MODELING THE EFFECTS OF THE FOOD STAMP PROGRAM ON PARTICIPATING HOUSEHOLDS' PURCHASES: AN EMPIRICAL APPLICATION

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The present legal authority for the Food Stamp Program (FSP) is the Food and Agriculture Act of 1977. As adopted, the legislation includes a thorough overhaul of the FSP enacted into law in 1964. The FSP provides direct subsidies in the form of additional food dollars to low-income households to enhance the purchasing of nutritionally adequate diets. The most significant effect both on participating households and the food industry is the elimination of the purchase requirement whereby participants pay for food stamps. Under the new legislation, participants receive food stamps free of charge. The benefits received are roughly equivalent to the value of bonus stamps under the old program (Stucker and Boehm).[1]

Previous studies generally concur that participation in the FSP increases household food purchases (Reese, Feaster and Perkins; Neenan and Davis; West and Price). However, some research suggests that the food stamp purchase requirement had been a significant barrier to program participation for many eligible households (Love; Rungeling and Smith). For example, because they had to retain a certain level of cash for household expenses and emergencies or because their income receipts were not timely, some needy households were unable to make cash payments for food stamps at the appropriate times. Since January 1, 1979, when the new legislation took effect, the enrollment in the FSP has increased from 15.9 million people in December, 1978, to nearly 21 million in January 1, 1980. During the 1979 fiscal year, the FSP exceeded the congressionally budgeted 6.2 billion dollars by 650 million dollars.[2]

Directing more federal dollars to a larger number of the nation's poor under the new program will result in the FSP participant households as a group purchasing not only more food but more of other commodities as well. The legislation may free money that participants would have used to purchase food stamps for other uses. In fact, the possibility exists that individual recipients may spend less for food under the new program.

The objective of this study is to refine the theoretical framework and its application to analyze the effect of participation in the previous FSP on low-income households' food purchasing patterns. The effects of FSP transfer income on households' at-home food expenditure patterns for four major food commodity groups are statistically estimated using the 1972–73 Consumer Expenditure Diary Survey (CEDS) data. Although the CEDS data are inadequate to assess fully the effect of the new FSP on household purchasing behavior, estimates of the effects of the FSP, household income, and other socioeconomic characteristics on FSP households' food expenditures prior to the change of the program may provide some insight for assessing the possible effects and implications of the new program.

Specifically, the study develops a theoretical framework wherein two types of effects may be distinguished in analyzing the impact of the FSP on the participant household food purchases. The theoretical considerations are then used to divide the sample of FSP participant households into two subsamples for empirical estimation. To obtain parameter estimates of the empirical model, Tobit analysis is applied to the sample data. The application of the Tobit analysis in the present study is appropriate because the general structure of the empirical model is a limited dependent variable model. In addition, the study also demonstrates that the estimated income elasticity derived from Tobit analysis can be decomposed into two components, in which their economic interpretations are assessed in terms of the FSP.

THEORETICAL MODEL

Previous studies have utilized indifference curves to analyze the effect of FSP on household food purchasing behavior (Mittelhammer and West; Neenan and Davis). Alternatively, Salathe has proposed a theoretical model based on

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[1] Prior to the FSP reform, all food stamp participant households of a specified size were eligible to receive the same allotment of food stamps. Based upon net income, each household paid a variable amount for stamps. The amount of the subsidy, that is, the difference between the allotment value and the cash payment, is referred to as "bonus."

[2] Three major factors—increases in program benefits, increases in unemployment, and the extension of program availability to new project areas, were generally attributed to the increases in program participation and, consequently, program costs over the years. While new legislation tightened eligibility standards to reduce program costs, its major objective was to make the program easier for eligible nonparticipant households to receive food aid and thus to increase participation rates of the "poorest of the poor." It appeared that the elimination of the purchase requirement had achieved its legislative objective and contributed rather significant positive impact on participation and, thus, program costs.

income-consumption curves to analyze the FSP's effect over various levels of household income. Both approaches yield identical results if the households are assumed to be rational and allocate their income optimally so that their utility function is maximized for a given budget constraint (Salathe, p. 36). This study uses the indifference curve approach and suggests some theoretical considerations that were neglected in previous studies.

