Food Assistance and Well-Being

The goal of most food assistance programs in both countries is to improve the nutrition of lower income households. In addition, by freeing up money previously allocated to food expenditures, the well-being of households over other dimensions may improve as well. Research on the benefits of food assistance programs in the United States, especially in terms of the Food Stamp Program, is more extensive than for Mexican food assistance programs. Here we review several studies that examine the effect of food assistance programs on food security, nutrition, and food consumption in the United States with brief references to the available literature for Mexico. We conclude this section with a recalculation of poverty rates in Mexico after the inclusion of food assistance benefits.

Food Assistance and Food Insecurity

In the United States, the "USDA food insufficiency question," one measure of food insecurity, has been included on numerous surveys since the early 1970's. This question asks respondents to describe their household's recent food intake by responding to the following question: "Which of these statements best describes the food eaten in your household in the last four months?" They may choose one of four answers: (1) "enough of the kinds of food we want to eat"; (2) "enough but not always the kinds of food we want to eat"; (3) "sometimes not enough to eat"; or (4) "often not enough to eat." Households reporting that they sometimes or often do not get enough to eat are considered food insufficient and are asked a further question: "In what month(s) did your household not have enough to eat?"[23]

Gundersen and Oliveira (1999) examined the effect of food stamps on food insufficiency, using the above question. Out of eligible households, 8.5 percent of participating households were food insufficient, while 4.2 percent of nonparticipants were food insufficient. On the surface, this is surprising: participants are presumed to have more resources, in the form of food stamps, to purchase enough food to avoid food insufficiency. However, this breakdown does not accurately portray the effect of food stamps on food insufficiency. Households more likely to be food insufficient, with or without food stamps, may also be the same households more likely to enter the program. If so, there are two main consequences. First, the program is effectively targeting its benefits insofar as households most in need are receiving the benefits. Second, the positive effects of food stamps on food insufficiency are diminished because of adverse selection.

Gundersen and Oliveira showed that with a univariate probit model, one finds that participation in the Food Stamp Program is associated with substantially higher probability of being food insufficient. However, for reasons noted above, this finding is biased if households more likely to receive food stamps are also more likely to be food insufficient. To account for this possible endogeneity, they used a simultaneous equation model with two probits to estimate simultaneously the impact of participation on the food sufficiency status of households and the impact of food insufficiency on the probability of participating in the program. Results from this model indicate substantially different results than if separate univariate probits are analyzed. In particular, food stamps have no effect on food insufficiency, and food insufficient households are no more likely to receive food stamps than food sufficient households. Households with some of the characteristics associated with food insufficiency, though, are more likely to join the Food Stamp Program, indicating that effective targeting exists over this dimension.

Two other studies also looked at the effect of food stamps on food insufficiency. In a study of hunger among adult patients receiving medical care in an urban hospital in Minnesota, Nelson, Brown, and Lurie (1998) found that loss of food stamps was a significant determinant of food insufficiency. In a study of households with incomes less than 200 percent of the poverty line, using monthly data over a 9-month time horizon, Gundersen and Gruber (1999) found a similar result for a wider sample. Food-insufficient households were almost three times as likely to have lost food stamp benefits as food-sufficient households. Out of all households in the sample, 5.9 percent had lost their food stamp benefits. Food-insufficient households had a food stamp loss rate of 14.8 percent, while food-sufficient households had a food stamp loss rate of 5.4 percent.

Food Assistance and Nutrition

There have been numerous studies of the effect of food assistance programs on nutritional intake in the United States. The studies we review all controlled for factors other than food assistance participation. Those other factors included income, self-selection into the programs (for reasons discussed above in the context of food insecurity), location, household size, household composition (for example, single-parent household, dual-parent household), education, and age.

