(0.41)	(2.79)	(0.20)	(2.92)	(0.14)	(3.26)
1997	18.7	5.8**	7.6	18.6***	4.5	26.1***
	(0.42)	(2.91)	(0.21)	(3.13)	(0.16)	(3.57)
1998	17.8	5.9**	7.2	16.5***	4.4	22.5***
	(0.40)	(2.94)	(0.20)	(3.25)	(0.15)	(3.76)
1999	16.0	5.3*	6.5	15.4***	3.9	21.3***
	(0.38)	(3.13)	(0.19)	(3.43)	(0.14)	(3.99)
2000	15.4	4.3	6.2	13.9***	3.7	19.7***
	(0.38)	(3.35)	(0.19)	(3.69)	(0.14)	(4.25)

Notes: All poverty indexes are multiplied by 100. The first column under each of the three poverty indexes lists the child poverty estimates with food stamp benefits added to income. Standard errors for all poverty estimates are corrected for sample design effects following Jolliffe (forthcoming) and are in parentheses. The second column under each of the poverty measures lists the percentage decline in the poverty index after inclusion of food stamp benefits. The estimated percent reduction is superscripted with *, **, or *** if the p-value is less than 0.1, 0.05, or 0.01, respectively. Standard errors for the percent decline are listed in parentheses and are second-order approximations.

Source: Calculated by ERS from Current Population Survey data.

compare the efficacy of a large increase in benefits to all current participants in reducing poverty with that of more-targeted changes in the distribution of food stamps. Second, it allows us to examine the robustness of the results in table 3 to the CPS underestimation of food stamp benefits.

Panel A of table 4 reports the change in the child poverty indexes from increasing the level of benefits to all current participants by 10 percent, and Panel B reports the change for an increase of 20 percent. Since all simulations are based on CPS data, increasing benefits by 10 percent means increasing the size of benefit distribution on average by $1.1 billion. For all simulations, the effect of the increase is contrasted with the poverty estimates from table 3, where the value of the food stamps is added to income. The results indicate that this large increase in the Food Stamp Program would lead to only a small change in child poverty.

In none of the 5 years, and for none of the three poverty measures, is the estimated change in poverty statistically significant. Similarly, with an increase of 20 percent, there is, remarkably, only one statistically significant reduction in the level of poverty: in 1991, the poverty gap index would have been 5.4 percent less if food stamp benefits had been 20 percent greater. This simulation suggests that a general increase in food stamp benefits of more than $2 billion is unlikely to have a large effect on reducing poverty. It also demonstrates the robustness of the estimates in table 3 to measurement error, insofar as adding 10 and 20 percent to benefit amounts does not significantly affect the estimated levels of poverty.

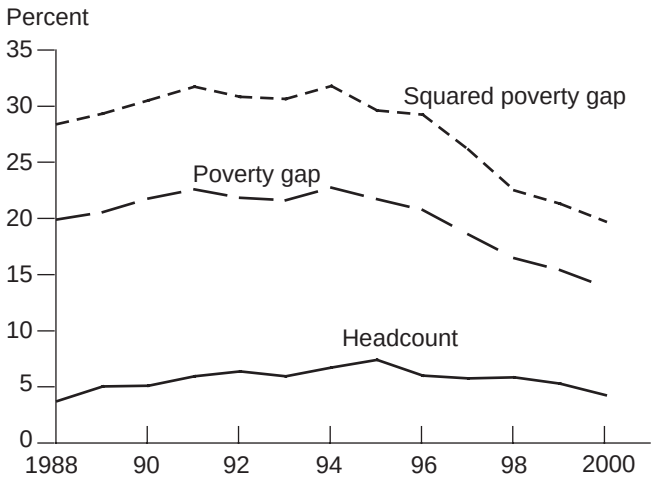
The remaining simulations all consider increases in benefit levels targeted to households with incomes under the poverty line.[14] One interpretation of the further simulations is that they are revenue-neutral changes that take food stamp benefits away from nonpoor households and redistribute them to poor households. We use the term "nonpoor" simply to denote those households whose income is greater than the poverty line. These are still very low-income households, and we do not mean to imply that they are well off. Perhaps a more palatable way to consider the simulations is to say that benefit levels to the poor households are increased by an amount equal to the benefit levels received by nonpoor households. This alternative description would require a large increase in the total value of food stamps distributed, but the effect on the poverty indexes would be identical because nonpoor people carry zero weight in the indexes. We use the shorthand of describing the simulations as redistributions from the nonpoor to the poor for the sake of simplicity, but wish to emphasize that all these simulations can also be viewed as increasing the total distribution of food-stamp benefits but targeting only poor households.