Indifference curve analysis is used to represent the effect of the FSP with purchase requirement on household food purchases (Figure 1). The initial household budget line is shown as NF. Under the old FSP, an eligible household may have paid AN dollars of their income and received AN′ dollars of food stamps, enabling them to purchase OB amount of food. Thus, N′F′ represents the new budget line as if the FSP participant household received a cash transfer income of NN′ dollars.

Since food stamps are in-kind transfer income, participation in the FSP affects the household's budget allocation. A portion of the new budget line N′C is unattainable because a secondary market for stamps is prohibited by law. Neenan and Davis suggest that the kinked line NDCF′ is the relevant budget constraint, given that food stamps are in-kind income supplement. However, under the provisions of the old program, eligible households were entitled to participate on a partial basis (purchase one-quarter, one-half, or three-quarters of the total eligible food stamp allotment). With the variable purchase options, the household's FSP eligibility modifies its budget constraint to a step-like line. In this case, all of the variable purchase options would increase the household's utility and the purchase of one-half coupon allotment would yield the highest utility (Clarkson). In addition to variable purchase options, the FSP allows intertemporal use of food stamps by the eligible participants; that is, food stamps can be purchased in one month and used in following months. Consequently, the relevant budget constraint for eligible FSP households would be represented by kinked line NCF′.

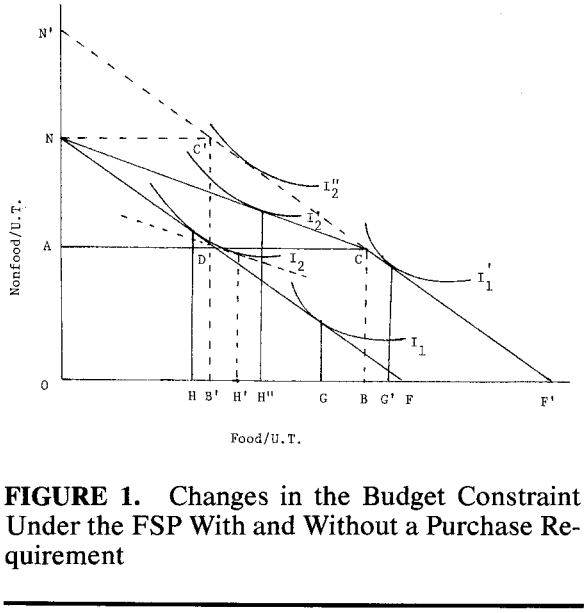

FIGURE 1. Changes in the Budget Constraint Under the FSP With and Without a Purchase Requirement

Given the relevant budget constraint NCF′, indifference-curve analysis aids in identifying effects of the FSP on household food purchasing behavior; namely, a pure income effect and a price effect. Distinguishing these effects depends on the point where the indifference curve is tangent to the budget line. A pure income effect occurs when the indifference curve and budget line are tangent along line segments CF′. A price effect occurs when the tangency is located along line segment NC.[3]

When a pure income effect occurs, participation in the FSP expands the household's food purchases by amounts consistent with the income elasticity of demand for food. Alternatively, if FSP recipients were given a transfer of income equivalent to the value of food stamp subsidies, their equilibrium level of food purchases and the level of utility attained would not change. The pure income effect is shown in Figure 1 by indifference curves I_1 and I_1', where the participant household's food purchase expands from OG to OG′.

Theoretically, if a FSP eligible household participates in the program on a partial basis, then a food stamp subsidy to the participant is equivalent to a decrease in the average price of food and is reflected in the budget line segment NC.[4] The resulting increase in food purchases is shown in Figure 1 by indifference curves I_2 and I_2'. The price effect is represented by the amount HH″. Although a price effect is relevant, its effect on FSP participation has not been clearly distinguished from the pure income effect. From the theoretical point of view, the price effect consists of two components, that is, substitution (due to change in the relative price ratio of food and non-food) and income effects. In the case of price effect, food purchases due to substitution and in-

[3]In the case where the indifference curve may be tangent to the kinked point C, the possible outcome cannot be identified. This is because of the unknown shape of the indifference curve. The effect of the FSP on household food purchases can be considered either as a pure income effect or as a price effect, depending on the shape of the indifference curve. In this study, a pure income effect is assumed.

