ANALYSIS OF SELF-REPORTED HOUSEHOLD FOOD SUFFICIENCY STATUS USING USDA's 1977-78 NATIONWIDE FOOD CONSUMPTION SURVEY DATA

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For presentation at the
Annual American Agricultural
Economics Association meeting,
August 2-5, 1987,
Michigan State University

Introduction

The issue of hunger or food sufficiency in the United States has received increasing attention in the last decade. The President's Task Force on Food Assistance was established on September 8, 1983, by an Executive Order in response to anecdotal reports that the incidence of "hunger" in the United States was on the increase. The Task Force developed and presented a report to the President in January of 1984 (President's Task Force on Food Assistance). In its report, the Task Force suggested that there are two characterizations of hunger: One is the scientific or physiological used by health professionals--"the actual physiological effects of extended nutritional deprivation." Several reports have indicated that such hunger in the United States is probably not as prevalent as in many other countries. The second characterization of hunger relates more to a social phenomenon than medical evidence. In this sense, "hunger is the inability, even occasionally, to obtain adequate food and nourishment." Although information concerning "physiological" hunger is far from adequate, even less quantitative information is available about the second characterization of hunger.

Most of the the existing reports on the extent of insufficient food intakes in the population rely on indirect measures or indicators such as estimating the number of individuals below the poverty line, receiving free food at soup kitchens, and having no place to live. An indicator of food sufficiency is self-reported food sufficiency. Beginning with the 1977-78 Nationwide Food Consumption Survey (NFCS) of the USDA, the household respondent (the person deemed most knowledgeable about household food purchasing and preparation) was asked to describe the household food availability. There were four possible answers: 1. "Enough and kind wanted to eat," 2. "Enough but not always kind wanted to eat," 3. "Sometimes not enough to eat,"

and 4. "Often not enough to eat." This question was purposely designed to require the repondent to consider the quantity (enough) and the quality (kind wanted) of food together. It attempts to avoid "leading" the respondent to report insufficient food, as in questions such as, "did you run out of food?" However, the precise understanding of the question by respondents and its validity were not tested before it was used.

Based on analyses of the NFCS, responses to this question appear to be statistically associated with household food costs and with food energy and nutrient levels (Smallwood and Blaylock, 1985; Basiotis and Kirby) . In addition, responses to this question were used to derive poverty thresholds on the assumption that the responses were accurate reflections of household food sufficiency (Blaylock and Smallwood). The resulting poverty thresholds were rather close to those currently in use by the U.S. Government . Despite these positive findings it remains unclear that self-reported food sufficiency is an accurate reflection of "true" household food sufficiency. However, an indirect way to examine the validity of this food sufficiency indicator would be to test whether self reported food sufficiency status is in agreement with food consumption behavior revealed prior to reporting food sufficiency status.

The purpose of this study is to test the hypotheses that households describing their food supply as not sufficient have higher income elasticities for food expenditures and for the aggregate commodity "Food," as measured by food energy or calories consumed by the household; and to obtain estimates of income elasticities for food energy price/quality for each food sufficiency category and compare them. Rejection of these hypotheses may cast doubt on the validity of self-reported evaluation of household food supply as an accurate descriptor of the household's true food sufficiency status. On the

other hand, failure to reject these hypotheses is not sufficient to guarantee the validity of self-reported food sufficiency (but may encourage further research on the subject). This is because the objective rests on the underlying assumption that as household resources become more and more limited, households reduce expenditures on food (and on other commodities) by consuming lower priced varieties of food while maintaining a reasonably constant amount of food energy in order to maintain body weight and health. Substantial reductions in the quantity of food energy consumed may follow exhaustion of price/quality reduction possibilities. It is thus expected that households which truly do not have sufficient food supplies (whatever the definition of food sufficiency) will have, on average, higher income elastisities for food costs or expenditures, and food energy. They will have lower price/quality elasticity if their food energy consumption is severely restricted; otherwise, they are expected to have a price/quality income elasticity higher than or similar to households with sufficient food. The converse reasoning need not hold, however. That is higher income elasticities for food expenditure, and energy, and lower price/quality income elasticity, do not necessarily imply not sufficient household food supplies.

The objective of this paper is carried out in the following steps: (a) utilize household data from the 1977-78 NFCS basic and divide the sample into sufficient food and not sufficient food households. For the purpose of this study, a household was classified as having not sufficient food supplies if the response was "sometimes not enough to eat" or "often not enough to eat." Households were classified as having sufficient food supplies if they responded otherwise; (b) estimate double-log unrestricted reduced form equations for food costs, food energy available to the household, and price/quality as functions of household income, size, and other household

charactistics available from the NFCS for the two food sufficiency categories using appropriate statistical methods; (c) compare income elasticities thus obtained and draw conclusions. The results may be of interest to food consumption data collecting agencies, Federal food assistance program planners, the academic community, and the public at large.