In interpreting the results, one should note that two important issues are not addressed. First, we do not

[14]The simulations are based on the Bureau of Census poverty lines, but this change would encounter the problem that the official thresholds are made for the preceding year and therefore cannot be used to determine eligibility for the current year. For this reason, the actual eligibility criteria are based on current-year poverty lines set by the Department of Health and Human Services (HHS), and it is reasonable to assume that the policy simulations could be implemented based on the HHS thresholds.

Figure 6

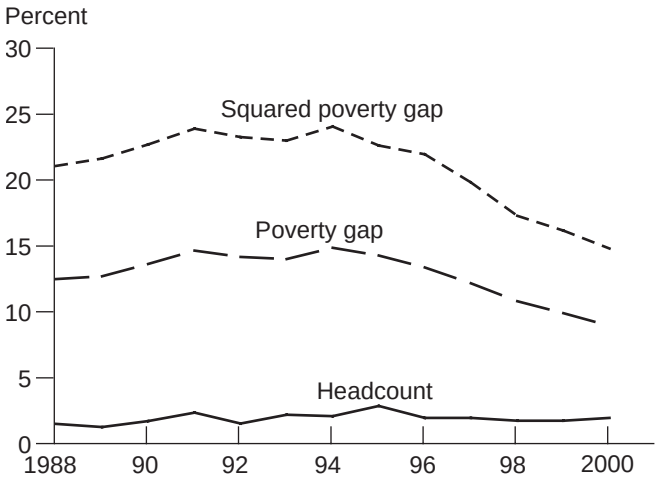
Percentage reduction in child poverty from food stamps (100% poverty thresholds)



Source: Calculated by ERS from Current Population Survey data.

Figure 7

Percentage reduction in child poverty from food stamps (130% poverty thresholds)



Source: Calculated by ERS from Current Population Survey data.

consider the potential behavioral effects that increased food stamp benefits may have on affected households. Second, we are only assessing the impact of the simulations in terms of changes in poverty levels; we do not examine the effects on other indicators of well-being (for example hunger, food insecurity, or overall health status).

We do not suggest that these simulations could be implemented precisely as described, but we believe they illustrate the impact from certain types of changes in the actual eligibility criteria and benefit-level formula. (For more details on how benefit levels are determined, see Wilde, 2001.)

The second simulation we consider increases benefits to all poor households currently receiving food stamps by a total amount equal to the benefits received by the nonpoor households. The third simulation transfers this same amount, but targets poor households with children currently receiving food stamps; the fourth simulation targets poor households not receiving food stamps; and the fifth simulation targets poor households with children not receiving food stamps. In each simulation we first distribute the additional benefits to the poor and then to all poor households whose income is less than half the poverty line, which we refer to as the extreme poor. This is a large redistribution of funds. In 2000, for example, by our calculations, 33 percent ($3.6 billion) of the total value of food stamp benefits were distributed to households with income greater than the poverty line.

Panel A of table 5 reports the results of increasing benefits to all poor households currently receiving food stamps. The value of the simulated transfer to each

Table 4—Reduction in child poverty from increased food stamp benefits,1988-2000

	Simulation 1: Increase food stamp benefits to all recipients					
	Head count index		Poverty gap		Squared poverty gap	
Year	Percent transfer	Income + decline	Percent transfer	Income + decline	Percent transfer	Income + decline
Panel A: Increase benefits by 10 percent						
1988	18.7 (0.41)	0.6 (3.05)	7.2 (0.20)	2.4 (3.76)	4.0 (0.14)	3.0 (4.83)
1991	20.3 (0.40)	0.7 (2.73)	7.7 (0.19)	2.7 (3.28)	4.2 (0.13)	3.4 (4.2)
1994	20.2 (0.42)	0.9 (2.87)	7.7 (0.2)	2.7 (3.47)	4.2 (0.14)	3.4 (4.37)
1997	18.5 (0.42)	1.0 (3.12)	7.4 (0.21)	2.1 (3.84)	4.3 (0.16)	2.7 (4.92)
2000	15.3 (0.38)	0.6 (3.52)	6.1 (0.19)	1.5 (4.28)	3.6 (0.14)	1.9 (5.33)
Panel B: Increase benefits by 20 percent						
1988	18.6 (0.41)	1.3 (3.04)	7.0 (0.20)	4.7 (3.69)	3.8 (0.14)	5.8 (4.73)
1991	20.1 (0.40)	1.5 (2.71)	7.4 (0.19)	5.4* (3.2)	4.1 (0.13)	6.6 (4.09)
1994	19.9 (0.42)	2.2 (2.84)	7.5 (0.20)	5.4 (3.39)	4.1 (0.14)	6.6 (4.26)
1997	18.4 (0.42)	1.8 (3.10)	7.3 (0.21)	4.2 (3.77)	4.2 (0.16)	5.2 (4.83)
2000	15.2 (0.38)	1.3 (3.50)	6.0 (0.19)	3.0 (4.22)	3.6 (0.14)	3.8 (5.25)

