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IMPACT OF THE FOOD STAMP PROGRAM ON LOW INCOME HOUSEHOLD FOOD CONSUMPTION IN RURAL FLORIDA*

Pamela H. Neenan and Carlton G. Davis

INTRODUCTION

One objective of the Food Stamp Program (FSP) is to supplement food expenditures of low income households to enhance the household's ability to provide nutritionally adequate diets. A household may consist of any person, or group of persons, who purchase, store and prepare food. Program eligibility is based on net household income, total assets and household size. Eligible households purchase coupons which are used in retail food outlets. Households of equal size receive coupon allotments of equal purchasing value, but the cash purchase requirement varies with net income [8]. Bonus stamps represent the difference between the purchase requirement and the coupon allotment value.

With a few notable exceptions, most Food Stamp Program evaluations have focused on dimensions such as coupon production, distribution, program monitoring, participation rates and fraud control.[1] No generally accepted system exists for assessing changes in household food expenditures and distributional effects.

The objective of this paper is to identify socio-economic determinants of food expenditure levels for Food Stamp Program participants and eligible non-participants in a rural area of Florida.

SOCIO-ECONOMIC DETERMINANT APPROACH TO CONSUMER DEMAND

Traditional consumer demand theory revolves around the existence of a continuous utility function for each consumer. Given the traditional axioms of utility theory, the consumer maximizes his utility function within the limitations of a budget constraint. Strotz [20], Gorman [9] and Houthakker [10], have made important contributions to utility theory in the area of separability of utility function. More recently, the work of Becker [1] and Lancaster [12] have provided further insights into specification of utility function in terms of household production function and goods characteristic space.

Despite contributions of economists such as Becker and Lancaster to more rigorous specification of consumer utility functions, additional unexplained variation is observed in consumption patterns between households and over time within the same household. These variations, attributed to socio-economic factors, can be separated into two categories, those which affect the income and price framework and those which affect the indifference system.

Ability of a household to obtain food in sufficient variety and quantity to provide nutrients to maintain normal health is determined in part by household income and prices of food and other commodities necessary to provide the remaining primary needs.[2] Availability of food from outside the traditional retail market outlets also affects the household's demand for purchased food. If the value of such goods is considered as an in-kind income supplement, household food expenditures could be

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[1]For selected studies focusing on distributional effects and other nontraditional evaluation criteria of the Food Stamp Program see [3, 7, 13, 15, 17 and 23].

[2]According to Maslow [16], there is an orderly sequence in which human needs are fulfilled. Food, clothing and shelter are the primary elements of the need hierarchy and are fulfilled before other needs such as position security, peer recognition or self-fulfillment.

expected to increase. However, if food from these sources is substituted for food normally purchased, food expenditures may fall.

Location has been shown to affect consumer behavior. Urban residence may reduce access to non-marketed foods. Similarly, it may affect consumer behavior through its effect on market prices. Larger chain grocery stores tend to locate in more urban settings, and such stores may be able to offer lower prices and larger selections due to economies of scale in purchasing, distribution and management.

Employment status of the homemaker is also a factor responsible for variation in consumption behavior among households. The working homemaker has a different time value from the unemployed homemaker [2, 19]. If the value of the employed homemaker's time, represented by the wage rate, is greater than the cost of purchasing and preparing meals, food expenditures may be greater than in households with unemployed homemakers. Similarly, the employed homemaker may eat fewer meals at home, thus decreasing at-home food expenditures. In a parallel fashion, children participating in school breakfast or lunch programs, or retired senior citizens eating at a Congregate Meal for the Elderly site would be expected to decrease at-home food expenditures.

Family size and composition also affect both the quantity of at-home food expenditures and the consumption of the purchased bundle of goods. When income and food expenditures are expressed on a per capita basis, larger family per capita expenditures may differ from those of smaller families, largely as a result of economies of scale in food purchases. Economies of size differences between households may then be represented by a family size variable in any estimating procedure. However, family composition may also affect quantity and quality of purchased food. Individual differences in food and nutrition requirements are based on age, sex, height, weight and activity levels [18]. Thus, it is evident that different quantities and types of foods would be required for different households with different family composition. Such variations across households could be expected to be partially responsible for differences in food expenditure levels among households.