Model Development

In demand estimation with cross sectional data the assumption is usually made that there is little or no price variation (Capps and Havlicek; Cox, Ziemer, and Chavas; Purcell and Raunikar). Whatever price variation there is it is assumed to be controlled for by supply related factors such as geographical region and urbanization. However, an important share of price variation in cross-sectional data, which is often ignored, is price variation due to quality differences caused by heterogeneous commodity aggregates, such as food energy (Houthakker). An excellent discussion of price/quality variation and its sources can be found in the recent article by Cox and Wohlgenant (1986).

In conventional Engel analysis of household food consumption data, expenditures, c, are hypothesized to depend on real income, y, household size, and other household characteristics. By the definition of expenditures as price (p) x quantity consumed (q), it follows that

$$(1) \quad \log c \equiv \log p + \log q$$

Thus, given the Engel relationship, we have

$$(2) \quad \frac{\partial \log c}{\partial \log y} = \frac{\partial \log p}{\partial \log y} + \frac{\partial \log q}{\partial \log y}$$

Where $\partial \log p / \partial \log y$ is the quality elasticity (Prais and Houthakker). While for a homogeneous good this elasticity is assumed to be zero, for a highly aggregated commodity such as food energy it is non zero (Prais and Houthakker).

Utility maximation incorporating the quality dimension yields demand functions for quantity and quality of the commodity (Cox and Wohlgenant). Any two of the three terms in (1) can be estimated as functions of income, household size and other household characteristics with the third following from the identity. With cross sectional data it is often assumed that the qualitative nature of an aggregate commodity is reflected in its average price, especially after controlling for possible quantity price components due to regional supply differentials (Houthakker; Theil). Thus, the food energy quality/price equation can be specified:

(3) $c_i/q_i \quad p = X_i \quad b^p + e^p,$

where i = 1, 2, ..., N = number of households, Xi is a vector of household characteristics including income and geographic location, b^p is a vector of coefficients to be estimated and e^p is a vector of regression residuals (Houthakker; Cox and Wohlgenant). Similarly, the expenditure and quantity equations may be specified as

(4) $ci = X_i \quad b^c + e^c$

(5) $qi = X_i \; b^q + e^q$

In this specification, the unrestricted reduced form is estimated. The functional form chosen was the double log as it permits direct estimation of

income elasticities. It is also appropriate for estimation of Engel curves for food (Prais and Houthakker). The estimated income coefficients in (3) - (5) are the respective income elasticities and satisfy (2).

Data and variable definitions

Data from USDA's 1977-78 Nationwide Food Consumption Survey were utilized to estimate (3) - (5) for each of the two self-reported food sufficiency categories described previously. Findings from a test for sample selection bias resulting from partitioning the data in this way will be discussed subsequently.

The 1977-78 NFCS collected dietary and other information from approximately 15,000 U.S. households over a one-year period. Due to incomplete records (mainly due to nonreporting of income) data from 10,338 households were available for analysis. Of these, 358 or 3.5 percent reported their food supply as not sufficient. Over 80 percent of the households reporting their food supply as not sufficient were income eligible for the Food Stamp Program. In order to make more meaningful comparisons between the two food sufficiency groups only 2747 low income food stamp program eligible households with complete records were retained and analyzed for this study. Of these, 297 households or 10.8 percent reported their food supply as not sufficient.

Households reported quantity and price or cost of each food used from the household food supply during one week. Households then provided information on income for the previous calendar year and the previous month, whether food stamps were received, and information on other household characteristics and activities. Lastly information on the household's self evaluation of its food supply was provided.

Total costs and the total food energy content of all food used by the households during the week prior to the interview were adjusted using the "21 Meal at home Equivalent Person" concept (21 MEP) in order to account for differences in the number of at-home meals consumed by household members (USDA, Smallwood and Blaylock, 1984). The selected measure of household income for this analysis was last month's income (including food stamp program benefits) rather than last year's. The rationale was that a "not sufficient" food household status is more likely to be temporary in this country than permanent. Thus, last year's income, which may reflect mostly permanent income, was inappropriate for the purposes of this analysis. Last month's income was expressed in income per person per week by multiplying by (12 ÷ 52) and dividing by the number of people in the household. Self explanatory descriptions of the remaining variables used in this analysis as well as their respective averages are in Table 1. Variables commonly used as proxies for unobserved household preferences for food quantity and quality as well as for food market supply and availability (e.g., season of year) were included (Pollak and Wales; Basiotis, et al). In addition, since the analysis was exploratory, a number of additional variables was included in the estimation of the Engel and price/quality equations to serve as controls. The statistical consequence of including many, and some possibly irrelevant, variables in a regression model is that estimated coefficients are unbiased; however, they likely have larger variances. Consequently, tests of hypotheses using the estimated coefficients (e/g. income elasticities) will tend to be conservative.

Results

Table 1 shows estimated variables means and regression coefficients for the food costs, food energy, and food energy price/quality equations by self-reported household food sufficiency category. Due to space limitations only results on income elasticities will be discussed here. Results for the remaining variables included in the model are presented without discussion. Recall that given (1) and the common Engel relationship specified the estimated coefficient vector of any one of the three regression equations may be obtained as the sum of the coefficient vectors of the remaining two equations. Nevertheless, all three equations were estimated and presented here for ease of comparability and statistical testing of coefficients.

