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## IMPACT OF ELIMINATION OF THE FOOD STAMP PROGRAM'S PURCHASE REQUIREMENT ON PARTICIPANTS' FOOD PURCHASES

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The Food Stamp Act authorizes the distribution of food coupons (stamps) to households which meet certain income eligibility requirements. This legislation enables low-income households to buy more food of greater variety to improve their diet. In fiscal 1979, the cost of the Food Stamp Program amounted to \$6.7 billion and the number of persons participating in the program averaged 18.9 million.

The magnitude of the Food Stamp Program has spurred questions concerning its effectiveness. Past studies (Neenan and Davis; Reese, Feaster, and Perkins; USDA 1975; West and Price) suggest that the Food Stamp Program is at least twice as effective as comparable amounts of income supplements in expanding expenditures for food among low-income households. However, these studies did not analyze the likely reduction in program effectiveness resulting from elimination of the purchase requirement. The purpose of this article is to provide estimates of the effectiveness of the Food Stamp Program with and without the purchase requirement in expanding food expenditures among low-income households. Program effectiveness is also compared with that of a cash transfer program providing the same level of benefits.

The Food Stamp Program's purchase requirement was eliminated on January 1, 1979. The latest available data on food expenditures by food stamp households were collected prior to elimination of the purchase requirement. Therefore, a model is developed to predict or simulate food stamp recipients' food expenditure behavior under alternative transfer programs. Previous research by Mittlehammer and West and by Reese, Feaster, and Perkins was helpful in developing the theoretical framework underlying the simulation model.

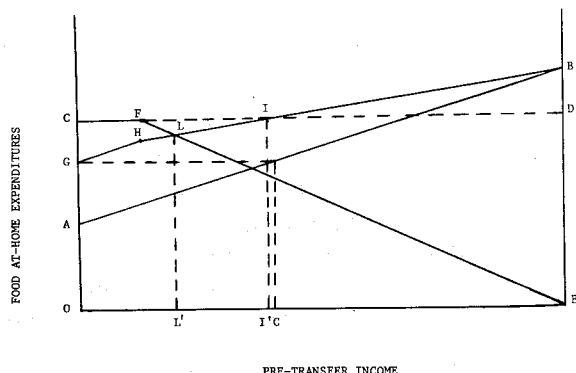
### THEORETICAL FRAMEWORK

Figure 1 illustrates the theoretical framework. Line AB represents the relationship between household at home food expenditures and income prior to participation in the Food Stamp Program.<sup>1</sup> The relationship between the value of food coupons (stamps) a house is eligible to receive and household income is given by CFE.

Assume the transfer is distributed in the form of cash rather than food coupons and households allocate this transfer between food and nonfood in the same fashion as additional income. Under these conditions the relationship between household at home food expenditures and (pretransfer) income for participant households is given by GHB. This relationship is derived by multiplying the value of the transfer at each level of income by the marginal propensity to spend on food at home (slope of AB) and then adding this incremental change in food at home expenditure to line AB. For example, at an income of 0 dollars the transfer is equal to C dollars. If the transfer is treated as income, the household would allocate G minus A additional dollars to food at home and the remainder (C-[G-A]) to nonfood and food away from home. Thus, in total, a participant household with a pretransfer income of 0 dollars will spend G dollars on food at home. By selecting successively higher income levels and following the same procedure one can derive a locus of points which defines GHB.

Under the provisions of the current Food Stamp Program the transfer is distributed to participant households in the form of food coupons rather than cash. This form of transfer may encourage some low-income households to spend more on food at home than a cash transfer of the same value. For example, participant households will not spend less than the value of food coupons received on food at home (if the marginal utility derived from food is assumed to be positive). In Figure 1, a participant household with an income of 0 dollars will spend C dollars on food at home and allocate A additional dollars to other items. If the transfer is given to households in the form of food coupons, participant households' food at home expenditure/income relationship becomes CFLB. Thus, households with incomes below L' would spend more on food at home (and less on nonfood and food away from home) than they would if they were given a cash transfer of the same value. The food expenditure behavior of households with incomes above L' would remain unchanged regardless of whether the transfer is in the form of food coupons or cash.

