The Relationship between Food Assistance, the Value of Food Acquired, and Household Food Security

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Abstract

The research presented examines household food spending relative to households need for food and the relationship between food expenditures and measures of food security. Using data from the Current Population Survey and the Consumer Expenditure Survey, we find that Food Stamp households that do not receive at least 75% of their (Extended) Thrifty Food Plan amount from Food Stamps are worse off with respect to their food expenditures than those that receive at least 75% of their needs from the Food Stamp program. While having an elderly person in the home is associated with a higher probability of not spending enough on food, households with at least one elderly person have a lower probability of reporting food insecurity than statistically comparable households. We find that among Food Stamp participating households, those that achieve at least 90 percent of their Thrifty Food Plan amount devote lower shares of their expenditures to apparel, child care, housing, utilities, and entertainment relative to the households tha do not achieve this food expenditure threshold.

I. Introduction

This paper considers the impact of food assistance on household food expenditures and measures of household food security. The research addresses an apparent gap in the literature. Past research on food stamps (hereafter FS) has focused on their impact on food expenditures and nutrition. Analyses that have focused on the marginal propensity to consume (or spend on) food from different sources (e.g., FS, cash) have shown that compared to cash, FS have a greater impact on increasing food expenditures (e.g., Fraker 1990, Senauer and Young 1986, Levedahl 1995, Salathe 1980a, Salathe 1980b, Breunig *et al* 2001). These analyses, however, do not consider the degree to which households spend *enough* on food. That is, although FS increase food expenditures, recipient households may still not spend enough on food.

We first document the extent to which different forms and amounts of food assistance, either through expenditures or in-kind donations, move a household closer to acquiring enough food. We define "enough food" by whether or not the household achieves its Extended Thrifty Food Plan amount (Daponte *et al* 2003). The FS program defines the Thrifty Food Plan (TFP) as the minimum amount in food resources required to potentially meet the household's food needs. As we argue below, the ETFP is likely a better indicator of minimum household food needs since it takes into account the actual age and sex composition of all household members whereas the TFP only uses a composite household scaled for household size.

Daponte, Haviland and Kadane (2003) have examined whether or not households achieve their Extended Thrifty Food Plan (ETFP), but their sample was limited to household from a single Pennsylvania county. In the current study, we use two nationally representative datasets, the Current Population Survey and the Consumer Expenditure Survey, to examine the extent to which food assistance programs help families to achieve their ETFP.

We recognize, however, that there is a great deal of heterogeneity in the population and that "enough to eat" may differ from household to household. Even though the ETFP is meant to capture a relatively low food standard, failure to achieve this threshold does not necessarily mean that individuals in households that do not acquire their ETFP are not reaching their individual level of having enough to eat. Therefore, we next examine the correlation between achieving the ETFP and household food

security using the Current Population Survey. By considering households' self-reported levels of food security, we examine the relationship between food security and the amount of money a household spends on food, relative to its food needs.

In the final part of our paper, we examine the relationship between achieving the ETFP and other measures of household expenditures. The popular press occasionally reports that both fixed expenses such as housing and utilities as well as unexpected expenses such as medical expenses may cause households to spend too little on food (e.g., Waldman 2004; Scherer 2003; Ubinas 2002; Paulson 2001; Mann 2000; Banerjee 2000). Using the Consumer Expenditure Survey, we provide descriptive evidence of the relationship between achieving the ETFP and the composition of household food expenditures by examining differences between the expenditure patterns of households that achieve their ETFP and those that do not.

The remainder of the paper is structured as follows. First, we provide a brief review of past research. Then, we describe the two sources of data sets we analyze– the Consumer Expenditure Survey and the Current Population Survey. Following, we address the above questions. We conclude with a discussion of the findings, the policy implications of the research, and an outline for further research.

II. Review of Past Research

One strain of food assistance research has focused on the extent to which food assistance affects the marginal propensity to consume or purchase food. In reviewing a number of studies addressing the question of whether benefits in the form of FS versus cash more effectively increase the marginal propensity to consume or purchase food (hereafter MPC_f), Fraker writes "These studies show that the estimate MPC_f out of food stamps is generally two to ten times larger than the MPC_f out of regular income" (Fraker 1990, p. 77). In general, economists find "The net increase in food consumption or expenditures associated with a food assistance program depends in part on how or in what form benefits are provided" (Levedahl and Oliveira 1999, p. 312).

Another strain of research has examined whether food assistance impacts self-reported food insecurity or insufficiency. Analyzing SIPP (1992) and CSFII (1989-91) data, Rose *et al* (1998) found that receipt of FS has a minimal (though statistically significant) negative correlation with food insufficiency. Daponte (2000) finds that FS households are more likely to report food insecurity than

economically and demographically comparable non-participating households when using detailed data collected from a sample of low-income households. However, her research also shows no correlation between FS participation and the probability of a child being an anthropometric outlier. Because of the cross-sectional nature of the data used, her finding is not evidence that FS contribute to food insecurity or that FS do not positively affect child nutrition. Work done by Cohen *et al* (1999) also suggests that when examined cross-sectionally, FS program participants are more likely to report food insecurity than non-participating FS eligible households (50% vs. 34%) (p. 44).

Gunderson and Oliveira (2001) employ a simultaneous equations model to control for the increased propensity of food insufficient households to participate in the FS program. Even with this control, although they find that FS participants are not more likely to report food insufficiency than non-participating households, they do not find that FS participants are more food secure than statistically equivalent non-participating households. That is, they find that participation in the FS program has no impact on food security, similar to Borjas' (2001) work.

Food security, measured on a four-level scale, is ultimately a subjective statement which combines household budgeting strategies with perceived access to food. This point has been made in the literature in two related, but subtle ways. Cornell *et al* find that the when examining the relationship between the body mass index (BMI) of adults living in the south and their reported food security, they find that the mean BMI of food secure adults mimics that of food insecure adults (Cornell *et al* 2000, Table 1). Using the CPS-Food Security Supplement question on the minimum amount one would have to spend in order to meet one's nutritional needs, Jensen (2002) finds that among households with incomes less than 130% of poverty, the minimum amount of money needed to spend on food is negatively correlated with one's food security. That is, in the 2000 CPS-FSS, food secure households report that one needs to spend at least $34.05 per capita per week, while those who are food insecure with hunger believe that the minimum amount needed is $44.79 (Jensen 2002, p. 1220). This finding suggests that food security may not be tied directly to food expenditures, but instead be the result of food expenditures interacting with shopping and cooking skills, or possibly the preferences of household members.

Another approach taken to examining the efficacy of FS has been to consider the program's impact on nutritional intake directly. Most studies have shown either no or a minimally positive significant impact

of FS on nutrition (Fraker 1990). Levedahl and Oliveira (1999) find that "between 1965-66 and 1977-78, a period that marked the national expansion of the FSP and the introduction of WIC, the gap between the diets of low-income and other families narrowed" (p. 309). Wilde *et al* (1999) found that receiving FS positively and significantly correlates with the intake of meats, added sugars, and fats although they find no effects for other food groups. In contrast, they find that WIC negatively and significantly correlates with the intake of added sugars. In a study that finds differing evidence from those cited above, Butler and Raymond (1996) find that "increased income, either restricted to food stamps or otherwise, is associated with reduced nutrient intake...." (p. 79). They argue that as income increases, so does one's value of time, making the purchase of prepared food (with perhaps relatively low nutritional value) more attractive.

Indirectly considering nutritional impact, Wilde and Ranney (2000) examined the timing of shopping over the month in relation to the receipt of food stamps. Using data from the Consumer Expenditure Diary Survey for 1988-92 and the Survey of Food Intake by Individuals, 1989-91, they find that per capita expenditures peak for the first three days after the receipt of FS[1]. Considering the timing of nutrient intake and defining infrequent shoppers as those that shop once a month or less often, Wilde and Ranney observe a drop in nutrient intake among infrequent shoppers in the fourth week from the receipt of FS. Their finding suggests that many FS recipients (43% of the sample) shop infrequently and reduce their nutritional intake rather than incur out-of-pocket expenditures for food.