Estimated coefficients (elasticities) for the continuous variables in the model (income, household size, and distance from the store) may be meaningfully compared across the self-reported food sufficiency categories. The remaining coefficients which are for qualitative, or dummy, variables may not be compared across food sufficiency categories since intercepts (or other characteristics) were not restricted to be equal across reported food sufficiency categories. Such a restriction was deemed unrealistic. However, additional information may be obtained by comparing distributions of characteristics across food sufficiency categories. These distributions are given by the means of the dummy variables.

Observing the estimated food cost income coefficients, or elasticities, in columns (2) and (6) we see that households in the sufficient food category had an estimated food expenditure per 21 MEP income elasticity of .055. Households in the not sufficient food category had an estimated expenditure income elasticity of .194, or approximately 250 percent higher than that of sufficient food households. Both of these estimates and their difference were

significant at the .01 level. Income elasticities for the quantity of food energy used at home per 21 MEP for the two self-reported food sufficiency categories are shown in columns (3) and (7). These were .0099 for the sufficient food category (not significant at the .10 level) and .1171, for the not sufficient food category. The latter of these estimated quantity income elasticities, as well as their difference were significant at the .05 level. From columns (4) and (8), the price/quality income elasticity for sufficient food households was estimated at .045; that for not sufficient food households was estimated at .077. Each of these estimated price/quality income elasticities for the two food sufficiency categories were statistically different from 0 at the .01 level. However, their difference was not significantly different from 0 at the .10 level.

These results imply that given a small but equal percentage increase in food expenditures by both sufficient and not sufficient food households, (resulting perhaps from small but unequal percentage increases in household monthly income per person), not sufficient food households would on average, distribute about 60 percent of the increase (columns (7) ÷ (6)=expenditure elasticity) on purchasing a higher quantity of food energy; they would distribute the remaining 40 percent of the increase in food costs (columns (8) ÷ (6)) on purchasing more expensive sources of food energy. By contrast, sufficient food households would on average distribute 18 percent of the increase in food expenditure to purchasing higher quantities of food energy (columns (3) ÷ (2)); they would distribute the remaining 82 percent of the increase in food expenditures (columns (4) ÷ (3)) on purchasing more expensive sources of food energy.

An additional observation of interest is that, on average, not sufficient food households had approximately the same level of food energy available to

them for consumption as sufficient food households (20,679 vs. 21,200 kcal/21 MEP/week). Yet as discussed above, not sufficient food households appeared to be more responsive in changing food energy levels in the household due to given changes in per capita income than sufficient food households.

A test for selectivity bias was performed using a two stage method in a switching regression framework (Maddala, 1983, pp. 223-228; Nelson, 1984). Table 2 presents these estimates. In general, the selectivity variable coefficients (LAMDA) were not significant. All of the selectivity adjusted estimated income elasticities corroborated and enhanced the previously estimated elasticity differences between the two food sufficiency groups. As the results based on no selectivity adjustment were more conservative they were discussed here.

Finally, additional analyses of the total NFCS and food stamp eligible samples using the semi log functional form resulted in similar findings. Income elasticity estimates obtained from alternative functional form specifications and 1977-78 NFCS samples are shown in Table 3, and food energy expenditure elasticities are shown in Table 4 for convenience. With the possible exception of the selectivity bias adjusted estimated elasticities, these estimates are quite robust.

Conclusions

The results of this exploratory analysis suggest that food stamp program eligible households in the 1977-78 NFCS survey reporting their food supply as not sufficient tended to adjust their food energy consumption behavior more drastically in response to a small change in income than did households describing their food supply as sufficient. This finding is important for two reasons. First, the study shows that self-reported household food sufficiency could be an accurate measure of true food sufficiency, although its validity

is not assured by this study. Second, in the 1977-78 NFCS the food sufficiency question was asked after questions pertaining to food assistance program participation. This might have biased the household's reported food sufficiency status toward the "not sufficient food" category. Since data on household food use were collected at the beginning of the interview, the results of the study suggest that, on average, the placement of the food sufficiency question on the questionnaire did not result in substantial biases toward the not sufficient food category. These conclusions will hopefully stimulate more research from different perspectives on the potential of self-reported food sufficiency as an accurate indicator of true food sufficiency.

References

Basiotis, P. P., M. Brown, S. R. Johnson, and K. J. Morgan: Nutrient availability, food costs, and food stamps. Am. J. Agric. Econ. 65(4):685-696, Nov. 1983.

Basiotis, P. P. and G. H. Kirby. "Self evaluation of household food supplies, dietary intakes, and socioeconomic characteristics." Draft report. United States Department of Agriculture, Human Nutrition Information Service. Hyattsville, MD. 1985.