[4]The partial participant is defined as an FSP household that did not fully exercise its eligible food stamp allotment, that is, the household purchased variable options; or food stamps were stored for intertemporal use, regardless of purchasing full or variable proportions of eligible coupon allotment. Although the food stamp subsidy also affects the full participant households with a decrease of average price level for food items, the relative price ratio of food and non-food does not change. Thus, the effect of purchasing full coupon allotment is equivalent to an increase of real income, with the prices of food and non-food items being held constant. This is shown in Figure 1 with a parallel shift of the initial budget line NF.

come effects are represented by HH′ and H′H″, respectively, in Figure 1.

This theoretical exercise suggests that the assumption that all households face the same relative price ratio in a cross-sectional analysis of the impact of the FSP is no longer valid. Thus, the Engel curve cannot be uniquely estimated, given there are two different sets of relative price ratios. From a practical point of view, this suggests that in the empirical analysis where the effect of income on food purchases among the FSP participant households is to be measured, the two types of FSP participant households should be recognized. Empirical models that do not make provisions to distinguish a pure income-effect, FSP-participant-household from a price-effect, FSP-participant-household are likely to be misspecified, and the impact of the FSP subsidy would be measured inaccurately.

Under the new legislation, the distinction between the pure income effect and the price effect no longer exists. Only a pure income effect is relevant for describing the effect of FSP participation under the new legislation. The effect of eliminating the purchase requirement is also depicted in Figure 1. Other things being equal, an eligible household would be given food stamps equal to NN′ free of charge to purchase food (assuming food stamps received under the new program are equal to bonus stamps received under the old program). Thus, the relevant budget line becomes NC′CF′, rather than NCF′. A household that exercises full food stamp allotment under the old program (i.e., full participant), theoretically, would not be affected and its food consumption behavior would not be changed.

If the household did not fully participate under the previous program (i.e., partial participant), then a higher level of household utility (represented by I_2'' in Figure 1) would be attained under the new program. This higher level of utility for the partial participants does not necessarily imply increased food purchases. For example, the partial participant's food purchases could decrease under the new program relative to the old program (as an example, see Figure 1). The reason for such an occurrence is that the price of food relative to nonfood has increased under the new program for the partial participants which, *ceteris paribus,* leads to a decrease in food purchases. The income effect was not considered in the above example for partial participants, since one cannot unambiguously say whether real income would increase, decrease, or remain constant between the two programs. Yet, in comparing partial participants' food purchases between no program and the new program, food purchases would increase.

MODEL SPECIFICATION AND ESTIMATION PROCEDURE

The statistical model estimated is derived from the above theoretical considerations. On *a priori* basis, it is expected that participation in the FSP would increase household food purchases. Theoretically, the slopes of the Engel curve for full participants in the FSP and eligible nonparticipants are expected to be positive, with no difference in magnitudes between the two groups because the relative price ratios remain unchanged. The FSP provides that eligible partipating households of the same size receive an equal allotment of food stamp coupons regardless of income However, the amount of bonus stamps receiveo decreases as income increases. With household size held constant, changes in the value of bonus stamps should have no effect on the full participant households' food expenditures. Conversely, if the eligible FSP household only partially participates in the program, the participant's food expenditures would be expected to have a positive relationship with the value of the bonus stamps, but little relationship with income. If the FSP household is unable to exercise its food stamps allotment fully because of a cash flow problem, then a positive interaction effect between bonus stamps and income would be expected.

The effect of household size on at-home food purchases was specified on an adult equivalent scale basis developed by Buse and Salathe. Other socioeconomic characteristics of the household, such as race, location, and urbanization, were also specified in the statistical model to account for possible variation of at-home food expenditures.