As we discussed above, only one prior study examines the relationship between all common forms of food assistance and meeting the minimum food needs. Analyzing a detailed data set on low-income households in Allegheny County, PA, Daponte, Haviland and Kadane (2003) examined the total value of food a household acquires, either through purchases or through various food assistance programs, including private food assistance. The data set they used includes measures of the value of food received from a food pantry, as well as the value of Food Stamp and WIC benefits. Using the percent of the ETFP a household acquires as the dependent variable, they find that households that receive “high” FS benefits (at least 75% of their ETFP in benefits) acquire on average nearly 20% more of their ETFP amount than similar households that do not receive any food assistance. They also found that households that receive a moderate level in FS benefits (35-74% of their ETFP) acquire 8% more of their ETFP amount, and the receipt of a low level of FS benefits (<35% of the household’s ETFP) does

not statistically significantly impact food acquisitions. That is, their findings suggest that *in spite of their generally higher net monthly incomes, in terms of attaining their ETFP households receiving less that 75% of their ETFP in food stamp benefits are worse off in terms of food acquisitions than households receiving high FS benefits.* Daponte *et al* also found that receipt of food from a food pantry increases a household's food acquisitions relative to its ETFP by 6%, and this increase is statistically significant. Participation in the WIC program also positively impacts households' food acquisitions[2]. In other analyses that exmin the relative effectiveness of FS, WIC, and food pantries, Daponte *et al* find support for the theory that the more restrictive the food assistance, the greater the impact on food consumption.

In summary, the literature reviewed suggests that the means by which food assistance impacts the well-being of households with respect to their food needs, measured as being food secure or spending enough on food, is not fully understood. We now turn to discussing the data we use to examine the relationship between income, food expenditures, and food security.

III. Data Considerations

Our research uses two data sets: the Consumer Expenditure Survey (CEX) Survey-- Interview and Diary Survey and the Current Population Survey. The Bureau of Labor Statistics (BLS) conducts the CEX in two separate components, a quarterly Interview Survey and the two-week Diary Survey[3]. The Interview Survey is designed to capture the more expensive and less frequently purchased items that are easy to recall at quarterly intervals (e.g., appliances, automobiles). The Diary Survey is designed to gain an accurate accounting of less expensive and more frequently purchased items (e.g., food eaten at home and away, gasoline, and personal care items). Quarterly, the BLS publishes tables that integrate data from both of these surveys to accurately assess expenditures by U.S. households.

Both the Interview and Diary Surveys are on-going studies with participating consumer units continually entering and exiting the survey. The BLS defines a consumer unit as ``consisting of all members of a particular housing unit who are related by blood, marriage, adoption, or some other legal arrangement. Consumer unit determination for unrelated persons is based on financial independence." The Interview Survey contacts consumer units up to five times. The initial contact establishes a household roster and inventories household durable goods. The consumer unit is then contacted again at

a quarterly interval for four more interviews. During these quarterly interviews, households report their detailed expenditures for the previous three months on both non-durable and durable goods.

A consumer unit participates in the Diary Survey for two consecutive one-week periods. The BLS randomly determines each consumer unit's start date, with new households entering the survey each day. At the beginning of the two-week collection period, an interviewer collects household characteristics, instructs the consumer unit how to fill out the diary, and leaves a diary for the first week. At the end of the first week, the interviewer reviews the first diary, answers any questions, and leaves a diary for the second week. At the end of the second week, the interviewer returns for the second diary and to collect additional household demographic and economic information. The consumer unit is instructed to record all expenditures for each day including both food and non-food items, expenditures on rentals such as videos, and catalog purchases. The consumer unit is told to exclude expenditures made when away from home overnight, business or farm expenses, and sales tax except for food away from home.

In addition to expenditures, the CEX collects employment and income information for each member of the consumer unit as well as income information for the entire consumer unit. In the Interview Survey, household income information only is collected during the first and fourth of the quarterly interviews. Income data in the Diary Survey is collected at the end of the second week. For each consumer unit member ages fourteen and older, information on wage, salary, and other earnings and Social Security income in the past twelve months is collected. The BLS provides summary measures of total wage and salary earnings as well as Social Security earnings for the consumer unit during the past twelve months. At the consumer unit level, information on interest and dividend income is collected. In addition, information on the amount and the date of food stamp payments in the past month is collected.

The Food Stamp information collected in the CEX differs between the Interview and Diary Surveys. Consumer units in the Interview Survey are asked about the total amount of FS received during the past quarter as well as the number of months during the quarter that FS benefits where received. These figures are converted into an annualized value of Food Stamp benefits. Thus, the quarterly value of FS benefits can be recovered, but the exact monthly benefit can only be estimated. In contrast, the Diary Survey records up to three FS arrival dates within the past month. An examination of the data

revealed that if households reported more than one FS date, they fell into two general categories– 1) households that report the arrival date and value of FS for each of the past three months, and 2) households with multiple dates within a month of the survey. The BLS reports the value of FS at each of these dates and these values can be summed for purposes of the analysis to determine exact monthly FS values.

Although the CEX has been conducted on an on-going basis since 1980[4], we use only the 1986-2000 data because the public use Diary Survey data does not include all recorded expenditures until the 1986 survey. Thus, we limit our sample to the time period that allows us to make full use of both data sets. In addition, we limit the sample to observations that the BLS deems to be "complete income reporters." These households are those that report income from major sources such as wages and salaries, self-employment income and Social Security. For households that are not deemed by be complete income reporters, the Bureau of Labor Statistics sets all income information (even that which is reported in the survey) to zero. This restriction precludes roughly 20 percent of consumer units from the sample. After making these restrictions, we have 68,572 consumer units in the Interview Survey and 60,418 consumer units in the Diary Survey.

The Food Security Supplement of the Current Population Survey, first administered in 1995, is used to develop an understanding of the relationship between food assistance, food expenditures, and food security. The supplement includes questions that allow determination of a household's level of food security, as well as usual and actual food expenditures, participation in food assistance programs, and value of FS and WIC benefits. The CPS includes data on social program participation, household characteristics, income, and labor force experience. The Bureau of Labor Statistics and the U.S. Census Bureau collaboratively sponsor the Current Population Survey. Monthly, the U.S. Census Bureau collects data from approximately 50,000 sampled households. Data is collected both on the household level and on individuals in households. (For details on the sampling and weighting schema used, see U.S. Bureau of Labor Statistics and U.S Census Bureau 2002.)

Issues of undercount and inclusion cloud the use of the CPS. While used widely by social scientists, there may be a misweighting of low-income households that participate in the survey. Daponte and Wolfson (2003) show that the numbers of people participating in various social programs based on

administrative data exceeds the numbers participating implied by the weighting schema and responses in the Current Population Survey. Examining the 1999 Food Security Supplement of the CPS, Daponte and Wolfson find that nationwide, the 1999 FSS captures only 57% of infants and 78% of children 1-4 who receive WIC benefits.

Jolliffe *et al* analyzed the 1988 to 2000 March Supplement of the CPS (ADF) and Food Stamp program administrative data. They conclude that "[a] shortcoming of the CPS is that it most likely underestimates the number of food stamp recipients and the value of food stamp benefits" (Jolliffe *et al* 2002, p. 5). Specifically, Jolliffe *et al* consider the month-weighted average of all participants during the year, as obtained from the CPS and compare it to figures from the administrative data. "On average, the CPS underestimates total participation in comparison to the administrative estimate by 13 percent...The relative difference ...is fairly constant between 1988 and 2000....The CPS data also underestimate the value of food stamp benefits. The data indicate that between 1988 and 2000, the total value of food stamp benefits is equal to 82 percent of the value as estimated by the administrative data" (Jolliffe et al 2002, p. 5) Jolliffe *et al*'s analysis indicates "that food stamp recipients and benefits levels are underestimated by the CPS over all years between 1988 and 2000" (Jolliffe et al 2002, p. 5).