Blaylock, J. R. and D. M. Smallwood. "An alternative approach to defining and assessing poverty thresholds." West. J. Agr. Econ. 11 (1986).

Capps, O., Jr. and J. Havlicek, Jr. "National and regional household demand for meat, poultry, and seafood: A complete systems approach." Can. J. Agr. Econ. 32(1984): 93-101.

Cox, T. L., R. F. Ziemer, and J. Chavas. "Household demand for fresh potatoes:A disaggregated cross-sectional analysis." West. J. Agr. Econ. 9(1984): 41-57.

Cox, T. L. and M. K. Wohlgenant. "Prices and quality effects in cross-sectional demand analysis." Am. J. Agr. Econ. 68(1986): 908-19.

Houthakker, H. S. "Compensated changes in quantities and qualities consumed." Rev. Econ. Stud. 19(1952): 155-64.

Maddala, G.S. "Limited-dependent and qualitative variables in econometrics." Cambridge: Cambridge University Press, 1983.

Nelson, F.D. (Efficiency of the two-step estimator for models with endogenous sample selection." J. of Econometrics. 24 (1984): 181-196.

Pollak. R. A. and T. J. Wales. "Estimation of complete demand systems from household budget data: The linear and quadratic expenditure system." Amer. Econ. Rev. 68(1978): 348-59.

Prais, S. J. and H. S. Houthakker. "The analysis of family budgets. Cambridge: Cambridge University Press, 1955.

President's Talk Force on Food Assistance. "Report of the President's Task Force on Food Assistance." January 10, 1984, Washington, D.C.

Purcell, J. C. and R. Raunikar. "Price elasticities from panel data: Meat, poultry, and fish." Amer. J. Agr. Econ. 51(1971): 216-21.

Smallwood, D. M. and J. R. Blaylock. "Scaling household nutrient data." Agr. Econ. Res. 36(1984): 12-22.

Smallwood, D. M. and J. R. Blaylock. "Self evaluation of home food supplies in low-income households." Paper presented at the annual meeting of the Southern Agricultural Economics Association in Biloxi, Mississippi, February 3-6, 1985.

U. S. Department of Agriculture, Human Nutrition Information Service. 1985 Dietary Levels: Households in the United States, Spring 1977. Report No. H-11

Theil, H. "Qualities, prices, and budget enquiries." Rev. Econ. Stud. 19(1952): 129-47.

Table 1.

Summary table of means (weighted) and regression results estimating relationships between measures of household food costs, food energy consumed from the household food supply, and food cost per unit of food energy (price/quality), and several household characteristics by self-evaluation of household food supply category; 1977-78 NFCS Basic, Food Stamp Eligible subsample, 4 quarters.

Independent Variables		SUFFICIENT (N = 2,450)				NOT SUFFICIENT (N = 297)			
Column:		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		Mean	"Actual" weekly food cost per 21 MEP (Average = $16.16)	Household weekly food energy consumed per 21 MEP (Average = 21,200 kcal)	"Price" $/1000 kcal consumed by household (Average = $.7857)	Mean	"Actual" weekly food cost per 21 MEP (Average = $14.70)	Household weekly food energy consumed per 21 MEP (Average = 20,679 Kcal)	"Price" $/1000 kcal consumed by household (Average = $.7261)
Income last month per person per week	Average:	42.56				30.78			
	Effect of a 10% increase:		0.55[c]	0.107	0.45[c]		1.94[c]	1.171[b]	0.77[b]
Number of people in household	Average:	3.01				3.41			
	Effect of a 10% increase:		-2.14[c]	-0.842[c]	-1.30[c]		-2.22[c]	-1.056	-1.16[c]
Distance to the store	Average:	1.693				2.27			
	Effect of a 10% increase:		0.18[c]	0.18[c]	0.044		0.24	0.15	0.08
Urbanization (Base = Central City)	Average (%)	36.9				56.4			
Suburban	Average (%)	23.8				19.1			
	Effect of (%)		-4.1[a]	2.2	-6.3[c]		6.8	2.1	5.0
Rural	Average (%)	39.3				24.5			
	Effect of (%)		-8.4[c]	3.1	-11.4[c]		2.4	10.0	-7.5[a]

Independent Variables		SUFFICIENT (N = 2,450)			NOT SUFFICIENT (N = 297)			
Column:		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		Mean	"Actual" weekly food cost per 21 MEP (Average = $16.16)	Household weekly food energy available per 21 MEP (Average = 21,200 kcal)	"Price" $/1000 kcal available to household (Average = $.7857)	Mean	"Actual" weekly food cost per 21 MEP (Average = $14.70)	Household weekly food energy available per 21 MEP (Average = 20,679 Kcal)	"Price" $/1000 kcal available to household (Average = $.7261)
Region (Base = Northeast)	Average (%)	22.8				23.2			
North-central	Average (%)	19.6				16.0			
	Effect of (%)		-10.1[c]	6.0[b]	-16.1[c]		-10.2	-0.1	-10.4[a]
South	Average (%)	41.8				49.4			
	Effect (%)		-11.7[c]	9.3[c]	-21.0[c]		-32.1[c]	-2.7	-29.4[c]
West	Average (%)	15.8				11.4			
	Effect of (%)		-10.1[c]	-1.5	-11.5[c]		-38.1[c]	-29.9[c]	-8.3
Headship (Base = Male & Female)	Average (%)	46.9				32.3			
Male Head Only	Average (%)	6.9				7.5			
	Effect of (%)		-0.2	4.1	-4.3		17.4	5.3	2.2
Female Head Only	Average (%)	46.2				60.2			
	Effect of (%)		-6.9[b]	4.1	-1.7		4.6	1.6	3.1