FIGURE 1. IMPACT OF THE FOOD STAMP PROGRAM ON HOUSEHOLD FOOD AT-HOME PURCHASES



Before January 1, 1979, the Food Stamp Program contained a purchase requirement. Under this program all households of the same size received the same allotment of food coupons (C dollars in Figure 1), but the amount of income spent to obtain this allotment varied by household income (difference between CD and CFE in Figure 1). Under these program provisions *all* food stamp households would spend at a minimum C dollars on food at home. For this program, the food at home expenditure/income relationship for participant households is denoted by CIB in Figure 1. The difference between CIB and CFLB, FLI, denotes the decline in food at home purchases resulting from elimination of the purchase requirement, if all other program provisions such as funding level remain unchanged when the purchase requirement is eliminated.<sup>2</sup>

To illustrate the implications of the theoretical framework assume that relationships between income and at home (line AB Figure 1) and away from home food expenditures have been obtained for households prior to participation in the Food Stamp Program. Also assume these relationships are given by

$$(1) \quad AH_h = A_0 + A_1 Y_h$$

$$(2) \quad AFH_h = B_0 + B_1 Y_h$$

where  $AH_h$  is at home food expenditures,  $AFH_h$  is away from home food expenditures, and  $Y_h$  is the  $h^{th}$  household's income prior to participation in the Food Stamp Program. If the transfer, denoted by  $BV_h$  (line CFE in Figure 1), is distributed in the form of cash the household's food expenditures become

<sup>1</sup>A linear relationship between income and food at home expenditures was assumed, but is not necessary to derive the results presented. In Figure 1, all factors other than income, such as household size, are assumed to be held constant.

<sup>2</sup>The procedures used to develop Figure 1 can also be applied to analyze the impact of the Food Stamp Program on food away from home expenditure behavior. A similar figure describing the relationship between food away from home expenditures and income is not presented because it is easily derivable from Figure 1.

<sup>3</sup>Elimination of the purchase requirement or changing to a cash transfer program could encourage program participation. It is assumed that incomes of households choosing to participate in the program after elimination of the purchase requirement or in a cash transfer program would not differ substantially from those of households participating in the program prior to elimination of the purchase requirement.

<sup>4</sup>Participants' food expenditures equal actual food expenditures plus the value of food coupons used to purchase food for at home consumption. Household income excludes the value of food coupons received from the Food Stamp Program.

$$(3) \quad AH_h' = A_0 + A_1 (Y_h + BV_h)$$

$$(4) \quad AFH_h' = B_0 + B_1 (Y_h + BV_h)$$

Now assume the participant household receives free food coupons having a value of  $BV_h$  (program without a purchase requirement). The theoretical framework indicates that the household's food expenditures will be unchanged from those under a cash transfer program if its food at home expenditure under a cash transfer program ( $AH_h'$ ) equals or exceeds the value of food coupons received ( $BV_h$ )—i.e., income equal to or greater than  $L'$ .<sup>3</sup> However, if  $BV_h$  exceeds  $AH_h'$  (income less than  $L'$ ), the household's food expenditures become

$$(5) \quad AH_h'' = BV_h$$

$$(6) \quad AFH_h'' = B_0 + B_1 (Y_h + AH_h)$$

In this case, the household will spend more on food at home ( $BV_h - AH_h'$ ) but less on food away from home ( $AH_h - BV_h$ ) than it would under a cash transfer program. In addition, the amount of income that is "freed" to purchase food away from home and nonfood items becomes the amount of income allocated to food at home prior to participation in the Food Stamp Program.