Notes: All poverty indexes are multiplied by 100. The first column under each of the three poverty indexes lists the child poverty estimates with food stamp benefits added to income. Standard errors for all poverty estimates are corrected for sample design effects following Jolliffe (forthcoming) and are in parentheses. The second column under each of the poverty measures lists the percentage decline in the poverty index after inclusion of food stamp benefits. The estimated percent reduction is superscripted with *, **, or *** if the p-value is less than 0.1, 0.05, or 0.01, respectively. Standard errors for the percent decline are listed in parentheses and are second-order approximations.

Source: Calculated by ERS from Current Population Survey data.

household is proportional to the actual receipt of food stamps. Using 2000 as an example, this simulation would transfer $3.6 billion in additional food stamps to the poor, whose current receipt of stamps is equal to $7.2 billion, for an increase of 50 percent.

Panel B of table 5 considers a more-targeted simulation by increasing the amount of food stamp benefits to the extreme-poor households. Again, the value of the transfer is proportional to the actual receipt of food stamps, but now the proportional increase is greater because it is going to fewer people. Continuing with 2000 as an example, CPS estimates of the value of food stamp benefits to people living in households with income less than half the poverty line to be $3.7 billion. This means that all households living in extreme poverty and participating in the Food Stamp Program would receive an increase of 97 percent.

The qualitative nature of the results is similar across the two panels. There is essentially no effect on the incidence of child poverty, but the depth and severity (as measured by the poverty gap and squared poverty gap indexes) are significantly reduced. The average decline in the headcount index between 1988 and 2000 is 0.3 percent when the transfer is only to the extreme poor and 2.8 percent when it is made to all poor FSP participants. That the transfer to the extreme poor results in almost no change in the headcount index is not surprising, because these are all people who would need large transfers to become nonpoor.

Table 5—Change in child poverty from revenue-neutral transfer, 1988-2000

	Simulation 2: Transfer food stamps from nonpoor to poor FSP households					
	Head count index		Poverty gap		Squared poverty gap	
Year	Income + transfer	Percent decline	Income + transfer	Percent decline	Income + transfer	Percent decline
Panel A: Transfer to all poor FSP households						
1988	18.5	1.6	6.9	5.3	3.8	6.5
	(0.41)	(3.03)	(0.20)	(3.67)	(0.14)	(4.70)
1991	20.1	1.9	7.3	7.4**	4	8.8**
	(0.40)	(2.71)	(0.19)	(3.14)	(0.13)	(4.02)
1994	19.6	3.6	7.2	9.2***	3.9	11.0***
	(0.42)	(2.82)	(0.2)	(3.27)	(0.14)	(4.11)
1997	18.1	3.2	7.0	7.1*	4.1	8.5*
	(0.42)	(3.07)	(0.21)	(3.68)	(0.16)	(4.70)
2000	14.9	2.9	5.7	7.2*	3.4	8.7*
	(0.38)	(3.46)	(0.19)	(4.07)	(0.14)	(5.04)
Panel B: Transfer to extreme-poor FSP households						
1988	18.8	0.1	6.9	6.4*	3.7	9.6**
	(0.41)	(3.07)	(0.20)	(3.61)	(0.14)	(4.58)
1991	20.4	0.1	7.2	9.1***	3.8	12.8***
	(0.40)	(2.74)	(0.19)	(3.06)	(0.13)	(3.88)
1994	20.2	0.7	7.0	11.8***	3.7	16.3***
	(0.42)	(2.87)	(0.2)	(3.15)	(0.14)	(3.92)
1997	18.7	0.3	6.9	8.8**	3.9	12.7***
	(0.42)	(3.13)	(0.21)	(3.59)	(0.16)	(4.53)
2000	15.3	0.2	5.6	8.8**	3.2	12.8***
	(0.38)	(3.53)	(0.19)	(3.97)	(0.14)	(4.85)

Notes: All poverty indexes are multiplied by 100. The first column under each of the three poverty indexes lists the child poverty estimates with food stamp benefits added to income. Standard errors for all poverty estimates are corrected for sample design effects following Jolliffe (forthcoming) and are in parentheses. The second column under each of the poverty measures lists the percentage decline in the poverty index after inclusion of food stamp benefits. The estimated percent reduction is superscripted with *, **, or *** if the p-value is less than 0.1, 0.05, or 0.01, respectively. Standard errors for the percent decline are listed in parentheses and are second-order approximations.