Another area of concern in using the Current Population Survey is the reporting of reliance on food pantries. The 2001 Food Security Supplement of the CPS implies that 8.7 million individuals relied on a food pantry at least once within 12 months of the survey, whereas America's Second Harvest reports 21.3 million individuals (America's Second Harvest 2001). The USDA's client survey of the Emergency Food Assistance System (hereafter EFAS) implies that approximate 12.5 million people received food from a food pantry during a typical month in 2001 (Briefel *et al* 2003). That is, the number of people using a pantry during any time in the year, according to the FSS-CPS is less than the number using one within a month, according to the USDA's EFAS survey.

To date, the reasons for these discrepancies between administrative data and the weighted survey data and how to rectify these differences are unknown. Although aware of these issues, we use the data without correcting for either the apparent underreporting or underweighting of program participants.

IV. The Extended Thrifty Food Plan

We use Daponte *et al*'s approach in constructing for each household a variable that reflects the minimum amount in food resources required to potentially meet the household's food needs. Their measure of the minimum amount needed, which they refer to as the Extended Thrifty Food Plan, is based on the USDA's Thrifty Food Plan.[5] The Extended Thrifty Food Pan differs from the Thrifty Food Plan amount used by the Food Stamp program in a few important ways. Unlike the formula upon which Food Stamp benefits are based, the Extended Thrifty Food Plan, takes into account the actual age and sex composition of all household members, rather than use a composite household scaled for household size. Further the USDA's Thrifty Food Plan does not account for persons with any special nutritional needs, such as infants and pregnant or lactating women. We base the amount of food acquisitions needed for infants on the voucher allotments provided by the WIC program in 2001 (more recent data was not yet available). [6] [7]

We calculate an Extended Thrifty Food Plan amount for each household by summing the amounts from the Thrifty Food Plan for each individual in the household (which assume that individuals reside in households with three other people), based on age and gender and multiplying this amount by an economy of scale factor based on household size. The economy of scale factors we use are those used by the USDA when calculating maximum Food Stamp benefits. These factors lower the amounts for larger households (assuming that it is less expensive to buy larger amounts) and increase the amounts for smaller households. (See Appendix A for the full Extended Thrifty Food Plan amounts and the economy of scale factors.)

Reasons abound why acquiring food either through purchases and/or donations worth the ETFP or TFP amount may not provide every member in the household with adequate nutrition:

1. Households typically lose between 5% and 10% of their food to spoilage or waste (Gregor, 1985).
2. While the USDA intends for the TFP to be a guide as to the minimum amount needed to achieve a nutritional diet for all, for a variety of reasons (e.g., different food tastes), people may not buy exactly the market basket intended by the TFP.

3. Preparing food included in the TFP's market basket has been estimated to take approximately three hours a day (Gregor, 1985) and involve cooking skills that household members may not possess or time household members may not have.
4. The TFP is based on average national prices, thus in areas where food prices exceed the national average, households will have a harder time meeting their basic nutritional needs without additional food acquisitions (conversely, in areas with low food prices, households will more easily achieve their ETFP).
5. In multi-person households, the food may not be shared equitably.

Thus, the TFP gives a minimum amount in the sense that it is quite possible for a household to acquire the TFP amount (or even more) in food and the nutritional needs of each household member not be met. We contend, though, that households that spend or acquire less than the TFP will have difficulty meeting basic nutritional needs, making examining household expenditures on food relative to need for food as measured by the Extended Thrifty Food Plan a valuable, albeit conservative, exercise.

V. Household Food Expenditures and Household Food Security in the CPS

Using the 2001 Food Security Supplement of the Current Population Survey, we examine the correlation between the degree to which a household meets its Extended Thrifty Food Plan and its reported food security (based on a 30-day recall) (for additional background on the 30-day scale, see Nord 2002). Households are classified according to their responses to a series of questions and can fall into the categories of

1) food secure or food insecure at low level of severity;

2) food insecure without hunger; or

3) food insecure with hunger.

Table 1 presents descriptive statistics on the variables used in later analyses from the 2001 Food Security Supplement of the CPS. The table displays the percent of the sample in the category, the percent reporting food insecurity within the past 30 days of being interviewed, and the percent that have low (below 90% of the household's Extended Thrifty Food Plan), within their level of need (90%-110% of the household's Extended Thrifty Food Plan), or high (above 110% of the Extended Thrifty Food Plan) food expenditures.

Table 2 displays summary statistics on food expenditures relative to the food needs of the household. Food expenditures (expenditures on food consumed either inside or outside of the home) are asked about in two ways– actual and usual weekly expenditures on food. (Items bought with food stamps are included in the food expenditures.) Food secure households (90% of the weighted households in sample) report mean actual and usual weekly food expenditures of 139% and 126%, respectively, of their ETFP. These households also report a median of actual and usual food expenditures of 118% and 110%, respectively, of their ETFP. The 25% to 75% range of usual food expenditures relative to needs (.78-1.56) is narrower than that for actual food expenditures (.78-1.56).

Food expenditures of households that are food insecure without hunger (approximately 4.5% the weighted households in sample) are slightly lower than those of food secure households. Both the means and medians of actual and usual food expenditures relative to food needs are within eight percentage points than those of food secure households, as is the 25%-75% range. Households that are food insecure with hunger have median actual and usual food expenditures of 1.08 and 1.03 of the household's ETFP. That is, more than half of households that report hunger have usual food expenditures above their ETFP.

Median food expenditures relative to food needs decreases as food security decreases. Median actual expenditures for food secure households are 1.18 of their ETFP, while among households with hunger the median ratio decreases to 1.08. Considering mean usual food expenditures relative to food needs, the figure is 1.10 for food secure households, 1.07 for households that report being food insecure without hunger, and 1.03 for households with hunger.

Table 3 disaggregates the sample into food stamp participants and nonparticipants. Food Stamp participating households that report being food secure have median actual and usual food expenditures of 95% and 89%, respectively of the household's ETFP. This level of food expenditures falls well below that of food insecure households that do not receive Food Stamps and food insecure households that do receive Food Stamps. That is, food secure Food Stamp households have lower food expenditures relative to need than food secure households that do not use Food Stamps, and food insecure households, irrespective of Food Stamp participation.

VI. Examining the Probability of Spending Too Little on Food– FSS/CPS

Next, we turn to examining influences on the probability of a household spending too little on food (<90% of its Extended Thrifty Food Plan) relative to its needs using data from the 2001 Food Security Supplement of the Current Population Survey. To be included in the analysis, a household had to have completed a valid interview and its participation in the Food Stamp program at the time of the interview must be known. Further, households that report having usual food expenditures of $0 (N=128) or in excess of five times the household's Extended Thrifty Food Plan (N=95) are excluded from analysis, yielding 18,630 households with viable food expenditures. Table 4 displays the results of this analysis and contrasts poor (those with incomes below 185% of the poverty level) with nonpoor households and households that receive Food Stamps with those that do not.

We find:

- Households with at least one elderly resident have an increased probability of spending too little on food.
- Households with at least one child in the household generally have a decreased probability of spending too little on food.
- Being a married couple household seems to have no effect on whether a household spends too little on food.
- Households with at least four people have an increased probability of spending too little on food, whereas those with only one person have a decreased probability of spending too little on food.
- Households where the person interviewed reported being African-American have a lower probability of spending too little on food, whereas if the person reported being Hispanic, there is no significant impact on food spending.
- Unemployment seems to have no effect on the probability of spending too little on food.
- Being below 185% of poverty increases the probability of spending too little on food.
- Among households that receive Food Stamps, those that receive benefits valued at least 75% of their Extended Thrifty Food Plan are better off with respect to their food expenditures relative to need than those that receive a lower level of Food Stamp benefits. Households that receive

benefits from the WIC or School Lunch programs, or those that receive food from a food pantry have a higher probability of spending too little on food.