Now suppose the household must spend a certain amount represented by  $COST_h$  to receive a transfer of food coupons worth  $EXV_h$  and the net transfer is  $BV_h$  (program with a purchase requirement). The theoretical framework indicates that under these circumstances the household's food expenditures will be unchanged from those under a cash transfer program if its food at home expenditure under a cash transfer program ( $AH_h'$ ) equals or exceeds  $EXV_h$  (i.e., income equal to or greater than  $I'$ ). Otherwise the household's food expenditures become

$$(7) \quad AH_h''' = EXV_h$$

$$(8) \quad AFH_h''' = B_0 + B_1 (Y_h + AH_h - COST_h)$$

In this case, the household will further expand food at home purchases and decrease away from home food purchases. Also, the household could reduce away from home food purchases below the level prior to participation in the Food Stamp Program if the cost of the food coupons exceeds at home food purchases prior to participation.

## DATA SOURCE

Basic data required to analyze the food expenditure behavior of food stamp recipients under alternative transfer programs include estimates of equations 1 and 2 and information on the characteristics of food stamp recipients. Data from the diary portion of the 1972-74 Bureau of Labor Statistics (BLS) Consumer Expenditure Survey (CES) were used to provide information on food expenditures and household characteristics of food stamp recipients. This portion of the 1972-74 CES data was collected in two separate 12-month periods (USDL). Data on participation in the Food Stamp Program were collected only in the second survey period. In that survey period, data were collected on 610 food stamp participant households. However, 53 food stamp households were eliminated from the analysis because either the household reported zero for both the value of food coupons received and the purchase requirement, or the household's previous year's (before-tax) income exceeded twice the Food Stamp Program's maximum (allowable) income eligibility standard in effect during 1973-74.

The characteristics of the sample of participants appear to be representative of those of Food Stamp Program participant households. The average before-tax income of participant households in the sample was \$3,424. Average household size was 3.40 persons. In the 1972-74 CES, 1 and 2 person households accounted for 46 percent of all participants and 5 or more person households accounted for 28 percent. A survey of food stamp households taken in 1976 (USDA 1977) indicates that 1 and 2 person households accounted for 49 percent of all participants and 5 or more person households accounted for 21 percent.

A subsample of low-income households *not* participating in the Food Stamp Program was selected from the diary portion of the 1972-74 CES to provide information on the relationship between food expenditures and income *prior to* participation in the Food Stamp Program (equations 1 and 2). This subsample was selected because biased estimates of the marginal propensity to spend out of ordinary income may be obtained for low-income households if such estimates are based on food purchases of food stamp households (Salathe). Income eligibility standards for Food Stamp Program benefits in effect between July 1 and December 31, 1973, were used to select this subsample of households. The standards were adjusted upward by 20 percent to allow for tax and other nontax deductions such as excessive medical and housing costs. A total of 1697 non-participant households had incomes below these standards and their (before-tax) income averaged \$3,501.

Ordinary least squares regression was used to estimate the influence of income and other household characteristics on low-income nonparticipant households' food at home and food away from home expenditures. The mathematical form of the econometric model was

$$(9) \quad E_h^* = A_{01} + A_1 \text{URBN}_h + A_2 \text{NE}_h + A_3 \text{NC}_h \\ + A_4 \text{SH}_h + A_5 \text{WHT}_h + A_6 Y_h^* + A_7 \text{NAG1}_h \\ + A_8 \text{NAG2}_h + A_9 \text{NAG4}_h + A_{10} \text{NAG5}_h \\ + A_{11} \text{NAG6}_h + A_{12} S_h^*$$

where

$E_h^*$  = per capita household weekly expenditure on food at home (food away from home)

$\text{URBN}_h$  = 1 if household residence is urban, 0 otherwise

$\text{NE}_h$  = 1 if household residence is in the Northeastern region, 0 otherwise

$\text{NC}_h$  = 1 if household residence is in the North Central region, 0 otherwise

$\text{SH}_h$  = 1 if household residence is in the Southern region, 0 otherwise

$\text{WHT}_h$  = 1 if household head is not black, 0 otherwise

$Y_h^*$  = per capita household weekly before-tax income

$\text{NAG1}_h$  = the proportion of household members 10 years old or younger

$\text{NAG2}_h$  = the proportion of household members between 11 and 20 years old

$\text{NAG4}_h$  = the proportion of household members between 36 and 50 years old

$\text{NAG5}_h$  = the proportion of household members between 51 and 65 years old

$\text{NAG6}_h$  = the proportion of household members more than 65 years old

$S_h^*$  = the log of household size.