Source: Calculated by ERS from Current Population Survey data.

If neither of the transfer scenarios reported in panels A and B resulted in any family's moving out of poverty, the effect on the poverty gap index would be identical. Since this is not the case, the reduction in the poverty gap is greater for the transfer to the extreme poor, averaging 9.2 percent, compared with 7.5 percent for the transfer to all poor FSP participants. Not surprisingly, the largest difference across the two panels is the change in the squared poverty gap index: the average decline for the transfer to the extreme-poor participants is 13.2 percent, in contrast to a decline of 8.9 percent for the less-targeted transfer to all poor FSP households.

Table 6 reports the results from the third simulation, which takes the transfer amount and gives this to poor food stamp households with children. Again, the results in panel A are from targeting the poor, while panel B focuses on the extreme poor. The results are similar to those from the previous simulations, but as expected, this simulation is more effective in reducing child poverty. For the transfers to all poor households with children and extreme-poor households with children, the change in the headcount index is for the most part not statistically significant. For the depth and severity of child poverty, however, there are statistically significant changes with this simulation. The average decline in the child poverty gap index for the transfer to all poor food stamp households with children is 9.4 percent, while for the same transfer to the extreme poor it is 11.1 percent. Again, the decline in the squared poverty gap index is even larger, with an average decline of 15.3 percent when the funds are transferred to the extreme poor with children.

Table 6—Change in child poverty from revenue-neutral transfer, 1988-2000

	Simulation 3: Transfer food stamps from nonpoor to poor FSP households with children					
	Head count index		Poverty gap		Squared poverty gap	
Year	Income + transfer	Percent decline	Income + transfer	Percent decline	Income + transfer	Percent decline
Panel A: transfer to all poor FSP households with children						
1988	18.5	1.8	6.8	6.6*	3.8	8.0*
	(0.41)	(3.03)	(0.20)	(3.63)	(0.14)	(4.65)
1991	20.0	2.4	7.2	9.2***	3.9	10.7***
	(0.40)	(2.70)	(0.19)	(3.10)	(0.13)	(3.96)
1994	19.4	4.7*	7.0	11.5***	3.8	13.5***
	(0.42)	(2.79)	(0.2)	(3.20)	(0.14)	(4.03)
1997	18.0	4.0	6.9	8.8**	4.0	10.5**
	(0.42)	(3.05)	(0.21)	(3.62)	(0.16)	(4.63)
2000	14.8	4.0	5.6	9.8**	3.3	11.4**
	(0.38)	(3.44)	(0.19)	(3.98)	(0.14)	(4.93)
Panel B: Transfer to extreme-poor FSP households with children						
1988	18.8	0.1	6.8	7.6**	3.6	11.1**
	(0.41)	(3.06)	(0.20)	(3.57)	(0.14)	(4.52)
1991	20.4	0.3	7.0	10.5***	3.7	14.6***
	(0.40)	(2.73)	(0.19)	(3.02)	(0.13)	(3.82)
1994	20.2	0.9	6.8	13.9***	3.5	18.6***
	(0.42)	(2.87)	(0.20)	(3.09)	(0.14)	(3.84)
1997	18.6	0.4	6.8	10.4***	3.8	14.5***
	(0.42)	(3.13)	(0.21)	(3.53)	(0.16)	(4.47)
2000	15.2	0.9	5.5	11.7***	3.1	15.8***
	(0.38)	(3.52)	(0.19)	(3.87)	(0.14)	(4.73)

Notes: All poverty indexes are multiplied by 100. The first column under each of the three poverty indexes lists the child poverty estimates with food stamp benefits added to income. Standard errors for all poverty estimates are corrected for sample design effects following Jolliffe (forthcoming) and are in parentheses. The second column under each of the poverty measures lists the percentage decline in the poverty index after inclusion of food stamp benefits. The estimated percent reduction is superscripted with *, **, or *** if the p-value is less than 0.1, 0.05, or 0.01, respectively. Standard errors for the percent decline are listed in parentheses and are second-order approximations.