Studies of nutrient intake levels, all using the CSFII data set, have found, holding all else constant, participants had higher nutrient intake levels than eligible nonparticipants. Devaney and Moffitt (1991) found that the marginal propensities for low-income households to consume nutrients out of food stamps is higher than out of cash for each of the nutrients.[24] Basiotis, Kramer-LeBlanc, and Kennedy (1998) examined the effect of food stamps and WIC on the Healthy Eating Index (HEI), an index of overall diet quality. They found that above some minimum food stamp benefit level, food stamp recipients had higher HEI scores than eligible nonre-

[23]Several studies have confirmed the validity of the USDA food sufficiency question as a measure of decreased food intake (Cristofar and Basiotis, 1992, and Rose and Oliveira, 1997).

[24]The nutrients are food energy, protein, vitamin A, vitamin C, thiamin, riboflavin, vitamin B6, calcium, phosphorus, magnesium, and iron. They used the 1989-90 CSFII.

cipients.[25] Wilde, Ranney, and McNamara (1999) found that food stamp use leads to statistically significantly higher intakes of meats, added sugars, and total fats, three economically efficient sources of food energy.

Similar results held for WIC recipients.[26] Oliveira and Gundersen (1999) considered the effect of WIC on children ages 1 to 4. They found that, with and without controlling for possible selection bias, WIC recipients had higher nutrient intakes for most nutrients than eligible nonrecipients.[27] Wilde, Ranney, and McNamara (1999) found that, all else equal, WIC recipients had lower intakes of added sugars. Earlier studies using different methodologies have also found improvements in nutrient intake among WIC recipients. A 1989 National WIC Evaluation found that children receiving WIC had higher mean intakes of iron, vitamin C, thiamin, niacin, and vitamin B6, without an increase in food energy intake. This lack of an increase in food energy indicates that there was an increase in the nutrient density of the diet (U.S. Dept. Agr., Food and Nutrition Serv., 1989). Yip et al. (1987) showed that the WIC program was partly responsible for the over 60 percent decline in iron deficiency anemia from 1975 to 1985. WIC also appears to increase breast-feeding among recipients (U.S. Dept. Agr., Food and Nutrition Serv., 1995, 1992, 1989). Other post-1980 analyses of the effect of food assistance on nutrition include Alkin et al., 1985; Butler and Raymond, 1996; and Rose, Habicht, and Devaney, 1997.

The only studies we are aware of in Mexico regarding the effect of food assistance programs on nutrition are a 1980 joint study by the Instituto Nacional de Nutrición and Harvard University about the now-defunct Mexico City milk program and a 1992 study about the distribution of dehydrated milk through LICONSA. Both of these found little beneficial effects of the programs. One conclusion was that if poorer households were reached instead of the relatively better off households, a greater effect would have been realized (Chavez et al., 1996; p. 175).

The Effect of Food Assistance Versus Cash on Food Consumption

There have been numerous studies comparing the relative contribution of food stamps versus cash on the marginal propensity to consume food (see, e.g., Fraker, Martini, and Ohls, 1995; Levedahl, 1995; and Moffitt, 1989). Using "cash-out experiments," where a random sample of food stamp recipients receive cash instead of food stamps and a control group continues to receive food stamps, these studies found that the marginal propensity to consume food out of food stamps was higher than out of cash. While this finding may be expected for households who would spend less on food in the absence of food stamps than they receive in food stamps, it is unexpected for infra-marginal households (households spending more on food than they receive in food stamps). These infra-marginal households constitute about 90 percent of food stamp households. Studies have also found this for WIC (Arcia, Crouch, and Kulka, 1990).

Food Assistance and Poverty Rates

U.S. poverty rates are calculated based on households' pretax income. One common criticism of this method is that in-kind benefits like food stamps and WIC are not included (for example, Citro and Michael, 1995). For example, suppose the Food Stamp Program expanded (as occurred in the early 1970's), but there was no change in the poverty rate. The beneficial effect of expanding food stamps would thus not be reflected. The effectiveness of in-kind benefits in reducing poverty can be figured by the extent to which the poverty rate is reduced when the value of in-kind benefits is added to cash income. Using 1997 data, the U.S. poverty rate, as measured by the head count ratio, declined by 1.4 percentage points after food assistance and housing benefits were included (Dalaker and Naifeh, 1998; p. xv).