There are methodological difficulties in generalizing the behavior of the individual consumer to that of the household. In any given multiperson household, no single individual consumes or even purchases all food items. Within the context of at-home food consumption, Lewin has suggested the "gatekeeper" theory [14]. Food expenditures are attributed to one person, generally the female homemaker. Decisions regarding food purchases are affected by specific family members' desires, but the homemaker is the ultimate decision maker. Through knowledge of nutrition and types of food preparation the gatekeeper is instrumental in the formation of family food habits. Therefore, age, education and motivation of the gatekeeper will be key factors in establishing food consumption and expenditure patterns of the entire household.

THEORETICAL FRAMEWORK

It is hypothesized that household food expenditures are a function of income, prices, food aid status and a set of socio-economic variables that condition tastes and preferences. The consumer is assumed to maximize utility within limitations of a budget constraint, with or without food stamps. However, the Food Stamp Program (FSP) acts as an in-kind income supplement and therefore affects initial group budget allocations. Food expenditure decisions of food stamp households may have three general outcomes. Recall that FSP supplementation requires a purchase requirement based on income levels. Value of the bonus coupons, i.e., face value of the food stamp coupons minus the purchase requirement, is the real income supplement. The income constraint becomes a kinked constraint as represented in Figure 1. Figure 1 is an hypothetical example of a four person household, with monthly income of

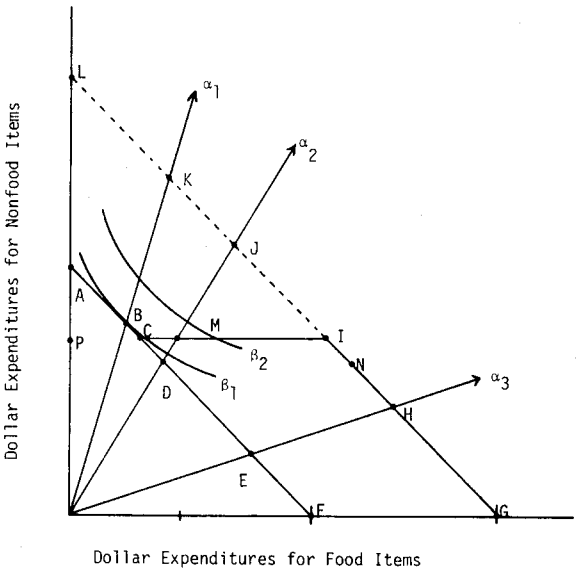

FIGURE 1. HYPOTHETICAL INCOME, CONSUMPTION AND BUDGET CONSTRAINT RELATIONSHIPS, FOUR PERSON FOOD STAMP PROGRAM HOUSEHOLDS

$200. The FSP coupon allotment for a family of this size is $166. A purchase requirement of $60 is necessary to obtain $166 worth of food stamp coupons [8]. Since the coupons can be used only to purchase food, the new income constraint becomes the kinked, ACIG rather than LG, the constraint if a cash income supplement is used.[3] AP represents the purchase requirement. Vectors α_1, α_2 and α_3 are income-consumption relationships and represent consequences of three alternative expenditure preference levels.

Vector α_1 represents a household that normally spends less for food than the food stamp purchase requirement. Depending on the preference structure, the household may or may not choose to participate in the FSP. Theoretically, households represented by indifference curves β_1 and β_2 would choose to participate, since higher levels of utility can be obtained with participation. However, income-consumption vectors which cross AF at points closer to A will be less likely to participate in the FSP. It is possible to have indifference curves that do not cross CI. In these cases, higher levels of utility would not be reached with FSP participation.