Source: Calculated by ERS from Current Population Survey data.

The simulations thus far have measured the effect of an increase in benefits only among households already receiving food stamps. With the fourth and fifth simulations we consider the impact of delivering benefits to poor households that are currently not participating in the Food Stamp Program (hereafter referred to as non-FSP households). Depending on the estimation method, between 30 and 50 percent of eligible households do not receive food stamps (Blank and Ruggles, 1996; Castner and Cody, 1999). We do not attempt to impute values for the eligibility requirements to identify the targeted population, but instead consider the simpler simulation of distributing benefits to non-FSP families identified as poor by the official U.S. definition of poverty. We believe this exercise is useful both because it helps us understand the impact of expanding food stamp coverage to all poor people and because it sheds some light on the benefit of expanding participation rates of the eligible population. For the eligible population, we implicitly assume that a large percentage of poor (and, in particular, extreme-poor) are eligible for food stamps.

In the next two simulations, the same amount of additional benefits is transferred or redistributed as in the previous two simulations (an amount equal to the benefits received by the nonpoor households), except that the benefits are transferred to non-FSP households. In panel A of table 7, the benefits are redistributed to all poor non-FSP households, and the amount of the transfer is

Table 7—Change in child poverty from revenue-neutral transfer, 1988-2000

	Simulation 4: Transfer food stamps from nonpoor to poor, non-FSP households					
	Head count index		Poverty gap		Squared poverty gap	
Year	Income + transfer	Percent decline	Income + transfer	Percent decline	Income + transfer	Percent decline
Panel A: transfer to all poor non-FSP households						
1988	18.8	0	7.1	2.6	3.8	5.8
	(0.41)	—	(0.20)	(3.73)	(0.14)	(4.62)
1991	20.5	0	7.6	3.7	4.0	8.4**
	(0.40)	—	(0.19)	(3.23)	(0.13)	(3.92)
1994	20.4	0	7.5	4.4	3.9	9.9**
	(0.42)	—	(0.20)	(3.40)	(0.14)	(4.02)
1997	18.7	0	7.3	3.4	4.1	7.5
	(0.42)	—	(0.21)	(3.78)	(0.16)	(4.61)
2000	15.4	0	6.0	3.4	3.4	7.1
	(0.38)	—	(0.19)	(4.19)	(0.14)	(5.01)
Panel B: transfer to extreme-poor non-FSP households						
1988	18.8	0	7.1	2.5	3.8	7.1
	(0.41)	—	(0.20)	(3.72)	(0.14)	(4.52)
1991	20.5	0	7.6	3.6	3.9	10.2***
	(0.40)	—	(0.19)	(3.22)	(0.13)	(3.8)
1994	20.4	0	7.6	4.0	3.9	11.3***
	(0.42)	—	(0.20)	(3.39)	(0.14)	(3.91)
1997	18.7	0	7.3	3.1	4.1	8.6*
	(0.42)	—	(0.21)	(3.77)	(0.16)	(4.52)
2000	15.4	0	6.0	3.0	3.4	8.0
	(0.38)	—	(0.19)	(4.19)	(0.14)	(4.93)

— = No change.

Notes: All poverty indexes are multiplied by 100. The first column under each of the three poverty indexes lists the child poverty estimates with food stamp benefits added to income. Standard errors for all poverty estimates are corrected for sample design effects following Jolliffe (forthcoming) and are in parentheses. The second column under each of the poverty measures lists the percentage decline in the poverty index after inclusion of food stamp benefits. The estimated percent reduction is superscripted with *, **, or *** if the p-value is less than 0.1, 0.05, or 0.01, respectively. Standard errors for the percent decline are listed in parentheses and are second-order approximations.

Source: Calculated by ERS from Current Population Survey data.

proportional to the household's income gap (the difference between household income and the poverty line).

As an example of the simulated transfer, consider the year 2000, when $3.6 billion in food stamps were distributed to nonpoor households. The total income gap in that year for all poor non-FSP households was $63.1 billion. The simulated redistribution of the $3.6 billion in food stamps gives all households an amount equal to 5.7 percent (63.1 * 0.057 = 3.6) of the household's income gap. In panel B of table 7, the benefits are redistributed to non-FSP households with income less than half the poverty line. In 2000, the total income gap for these extreme-poor households was $46.4 billion, which means that the simulated redistribution would give each household an amount equal to 7.8 percent of its income gap.