Independent Variables			SUFFICIENT (N = 2,450)				NOT SUFFICIENT (N = 297)		
Column:		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		Mean	"Actual" weekly food cost per 21 MEP (Average = $16.16)	Household weekly food energy available per 21 MEP (Average = 21,200 kcal)	"Price" $/1000 kcal available to household (Average = $.7857)	Mean	"Actual" weekly food cost per 21 MEP (Average = $14.70)	Household weekly food energy available per 21 MEP (Average = 20,679 Kcal)	"Price" $/1000 kcal available to household (Average = $.7261)
Employment: Male Head (Base = Fully Employed)	Average (%)	45.3				44.2			
Part time	Average (%)	8.4				9.3			
	Effect of (%)		-2.4	-1.2	-1.2		10.6	0.6	10.0
Not Employed	Average (%)	46.3				46.5			
	Effect of (%)		-8.0[c]	-4.3[a]	-3.7		-8.4	-6.1	-2.3
Employment: Female Head (Base = Fully Employed)	Average (%)	12.3				8.1			
Part Time	Average (%)	10.1				7.4			
	Effect of (%)		-5.6	-8.7[b]	3.1		21.5	10.1	11.4
Not Employed	Average (%)	77.6				83.7			
	Effect of (%)		-9.8[c]	-7.8[c]	-2.0		10.0	4.0	6.0

Independent Variables		SUFFICIENT (N = 2,450)			NOT SUFFICIENT (N = 297)			
Column:		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		Mean	"Actual" weekly food cost per 21 MEP (Average = $16.16)	Household weekly food energy available per 21 MEP (Average = 21,200 kcal)	"Price" $/1000 kcal available to household (Average = $.7857)	Mean	"Actual" weekly food cost per 21 MEP (Average = $14.70)	Household weekly food energy available per 21 MEP (Average = 20,679 Kcal)	"Price" $/1000 kcal available to household (Average = $.7261)
Education: Male Head (Base = Highschool or less)	Average (%)	83.8				94.4			
More than H.S.	Average (%)	16.2				5.6			
	Effect of (%)		5.3	2.0	3.3[a]		-12.1	-19.2	7.1
Education: Female Head (Base = Highschool or less)	Average (%)	90.7				95.4			
More then H.S.	Average (%)	9.3				4.6			
	Effect of (%)		3.6	-4.1	7.7[c]		9.0	21.4	-12.4[a]
Meal Planner: (Base = Female Head)	Average (%)	83.7				85.7			
Male Head Only	Average (%)	6.5				6.5			
	Effect of (%)		7.7	5.3	2.4		25.8	30.1	-4.8
Male and Female Head	Average (%)	4.1				2.2			
	Effect of (%)		6.1	8.1[a]	-2.0		6.9	-1.4	8.3
Other Combination	Average (%)	5.7				5.6			
	Effect of (%)		3..	2.2	1.5		13.6	1.0	12.6[a]

Independent Variables			SUFFICIENT (N = 2,450)				NOT SUFFICIENT (N = 297)		
Column:		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		Mean	"Actual" weekly food cost per 21 MEP (Average = $16.16)	Household weekly food energy available per 21 MEP (Average = 21,200 kcal)	"Price" $/1000 kcal available to household (Average = $.7857)	Mean	"Actual" weekly food cost per 21 MEP (Average = $14.70)	Household weekly food energy available per 21 MEP (Average = 20,679 Kcal)	"Price" $/1000 kcal available to household (Average = $.7261)
Household Had Guests Eating	Average (%)	29.2				17.8			
	Effect of (%)		9.4[c]	7.8[c]	1.6		8.2	7.1	1.1
Season of Survey (Base = Spring)	Average (%)	25.6				22.1			
Summer	Average (%)	25.1				24.8			
	Effect of (%)		3.2	4.2[a]	-1.0		0.1	-2.4	2.5
Fall	Average (%)	25.5				27.1			
	Effect of (%)		3.4	7.4[c]	-3.9[c]		-7.7	-8.5	0.9
Winter	Average (%)	23.8				16.0			
	Effect of (%)		3.1	4.0[a]	-0.9		1.1	2.5	-1.4
Race (Base = White)	Average (%)	69.5				45.3			
Black	Average (%)	24.3				46.2			
	Effect of (%)		-2.2	1.8	-3.9[c]		17.8[b]	16.4[b]	1.3
Other	Average (%)	6.2				8.5			
	Effect of (%)		0.2	1.0	-0.8		5.2	2.4	2.8
Ethnic Origin (Base = Not Spanish)	Average (%)	91.1				84.5			
Spanish	Average (%)	8.9				15.5			
	Effect of (%)		9.1[b]	11.1[c]	-2.0		15.1	19.0	-3.9