The proportion of household members between 21 and 35 years old was omitted to avoid singularity. The logarithm of household size was included to allow for economies of size in food purchasing.

The estimated parameter values obtained for the sample of low-income nonparticipants are reported in Table 1. These estimated equations provide empirical estimates of equations 1 and 2. The parameter estimates in Table 1 indicate that the marginal propensity to spend on food at home out of one dollar of (before-tax) income for low-income (nonparticipant) households is 6.1 cents. Food at home expenditures by low-income households do not differ significantly between urban and rural households. However, low-income households in the northeast spend significantly more on food at home than

TABLE 1. ESTIMATED ENGEL CURVES FOR LOW-INCOME NONPARTICIPANT FOOD STAMP HOUSEHOLDS

<sup>a</sup>Numbers in parentheses denote t-values.

Independent variables	Food at home	Food away from home
Intercept	5.3374 (5.23) <sup>a</sup>	3.5309 (6.06)
URBN	.0127 (.03)	.6228 (2.75)
NE	1.7838 (3.29)	.4647 (1.50)
NC	-.6521 (-1.31)	-.4268 (-1.50)
SH	-.2713 (-.57)	-.2583 (-.95)
WHT	-.2206 (-.50)	.6762 (2.68)
Y*	.0614 (3.72)	.0215 (2.28)
NAG1	-.8080 (-60)	-2.6769 (-3.48)
NAG2	-1.2266 (-1.35)	-.7108 (-1.37)
NAG4	1.5173 (1.46)	-.7218 (-1.22)
NAG5	3.8475 (5.11)	-2.1034 (-4.89)
NAG6	2.9135 (4.33)	-3.8600 (-10.04)
S*	.0729 (.20)	-1.3820 (6.63)
R <sup>2</sup>	.10	.12

similar households in other regions of the U.S. As the age of household members increases food at home expenditures also rise, probably reflecting an increase in the proportion of meals eaten at home.

The marginal propensity to spend on food away from home out of one dollar of income for low-income households is 2.2 cents. Low-income urban households spend significantly more on food away from home than rural low-income households. Also, low-income nonblack households spend more on food away from home than their black counterparts. Generally, households with members between 21 and 35 years old spend more on food away from home than other households.

## RESULTS

Data on household characteristics and income of Food Stamp Program participants from the diary portion of the 1972-74 CES were used to simulate the impact of alternative transfer programs on food purchases. To provide a basis for comparison, the estimated food at home and away from home equations were used to estimate food purchases by participants under the assumption of nonparticipation in the Food Stamp Program (e.g., transfer equals zero). The results, denoted as simulation I in Table 2, were generated by substituting the characteristics of food stamp households in the diary portion of the 1972-74 CES into the estimated equations in Table 1. These calculations indicate that if recipients had not participated in the Food Stamp Program their per capita weekly food expenditures

would have averaged \$9.28—food at home expenditures of \$7.71 plus food away from expenditures of \$1.57.

Data on the amount paid for food coupons (purchase requirement) and the value of food coupons received by Food Stamp Program participants from the diary portion of 1972-74 CES provide the basis for the remaining simulations. Participant households spent an average of \$40.59 per month to receive food coupons worth \$92.46. On a per capita weekly basis the net transfer amounted to \$4.00.