Two types of measures are used to characterize poverty in Mexico. The first type uses more direct measures of well-being. These direct measures are generally defined with respect to housing quality and community services. These measures generally do not use nutrition information, except indirectly (for example, lack of running water may produce higher rates of sickness, leading to higher malnutrition rates), although they are probably highly correlated with malnutrition measures. The Indice de Marginación is one such measure. The second type of poverty measure uses household income or expenditures. Common poverty lines are defined as one minimum salary, two minimum salaries, the minimum expenditures needed to purchase the most basic needs, and the minimum expenditures needed to purchase a slightly larger set of basic needs. These latter two lines are based on baskets of goods established by the General Coordinator for the National Plan for Marginal Zones (COPLAMAR): the Canasta Normativa Alimentaria (CAN) and the Canasta Normativa de Satisfactores Esenciales (CNSE) (COPLAMAR, 1985).

We analyzed how poverty rates are affected by the inclusion of food assistance benefits.[28] We do not have data on whether any household receives food assistance benefits; rather, we just know the percentage of people receiving benefits in every State, broken down by type of assistance. This information is taken from the 1995 Conteo de Poblacion y Vivienda (INEGI, 1997). From the 1994 Encuesta Nacional

[25]As opposed to other indexes that focus on nutrients, the HEI is measured almost exclusively with respect to the consumption of 10 broad categories of foods: grains, vegetables, fruit, dairy, meat, total fat, saturated fat, cholesterol, sodium, and variety.

[26]In addition to positive impacts on nutrition, in comparison to non-participants, WIC participants, ceteris paribus, have longer pregnancies, fewer premature births, a lower incidence of moderately low and very low birth weight, fewer infant deaths, and are more likely to receive prenatal care (U.S. Dept. Agr., Food and Nutrition Serv., 1993, 1992).

[27]In the nonselection bias model, the nutrients for which WIC recipients had higher intakes than nonrecipients are iron, vitamin C, vitamin A, vitamin B6, and folate. In the selection bias model, the nutrients are iron, calcium, vitamin B6, and folate.

[28]We implicitly assume that food assistance benefits do not produce any changes in behavior among low-income households. For more on the reasons behind this assumption, see "Identification of Recipients" above.

de Ingreso-Gasto de Hogares (ENIGH), though, we do have total monetary and nonmonetary expenditure information at the household level (INEGI, 1992). If food assistance is received, the value of food assistance benefits per person in a household is taken from *Informe de Gobierno* (1998). Since we do not know the exact distribution of benefits, we consider three possible distributions of benefits.

First, we imputed the value of food assistance benefits to households, assuming that in each State the benefits are evenly distributed throughout the population below the poverty line. We took the current level of benefits in each State as reported in the CPV and assigned each poor family an equal share of these benefits. For example, in Chiapas where 5.68 percent of households received LICONSA and 62.39 percent of households were poor, each household was assigned a 9.10-percent share of LICONSA benefits (62.39 percent divided by 5.68 percent).[29]

Second, we imputed the value of food assistance assuming that benefits are perfectly targeted within States. Perfect targeting implies that only the poorest households receive benefits. For each State, we took the current number of beneficiaries as reported in the CPV, but assigned benefits only to the poorest x households, where x is the number of current beneficiaries. Each household receiving benefits was assigned an amount for any particular benefit equal to the percentage of households receiving the benefit times the value of the benefit. For example, in Chiapas, the poorest 14.03 percent of households would receive benefits, and the remaining 85.97 percent would not.