Independent Variables		SUFFICIENT (N = 2,450)			NOT SUFFICIENT (N = 297)			
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Gov't Assistance Programs									
FSP Status (Base = Eligible not participating)	Average (%)	70.0				49.7			
Eligible, participating	Average (%)	30.0				50.3			
	Effect of (%)		6.0[c]	6.6[c]	-0.6		10.0	10.6[a]	-0.6
WIC	Average (%)	2.9				5.7			
	Effect of (%)		-1.1	-3.0	1.9		-1.4	4.9	-3.5
School Lunch	Average (%)	33.4				41.6			
	Effect of (%)		5.7[b]	6.4[b]	-0.8		15.8[a]	11.1	4.6
School Breakfast	Average (%)	5.6				14.8			
	Effect of (%)		9.0[b]	9.1[b]	-0.1		-13.8	-4.3	-9.5[a]
House is Part of Public Project	Average (%)	9.9				21.3			
	Effect of (%)		-4.6	-3.9	-0.7		14.9[b]	7.0	8.0[b]
Household size in 21 MEP	Average	2.81				3.13			
F			13.826	4.412	34.486		4.042	2.093	5.175
R^2			0.1506	0.0535	0.3066		0.3210	0.1967	0.3771

[1]If answer to the following question asked of respondents in 1977-78 NFCS were "1" or "2" household food supply was classified as "sufficient," otherwise, it was classified as "not sufficient."

[a]Significant at .10 level.
[b]Significant at .05 level.
[c]Significant at .01 level.

Question# III. 20--Which one of the following statements <u>best</u> describes the food eaten in your household:

1. Enough of the kinds of food we want to eat,
2. Enough but not always what we want to eat,
3. Sometimes not enough to eat or,
4. Often not enough to eat?

Table 2.

Summary table of means (weighted) and selectivity bias adjusted regression results estimating relationships between measures of household food costs, food energy consumed from the household food supply, and food cost per unit of food energy (price/quality), and several household characteristics by self-evaluation of household food supply category; 1977-78 NFCS Basic, Food Stamp Eligible subsample, 4 quarters.

Independent Variables			SUFFICIENT (N = 2,450)				NOT SUFFICIENT (N = 297)		
Column:		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		Mean	"Actual" weekly food cost per 21 MEP	Household weekly food energy consumed per 21 MEP	"Price" $/1000 kcal consumed by household	Mean	"Actual" weekly food cost per 21 MEP	Household weekly food energy consumed per 21 MEP	"Price" $/1000 kcal consumed by household
			(Average = $16.16)	(Average = 21,200 kcal)	(Average = $.7857)		(Average = $14.70)	(Average = 20,679 Kcal)	(Average = $.7261)
Lamda		0.36	.846	0.107	.740[b]	-.37	-4.08[a]	-3.25	-0.83
Income last month per person per week	Average:	42.56				30.78			
	Effect of a 10% increase:		0.63[c]	0.109	0.52[c]		3.49[c]	2.40[b]	1.09[b]
Number of people in household	Average:	3.01				3.41			
	Effect of a 10% increase:		-2.17[c]	-0.846[c]	-1.32[c]		-2.30[c]	-1.12	-1.18[c]
Distance to the store	Average:	1.693				2.27			
	Effect of a 10% increase:		0.18[c]	0.18[c]	0.002		0.24	0.15	0.08
Urbanization (Base = Central City)	Average (%)	36.9				56.4			
Suburban	Average (%)	23.8				19.1			
	Effect of (%)		-4.2[a]	2.2	-6.4[c]		8.1	3.1	5.0
Rural	Average (%)	39.3				24.5			
	Effect of (%)		-8.4[c]	3.1	-11.4[c]		2.8	10.2	-7.5[a]

Independent Variables		SUFFICIENT (N = 2,450)				NOT SUFFICIENT (N = 297)			
Column:		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		Mean	"Actual" weekly food cost per 21 MEP (Average = $16.16)	Household weekly food energy available per 21 MEP (Average = 21,200 kcal)	"Price" $/1000 kcal available to household (Average = $.7857)	Mean	"Actual" weekly food cost per 21 MEP (Average = $14.70)	Household weekly food energy available per 21 MEP (Average = 20,679 Kcal)	"Price" $/1000 kcal available to household (Average = $.7261)
Region (Base = Northeast)	Average (%)	22.8				23.2			
North-central	Average (%)	19.6				16.0			
	Effect of (%)		-10.1[c]	6.0[b]	-16.1[c]		-7.9	-1.9	-9.9[a]
South	Average (%)	41.8				49.4			
	Effect (%)		-11.6[c]	9.3[c]	-20.9[c]		-29.5[c]	-0.7	-28.8[c]
West	Average (%)	15.8				11.4			
	Effect of (%)		-10.1[c]	-1.5	-11.6[c]		-38.4[c]	-30.1[c]	-8.3
Headship (Base = Male & Female)	Average (%)	46.9				32.3			
Male Head Only	Average (%)	6.9				7.5			
	Effect of (%)		-1.7	3.9	-5.7		-17.5	-14.5	-2.9
Female Head Only	Average (%)	46.2				60.2			
	Effect of (%)		-6.9[b]	4.3	-2.7		-12.6	-12.2	-0.5