- Living in a metropolitan area decreases the probability of spending too little on food (which may reflect higher food prices in metropolitan areas rather than higher levels of consumption).
- Households in the South, West, or Midwestern areas of the United States have an increased probability of spending too little on food, when compared with households in the East.

Perhaps the most paradoxical finding above is that regarding the benefit level of Food Stamps received. By assuring that a household receives at least 75% of its TFP from FS, the FS program seems to positively affect food expenditures to the degree that FS households receiving a high level of benefits and statistically comparable households not receiving FS do not significantly differ with respect to spending enough on food. This results holds if the comparison group is either other poor households that do not receive Food Stamps or the general population of households.

VII. Examining the Probability of Food Insecurity

Logistic regression was used to examine the probability of households reporting food insecurity within the past 30 days of being interviewed, which was modeled as a two level dependent variable-- a household could be either food secure or food insecure (either with or without hunger). Table 5 displays the results from this analysis. We first start with an equation that includes only the household's level of usual food expenditures relative to the household's needs. Food expenditures are modeled as either low (below 90% of the households ETFP), within 10% of the ETFP, or high (more than 110% of the household's ETFP). We find that while having low food expenditures significantly increases the probability of reporting food insecurity, having high food expenditures has no impact on food security. Households with low food expenditures have an approximately 35% increased risk of reporting food insecurity.

To the model we add demographic characteristics of the household--whether the household includes at least one person 65 years of age or older, whether the household contains at least one person younger than 18 years of age, whether the household was one characterized as a husband/wife family, indicator variables reflecting household size, and the race/ethnicity of the respondent[8]. We find that, concurring with past literature, the presence of an elderly person in the household significantly decreases

the probability of food insecurity, as does the household being a "married" type of household. The coefficients of the variables that reflect the number of people in the household– one indicating whether only one person resides in the household, and another indicating whether household residents numbered four or more– suggest that the probability of food insecurity negatively correlates with household size. Further, households headed by African Americans have a decreased probability of reporting food insecurity (an odds ratio of .81) and those headed by Hispanics have an increased probability (with an odds ratio of 1.2).

Variables reflecting the economic/human capital status of the household are included. Households where the head is unemployed (either laid off or unemployed and looking for work) have a significantly increased probability of food insecurity, even though in the previous analysis, unemployment in poor households does not significantly impact spending too little on food. The risk of insecurity negatively correlates with the educational attainment of the head of the household. Compared with households where the head has a high school or some college educational attainment, households with a head who does not have a high school diploma have an increased probability of food insecurity, while those who have a bachelors degree or high have a significantly decreased probability of food insecurity (odds ratio of .7). Adding whether a household has an income that puts it below 185% of the poverty level has no significant impact on the probability of food insecurity.

Adding variables indicating the use of food assistance programs, consistent with the literature we find that all of the coefficients of the variables reflecting the use of various forms of food assistance (Food Stamps, WIC, School Lunch, and Food Pantries) are significantly positive. While after controlling for other household factors, food stamp households have a probability of reporting food insecurity that is 68% higher than that of statistically equivalent households that do not receive food stamps, and households that use food pantries are nearly five times as likely to report food insecurity.

Finally, adding variables that reflect the location of the household, we find that compared to households in the northeast, those in the south and the west have higher probabilities of reporting food insecurity. Further, households in metropolitan areas have a higher probability of reporting food insecurity.

To further understand the impact of food stamps, we categorized food stamp households according to the percent of the household's ETFP accounted for by Food Stamp benefits. We find that households that receive at least three-quarters of their ETFP from FS have a lower probability of reporting food insecurity than those that receive proportionately lower FS benefits.

In summary, from these models we note four important observations:

- **households that use food assistance have a higher probability of reporting food insecurity than statistically comparable households** and households using food pantries are far more likely to report food insecurity than households using other forms of food assistance;
- **the significance of race and ethnicity disappears after accounting for the geography of the household**;
- **having low food expenditures is significantly associated with an increased probability of food insecurity**,
- **in spite of their higher incomes, households that receive a low amount in Food Stamps are worse off with respect to food security than households that receive a high amount in Food Stamps**.

Table 6 presents results of the full models, separately estimated for households that receive Food Stamps and those that do not and using either the probability of food insecurity or the probability of spending too little on food as dependent variables. We observe that Food Stamp households differ from those that do not receive Food Stamps in the sense that among FS households, very few variables significantly impact the probability of food insecurity. The level of food expenditures relative to needs, the presence of an elderly person, being a married couple household, being poor, living in a metropolitan area and various regions of the country, and using the WIC, School Lunch Program, or a food pantry all influence the probability of food insecurity among households that do not use Food Stamps. However, for Food Stamp households, the only variables that impact the probability of food insecurity are the presence of an elderly person and the use of a food pantry. Further, paradoxically, while having an elderly person in a household decreases the probability of food insecurity, it also decreases the probability of spending enough on food, a point we return to in the discussion.

VIII. Household Food Expenditures and Achieving the ETFP in the CEX

To examine household food expenditures in the context of other household expenditures, we turn to the CEX Interview and Diary Surveys, concentrating on the surveys spanning 1986-2000. Table 7 presents the summary statistics for both datasets. Panels A and B present the results for the Interview sample and the Diary sample, respectively. Column 1 presents the results for the full sample of CEX households while Column 2 shows the characteristics for low-income households (those households at or below 130 percent of the poverty line). Consistent with prior research, low-income households are more likely to be non-white, less educated, have more children, and to be receiving food stamps. Columns 3 and 4 divide the low-income households into those receiving food stamps and those that do not. Amongst these sets of households, households receiving Food Stamps have more children, are more likely to be non-white, and possess less education.

Table 8 examines whether or not households achieve their Extended Thrifty Food Plan amount (ETFP) using the four groups of households presented in the columns of Table 2. There exist a number of measures of food expenditures in each of the CEX surveys. This table displays the results of *total* food (food at home plus food away from home) spending from the Interview and Diary data, respectively. For the Interview data, total food spending corresponds to reported usual food spending during the past quarter. Total food expenditure in the Diary data corresponds to actual spending during the two-week diary period. Examining all households in the top panel of the table indicates that nearly three-fourths of households achieve their ETFP when measured by total food expenditures. As would be expected, these numbers increase slightly when we use 90% of ETFP as the threshold and fall by the same magnitude when the bar is raised to 110% of ETFP.

As the results in Wilde and Ranney (2000) have shown, food expenditures for food stamp households are strongly correlated with the timing of the receipt of monthly food stamp benefits. As such, we are cautious when interpreting the results from the diary data, especially since we are examining expenditures relative to a fixed threshold. When achieving the ETFP is measured by total diary food spending the results are comparable to total food spending in the Interview survey (column 2), although again slightly lower. Overall, these results suggest that a substantial fraction of U.S. households does not report food expenditures which would allow them to achieve their ETFP.

Relative to the average household, low-income households are less likely to attain their ETFP. As shown in the middle panel of the table, low-income households are about 20 percentage points less likely to attain their ETFP than the average household. The bottom panel of Table 8 divides low-income households into those receiving food stamps and those that do not. Food Stamp households are far less likely to spend enough on food to achieve their ETFP relative to other low-income households. While low-income households that do not receive Food Stamps incur food expenditures that are about 57% of their ETFP, food stamp households incur expenditures that are only 35% of their ETFP. (However, the 2001 FSS-CPS suggests that half of Food Stamp households acheive at least 90% of the ETFP.) Some of this difference may be due to differences in demographic characteristics across households.

To better understand the factors that move households closer to achieving their ETFP, we estimate linear probability models of the form

$$AETFP_i = a_0 + a_1 Y_i + a_2 FS_i + a_3 X_i + u_i$$

where the dependent variable is whether or not the family achieved their ETFP ($AETFP_i$). Both household income (Y_i) and a measure of food stamp participation (FS_i) are included as the primary regressors of interest. In addition, the regressions also include a set of control variables (X_i). These controls are the age of the head of the household and its square, indicators for race of the household head (white, black, and other), the log of family size, the proportion of household members that are children, the proportion of household members that are age 60 or older, and dummy variables for each of the calendar years covered by the survey. This set of covariates is chosen to match the regressors used in Levendahl's (1995) study examining how the specification of the estimating equation affects estimates of the marginal propensity to consume out of food stamps and out of income.