Because the transfers in simulations 4 and 5 are proportional to the difference between a household's income and the poverty line (and the transfer is never greater than this income gap), there is no change in the headcount index for either. The redistribution of food stamps to all poor non-FSP households (in panel A of tables 7 and 8) has only a very small effect on the depth of child poverty. The average decline between 1988 and 2000 in the child poverty gap index is 3.6 percent. The decline in the squared poverty gap index is larger, with an average decline of 8 percent, but for most years this change is not statistically significant.

Table 8—Change in child poverty from revenue-neutral transfer, 1988-2000

	Simulation 5: Transfer food stamps from nonpoor to poor, non-FSP households with children					
	Head count index		Poverty gap		Squared poverty gap	
Year	Income + transfer	Percent decline	Income + transfer	Percent decline	Income + transfer	Percent decline
Panel A: transfer to all poor non-FSP households with children						
1988	18.8	0	6.9	5.8	3.5	13.1***
	(0.41)	—	(0.20)	(3.58)	(0.14)	(4.24)
1991	20.5	0	7.2	8.4***	3.6	18.4***
	(0.40)	—	(0.19)	(3.05)	(0.13)	(3.48)
1994	20.4	0	7.1	9.6***	3.4	21.6***
	(0.42)	—	(0.20)	(3.19)	(0.14)	(3.49)
1997	18.7	0	7.0	7.2**	3.7	16.5***
	(0.42)	—	(0.21)	(3.59)	(0.16)	(4.13)
2000	15.4	0	5.7	7.5*	3.1	16.6***
	(0.38)	—	(0.19)	(3.97)	(0.14)	(4.50)
Panel B: transfer to extreme-poor, non-FSP households with children						
1988	18.8	0	6.9	5.8	3.5	15.3***
	(0.41)	—	(0.20)	(3.58)	(0.14)	(4.07)
1991	20.5	0	7.2	8.4***	3.4	21.4***
	(0.40)	—	(0.19)	(3.05)	(0.13)	(3.3)
1994	20.4	0	7.1	9.6***	3.3	23.9***
	(0.42)	—	(0.20)	(3.19)	(0.14)	(3.34)
1997	18.7	0	7.0	7.2**	3.6	18.6***
	(0.42)	—	(0.21)	(3.59)	(0.16)	(3.96)
2000	15.4	0	5.7	7.5*	3.0	18.7***
	(0.38)	—	(0.19)	(3.97)	(0.14)	(4.32)

— = No change.

Notes: All poverty indexes are multiplied by 100. The first column under each of the three poverty indexes lists the child poverty estimates with food stamp benefits added to income. Standard errors for all poverty estimates are corrected for sample design effects following Jolliffe (forthcoming) and are in parentheses. The second column under each of the poverty measures lists the percentage decline in the poverty index after inclusion of food stamp benefits. The estimated percent reduction is superscripted with *, **, or *** if the p-value is less than 0.1, 0.05, or 0.01, respectively. Standard errors for the percent decline are listed in parentheses and are second-order approximations.

Source: Calculated by ERS from Current Population Survey data.

Panel B of table 7 reports the change in poverty from giving food stamp benefits to extreme-poor, non-FSP households. This narrowing in focus does not noticeably alter the results found in panel A. There is a small, but statistically insignificant, decline in the depth of child poverty, and a somewhat larger decline in the severity of child poverty. A comparison of tables 5 and 7 shows that increasing benefits to poor FSP households reduces the depth and severity of child poverty more significantly than an equal-sized increase in benefits to poor non-FSP households.

Our final simulation transfers food stamp benefits to poor non-FSP households with children. In the estimates reported in panel A of table 8, the average decline in the poverty gap index is 8.5 percent and the average decline in the squared poverty gap index is 17.8 percent. Both these declines are much larger than those found in the previous simulation, which targeted all poor non-FSP households. A comparison of tables 6 and 8 shows that increasing benefit levels to poor FSP households with children has a greater impact on reducing the depth of child poverty than an equal increase in benefits to poor non-FSP households with children. For the squared poverty gap index, though, the reverse is true: targeting poor non-FSP households with children is more effective in reducing the severity of child poverty.

Conclusions

Using data from the 1989 to 2001 March Supplement of the Current Population Survey, we verified the well-known result that the incidence of child poverty is much greater than the incidence of poverty for the population in general. We then expanded on the current understanding of child poverty by showing that the depth and severity of child poverty, indicated by the poverty gap and squared poverty gap indexes, is significantly higher than for overall national estimates.