The third scenario does not rely on the distribution of benefits by State. Instead, we assumed that benefits were perfectly targeted nationally. Nationally, 20.16 percent of households received benefits in 1995, and so benefits were assigned to the poorest 20.16 percent of households, regardless of their State of residence. For each of the households, the level of benefits was assigned as in scenario 2.

We used the following general axiomatically derived poverty measure, the Foster-Greer-Thorbecke measure, for our analysis:

$$P_\alpha = \left(\frac{1}{n}\right)\sum_{i=1}^{q}\left(\frac{Z - Y_i}{Z}\right)^\alpha$$

where n is the total number of households, Z is the poverty line, q is the number of households whose expenditure falls below the poverty line, and Y_i is the expenditure of the ith household. The parameter α is greater than or equal to zero. When α is equal to zero, all persons below the poverty line are equally reflected in the poverty measure. When it approaches infinity, only the income of the household with the lowest income is reflected.

When α is zero, this equation defines the head count index. The head count index is simply the fraction of the population whose income falls short of the poverty line. When α is one, the equation above defines the proportional poverty gap (PPG). The PPG accounts for the level of income of the poor (that is, the intensity of the poverty). The PPG weights the head count index by the ratio of the average income shortfall of the poor to the poverty line. When α equals two, the equation above defines the so-called distribution sensitive index. The distribution sensitive index accounts for the severity of poverty by giving greater weight to the income of the poorest households.[30]

Table 3 displays the results for the estimation of poverty rates using the ENIGH survey data on expenditures. The first column lists the estimates for poverty rates based on household expenditure per capita without the inclusion of food assistance benefits. The poverty rates for the head count, PPG, and distribution sensitive measures are 0.286, 0.098, and 0.047 (see equation above). Under the three scenarios described in the previous section, the poverty estimates for household expenditure per capita with the inclusion of food assistance are 0.282, 0.095, and 0.045 if benefits are distributed equally to all poor households (by State); 0.284, 0.096, and 0.045 if benefits are distributed to the poorest households (by State); and 0.286, 0.095, and 0.044 if benefits are distributed to the poorest households in the country. Below each of the rows with the poverty measures, the decline in the poverty rate for each scenario is presented. The absolute declines in poverty rates translate to the following relative declines. For scenario 1, the inclusion of food assistance benefits implies a 1.5-percent decline in the poverty rate for the head count measure; a 2.6-percent decline for the poverty gap measure; and a 3.2-percent decline for the distribution sensitive measure. For scenario 2, the relative declines are 0.6 percent, 2.0 percent, and 3.7 percent. For scenario 3, the relative declines are 0 percent, 2.8 percent, and 5.2 percent. In none of these cases is the decline in poverty statistically significant at usual confidence intervals.[31]

These declines in poverty rates due to the inclusion of food assistance benefits are substantially less than in the United States. The decline in the poverty rate in the United States is about 10.2 percent, although this figure includes other in-kind benefits such as housing assistance (but not medical insurance). Two primary differences between food assistance programs in the two countries may explain the smaller effect on poverty in Mexico. First, the level of benefits as a

[29]Consistent with the discussion of benefits above, the actual amount of LICONSA benefits assigned depends on the number of children below the age of 12. A household with no children, for example, would not get benefits.

[30]For greater details on the data sets used, the assumptions used to impute benefits, the methods of calculating levels of benefits, the poverty measures, and an analysis broken down by food assistance program, see Gundersen and Kelly, 1999.

[31]To calculate the t-statistics in tables 3 and 4, we used a technique derived from Kakwani, 1993. The t-statisic is

$$t = \frac{\left(\hat{P}_1 - \hat{P}_2\right)}{SE\left(\hat{P}_1 - \hat{P}_2\right)}, \text{where } SE\left(\hat{P}_1 - \hat{P}_2\right) = \left(\frac{\hat{\sigma}_1^2}{n_1}d_1 + \frac{\hat{\sigma}_2^2}{n_1}d_2\right)^{1/2}, \hat{\sigma}^2 = \left[\frac{1}{n}\sum_{i=1}^{q}\left(\frac{Z - Y_i}{Z}\right)^\alpha\right]^2, \text{and}$$

$d_i = \rho(v\text{-}1)+1$, i=1,2 and, where d_i is the design effect for the ith sample, ρ is the intraclass correlation coefficient, and v is the average number of households per cluster.