Table 9 presents the results of estimating these equations. Since the results for the Interview and Diary survey shown in Tables 7 and 8 are very similar, we only present the analysis for the Interview Survey in the remainder of the paper. A full set of results is available upon request from the authors. Panel A of the table presents the results for the impact of income on attaining the TFP and the measure of food stamp participation, (FS_i), an indicator for whether or not the household receives food stamps. When examining all households in Column 1, a thousand dollars in per capita income increases the probability of achieving the TFP by 5 percent. In addition, receiving food stamps is estimated to *reduce*

the likelihood that the family achieves its TFP by nearly 21 percent. This puzzling result may be due to both a non-linear relationship between income and attaining the TFP as well as the non-linear, and negative, relationship between income and food stamp receipt. To focus more directly on families that may be affected by the food stamp program, column 2 of the table reports the results where sample is restricted to low-income households. The relationship between receiving food stamps and achieving TFP is smaller, but still remains. However, the effect of income nearly doubles.

Panel B of Table 9 changes the food stamp regressor, (FS_i), from an indicator of food stamp receipt to a measure of the amount of food stamps received in thousands of dollars. The results in the first two columns of Panel B are similar to those in Panel A. Larger amounts of food stamps are associated with a lower likelihood of attaining ETFP. The third column of the table restricts the sample to those households that receive food stamps. As such, these estimates are related to prior studies that estimate the marginal propensity to consume out of food stamps although the parameters cannot be estimated as such. Within this set of households, the amount of food stamps received strongly increases the likelihood of reaching the ETFP threshold and the effect of Food Stamps is approximately 10 times that of cash.

We further examine the effect of Food Stamps by asking whether an association exists between the amount of FS received as a fraction of the household's ETFP and the likelihood the family reaches the ETFP threshold. In Panel C of Table 9, we include this fraction as our indicator of FS participation, (FS_i), which is disaggregated into four categories – <=25% of ETFP received as food stamps, between 25 and 50% of ETFP, between 50 and 75% of ETFP, and more than 75% of ETFP – in order to examine this association.

We find that among food stamp households, the percentage of ETFP received from food stamps does not affect the likelihood of attaining ETFP if this percentage is less than or equal to 75% of ETFP. However, for households that receive more than three quarters of their ETFP in the form of food stamps, the probability of achieving ETFP is increased by over 11 percent. Thus, it seems that unless the program guarantees participating households at least 75% of the household's food needs in Food Stamps, the probability of achieving the ETFP is not significantly affected. Participating households do not devote enough of their resources to fulfilling their minimum food needs.

X. The Relationship Between Achieving the ETFP and Non-Food Expenditures

We examine whether households that do not achieve their ETFP have different expenditure patterns than those that do. If differences in preferences for non-essential goods and services account for differences in spending patterns (and these preferences are shared by all household members), then policymakers may not be concerned about households not achieving their ETFP. However, if households that do not achieve their ETFP are burdened by necessary or fixed costs (e.g., housing, child care, utilities, health and drug expenditures) then not spending enough on food may be of concern to policymakers.

To examine the existence of differences in spending patterns, we ran a series of expenditure share regressions of the form

$$S_{ij} = c_0 + c_1 X_i + c_2 TE_i + c_3 (TE_i)^2 + c_4 AETFP_i + u_{ij}$$

In these models, the dependent variable (S_{ij}) is the share of total expenditure by individiual *i* in the category of interest *j*. To control for the level of spending, the right-hand side includes the log of total expenditure (TE_i) and its square. As before, the variable $AETFP_i$ is a binary indicator of whether or not the household achieved its ETFP. In addition, the control variables (X_i) included in the prior regressions are also included.

We use this regression specification to assess if achieving the ETFP is associated with differences in the expenditure shares across a number of items. Table 10 reports the estimated coefficients on ($AETFP_i$) where this variable is an indicator for achieving the ETFP in a series expenditure share regressions. The first two columns limit the analysis to households below 130% of the poverty level, and the last two columns limit the analysis to Food Stamp households. Non-durable expenditures account for approximately 57% and 51% of all spending by poor and FS households, respectively. However, those households that acheive at least 90% of the ETFP spend about 16-17 percentage points more on non-durables than those that do not. That is, the share of spending on non-durables by low-income households achieving their ETFP is nearly 30 percent (or 17/57) higher than for other low-income families.

Of course, a large component of non-durable expenditures is comprised of food expenditures. In fact, using the numbers in column 1 of Table 10, one can see food expenditures account for 27.5/57.3 =

48% of non-durable expenditures among poor households, and 59% of non-durable expenditures among Food Stamp households. As would be expected, households achieving their ETFP have spend larger shares of their budgets on food than do households that do not achieve their ETFP.

The remainder of Table 10 presents a number of interesting results. Items that might be seen as fixed constraints on the household budget–expenditures on housing, utilities, and child care– all account for lower expenditure shares among households achieving their ETFP. ***That is, households that do not achieve their ETFP spend a larger share of their income on housing, utilities, and child care.*** Housing and utility expenditures account for about 10% less of expenditures among those that achieve at least 90% of their ETFP. Households above the threshold have a significantly lower level of child care expenses. Most interesting is that relative to the average child care share of 0.5 percent, being above the threshold is associated with having child care spending that is 0.3 percentage points lower. *Thus, child care expenditures, though a small portion of overall spending, show a relatively large difference between the two sets of households.*

Considering what might be regarded as "non-essential" expenses, a somewhat higher share of spending in households achieving their ETFP is accounted for by alcohol but a slightly lower share is attributable to tobacco. Relative spending on entertainment is lower in households reaching the ETFP threshold, while personal care expenditures are somewhat higher.

Unfortunately, our analysis cannot delineate between higher budget shares for these fixed items among households that do **not** achieve their ETFP because of either high fixed costs of these items or because of preference differences across households. Recent empirical work has begun to examine whether the binding constraints due to fixed costs crowds out food expenditures. For example, papers by Bhattacharya, DeLeire, Haider, Currie (2003) and Cullen, Friedberg, and Wolfram (2003) have examined the "Heat or Eat" dilemma faced by low-income families that have to choose between how much to spend on utilities such as heat and how much to spend on food. Our results here show that there exists a number of expenditure categories for which a closer examination of the tradeoffs that families are forced to make warrants closer empirical study.

XI. Discussion

The results presented raise complex questions about the nature and effectiveness of food assistance programs and food spending. The food insecurity equations show that people participating in food assistance programs have an increased probability of reporting food insecurity within 30 days prior to being interviewed. While the counterfactual with respect to the level of food insecurity a household would have had if the household had not receive food assistance is unknown, certainly, the food assistance provided does not relieve all food insecurity among participating households.

Food pantry participants have a greatly amplified probability of reporting food insecurity within the past 30 days. While food pantries may be helping the household's food supply, they are not alleviating all of the uncertainty and stress that household members may have concerning their food supply. Further, selection bias may be a factor in the sense that persons particularly concerned about a lack of food turn to food pantries for support.

We find that FS households that do not receive at least 75% of their ETFP from FS seem to be worse off with respect to their food expenditures relative to food needs than those that receive at least 75% of their needs from the FS program. This contrasts with the fact that the level of support in FS is inversely related to household income. This leads us to speculate that there may be substitution occurring in households that receive low levels of support from Food Stamps, substitution beyond what policymakers anticipate. The Food Stamp program assumes that 30% of a Food Stamp household's net monthly income will be devoted to food. Apparently, FS households that do not receive a substantial amount in benefits are not devoting the monies that they do have to food to the degree assumed by the FS program. However, this difference in relative food spending does not seem to carry over to food security. The probability of food insecurity does not significantly differ between FS households receiving various levels of FS benefits, after controlling for other factors.