Based on the theoretical considerations, FSP participant households were classified into two subgroups for empirical analyses representing households that fully exercise their food stamp allotment, and households exercising on a partial basis. A household is considered to be a full participant if its food expenditures are equal to or greater than the value of food stamps available to it.[5] All other participating households were classified as partial participants. Finally, a program eligibility test developed by Scearce and Jensen is used to select a sample of eligible nonparticipant household from the total population sample. By allowing intercept and slope shifters, the statistical model is represented as

$$(1)\quad FE_{ij} = f(I, I_2, B_2, I_2{*}B_2, FS_1, FS_2, SE) + e_{ij}$$
$$i = 1,2,\ldots,N$$
$$j = 1,2,3,4$$

where

FE_{ij} = the ith household food expenditure for jth food item,

[5] Due to data limitation, it was not feasible to classify correctly the FSP participant households for the empirical analysis based on level of participation. However, this criterion should be a reasonably good indicator particularly for fully participated households. Misclassifications are more likely to occur in the group of partially participated households.

I = household income both for full participants and eligible nonparticipants,
I_2 = household income of partial participants,
B_2 = value of bonus food stamps received by partial participant households,
FS_1 = 1, if the ith household is a full participant in the FSP; = 0, otherwise,
FS_2 = 1, if the ith household is a partial participant in the FSP; = 0, otherwise,
SE = vector of other socioeconomic characteristics representing the effects of adult equivalent household size, race, location and urbanization, and
e_{ij} = error term.

Analysis of cross-sectional data often encounters the problem that the error term associated with the dependent variable in the econometric model is truncated normal; that is, the dependent variable has a number of its values clustered at a limiting value, usually zero. To avoid such a problem, zero observations in the sample are usually eliminated, and, hence, parameter estimates reflect only the change in average food purchases for purchasing households. Average food purchases for the total market population represent both the average purchases of all households and their participation rate. Analysis of household food purchasing behavior should take both into account.

Application of ordinary least squares to a model in which the dependent variable is truncated normal leads to biased and inconsistent estimates of the population parameters. Tobit analysis, a statistical procedure pioneered by James Tobin, is designed to estimate such a limited dependent variable model.[6] An important aspect of Tobit analysis is that it incorporates sample information supplied by both the nonpurchasing households as well as the purchasing households. In particular, the Tobit analysis provides not only probable changes in the magnitude of the dependent variable if it is already above the limit, but also changes in the probability of being above the limit (McDonald and Moffit), which would help assess the impact of the FSP on selected food purchases.

To apply the Tobit procedure, equation (1) is rewritten as

$$(2)\quad FE_{ij} = X_i \beta + e_{ij}, \text{ if } X_i \beta + e_{ij} > 0$$
$$= 0, \qquad \text{if } X_i \beta + e_{ij} \leq 0$$

where X_i is a matrix of independent variables included in equation (1); β is a vector of unknown parameters; FE_{ij} represents household food expenditures, and e_{ij} is a truncated normal error term.

After obtaining the Tobit regression coefficients, appropriate adjustments are required in computing the elasticities. These adjustments differ from the procedure used with OLS regression coefficients because the unconditional expected value E(FE) in equation (2) is no longer equal to $X\beta$ which is the property of OLS (Goldberger). Thus, the total income elasticity from the Tobit analysis is represented as

$$(3)\quad \eta_I = [\partial E(FE^*)/\partial I] \times [I/E(FE^*)] + [\partial F(z)/\partial I] \times [I/F(z)]$$

where η_I is the total income elasticity; $E(FE^*)$ is the conditional expected value for FE (the expected value of FE for observations greater than zero); and F(z) is the cumulative normal distribution function (the probability of FE being greater than zero), with $z = X\beta/\sigma$. The first component of the total income elasticity is the conditional income elasticity associated with actual purchases. The second component of the total income elasticity in equation (3) is the elasticity associated with market participation.

DATA

Data used are from the 1972–73 Consumer Expenditure Diary Survey completed in June, 1974, by the Bureau of Labor Statistics (BLS) of the U.S. Department of Labor.[7] Four categories of major at-home food expenditures (i.e., meat products, dairy products, cereal and bakery products, and fruits and vegetables) were included for analysis.

The summary statistics of the sample data are presented in Table 1. The FSP participant households were generally characterized with larger household size, greater food expenditures, and lower household income, as compared with the FSP eligible nonparticipants. Furthermore, the largest proportion of the survey households selected in the sample for the analysis are white urban residents, located in the southern region of the United States.