Table 3—Poverty rates with and without food assistance benefits, Mexico

Poverty measure	Food assistance distribution scenarios		
	Scenario 1	Scenario 2	Scenario 3
	Equal distribution to all poor households (by State)	Distribution to poorest households (by State)	Distribution to poorest households (for country)
Head count (α=0)	0.2815	0.2843	0.2860
Change in poverty rates due to benefits	.0044 (.500)	.0017 (.173)	0 (0)
Poverty gap (α=1)	.0952	.0956	.0949
Change in poverty rates due to benefits	.0025 (.595)	.0020 (.484)	.0027 (.653)
Distribution sensitive (α=2)	.044	.0447	.0441
Change in poverty rates due to benefits	.0015 (.617)	.0017 (.693)	.0024 (.976)

Notes: T-statistics are in parentheses. The poverty rates without food assistance benefits for the poverty measures are 0.2860 (α=0), 0.0976 (α=1), and 0.0465 (α=2).

percentage of income is much lower in Mexico. In the United States, the nominal value of food stamps can be as much as 50 percent of a household's income (Ohls and Beebout, 1993). In Mexico, under the assumption that a household receives benefits from every food assistance program, the average family below the poverty line receiving food assistance in an urban area would receive a maximum of 3.8 percent of its total expenditures in food assistance benefits and the average rural family would receive a maximum of 5.1 percent.

Second, a far larger percentage of people participate in the United States. In 1997, over 90 percent of households with positive incomes below the poverty line participated in the Food Stamp Program (Castner and Cody, 1999, table 4).[32] Using the figures from the CPV, in Mexico less than 70 percent of the low-income population participates in a food assistance program. These differences can be ascribed to the targeting methods used in the countries – in the United States there is no geographic targeting and any income-eligible household can participate, while in Mexico, a person could be income-eligible but not live in a geographically targeted area.

For a comparison with the United States, we now consider how poverty rates would differ in Mexico under the supposition that food assistance benefits were expanded in both these directions; that is, if average benefits and participation rates were both increased. We simulate three cases with higher average benefit levels and three cases with higher participation rates. The results are displayed in table 4.

To simulate the effect on poverty rates of higher average benefit levels, we assume that Mexico implements 10-, 25-, and 50-percent increases in the benefits of each program. With a 10-percent increase in benefits, for scenario 1, the inclusion of food assistance benefits implies a 1.6-percent decline in the poverty rate for the head count measure; a 2.8-percent decline for the poverty gap measure; and a 3.7-percent decline for the distribution sensitive measure. For scenario 2, the relative declines are 0.7 percent, 2.3 percent, and 4.1 percent. For scenario 3, the relative declines are 0 percent, 3.1 percent, and 5.6 percent. With a 50-percent increase in benefits, for scenario 1, the inclusion of food assistance benefits implies a 2.3-percent decline in the poverty rate for the head count measure; a 4.0-percent decline for the poverty gap measure; and a 4.7-percent decline for the distribution sensitive measure. For scenario 2, the relative declines are 0.9 percent, 3.1 percent, and 5.4 percent and for scenario 3, the relative declines are 0 percent, 4.2 percent, and 7.8 percent.[33] (The preceding declines are based on the results in table 4.)