Another finding to explain is the discordance between the impact of an elderly person on food insecurity and food spending. While we find support for the protective influence of an elderly person in the household from food insecurity, we also find that having an elderly person in the household increases the risk of spending too little on food. There are many possible explanations for these conflicting findings:

- **The USDA's TFP may not sufficiently account for the decreased food needs of the elderly**, and therefore the amount needed by the household's ETFP may overstate the actual amount that an elderly person may actually need to fulfill their food needs.
- **The elderly may have better budgeting and cooking skills** which enables them to spend less on food, yet still be food secure. It may be that the elderly have better experience budgeting their dollars, and are more able to "stretch" a dollar.
- **The elderly may have lower expectations about their food supply**. They may "make do" with less expensive foods. The example we offer is a low cost dinner that the mother of one of the authors enjoys, called "meat gravy." This dish is made by browning low grade ground beef, putting a cup of whole milk in the browned meat, and serving the "gravy" over mashed potatoes. Expectations about the content of a meal may have changed over time, resulting in generational differences in the acceptability of such a meal.
- **The elderly may be less willing to provide responses that would indicate food insecurity**.

Findings on the trade-offs that households make in their budgeting decisions reveal that after controlling for other characteristics, compared with FS households that do not achieve at least 90% of their ETFP, FS households that do achieve their ETFP devote a lower share of their expenditures to apparel, child care, housing, utilities, and entertainment. Interestingly, among FS households, those that acquire enough food do not differ from those that do not with respect to budget shares devoted to prescription drugs or health insurance.

XII. Next Steps

If one of the goals of food assistance is to improve the well-being of households with respect to their food acquisitions and food security, then some aspects of the FS program should be reconsidered. First, the assumption that Food Stamp households will spend 30% of their net monthly income on food perhaps is being violated. The program may want to consider policies that will encourage needy households to devote enough of their fungible income to food. In the past, the purchase requirement provided a clear economic incentive for households to earmark funds for food. Problems with the former rendition of the purchase requirement were generally in the form of households being unable to come up with lump sums of cash needed to purchase FS. With the advent of computer technology, the FS

program could be redesign so that rather giving participating households monthly lump sum benefits, household instead would be given benefits incrementally, matching out-of-pocket funds spent on food with additions to participants' Electronic Benefits Transfer account.

Second, it seems that more research is needed on constraints on the budgets of FS households, especially with respect to the constraints that child care, housing, and utility expenses present. While FS rules take into account and deduct some of the expenses of these three expense categories from a household's net monthly income, the threshold levels are not automatically annually updated.

Third, researchers need to develop a better understanding of household budgeting decisions made by the poor. Some poor households are able to manage their resources so that the household obtains enough food and the household does not feel food insecure. Learning the actual strategies such households employ would increase one's understanding of the causes of food sufficiency.

Finally, analyses of large, cross-sectional data sets have limitations. Experimental research should be conducted where the budgeting decisions and food security status of poor households are observed, before and after receiving food assistance. This would be the true test of seeing whether food assistance positively affects the poor.

Table 1
Weighted Descriptive Statistics from the 2001 Food Security Supplement of the Current Population Survey

Varable	% of sample	% Food Insecure	Food Expenditures		
			<90% ETFP	90%-110%	>110%
Total	100.0	9.7	35.4	14.9	49.8
Food Expenditures relative to ETFP					
<90%	35.4	12.3	100.0	--	--
90%-<110%	14.9	9.2	--	100.0	--
>110%	49.8	10.0	--	--	100.0
Elderly person(s) in household					
No	75.8	12.7	34.7	14.1	51.2
Yes	24.2	4.5	37.4	17.5	45.1
Child(ren) present in household					
No	57.4	10.1	31.0	14.1	55.0
Yes	42.6	11.6	41.2	16.1	42.7
Married couple household	40.5	7.7	37.7	15.3	47.0
Not a married couple household	59.5	12.8	33.8	14.6	51.6
African American	20.8	10.0	33.5	14.9	51.5
Not African American	79.2	13.5	42.3	14.8	42.9
Food Stamp Participant	10.3	22.3	49.1	15.2	35.7
FS account for < 33% of ETFP	0.8	23.9	52.3	12.7	33.9
FS account for 33%-74% of ETFP	0.7	23.5	60.6	11.9	27.5
FS account for >74% of ETFP	7.8	23.2	47.3	16.2	36.5
Do not receive Food Stamps	89.8	9.4	33.8	14.9	51.4
Unemployed	3.2	15.7	35.2	10.5	54.3
Education					
< High School	55.2	11.3	40.5	15.9	43.6
High School	35.8	10.4	31.4	14.4	54.2
College+	7.5	7.8	19.0	10.9	70.2
School Lunch	15.6	15.5	52.0	15.5	32.5
WIC	6.4	14.5	53.4	14.1	32.5
Food Pantry	3.4	40.7	49.5	14.4	36.1
Metropolitan area	75.5	11.2	33.0	14.4	52.6
Not a metropolitan area	24.5	9.3	42.6	16.5	40.9
Region					
South	38.8	11.1	37.3	15.0	47.7
Northeast	15.3	8.9	28.4	15.7	55.9
West	22.8	11.7	34.1	14.0	52.0
Midwest	23.1	10.3	38.0		
Poor (< 185% Poverty)	68.9	10.7	40.2	16.0	43.8
Household size					
One person	28.7	11.4	26.2	14.7	59.2
Two or three people	43.8	10.6	36.2	14.9	49.6
Four or more people	27.4	10.2	43.6	30.0	40.1

Source: December 2001 Food Security Supplement of the Current Population Survey. N=16,234.

Table 2
Household Food Security Status by the Proportion of the Household's Extended Thrifty Food Plan Acquired Through Food Purchases, 2001

Household Food Security Status, 30 day recall	ETFP acquired, last week's actual expenditures					ETFP acquired, usual weekly food expenditures				
	[N]	% of sample	Mean	Median	25%-75% range	[N]	% of sample	Mean	Median	25%-75% range
Food Secure (1)	[13,891]	89.9%	1.39	1.18	.78-1.75	[14,558]	89.7%	1.26	1.1	.78-1.56
Food Insecure without Hunger (2)	[680]	4.3%	1.31	1.1	.70-1.68	[724]	4.5%	1.22	1.07	.71-1.53
Food Insecure with Hunger (3)	[884]	5.7%	1.27	1.08	.61-1.63	[925]	5.9%	1.18	1.03	.66-1.54

Notes: Data were weighted using the household weight given in the CPS-FSS.

Table 3
Household Food Security Status by the Proportion of the Household's ETFP Acquired Through Food Purchases and Food Stamp Status

NOT CURRENT FOOD STAMP PARTICIPANTS										
Household Food Security Status, 30 day recall	**ETFP acquired, last week's actual expenditures**					**ETFP acquired, usual weekly food expenditures**				
	[N]	**% of sample**	**Mean**	**Median**	**25%-75% range**	**[N]**	**% of sample**	**Mean**	**Median**	**25%-75% range**
All Nonparticipants	[13062]	100.0%	1.40	1.19	.78-1.75	[14551]	100.0%	1.28	1.12	.78-1.59
Food Secure (1)	[12745]	91.3%	1.41	1.20	.79-1.77	[13,251]	91.1%	1.28	1.13	.79-1.59
Food Insecure without Hunger (2)	[539]	3.9%	1.31	1.10	.70-1.68	[574]	3.9%	1.23	1.06	.74-1.53
Food Insecure with Hunger (3)	[678]	4.6%	1.25	1.08	.62-1.63	[726]	5.0%	1.22	1.09	.69-1.56
CURRENT FOOD STAMP PARTICIPANTS										
All	[1,583]	100.0%	1.24	.99	.64-1.58	[1,683]	100.0%	1.07	.91	.64-1.26
Food Secure (1)	[1,236]	78.1%	1.21	.95	.64-1.53	[1,307]	77.7%	1.05	.89	.65-1.25
Food Insecure without Hunger (2)	[141]	8.9%	1.31	1.15	.68-1.78	[150]	8.9%	1.16	1.07	.68-1.53
Food Insecure with Hunger (3)	[206]	13.0%	1.33	1.11	.59-1.68	[226]	13.4%	1.05	.92	.59-1.36

Notes: Households are considered current Food Stamp Program participants if a responded reported that the household last received Food Stamps in November or December of 2001.