The impact of a Food Stamp Program with and without a purchase requirement on recipients' food at home and away from home expenditures was derived by using the previously described theoretical model. First, estimates of each household's food at home expenditure were derived under the assumption that the transfer was distributed in the form of cash rather than food coupons. Next, the predicted level of food at home expenditure was compared with the value of food coupons actually received. If the value of food coupons received did *not* exceed the predicted level of food at home expenditure no adjustment was made in the predictions for food at home or away from home expenditures. However, if the level of food at home expenditure was less than the bonus value under a simulated program without a purchase requirement, or exchange value under a simulated program with a purchase requirement, food at home and away from home expenditures were adjusted as denoted by equations 5-8. For example, under a simulated program without a purchase requirement food at home expenditures were set equal to the bonus value if predicted food at home expenditures under a cash transfer program were less than the bonus and food away from home expenditures were reduced appropriately.

TABLE 2. SIMULATED IMPACTS OF ALTERNATIVE TRANSFER SCHEMES ON PER CAPITA WEEKLY FOOD PURCHASES

<sup>a</sup>Increase in total food purchases from that given in Simulation I divided by the value of the transfer.

Simulation	Food at home	Food away from home	Total food	Net transfer	Program effectiveness <sup>a</sup>
I	\$7.71	\$1.57	\$9.28		
II	8.57	1.64	10.21	\$4.00	.233
III	8.70	1.64	10.34	4.32	.245
IV	8.10	1.66	9.76	4.32	.111
V	7.98	1.66	9.64	4.32	.083

Simulation II estimates the impact of the Food Stamp Program under the assumption that it contains a purchase requirement. For these circumstances, the model predicts per capita weekly food expenditures would have increased to \$10.21. Thus, if the Food Stamp Program contains a purchase requirement, the program is estimated to raise total food expenditures among participants by 10.0 percent. Food at home expenditures increased by 11.2 percent whereas food away from home expenditures increase by 4.5 percent.

Simulation II also provides a basis for validating the simulation model. Results from Simulation II indicate that on average each dollar distributed through a Food Stamp Program with a purchase requirement increases household expenditures for food by 23 cents. Previous studies suggest that each dollar distributed through the Food Stamp Program raises food purchases between 30 and 60 cents (Neenan and Davis; Reese, Feaster, and Perkins; USDA 1975; West and Price). However, these studies have tended to analyze only the program's impact on food at home expenditures. Because food stamps cannot be used to purchase food away from home these studies probably overestimate the impact of the Food Stamp Program on total food purchases.

Data on food expenditures by Food Stamp Program participants in the diary portion of the 1972-74 CES also provide a basis for validating the model because they include actual expenditures by food stamp participants prior to elimination of the purchase requirement. Participant households in the survey spent an average of \$10.15 per person per week on food. Thus, average total per capita food expenditures were overpredicted by only 6 cents per week (0.6 percent). The model underpredicted participants' actual (average) per capita weekly at home food expenditures by 59 cents (6.8 percent), and overpredicted per capita weekly away from home food expenditures by 65 cents (65.0 percent). Though the latter error is sizeable, it does not seem crucial to the analysis because away from home expenditures accounted for less than 10 percent of total food expenditures by food stamp households in 1972-74. One explanation for why the model underpredicts at home but overpredicts away from home food expenditures could be that low-income households view the (average) price of food at home as declining in relation to the price of food away from home and nonfood items after participation in the Food Stamp Program and thus substitute food at home for food away from home. However, participant households seem not to be constrained by the program to spend less on food away from home (or more on

food at home) than the amount predicted by the simulation model.

Simulation III differs only slightly from Simulation II. Its purpose is to make Simulation II comparable to subsequent simulations. Approximately one quarter of all participants in the diary portion of the 1972-74 CES partially participated (purchased a fraction of the total food coupon allotment) in the program. In subsequent simulations all participant households are assumed to have received the full food coupon allotment. If all participant households had purchased the total allotment of food coupons the average weekly per capita net transfer would have risen to \$4.32. If all participants had fully participated in the program, the model predicts that total weekly per capita food purchases by participants would have averaged \$10.34.