Independent Variables			SUFFICIENT (N = 2,450)				NOT SUFFICIENT (N = 297)		
Column:		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		Mean	"Actual" weekly food cost per 21 MEP (Average = $16.16)	Household weekly food energy available per 21 MEP (Average = 21,200 kcal)	"Price" $/1000 kcal available to household (Average = $.7857)	Mean	"Actual" weekly food cost per 21 MEP (Average = $14.70)	Household weekly food energy available per 21 MEP (Average = 20,679 Kcal)	"Price" $/1000 kcal available to household (Average = $.7261)
Employment: Male Head (Base = Fully Employed)	Average (%)	45.3				44.2			
Part time	Average (%)	8.4				9.3			
	Effect of (%)		-2.4	-1.2	-1.2		9.3	-0.4	9.7
Not Employed	Average (%)	46.3				46.5			
	Effect of (%)		-8.1[c]	-4.3[a]	-3.8		-9.2	-6.7	-2.5
Employment: Female Head (Base = Fully Employed)	Average (%)	12.3				8.1			
Part Time	Average (%)	10.1				7.4			
	Effect of (%)		-5.5	-8.7[b]	3.2		25.3	13.1	12.1
Not Employed	Average (%)	77.6				83.7			
	Effect of (%)		-9.7[c]	-7.8[c]	-2.0		11.9	5.5	6.4

Independent Variables		SUFFICIENT (N = 2,450)				NOT SUFFICIENT (N = 297)			
Column:		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		Mean	"Actual" weekly food cost per 21 MEP (Average = $16.16)	Household weekly food energy available per 21 MEP (Average = 21,200 kcal)	"Price" $/1000 kcal available to household (Average = $.7857)	Mean	"Actual" weekly food cost per 21 MEP (Average = $14.70)	Household weekly food energy available per 21 MEP (Average = 20,679 Kcal)	"Price" $/1000 kcal available to household (Average = $.7261)
Education: Male Head (Base = Highschool or less)	Average (%)	83.8				94.4			
More than H.S.	Average (%)	16.2				5.6			
	Effect of (%)		5.2	2.0	3.2		-13.9	-20.6	6.7
Education: Female Head (Base = Highschool or less)	Average (%)	90.7				95.4			
More then H.S.	Average (%)	9.3				4.6			
	Effect of (%)		3.6	-4.1	7.7[c]		7.9	20.5	-12.6[a]
Meal Planner: (Base = Female Head)	Average (%)	83.7				85.7			
Male Head Only	Average (%)	6.5				6.5			
	Effect of (%)		7.8	5.3	2.5		25.6	30.5	-4.9
Male and Female Head	Average (%)	4.1				2.2			
	Effect of (%)		6.1	8.1[a]	-2.1		6.5	-1.8	8.3
Other Combination	Average (%)	5.7				5.6			
	Effect of (%)		3.8	2.2	1.6		12.5	0.1	12.4[a]

Independent Variables		SUFFICIENT (N = 2,450)				NOT SUFFICIENT (N = 297)			
Column:		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		Mean	"Actual" weekly food cost per 21 MEP (Average = $16.16)	Household weekly food energy available per 21 MEP (Average = 21,200 kcal)	"Price" $/1000 kcal available to household (Average = $.7857)	Mean	"Actual" weekly food cost per 21 MEP (Average = $14.70)	Household weekly food energy available per 21 MEP (Average = 20,679 Kcal)	"Price" $/1000 kcal available to household (Average = $.7261)
Household Had Guests Eating	Average (%)	29.2				17.8			
	Effect of (%)		9.3[c]	7.8[c]	1.5		7.9	6.8	1.1
Season of Survey (Base = Spring)	Average (%)	25.6				22.1			
Summer	Average (%)	25.1				24.8			
	Effect of (%)		3.2	4.2[a]	-0.9		-0.04	-2.5	2.5
Fall	Average (%)	25.5				27.1			
	Effect of (%)		3.5	7.4[c]	-3.9[c]		-8.5	-9.2	0.7
Winter	Average (%)	23.8				16.0			
	Effect of (%)		3.1	4.0[a]	-0.9		-0.4	1.3	-1.4
Race (Base = White)	Average (%)	69.5				45.3			
Black	Average (%)	24.3				46.2			
	Effect of (%)		-4.3	1.6	-5.8[c]		13.4	8.4	-5.0
Other	Average (%)	6.2				8.5			
	Effect of (%)		1.5	0.7[c]	-2.3		-18.4	-16.4	-2.0
Ethnic Origin (Base = Not Spanish)	Average (%)	91.1				84.5			
Spanish	Average (%)	8.9				15.5			
	Effect of (%)		9.1[b]	11.1[c]	-2.0		15.1	19.0	-3.9