Table 4
Logistic Regression of Probability of Having Food Expenditures Less Than a Household's Extended Thrifty Food Plan

Coeff. (s.e.)	Do not receive Food Stamps	Receive Food Stamps	All HH's below 185% poverty	Above 185% poverty	All Households
Intercept	-.8904*** (.089)	-.1836 (.324)	-.3830*** (.092)	-.7319*** (.152)	-.9217*** (.084)
Elderly	.2879*** (.048)	.2822+ (.151)	.2303*** (.050)	.4757*** (.113)	.2820*** (.046)
Child(ren) in hh	-.2261*** (.070)	-.3141 (.216)	-.2245** (.079)	-.2420+ (.129)	-.2280*** (.066)
Married	-.0566 (.047)	.1808 (.139)	.0318 (.052)	-.1742* (.082)	-.0325 (.044)
Household size=1	-.6252*** (.056)	-.5098** (.181)	-.5509*** (.060)	-.7248*** (.119)	-.5999*** (.053)
Household size=4+	.2967*** (.058)	.0651 (.138)	.3104*** (.065)	.1904* (.093)	.2703*** (.053)
Black	-.2681*** (.050)	-.0859 (.117)	-.1703** (.053)	-.4455*** (.092)	-.2399*** (.046)
Hispanic	.0357 (.062)	.0949 (.162)	.0180 (.064)	.0855 (.133)	.0511 (.057)
Unemployed	.1738 (.106)	.2678 (.294)	.1271 (.119)	.3032+ (.183)	.1852+ (.010)
< High School	.1278* (.051)	.1142 (.145)	.1264* (.053)	.2111+ (.113)	.1339** (.048)
College +	-.3986*** (.081)	.1573 (.372)	-.3647*** (.101)	-.3862** (.130)	-.3824*** (.079)
< 185% poverty	.6077*** (.044)	.1881 (.215)	--	---	.5993*** (.042)
FS <33% of ETFP		.0458 (.213)	.6726*** (.1696)	--	.6438*** (.1666)
FS 33%-74% of ETFP		--	.6773*** (.198)	--	.7040*** (.193)
FS 75%+ of ETFP		-.4690** (.142)	.0408 (.069)	--	.0268 (.067)
WIC	.4091*** (.086)	.2093 (.144)	.3141*** (.079)	.3900* (.186)	.3398*** (.072)
School Lunch	.4022*** (.062)	.5801*** (.153)	.3739*** (.064)	.5526*** (.126)	.4252*** (.056)
Pantry	.3881** (.120)	.2332 (.142)	.3019** (.097)	.7130** (.247)	.3545*** (.091)
Metro Area	-.3596*** (.040)	-.2840** (.108)	-.3332*** (.043)	-.4065*** (.077)	-.3547*** (.037)
South	.2955*** (.056)	.4196** (.146)	.2760*** (.061)	.4027*** (.104)	.3076*** (.052)
West	.2458*** (.059)	.3718* (.163)	.2551*** (.064)	.2492* (.108)	.2554*** (.055)
Midwest	.4672*** (.057)	.3910* (.154)	.4139*** (.063)	.5769*** (.105)	.4537*** (.054)
-2 log likelihood Ratio d.f.	17800*** 17	2331*** 20	14482*** 20	5613*** 20	19865*** 21
[N]	14,551	1,683	11,184	5,050	16,234

Table 5
Logistic Regression Results of the Probability of Food Insecurity, All Households in the 2001 FSS-CPS

Coeff. (s.e.)	Model					
	I	II	III	IV	V	VI
Intercept	-2.2945*** (0.070)	-1.7194*** (.104)	-1.7522*** (.116)	-1.8602*** (.118)	-2.2422*** (.147)	-2.2337*** (.147)
< 90% ETFP	0.2990*** (0.081)	.2960*** (.083)	.2897*** (.083)	.2394** (.085)	.2414*** (.085)	.2414*** (.085)
>110% ETFP	0.0404 (0.080)	-.0518 (.081)	-.0371 (.082)	.0114 (.084)	.0008 (.084)	.0021 (.084)
Elderly		-1.2976*** (.088)	-1.3529*** (.090)	-1.2826*** (.092)	-1.2755*** (.092)	-1.2824*** (.093)
Child(ren) in hh		.1232 (.078)	-.0291 (.096)	-.1808 (.104)	-.1916+ (.104)	-.1872+ (.104)
Married		-.6146*** (.0675)	-.6160*** (.069)	-.4957*** (.071)	-.4872*** (.071)	-.4912*** (.071)
Household size=1		.1549* (.078)	.1696* (.078)	.1636* (.081)	.1734* (.081)	.1683* (.081)
Household size=4+		-.1597* (.079)	-.1493+ (.079)	-.2068* (.082)	-.2096* (.082)	-.2052* (.082)
Black		-.2096** (.064)	-.1884** (.064)	-.1128+ (.066)	-.0592 (.068)	-.0634 (.068)
Hispanic		.1939* (.082)	.1556+ (.082)	.1409+ (.085)	.0507 (.088)	.0561 (.088)
Unemployed			.3511*** (.127)	.2923* (.132)	.2881* (.132)	.2843* (.132)
< High School			.1730* (.077)	.0853 (.079)	.0976 (.079)	.0931 (.079)
College +			-.3880*** (.116)	-.3410** (.117)	-.3680** (.117)	-.3674*** (.117)
< 185% poverty			.0027 (.061)	-.2065** (.064)	-.1912*** (.064)	-.1939*** (.064)
FS User				.5558*** (.077)	.5808*** (.078)	---
FS < 33% of ETFP						.8881*** (.211)
FS 33%-74% of ETFP						.7882*** (.231)
FS 75%+ of ETFP						.5858*** (.086)
WIC				.1502 (.104)	.1590 (.104)	.1649 (.105)
School Lunch				.3751*** (.085)	.3826*** (.086)	.3843*** (.086)
Pantry				1.6019*** (.097)	1.6066*** (.097)	1.5936*** (.097)

Coeff. (s.e.)	Model					
	I	II	III	IV	V	VI
Metro Area					.2305*** (.062)	.2274*** (.062)
South					.2243*** (.083)	.2262*** (.083)
West					.2714*** (.085)	.2718*** (.085)
Midwest					.1051 (.087)	.1029 (.087)
-2 log likelihood ratio. d.f.	10758***	10290***	10262***	9848***	9822***	9812***

Source: Authors' analysis of the Food Security Supplement of the December 2001 Current Population Survey.

Notes: [N]=16,234. The analysis includes only households with valid responses to the food stamp participation question and only households that report usual food expenditures greater than $0 and less than five times the household's ETFP. See text for details.