EMPIRICAL RESULTS

Results of Tobit analysis for the sample data are presented in Table 2. Overall, the regression model suggests that the mean food expenditures (represented by the intercepts) are significantly different between the FSP full participant households and eligible nonparticipant households after controlling for the other effects in the

[6] An alternative procedure known as Heckman's sample selection bias procedure has recently been developed by Heckman. This procedure views the limited dependent variable problem as a specification error bias. He suggests a two-step estimator involving probit and ordinary least square that will yield consistent estimates of the unknown parameters.

[7] The 1972–73 BLS CEDS covered two one-year periods from July, 1972, to June, 1973, and from July, 1973, to June, 1974. However, information concerning the FSP was collected only during the second year of the expenditure survey. A total of 2,995 households were classified as eligible FSP households from this data base for the analysis. Forty-six sample households were identified as outliers and discarded from further analysis.

TABLE 1. Sample of Means for Average Weekly Selected At-Home Food Expenditures and Other Selected Variables, FSP Eligible Nonparticipant, Full Participant and Partial Participant Households[a]

Variable	Eligible Nonparticipant	Full Participant	Partial Participant
Meat products ($)	8.07 (7.52)[b]	13.21 (8.42)	4.88 (4.43)
Dairy products ($)	3.01 (2.76)	4.27 (3.55)	2.20 (2.50)
Cereal and bakery products ($)	2.72 (2.44)	3.97 (2.83)	1.94 (2.07)
Fruits and vegetables ($)	2.98 (2.81)	4.34 (2.88)	1.62 (1.90)
Household income ($)	4,402.30 (2,899.02)	3,664.73 (3,087.69)	3,466.47 (2,896.51)
Monthly food stamp bonus ($)	---	44.78 (37.67)	56.79 (39.43)
Household size (persons)	2.86 (2.05)	3.19 (2.27)	3.26 (2.16)
Location:			
North Central (%)	26.34 (44.06)	20.39 (40.35)	25.13 (43.48)
South (%)	36.79 (48.23)	40.78 (49.22)	42.21 (49.51)
West (%)	17.90 (38.35)	16.51 (37.18)	24.62 (43.19)
Residence (% urban)	48.63 (49.99)	60.84 (48.89)	60.80 (48.94)
Race of household head (% white)	84.64 (36.07)	61.81 (48.66)	57.79 (49.51)
Sample size	2,441	309	199

[a] The proportion of household purchases for each food category is reported in Table 3.
[b] The numbers in parentheses are the standard deviations.

model. On the other hand, partial participant households' income and bonus value effects on selected at-home food expenditures, except for cereal and bakery products, are not significantly different from zero. Results suggest that after controlling for all other effects in the model, increases in number of adult equivalents in the FSP household significantly increase selected at-home food expenditures, with the largest increase on expenditures for meat products. Changes in at-home food expenditures due to changes in the age-sex composition of the household are relatively constant among other selected food product categories.

Among other socioeconomic variables, the results indicate significant differences among all regions in each selected at-home food expenditure category (Table 2). White households spend significantly more on all selected at-home food products, except for meat products relative to nonwhite households. Urban households spend significantly more on fruits and vegetables, but less on cereal and bakery products, as compared with nonurban households.

Most significantly, the results appear to be in accord with the theoretical framework outlined in a previous section. In general, the results support the contention that the FSP would have a significant impact on at-home food expenditures of the participating households, particularly, if the household fully participates in the program. No significant relationships between income and household at-home food expenditures of FSP partial participants were found in this analysis, as might be expected from the theoretical considerations. However, the analysis fails to provide any empirical evidence to indicate that significant relationships existed between selected at-home food expenditures and value of bonus stamps for partial participants. Although the results indicate a positive interaction effect between income and bonus stamp on at-home food expenditures for partial participants, the relationship was not statistically significant.