Independent Variables			SUFFICIENT (N = 2,450)				NOT SUFFICIENT (N = 297)		
Column:		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		Mean	"Actual" weekly food cost per 21 MEP (Average = $16.16)	Household weekly food energy available per 21 MEP (Average = 21,200 kcal)	"Price" $/1000 kcal available to household (Average = $.7857)	Mean	"Actual" weekly food cost per 21 MEP (Average = $14.70)	Household weekly food energy available per 21 MEP (Average = 20,679 Kcal)	"Price" $/1000 kcal available to household (Average = $.7261)
Gov't Assistance Programs									
FSP Status (Base = Eligible not participating)	Average (%)	70.0				49.7			
Eligible, participating	Average (%)	30.0				50.3			
	Effect of (%)		4.6[b]	6.4[c]	-1.9		12.0	-6.9	-5.1
WIC	Average (%)	2.9				5.7			
	Effect of (%)		-1.0	-3.0	2.0		-1.7	5.2	-3.5
School Lunch	Average (%)	33.4				41.6			
	Effect of (%)		5.8[b]	6.4[b]	-0.6		16.3[a]	11.6	4.7
School Breakfast	Average (%)	5.6				14.8			
	Effect of (%)		8.9[b]	9.1[b]	-0.2		-14.9	-5.2	-9.7[b]
House is Part of Public Project	Average (%)	9.9				21.3			
	Effect of (%)		-4.6	-3.9	-0.7		16.7[b]	8.4	8.3[b]
Household size in 21 MEP	Average	2.81				3.13			
F			13.457	4.273	33.593		4.059	2.109	5.021
R^2			0.1512	0.0535	0.3078		0.3297	0.2036	0.3784

[1]If answer to the following question asked of respondents in 1977-78 NFCS were "1" or "2" household food supply was classified as "sufficient," otherwise, it was classified as "not sufficient."

[a]Significant at .10 level.
[b]Significant at .05 level.
[c]Significant at .01 level.

Question# III. 20--Which one of the following statements <u>best</u> describes the food eaten in your household:

1. Enough of the kinds of food we want to eat,
2. Enough but not always what we want to eat,
3. Sometimes not enough to eat or,
4. Often not enough to eat?

Table 3. Estimated income elasticities (x10) for household food costs and food energy consumed (per 21 meal equivalent persons) and dollar amount paid per 1000 kcalories consumed by the household; for households describing their food supplies as "sufficient" or "not sufficient" 1977-78 NFCS Data

NFCS sample utilized and functional form	Sufficient			Not sufficient		
	"Actual" weekly food cost per 21 MEP	Household weekly food energy consumed per 21 MEP	"Price" $/1000 kcal consumed by household	"Actual" weekly food cost per 21 MEP	Household weekly food energy consumed per 21 MEP	"Price" $/1000 kcal consumed by household
Total NFCS sample, "double-log"	1.34[c]	0.329[c]	1.01[c]	1.99[c]	1.26[b]	0.72[c]
Total NFCS sample, "semi-log"*	1.39[c]	0.31[c]	1.06[c]	1.42[c]	0.94[a]	0.66[b]
Food stamp eligible NFCS Sample,"double-log"	0.55[c]	N.S.	0.45[c]	1.94[c]	1.17[b]	0.77[c]
Food stamp eligible NFCS Sample,"semi-log"	0.51[c]	N.S.	0.45[c]	1.35[c]	0.88[a]	0.77[c]
Food stamp eligible, NFCS Sample, double-log, Selectivity bias adjusted	0.63[c]	N.S.	0.52[c]	3.49[c]	2.40[c]	1.09[b]

a- Significant at .1 Level
b- Significant at .05 Level
c- Significant at .01 Level
N.S.- Not significant at .1 level

*- For the semi-log specification, income elasticity is defined as ratio of estimated log-income coeficient (times 10) to group mean value of the dependent variables. In all cases, significance level reported is for estimated log-income coeficient.

Table 4. Estimated Food Energy Expenditure Elasticities for Households Describing their Food Supplies as "Sufficient" or "Not Sufficient", 1977-1978 NFCS Data.

NFCS sample utilized and functional form	Sufficient	Not sufficient
Total NFCS sample, "double-log"	.24	.63
Total NFCS sample, "semi-log"	.22	.66
Food stamp eligible NFCS Sample,"double-log"	.18	.60
Food stamp eligible NFCS Sample,"semi-log"	.12	.65
Food stamp eligible, NFCS Sample, double-log, Selectivity bias adjusted	.18	.69