Vector α_2 represents a household that normally spends more for food than the food stamp purchase requirement, but less than the coupon allotment. The difference between the amount usually spent for food and the purchase requirement is freed or discretionary income. The preferred position of J is unobtainable, since it is outside the feasible set of possibilities. The dashed segment of LI indicates that these points are not attainable under the two alternative budget regimes under consideration. At point I, the food stamp coupon allotment, the entire discretionary income is spent on nonfood items. The income effect is responsible for portion DM, while MI is the in-kind food stamp effect. This solution is not unique. The family may choose to spend an additional portion of the discretionary income for food, represented by the portion of the income constraint between point I and point N. This third part of the subsidization effect could be the result of a relative price decline for food commodities in relation to the price of nonfood items. Households normally spending a smaller budget share for food than FS allotment would realize a decline in their average budget share for food as real income remains unchanged. Households with higher propensities to consume, such as those normally spending more for food than food stamp allotment, will not necessarily realize a relative price effect. Higher levels of utility can be reached with no more than the income effect, as expansion from point E to H on vector α_3.

THEORETICAL MODEL SPECIFICATION

For this study, the general form of the Engle type total food expenditure relationship is written:

$$TFE = f(I, B, SE_r) \qquad (1)$$

where

TFE = total food expenditures/household/month
I = household income/month
B = bonus value of food stamp supplement and
SE_r = socio-economic variables to measure family size, composition, ethnicity, urbanity, etc.

Empirical results of this type of relationship are expected to provide important insights into the effect of food stamp supplementation with household income level, household size, level of bonus supplementation and family composition.

DATA BASE

The study utilizes information obtained from the Spring 1976 survey records of Expanded Food and Nutrition Education Program (EFNEP) participants in Polk County, Florida. According to 1970 census data, over 39 percent of Polk's population was classified rural, compared to slightly over 19 percent for the state average. For the same period, over 15 percent of the county's families had below poverty level incomes, compared to a state average of somewhat less than 13 percent [21]. In December 1975, 43 percent of this county's EFNEP participants were rural, compared to 28 percent statewide. In addition, 27 percent of the participants were also enrolled in the Food Stamp Program, compared to 52 percent simultaneous enrollment statewide [6]. In May 1976, there were 5,692 county households actively participating in the FSP, representing seven percent of total county households [4]. The actual number of households eligible for FSP participation, but not choosing to do so is unknown.

EFNEP records include information on the socio-economic characteristics of participants. These data include, among other things, income, food expendi-

[3]This framework might be more restrictive than the actual operation of the FSP. In some instances an eligible household has the option of purchasing any quarterly fraction of its maximum stamp allotment. In exercising this option, eligible households would actually face four alternative kinked budget constraints and must decide which one to select. For further discussion of the theoretical implication of this option, see [17].

tures and demographic profile. Also included is information regarding program status and 24-hour dietary recalls of participants, collected at six-month intervals by program aides. Food expenditure information is regularly collected at the time of the six-month food recall for EFNEP participating households not receiving stamps. For EFNEP households receiving food stamps, the purchase requirement is the only food expenditure information collected.

In an additional questionnaire administered simultaneously with the Spring 1976 food recall questionnaire, FSP participants were asked to estimate how much, if any, additional money was spent for food above the normal food stamp allotment. Specific expenditures were provided by many households. However, some households were unable to provide estimates of additional food expenditures. No distinguishing characteristics could be attributed either to food stamp respondents providing specific expenditure information or those unable to estimate additional expenditures, so it was decided to pool the food stamp household observations. Households recording food expenditures above the food stamp allotment spent, on the average, an additional 12 percent of the value of the coupon allotment. It was assumed that households indicating additional, but unspecified food expenditures in excess of the coupon allotment, could be represented by an average food expenditure proxy value equal to 1.12 times the household food stamp coupon allotment.