TABLE 2. Regression Results of Tobit Analysis for Selected At-Home Food Expenditures

Variable[a]	Meat products	Dairy products	Cereal and bakery products	Fruits and vegetables
Intercept	4.194 (6.994)[b]	-.232 (-1.070)	.478 (2.681)	.551 (2.308)
Income	3.27E-4 (4.893)	1.84E-4 (7.598)	1.10E-4 (5.498)	1.41E-4 (5.281)
$Income_2$	-1.25E-5 (-3.23E-2)	-5.23E-5 (0.370)	-2.30E-4 (-1.979)	-2.09E-4 (-1.272)
$Bonus_2$	-5.94E-3 (-.288)	2.94E-3 (.393)	-7.65E-3 (-1.246)	-3.13E-3 (-.372)
$Income_2$*$Bonus_2$	1.23E-7 (2.71E-2)	9.85E-7 (.596)	2.46E-6 (1.800)	1.76E-6 (.932)
FS_1	4.853 (11.214)	1.568 (10.026)	1.328 (10.254)	1.575 (9.151)
FS_2	-1.994 (-1.344)	-.135 (-.246)	.422 (.953)	-.287 (-.468)
A	2.122 (9.436)	.617 (7.607)	.677 (10.041)	.568 (6.347)
NC	-2.040 (-5.244)	-.617 (-4.394)	-.560 (-4.816)	-.722 (-4.651)
South	-1.683 (-4.542)	-.742 (-5.533)	-.458 (-4.132)	-.770 (-5.196)
West	-2.239 (-5.255)	-.815 (-5.295)	-.693 (-5.438)	-.499 (-2.941)
White	-2.398 (-6.777)	1.109 (8.589)	.393 (3.722)	.301 (2.131)
Urban	.298 (1.123)	1.24E-2 (.129)	-.138 (-1.735)	.236 (2.220)
Standard error of estimate	6.829	2.469	2.048	2.722

[a] Income represents the income for full participating and eligible non-participating food stamp households. $Income_2$ represents the income for partial participating food stamp households. FS_1 is the intercept shifter representing full participant households and FS_2 is the intercept shifter for partial participant households. A represents a household's adult equivalent scale value based on the formulation derived by Buse and Salathe. NC, South, and West are intercept shifters representing regional effects for North Central, Southern and Western regions, respectively, as compared with Northeastern region. White is an intercept shifter representing white households. Urban is also an intercept shifter representing urban households.
[b] Numbers in parentheses are the respective asymptotic 't-ratios'.

In general, the results suggest that the impact of the FSP on partial participants' at-home food expenditures were largely due to substitution effect rather than income effect. The results also imply that partial participant households are likely to reduce their food purchases under the new FSP relative to the amounts that were purchased under the old program. It is most likely that FSP partial participants will substitute non-food purchases for at-home food purchases with some income previously committed to food purchases. This is because the relative price of food to non-food under the new program increased, as compared with the same price ratio under the old program for those of partial participants.

On the other hand, the results indicate that the FSP has a strong income effect on both full and eligible nonparticpants' at-home food expenditures. Specifically, this implies that under the new program, the food purchasing behavior of FSP full participant households will not be changed. The effect of the FSP is to expand the household's food expenditures consistent with the estimated income elasticity. This is also true for those eligible nonparticipants if they choose to participate under the new program. Since the income elasticity is the major factor determining FSP effects on at-home food purchases under the new program, further examination of FSP effects both on full participant and eligible nonparticipant households' at-home food expenditures in terms of their estimated income elasticities is desirable.

As previously noted, results of the Tobit analysis provide not only the probable change in the magnitude of the selected at-home food expenditures, if they are non-zero expenditures, but also changes in the probability of being non-zero. This additional information has important economic and policy implications. The proportion of average total response (evaluated at the means of all independent variables) on selected at-home food items due to changes in actual purchasing for both eligible nonparticipant and full participant households are shown in Table 3. In addition, the observed frequency and predicted probability of actual purchasing are also presented.

As expected, the data indicate that greater proportions of full participant households have non-zero at-home food expenditures than eligible nonparticipants, Table 3. Using meat products in Table 3 as an example, the results suggest that, on average, 87.2 percent of average total response for eligible non-participants' food expenditures was due to actual purchasing, and 12.8 percent was due to changes in the probability of purchasing the meat products in the first place. In contrast, for full participants, the proportion of average total response in meat product expenditures resulting from actual purchasing was 98.9 percent and only 1.1 percent was due to changes in the probability of being a purchasing rather than non-purchasing household.