We examined the effect on poverty and child poverty of adding the value of food stamps to household income. Our results indicate only a small reduction in poverty and child poverty from food stamp receipt, as measured by the headcount index. In contrast, the depth and severity of child poverty and poverty overall are significantly reduced by the Food Stamp Program. The average decline from 1988 to 2000 was 20 percent in the child poverty gap index, and 28 percent in the child squared poverty gap index. These results clearly show the insufficiency of examining only the headcount index, which leads to the incorrect conclusion that food stamps do not have much impact on reducing child poverty. An analysis of the poverty gap and squared poverty gap indexes clarifies the important role of the Food Stamp Program in improving the welfare of children in low-income households.

The study postulates several changes to the Food Stamp Program and simulates their effects on child poverty. The first simulation shows that an increase in benefit levels by 10 and 20 percent would not result in a large reduction of child poverty. This is primarily because a general increase in benefits would not be well-targeted toward children living in poor households. We then simulate the effects on child poverty of increasing food stamp benefits targeted to specific subpopulations of the poor.

First, we increase benefit levels to poor and extreme-poor households, and then only to poor and extreme-poor households with children. All four of these policy changes would be very effective in further reducing the depth and severity of child poverty. Not surprisingly, the decrease in the depth and severity is greatest when the increased benefits are targeted to extreme-poor households with children.

A final set of simulations provides food stamps to poor and extreme-poor households not in the Food Stamp Program. We further narrow the target to only the poor and extreme-poor, non-FSP households with children. These changes in the program would likely be much more difficult to implement than those of the other simulations because they target people unaware of the program, who have decided not to participate, or who are not eligible under the current criteria. Our analysis indicates, though, that this kind of increase in participation rates does not necessarily result in a greater reduction in child poverty rates. The simulation that increases benefits to all poor households that already participate in the Food Stamp Program reduces the depth of poverty by a greater amount than the simulated increase in participation rates.

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Appendix Table 1—Rates of poverty and child poverty, 1988-2000

Year	Head count index		Poverty gap		Squared poverty gap	
	Children	All persons	Children	All persons	Children	All persons
1988	26.1	18.6	12.3	8.0	7.8	4.9
	(0.45)	(0.25)	(0.27)	(0.13)	(0.2)	(0.1)
1989	26.0	18.2	12.0	7.8	7.5	4.8
	(0.42)	(0.23)	(0.24)	(0.12)	(0.19)	(0.09)
1990	27.2	19.0	12.7	8.2	7.9	5.0
	(0.43)	(0.23)	(0.25)	(0.13)	(0.19)	(0.09)
1991	28.6	19.9	13.6	8.7	8.7	5.4
	(0.44)	(0.24)	(0.26)	(0.13)	(0.2)	(0.1)
1992	28.2	20.2	13.8	9.0	8.9	5.6
	(0.43)	(0.24)	(0.27)	(0.14)	(0.21)	(0.1)
1993	29.8	21.0	14.2	9.4	9.1	5.9
	(0.45)	(0.25)	(0.27)	(0.14)	(0.21)	(0.11)
1994	28.7	20.4	13.7	9.1	8.7	5.7
	(0.45)	(0.25)	(0.28)	(0.14)	(0.21)	(0.11)
1995	27.7	19.7	12.8	8.5	8.0	5.3
	(0.46)	(0.26)	(0.27)	(0.14)	(0.2)	(0.11)
1996	27.4	19.5	12.7	8.5	8.0	5.3
	(0.46)	(0.25)	(0.27)	(0.14)	(0.21)	(0.11)
1997	26.3	18.7	12.5	8.3	8.0	5.3
	(0.46)	(0.25)	(0.28)	(0.14)	(0.22)	(0.11)
1998	24.9	17.8	11.7	8.0	7.5	5.1
	(0.44)	(0.24)	(0.26)	(0.13)	(0.21)	(0.11)
1999	23.6	17.1	10.6	7.4	6.6	4.7
	(0.43)	(0.24)	(0.25)	(0.13)	(0.19)	(0.1)
2000	22.7	16.6	10.0	7.1	6.2	4.5
	(0.44)	(0.24)	(0.24)	(0.13)	(0.19)	(0.1)

Notes: Poverty rates are based on 130 percent of the official poverty line, and all indexes are multiplied by 100. The first column under each of the three indexes lists the child poverty rates and the second column lists the poverty rate for the full sample.

Source: ERS estimates are based on CPS March Supplement data and standard errors (in parentheses) are corrected for sample design effects following Jolliffe (forthcoming).