Pooling of data with differing quantities of information, as done in the sampling procedure, introduces a form of heteroscedasticity in the error term and the general assumption, $E(uu') = \sigma^2 I$ is violated. A two step procedure was used to estimate the food stamp total food expenditure model (equation 2). Step one generated estimates of the standard errors, σ_1 and σ_2, used to create the A matrix.[4]

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[4] A joint empirical model can be specified:

$$y^* = X\beta + v$$

where $y^* = \begin{bmatrix} y_1 \\ 1.12\, y_2^* \end{bmatrix}$

and $v = \begin{bmatrix} u_1 \\ u_2 + 1.12\epsilon \end{bmatrix}$

A variance-covariance matrix can be defined:

$$\Sigma = E(vv') = \begin{bmatrix} \sigma_1^2 & \cdots & 0 \\ 0 & \sigma_1^2 & 0 \\ \vdots & \ddots & \vdots \\ 0 & \sigma_1^2 & 0 \\ 0 & \sigma_1^2 & 0 \\ \vdots & \ddots & \vdots \\ 0 & \sigma_2^2 & 0_2 \\ 0 & \cdots & \sigma_2 \end{bmatrix}$$

where $\sigma_1^2 = \mathrm{Var}(u_1)$

and $\sigma_2^2 = \mathrm{Var}(U_2 + 1.12\epsilon)$

The diagonal matrix A is defined:

$$A = \begin{bmatrix} \frac{1}{\sigma_1} & \cdots & 0 \\ 0 & \frac{1}{\sigma_1} & 0 \\ \vdots & \ddots & \vdots \\ & \frac{1}{\sigma_1} & \\ & \frac{1}{\sigma_2} & \\ \vdots & \ddots & \vdots \\ & \frac{1}{\sigma_2} & \\ 0 & 0 & \frac{1}{\sigma_2} \end{bmatrix}$$

Dependent and independent variables were then premultiplied by A to standardize the variance. Generalized least squares (GLS) estimates obtained in this manner are considered consistent estimates of β when using data for which different quantities of information are available [11].

Since complete food expenditure information was available for the entire subsample of eligible non-participating households, equation 3 was estimated using ordinary least squares (OLS).

Some experimentation was carried out with alternative functional forms of both the income and family size variable. West and Price [23] suggest the natural logarithm of income may represent a satiation level (decreasing rates of increases in food consumption) and the logarithm of family size may measure economies of scale. Feaster and Perkins [7] use an income squared term with improved fit in explanation of food expenditures. The linear form of all variables in equations (2) and (3) was chosen, since a number of alternative functional forms did not significantly improve the model's explanatory power.

EMPIRICAL MODEL

The total food expenditure model is stratified into two groups, food stamp participants and eligible nonparticipating households. The functional form of the food expenditure model for food stamp households is estimated:

$$TFE_{FS} = \alpha_0 + \alpha_1 HI + \alpha_2 B + \alpha_3 FS + \alpha_4 F + \alpha_5 A + \alpha_6 W + \alpha_7 Y + \alpha_8 H + \alpha_9 BHI + \alpha_{10} BFS + \underline{B'LC} + \underline{T'E} + \underline{T'R} + \underline{\theta'S} + w \quad (2)$$

where

underlined variables and coefficients represent vectors

TFE_{FS} = total household food expenditure/month for food stamp households
HI = household income/month, including the sum of earnings for all household members, welfare payments, pensions and social security
B = bonus stamp value
FS = number of persons in household
LC = vector of 0-1 dummy variables representing life cycle family composition[5]
LC1 = 1 for beginning couple, no children
LC2 = 1 for oldest child birth to 6 years
LC3 = 1 for oldest child 7 to 13 years
LC4 = 1 for oldest child 14 to 20 years
LC5 = 1 for first child gone until last one leaves
LC6 = 1 for empty nest or retirement couple
E = vector of 0-1 dummy variables for ethnic background
E1 = 1 if white
E2 = 1 if nonwhite
F = 1 if head of household is female
A = number of household members regularly eating away-from-home meals, for example, in School Lunch or Congregate Meals for the Elderly
W = 1 if homemaker is employed
Y = age of homemaker
R = vector of 0-1 dummy variables for residence location
R1 = 1 if rural nonfarm
R2 = 1 if urban
S = vector of 0-1 dummy variables representing highest level of education completed by homemaker
S1 = 1 if less than grade 9 education
S2 = 1 if grades 9-12 education
H = 1 if homemaker indicated a perception of a special health need (nutritional requirement necessitated by specific physical condition)
BHI = interaction term between income and bonus stamp level
BFS = interaction term between family size and bonus stamp level and
w = disturbance term.