Results of this analysis suggest that the FSP increases food purchases of full participating households. However, the FSP may have affected the participating households' food purchases differently among different food commodities. Specifically, for meat products, dairy products, and cereal and bakery products, the FSP increases the proportion of average total response due to actual purchases. In contrast, for fruits and vegetables, the FSP increases the probability of the household's decision to purchase rather than the magnitude of actual purchases.

Based on results of Table 3, elasticity measures for selected food items can be derived from the estimated Tobit regression coefficients. Selected at-home food expenditure elasticities with respect to household income are presented in Table 4, for eligible non-participant and full participant households.

The interpretation of these elasticity measures is straight forward. For example, given a 1-percent increase in average household income, an

TABLE 3. Decomposition of Tobit Effects for Selected At-Home Food Expenditures, FSP Eligible Nonparticipant and Full Participant Households

	Eligible Nonparticipant			Full Participant		
Food product	Proportion of average total response due to actual purchases	Observed frequency of actual purchases	Predicted probability of actual purchases	Proportion of average total response due to actual purchases	Observed frequency of actual purchases	Predicted probability of actual purchases
Meat products	0.872	0.897	0.869	0.989	0.997	0.975
Dairy products	0.674	0.902	0.875	0.839	0.987	0.962
Cereal and bakery products	0.714	0.926	0.902	0.881	0.994	0.976
Fruits and vegetables	0.845	0.887	0.849	0.803	0.987	0.947

TABLE 4. Income Elasticities for Selected At-Home Food Expenditures, FSP Eligible Nonparticipant and Full Participant Households

Food product	Eligible Nonparticipant			Full Participant		
	Total	Conditional	Market participation	Total	Conditional	Market participation
Meat products	0.154	0.135	0.019	0.087	0.086	0.001
Dairy products	0.237	0.159	0.078	0.147	0.123	0.024
Cereal and bakery products	0.159	0.115	0.044	0.097	0.085	0.012
Fruits and vegetables	0.176	0.148	0.028	0.106	0.089	0.017

eligible non-participant household food expenditure for meat products will increase by 0.154 percent. Whereas, 0.019 percent of that total adjustment resulted from the increase in the probability of being in the market and purchasing meat products, and 0.135 percent was due to variations in the magnitudes of food expenditures for purchasing meat products.

For all selected at-home food products, expenditure response is relatively small for changes in income. The magnitudes of the income elasticity of selected at-home food commodities for FSP full participant households are much smaller than eligible non-participants. Not surprisingly, this finding coincides with what might be expected, since the provisions of the FSP specify that food stamps must be spent on food purchases. Thus, the income elasticities obtained for FSP participant households should be interpreted as the amount of additional food expenditures spent on food items in excess of those already available from food stamps.

CONCLUSIONS

The present study isolates and identifies certain key parameters governing Food Stamp Program participants' food purchasing behavior. Within this context, a theoretical model was developed to conceptualize the different effects of household income and food stamp subsidies on households' food purchasing pattern. Finally, an empirical model was specified and estimated via Tobit maximum likelihood procedure, using the 1972–73 BLS CEDS data.

By decomposing the total elasticities, the analyses also provide insights into how the FSP influences participants' food purchase behavior. Specifically, the results suggest that the FSP tends to affect the magnitude of purchases of meat products, dairy products, and cereal and bakery products more than the probability of purchasing those food products. On the other hand, the results for fruit and vegetables suggest that the FSP increases the probability of purchase by recipients more than the magnitude of purchases.

Although the validity for, and applicability of the results to, the new FSP program are limited by the nature of the available data, some tentative implications may be drawn from this analysis. The case of a pure income effect would be applicable under the new program. That is, full participant and non-participant households that are eligible for receiving food stamps free of charge would tend to expand their at-home food purchases consistent with the income elasticities. However, in relation to no program, the empirical results suggest that under the new program the federal subsidy would be less effective in increasing the partial participant households' food purchases than the previous program, which contained a purchase requirement. That is, the results suggest that income had negligible effect on the partial participants' food purchasing behavior, and that the relative price of food to nonfood increased between programs, which implies a negative influence on the food purchasing behavior.

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