Appendix A: Design-Corrected Sampling Variance of P_α

To examine the efficacy of food stamps in reducing poverty, one needs both measures of poverty and measures of their sampling variance. Without standard errors for the poverty indexes, it is not possible to know if changes in poverty are statistically significant or an artifact of the sampling procedure. The decomposability of the FGT poverty indexes greatly simplifies the derivation of standard errors for the poverty measures. Decomposability means that P_α can be expressed as the weighted sum of j subregional P_αs, or $P_\alpha = \sum_j \omega_j P_{\alpha j}$, where ω_j is n_j/n, or the sample weight for j'th region and $P_{\alpha j}$ is the FGT poverty measure for region j. While decomposability is typically considered in terms of regions, it can be extended to individuals. This extension means that P_α can be expressed as a weighted average of n individual-level measures of P_α. This trivial extension greatly simplifies deriving the sampling variance, since variance for P_α can be estimated following the standard formula for estimating the variance of a mean.

If the CPS data were selected from a pure random draw, then a consistent estimate of the variance of P_α could be estimated as:[15]

$$V(P_\alpha) = n^{-1}(n-1)^{-1}\sum_{i=1}^{n} (P_{\alpha,i} - P_\alpha)^2 \qquad \text{(A1)}$$

The CPS data, though, are not from a pure random draw, but from a stratified, multistage sample design. Howes and Lanjouw (1998) show that the estimated standard errors for the FGT poverty indexes can have large biases when erroneous assumptions are made on the nature of the sample design. In particular, they show that if the sample design is multistaged but standard errors are derived from equation A1, then the standard errors will significantly underestimate the true sampling variance.

The result of Howes and Lanjouw follows directly from the classic work of Kish (1965), who shows that the variance of an estimated mean typically increases when the sample is a multistage design rather than a pure random sample. Let the ratio of the design-corrected variance estimate to the variance estimate based on a pure random draw be called the design effect. Kish shows that the design effect typically decreases due to stratification and increases due to the multistage selection process. As one example of the importance of correcting for sample design, the estimated design effect for the U.S. headcount index using the 2000 CPS data is 4.15 (Jolliffe, forthcoming). As a consequence, the standard errors from equation A1 would need to be more than doubled to obtain a consistent estimate of the true variance.

Kish provides a design-corrected estimate of the sampling variance of an estimated mean from a weighted, stratified, clustered sample. Because P_α is a weighted mean, we can modify Kish's result to give the estimated sampling variance of P_α from a complex sample design as:

$$V(P_{\alpha,w}) = \sum_{h=1}^{L} n_h (n_h - 1)^{-1} \sum_{i=1}^{n_h} \left(\sum_{j=1}^{m_{h,i}} w_{h,i,j} P_{\alpha,h,i,j} - \sum_{i=1}^{n_h} \sum_{j=1}^{m_{h,i}} w_{h,i,j} P_{\alpha,h,i,j} \right)^2 \qquad \text{(A2)}$$

where the h subscripts each of the L strata, i subscripts the cluster or primary sampling unit (PSU) in each stratum, and j subscripts the ultimate sampling unit (USU), so w_{hij} denotes the weight for element j in PSU i and stratum h. The number of PSUs in stratum h is denoted by nh, and the number of USUs in PSU (h,i) is denoted by m_{hi}.[16]

Estimation of equation A2 is straightforward if one has the sample design information. Unfortunately, for the CPS data this information has been censored for the public-use data files. To overcome this difficulty, following Jolliffe (forthcoming), we use an estimation strategy to create synthetic design variables that induce a similar design effect for variance estimation. The first step of the synthetic design approach for this analysis of poverty is to sort the data by income.[17] Then each set of four consecutive housing units is assigned to a separate cluster. The purpose of sorting is to induce a high level of intracluster correlation, and the choice of four matches the actual cluster sizes, on average, of the CPS. To capture the geographic aspect of the CPS stratification, we select as the synthetic strata the four regions of the United States (Northeast, Midwest, South, and West). These synthetic cluster and strata variables are then passed to equation A2 to estimate the sampling variance. See Jolliffe (forthcoming) for a more detailed description of the approach.

[15] Kakwani (1993) presents an alternate representation of variance estimates for the FGT indexes, and his derivation is also based on the assumption that the sample design is a pure random sample.

[16] The poverty and sampling variance estimates are documented in more detail in Jolliffe and Semykina (1999).

[17] The methodology requires sorting the data on the variable most relevant to the analysis.