The functional form of the total food expenditure model estimated for the eligible but nonparticipating FSP sample is similar to (2) but excludes variables measuring bonus value (B) and the bonus interactions (BHI and BFS). The functional form is:

Premultiplying y^* by A gives:

$$Ay^* = A \times \beta + AV$$

The variance-covariance matrix for the standardized disturbance term, AV, is then defined:

$$E(Avv'A') = A\Sigma A' = 1$$

[5] Duval [5] argues that the majority of households follows a sequential development pattern. Thus decomposition of families by the age of the oldest child is one way to predict sibling groupings and act as a proxy for family composition.

$$TFE_{Non\text{-}FS} = \alpha_0 + \alpha_1 HI + \alpha_2 FS + \alpha_3 F + \alpha_4 A + \alpha_5 W + \alpha_6 Y + \alpha_7 H + \underline{\beta' LC} + \underline{T'E} + \underline{T'R} + \underline{\theta' S} + w \quad (3)$$

where all variables are as specified in (2).

The ommited categories of the dummy variables appearing in the intercept of equations (2) and (3) are life cycle 1, white, male head of household, unemployed homemaker, rural nonfarm, less than grade 9 education and no perceived health need.

EMPIRICAL RESULTS

Total Food Expenditure

A survey of Food Stamp Program participants and eligible nonparticipants sample means indicates that group differences exist (Table 1). Food Stamp Program participating households make an average monthly cash expenditure of $14.14 per person for food stamps and any food for at-home consumption in excess of coupon allotment. In comparison, food stamp eligible non-participating households spent significantly more, with a monthly average of $33.22 per person for food. The monthly per capita value of foods purchased by food stamp households was $38.41, compared to $33.22 for eligible non-participants.

Results of regression analysis of total food expenditures for FSP participating households (equation 2) and eligible nonparticipating households (equation 3) are reported in Tables 2 and 3, respectively. As expected, income and family size explain a significant proportion of the variation in total food expenditures.

Food Stamp Participants

Regression results for FSP participating households indicate statistically significant interaction between bonus value, income and family size variables (Table 2). The income response $(\frac{\partial TFE}{\partial HI})$ is .199—.0011B, while the bonus value response $(\frac{\partial TFE}{\partial B})$ is .518 —.0011HI + .0507FS. Evaluated at group

TABLE 1. GROUP MEANS FOR SELECTED VARIABLES, FOOD EXPENDITURE SAMPLES, FOOD STAMP PARTICIPANTS AND ELIGIBLE NON PARTICIPANTS, POLK COUNTY, FLORIDA, 1976

Variable	Food Stamp participants	Eligible non-participants
Sample size	123	196
Family size	5.1	3.79
	--------Dollars monthly---------	
Money income	299.16	349.79
Real income	423.01[a]	349.79
Food stamp purchase requirement	64.47	--
Cash food expenditure	7.42[b]	125.92
Total cash expenditure[c]	72.09	125.92
Food stamp bonus	123.85	--
Total value of purchased food[d]	195.94[e]	125.92
Total cash expenditure, per capita	14.14	33.22
Value of purchased food, per capita	38.41	33.22

[a]Includes bonus value of food stamps.

[b]Expenditures made in excess of the food stamp purchase requirement.

[c]Test statistic for the two sample t-test with unequal variances is 6.386.

[d]Test statistic for the two sample t-test with unequal variances is 8.306.

[e]Food stamp purchase requirement + bonus value + cash food expenditure.