To simulate the effect on poverty rates of an expansion in the number of beneficiaries, we assume, as above, that Mexico implements 10-, 25-, and 50-percent increases. Because the scenario of assigning equal benefits to all poor households in a State does not make sense in this context, we only consider the cases of assigning benefits to the poorest households by State and in the country. For all scenarios and poverty measures, the decline in poverty is smaller due to expansion in the number of recipients than due to expansion in benefit levels. The difference can be quite stark in the case of a 50-percent increase: for scenario 2 under the distribution-sensitive measure, the decline is 25 percent greater for an increase in benefit levels, and for scenario 3 under the distribution-sensitive measure, almost 40 percent greater. These large differences are probably due to the large number of nonpoor recipients in major population centers such as the Distrito Federal, where 28 percent of households

[32]Other food assistance programs have even higher participation rates among poor households.

[33]For the head-count and poverty-gap poverty measures, the decline in poverty is not significant at usual confidence intervals for any of these increases, irrespective of the targeting assumptions. This is also true for 10- and 25-percent increases for the distribution sensitive measure. With a 50-percent increase in benefits, the decline in poverty is statistically significant (at the 10-percent level) for the distribution sensitive measure under the assumption that benefits are targeted to the poorest households in the country.

are poor but 36 percent of residents participate in at least one food assistance program. When the number of beneficiaries increases in these areas, there is no decrease in the poverty rates because the incomes of nonpoor households are not reflected in these poverty measures. If Mexico is interested in expanding its food assistance programs and the goal is reduction of poverty, expanding the benefit level would be much more effective than expanding the number of beneficiaries.

We recognize that food assistance programs are not income transfer programs, rather they are nutrition supplement programs. Insofar as the poverty rate is a proxy for the extent of deprivation over more direct measures of well-being (such as nutrition), this recalculation of poverty rates measures the decrease in deprivation due to food assistance benefits. The effects on nutrition may differ.

Table 4—Simulations of changes in poverty rates in Mexico due to increases in benefit levels and number of recipients

Poverty measure	Food assistance distribution scenarios		
	[1] Equal distribution to all poor households (by State)	[2] Distribution to poorest households (by State)	[3] Distribution to poorest households (for Country)
	Change in poverty rates due to benefits		
	10-percent increase in benefit levels		
Head count (α=0)	0.0047	0.0020	0
	(.482)	(.197)	(0)
Poverty gap (α=1)	.0027	.0022	.0030
	(.653)	(.533)	(.719)
Distribution sensitive (α=2)	.0017	.0019	.0026
	(.676)	(.763)	(1.074)
	10-percent increase in number of recipients		
Head count (α=0)		0020	0
		(.205)	(0)
Poverty gap (α=1)		.0023	.0030
		(.552)	(.714)
Distribution sensitive (α=2)		.0019	.0025
		(.757)	(1.006)
	25-percent increase in benefit levels		
Head count (α=0)	.0057	.0022	0
	(.577)	(.221)	(0)
Poverty gap (α=1)	.0031	.00025	.0033
	(.738)	(.606)	(.818)
Distribution sensitive (α=2)	.0019	.0021	.0030
	(.764)	(.867)	(1.221)
	25-percent increase in number of recipients		
Head count (α=0)		.0023	0
		(.237)	(0)
Poverty gap (α=1)		.0025	.0033
		(.600)	(.804)
Distribution sensitive (α=2)		.0020	.0025
		(.808)	(1.034)
	50-percent increase in benefit levels		
Head count (α=0)	.0065	.0025	0
	(.656)	(.252)	(0)
Poverty gap (α=1)	.0037	.0030	.0041
	(.880)	(.727)	(.985)
Distribution sensitive (α=2)	.0022	.0025	.0036
	(.910)	(1.040)	(1.467)
	50-percent increase in number of recipients		
Head count (α=0)		.0023	.0031
		(.237)	(.316)
Poverty gap (α=1)		.0025	.0036
		(.600)	(.864)
Distribution sensitive (α=2)		.0020	.0026
		(.808)	(1.050)

Notes: T-statistics are in parentheses.