Simulation IV provides estimates of the impact of the Food Stamp Program after elimination of the purchase requirement. Using the equations in Table 1, the characteristics of food stamp participants, and the theoretical framework, the model predicts that total weekly per capita food expenditures of participants would have averaged \$9.76. On average, each dollar distributed through this program resulted in an increase in total food expenditures of 11 cents. Thus, elimination of the purchase requirement is estimated to reduce the ability of the Food Stamp Program to expand food purchases by slightly more than 50 percent. A comparison of away from home expenditures between simulations III and IV indicates that elimination of the purchase requirement increased away from home expenditures by participants only slightly (1.2 percent). However, elimination of the purchase requirement reduced food at home expenditures by participants by an average 6.9 percent.

In Simulation V the transfer is assumed to be distributed in the form of cash. Adding the value of coupons received (\$4.32 per person per week) to actual income reveals that if the transfer had been distributed in this manner participants' per capita weekly food expenditures would have averaged \$9.64. Thus, converting the current Food Stamp Program to a cash transfer program appears to have had little impact on participants' total food expenditures. Average food away from home expenditures would remain virtually unchanged, whereas food at home expenditures would be reduced by about 2 percent. A comparison of Simulations III, IV, and V reveals that a Food Stamp Program with a purchase requirement is about three times more effective in expanding food purchases than a cash transfer program providing the same benefits, but a Food Stamp Program without a

purchase requirement is only about 34 percent more effective than a cash transfer program.

The effectiveness of a transfer in the form of food coupons, however, depends on the household's characteristics. For example, in Simulation III (program with a purchase requirement), 290 of the 557 participant households had food purchases that were identical to those in Simulation V (i.e., their predicted at home food expenditures under a cash transfer exceeded the value of coupons received under a program with a purchase requirement). These households averaged 2.5 members and their per capita incomes averaged \$30.35 per week. The remaining 267 households (48 percent of the total) spent an average \$1.45 more per person per week on food than they did under a cash transfer program. These households averaged 4.3 members and their per capita incomes averaged \$17.51 per week. After elimination of the purchase requirement only 52 households (9 percent of the total) spent more on food than they did under a cash transfer program. Food expenditures of this group were increased by an average of \$1.20 per person per week. Their average size was 3.7 members and their per capita incomes averaged \$13.16 per week. Thus, if the attributes of Food Stamp Program households change, the program's impact on food purchases may also change. In addition, the results suggest that an increase in the proportion of participant households with incomes near the upper eligibility bound reduces the effectiveness of the Food Stamp Program in relation to a cash transfer program.

Elimination of the purchase requirement (or changing to a cash transfer program) probably encouraged more eligible households to participate in the Food Stamp Program. The study results are based on the assumption that the characteristics of new participants do not differ substantially from those of households

participating prior to elimination of the purchase requirement. Data collected by USDA's Food and Nutrition Service suggest that the incomes of new participants (after elimination of the purchase requirement) are not distinctly different from those of prior participants. A comparison of income distribution data from participant surveys taken in February 1978 and April 1979 reveals that the average income for all participants rose by less than 5 percent during that period (USDA 1979). Thus, the assumption that the characteristics of new participants do not differ substantially from those of participants prior to elimination of the purchase requirement is not overly restrictive.

## CONCLUSIONS

An analysis of each program's impact on household total food purchases indicates that a Food Stamp Program containing a purchase requirement is about three times more effective in expanding food expenditures (per dollar distributed) than a cash transfer program. However, after elimination of the purchase requirement the Food Stamp Program is found to be only 34 percent more effective in expanding food expenditures than a cash transfer program. When the Food Stamp Program contained a purchase requirement, 48 percent of all participant households were estimated to spend more on food than they would under a cash transfer program. After elimination of the purchase requirement less than 10 percent of all participant households were estimated to spend more on food than they would under a cash transfer program. Thus, elimination of the purchase requirement seems to severely reduce the ability of the Food Stamp Program to expand food purchases per dollar distributed. However, it also dramatically increases the purchasing freedom of participant households.

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