TABLE 2. STATISTICAL SUMMARY EQUATION (2), GLS COEFFICIENTS, DEPENDENT VARIABLE, TOTAL FOOD EXPENDITURE BY FOOD STAMP PARTICIPANTS (TFE_{FS})

Variable[a, b]	Cell count n=123	Regression coefficient	Standard error
Intercept		16.320	35.53
Income (HI)		0.199	0.053
Bonus value (B)		0.517	0.126
Family size (FS)		12.378	4.032
Life cycle:			
LC 2	12	-10.103	31.57
LC 3	32	-16.820	31.54
LC 4	48	-11.775	32.32
LC 5	13	- 3.045	32.62
LC 6	14	-33.764	31.42
Ethnicity:			
Nonwhite (E2)	95	- 5.596	7.009
Female head of household (F)	75	- 1.776	6.440
Meals away from home (A)		0.190	2.091
Employed homemaker (W)	23	- 1.264	6.688
Homemaker age (Y)		0.317	0.235
Residence:			
Urban (R2)	81	7.553	5.381
Schooling:			
Gr. 9-12 (S2)	73	- 0.028	5.628
Health need (H)	11	- 1.729	9.224
Interactions:			
BHI		- 0.00109	0.00037
BFS		0.05068	0.01983

[a]Complete variable definition can be found in equation (2).

[b]A generalized least squares procedure was used to standardize the variance of equation 2, so that R^2 statistic is inappropriate.

TABLE 3. STATISTICAL SUMMARY EQUATION (3), OLS COEFFICIENTS, DEPENDENT VARIABLE, TOTAL FOOD EXPENDITURE, ELIGIBLE NONPARTICIPANTS ($TFE_{Non\text{-}FS}$)

Variable[a]	Cell count n = 196	Regression coefficient	Standard error
Intercept		63.380	17.900
Income (HI)		0.135	0.023
Family size (FS)		7.817	2.144
Life cycle:			
LC 2	47	-10.228	12.530
LC 3	39	1.118	13.520
LC 4	34	17.119	14.690
LC 5	15	0.215	16.200
LC 6	52	- 5.102	14.480
Ethnicity:			
Nonwhite (E2)	159	3.734	6.779
Female head of household (F)	56	-12.693	6.301
Meals away from home (A)		- 3.393	2.492
Employed homemaker (W)	34	- 0.229	6.931
Homemaker age (Y)		- 0.087	0.250
Residence:			
Urban (R2)	85	- 8.222	5.410
Schooling:			
Gr. 9-12 (S2)	109	- 5.780	5.692
Health need (H)	19	8.031	8.039

$R^2 = .6064$

$F\ 17, 179 = 17.234$

[a]Complete variable definition can be found in equation (2).

sample means, this income response translates into a Marginal Propensity to Expend money income (MPE_I)[6] of .06 (standard error = .02). For every one dollar increase in money income, total food expenditures increase by $0.06. The MPE_I increases with a reduction in the value of bonus stamps and decreases with an increase in bonus value. The bonus value response is much larger. For the FSP participants group mean family size of 5.1 persons (Table 1), the Marginal Propensity to Expend Bonus (MPE_B) is .45 (standard error = .07). At a family size of seven the MPE_B increases to .54. At two persons it declines to .29. Through requirement of a cash purchase and issuance of the coupon allotment, the Food Stamp Program is designed to increase food expenditures at higher levels than would occur with a cash supplement. However, the positive sign of the bonus-family size interaction term implies that bonus food stamps are more effective in increasing food expenditures as family size increases. Larger families can be expected to use an increasing portion of the discretionary income, or that income freed by FSP participation, to purchase additional food. The negative sign of the bonus-income interaction suggests that the bonus value effect may be more effective at lower income levels and lose effectiveness as income rises (Table 2). The full impact of a change in bonus value is measured not only through the change in the MPE_B, $(\frac{\partial TFE}{\partial B})$, but also through the change in the MPE_I, $(\frac{\partial MPE_I}{\partial B})$. Although the sign of the bonus-income interaction term is negative, if interaction variables are calculated at group means, a one dollar increase in bonus value results in an overall increase of total food expenditure up to households with monthly income levels of $700 per month.

The coefficient of the family size variable explains significant variation in total food expenditures among FSP participants. The total food expenditure effect with respect to family size is $12.378 + .05068B$, $(\frac{\partial TFE}{\partial FS})$. At mean bonus value, the family size effect is 18.61 (standard error = 2.67). For every additional person in a FSP household, an additional $18.61 per month is spent for food. No other explanatory variables were found to be consistently statistically significant in explaining total food expenditures among FSP participants.

Eligible Nonparticipants

Income response (MPE_I) for eligible nonparticipants is .135, or for every one dollar increase in money income, total food expenditures increase by $.135, (Table 3). Magnitude of this response is larger than that of the FSP sample ($MPE_I = .06$). This result appears reasonable, since by income standards, households in this sample are eligible to participate in the Food Stamp Program, but have chosen not to do so. Reasons for nonparticipation were not evaluated in this study. However, it seems reasonable to expect that a number of households in this group may have desired additional food for their families but did not participate in the FSP for a number of reasons.[7]

The family size coefficient 7.81 is significantly different from zero for eligible nonparticipants. This is considerably smaller than the FSP participant coefficient 12.38 (Table 2).

[6]The traditional terminology used is Marginal Propensity to Consume (MPC). However, use of expenditure data in this study necessitates a corresponding modification in terminology. MPE_I and MPE_B represent Marginal Propensities to Expend Income and Bonus Stamps, respectively. It is assumed that these concepts represent reasonable proxies for elasticities.

[7]Some of these reasons might have been, among other things, lack of transportation to FSP distribution centers, lack of necessary purchase requirements and inability or unwillingness to do paper work necessary to obtain program certification.

Nonparticipating female-headed households spend less on the average, per month, than male-headed households. In the FSP sample there is no expenditure difference between female and male-headed households. Since the incidence of poverty tends to be higher among female-headed households than among male-headed households [22], the FSP may be operating as an equalizing factor between these two household categories.

No other explanatory variable is consistently significant in explaining total food expenditure variation among nonparticipating households.

SUMMARY AND CONCLUSIONS

One of the primary objectives of the Food Stamp Program is to supplement food expenditures of low income households as a means of improving the household's ability to purchase nutritionally adequate diets. This paper reports results of a model used to determine total food expenditure patterns of FSP households and eligible nonparticipating households in a rural area of Florida.

Food Stamp Program participating households had an average monthly cash expenditure of $14.14 per person for food stamps and any food for at-home consumption in excess of coupon allotment. In comparison, food stamp eligible nonparticipants spent, on the average, $33.22 per person for food. The monthly per capita value of foods purchased by FSP participants was $38.41, compared to $33.22 for eligible nonparticipants. Average annual income of FSP participants was $3,600, compared to $4,200 for eligible nonparticipants. FSP participants had an average family size of 5.1 persons, compared to 3.79 persons for nonparticipants.

Results of regression analyses suggest that income and family size explain a significant proportion of the variation in food expenditures among both FSP participants and eligible nonparticipants. Bonus value response is considerably larger than the income response for FSP participants. For program participants, there is an indication of strong interaction between the value of bonus food stamps and both income and family size. A positive bonus value-family size interaction implies that bonus value may be more effective in increasing food expenditures as family size increases. A negative bonus value-income interaction also suggests that the bonus value effect may be greater at lower income levels and lose effect as income rises. Despite the negative relationship between bonus value response and income response, food expenditure increases with increasing bonus value until a monthly income level of $700 is reached.

A strong income related food expenditure response is also found for eligible nonparticipants. This income response is greater than that of FSP participants.

Family size is significant in explaining food expenditures for both FSP participants and eligible nonparticipants. However, the family size coefficient of FSP participants is considerably larger than that of the nonparticipant group.

No other explanatory variables are found to be consistently statistically significant in explaining total food expenditure variations. It was noted, however, that among eligible nonparticipants the coefficient for female-headed households is consistently negative while in the FSP participant sample there is no difference in the food expenditure of female and male-headed households. This suggests that the FSP may be operating as an income equalization measure between male and female-headed households.

In terms of policy implication, caution should be exercised in extrapolating specific coefficients or actual numbers of case study of this type to the national population. It would be desirable to have a stratified national low income base from a longitudinal study to test policy implication. Despite these limitations, a study of this nature can be useful to identify the direction of general relationships and the relative impact of alternative policy measures.

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