Table 6
Results of Full Model by Household Food Stamp Participation Status

Coeff. (s.e.)	Probability of Food Insecurity		Prob of Spending Too Little on Food	
	Does not receive Food Stamps	Receives Food Stamps	Does not receive Food Stamps	Receives FS
Intercept	-.2.2673 (.163)	-1.5327*** (.429)	-.8904*** (.089)	-.2180 (.325)
< 90% ETFP	.3287*** (.097)	-.0235 (.180)	--	--
>110% ETFP	.0341 (.095)	.0239 (.185)	--	--
Elderly	-1.2261*** (.102)	-1.3743*** (.223)	.2879*** (.048)	.2894+ (.150)
Child(ren) in hh	-.1844 (.116)	-.2581 (.259)	-.2261** (.070)	-.3088 (.216)
Married	-.6085*** (.078)	.0465 (.171)	-.0566 (.047)	.1780 (.139)
Black	-.0929 (.077)	.0698 (.145)	-.2681*** (.050)	-.0843 (.117)
Hispanic	-.0045 (.099)	.2284 (.194)	.0357 (.062)	.0904 (.162)
hhsize=1	.1301 (.088)	.1412 (.216)	-.6252*** (.056)	-.4974** (.180)
hhsize=4+	-.1930* (.094)	-.1581 (.175)	.2967*** (.058)	.0650 (.138)
< 185% poverty	-.2555*** (.068)	.0236 (.261)	.6077*** (.044)	.1873 (.215)
Unemployed	.2769+ (.146)	.2789 (.321)	.1738 (.106)	.2593 (.294)
Metro Area	.2786*** (.071)	.0742 (.133)	-.3596*** (.040)	-.2850** (.108)
South	.2180* (.093)	.2894 (.181)	.2955*** (.056)	.4158** (.1456)
West	.2528** (.095)	.3668+ (.197)	.2458*** (.059)	.3700* (.163)
Midwest	.1083 (.098)	.1061 (.191)	.4672*** (.057)	.3877* (.154)
< High School	.1259 (.090)	-.1762 (.173)	.1278* (.051)	.1146 (.145)
College +	-.3691 (.123)	.1038 (.416)	-.3986*** (.081)	.1615 (.372)

Coeff. (s.e.)	Probability of Food Insecurity		Prob of Spending Too Little on Food	
	Does not receive Food Stamps	Receives Food Stamps	Does not receive Food Stamps	Receives FS
FS=33%-75% of ETFP		.3802 (.274)		.1638 (.225)
FS acct for 75%+ of ETFP		.2513 (.179)		-.4362** (.140)
WIC	.2434+ (.132)	-.0557 (.179)	.4091*** (.086)	.2118 (.145)
School Lunch	.5668*** (.097)	-.1328 (.191)	.4022*** (.062)	.5771*** (.153)
Food Pantry	1.7927*** (.126)	1.2238*** (.151)	.3881** (.120)	.2301 (.142)
-2 log likelihood Ratio d.f.	8104*** 20	1646*** 22	17599*** 18	2238*** 20
[N]	14,551	1,683	14551	1,683

Notes: *** p<.001, ** p<.01, * p<.05, + p<.10

Table 7
Consumer Expenditure Survey Summary Statistics

Variable	All Households	Low-Income households		
		Total	Does not receive Food Stamps	Receives Food Stamps
A. CEX Interview Data 1986-2000 (First Interview Only)				
Mean Age	47.6	48.8	50.6	43.5
% Non-white	14	24	19	39
Mean family size	2.5	2.5	2.2	3.2
Mean # of children	0.7	0.9	0.6	1.6
% HS Graduate	30	28	28	29
% Attended College	48	29	33	16
Mean Monthly Income ($)	3392	758	779	696
% Receiving FS	7	26	0	100
[N]	68,572	15,280	11,370	3,910
B. CEX Diary Data 1986-2000				
Mean Age	47.5	49.7	51.8	43.5
% Non-white	14	23	19	35
Mean family size	2.6	2.6	2.3	3.3
Mean # of children	0.7	0.9	0.7	1.7
% HS Graduate	30	29	29	30
% Attended College	49	28	32	17
Mean Monthly Income ($)	3517	802	822	739
% Receiving FS	6	25	0	100
[N]	60,418	12,024	9,049	2,975

Table 8
Fraction of Households Achieving Their Thrifty Food Plan Amount*

	Interview Survey Usual Total FoodSpending (1)	Survey Diary Total Food in Diary (2)
All Households		
Achieved ETFP	0.711	0.674
	(0.002)	(0.002)
Achieved 90% ETFP	0.772	0.727
	(0.002)	(0.002)
Achieved 110% ETFP	0.645	0.619
	(0.002)	(0.002)
[N]	68,572	60,418
Only Low-Income Households		
Achieved ETFP	0.499	0.449
	(0.004)	(0.005)
Achieved 90% ETFP	0.579	0.509
	(0.004)	(0.005)
Achieved 110% ETFP	0.422	0.388
	(0.004)	(0.004)
[N]	15280	12024
Low-Income Households		
No FS	0.541	0.480
	(0.005)	(0.005)
N	11,370	9,049
Gets FS	0.375	0.354
	(0.008)	(0.009)
N	3910	2975

Table 9
Linear Probability Regressions for Achieving the Thrifty Food Plan Amount

Model	All Households	HH ≤ Poverty	HH's receiving FS
A. Main Regressor= Receiving FS?			
Income ($)/1000	.05012 (.0016)	.0920 (.0235)	
Receive FS?	-.2107 (.0087)	-.1235 (.0109)	
[N]	68,478	15,280	
B. Main Regressor=Amount of FS/1000			
Income ($/1000)	.0532 (.0016)	.1145 (.0236)	.1916 (.0294)
Food Stamps / 1,000	-2.0493 (.1533)	-.8895 (.1603)	1.1792 (.2188)
[N]	68,478	15,280	4,453
C. Main Regressors=FS benefits as % of ETFP			
Income ($)/1000			.1917 (.0298)
FS between 25% and 50% of ETFP			.0054 (.0208)
FS between 50% and 75% of ETFP			.0076 (.0226)
FS between 75% and 100% of ETFP			.1156 (.0247)
[N]			4,453

Note: Regressions also contain head of household's age and its square, the log of family size, the proportion of household members over age 59, the proportion of household members under age 18, race (black/white/other), and year effects. The dependent variable is adjusted to equal the monthly value in panels B and C. The dependent variable, income (defined as monthly gross income), and food stamps (defined as monthly food stamp benefits) are per capita.

Table 10
Impact of Achieving 90 Percent of ETFP on Expenditure Shares Among Low-Income and Food Stamp Households

Spending Category	All Low-Income Households		Food Stamp Households	
	Mean Share	Impact of Spending ≥90% of ETFP	Mean Share	Impact of Spending ≥90% of ETFP
Non-durables	.573	.1715 (.0068)	.510	.1559 (.0062)
Food at Home	.239	.1413 (.0019)	.281	.1579 (.0035)
Food Away from Home	.036	.0269 (.001)	.021	.0117 (.0012)
Food, Total	.275	.1682 (.0018)	.302	.1695 (.0034)
Apparel	.053	-.0013 (.0013)	.056	-.0022 (.0023)
Alcohol	.011	.0009 (.0006)	.008	.0004 (.0008)
Tobacco	.022	-.0013 (.0008)	.030	-.0014 (.0016)
Entertainment	.044	-.0048 (.0012)	.037	-.0042 (.0018)
Personal Care	.013	.0009 (.0004)	.011	.0005 (.0007)
Health	.098	.0004 (.0044)	.047	-.0058 (.0036)
Child Care	.004	-.0026 (.0005)	.005	-.0032 (.001)
Housing	.243	-.0675 (.0037)	.253	-.0677 (.0061)
Utilities	.148	-.0275 (.0021)	.153	-.0301 (.0037)
Prescription Medicines	.020	.0001 (.0013)	.011	-.0025 (.0017)
Health Insurance	.050	-.0015 (.0021)	.024	-.0013 (.0019)

Note: N=15,280 Low-Income Consumer Units, 4,547 Food Stamp Consumer Units.
Note: The dependent variable is the share of household expenditure in the spending category. Regressions also contain head of household's age and its square, the log of family size, the proportion of household members over age 59, the proportion of household members under age 18, race (black/white/other), total household expenditure and its square, and year effects. The dependent variable is adjusted to equal the monthly value in panels B and C.

Appendix I
Extended Thrifty Food Plan, Fourth Quarter, 2001

Age-Gender Group	Weekly Cost
Both Sexes	
< 1 year	$22.03
1-2 years	$16.50
3-5 years	$17.90
6-8 years	$22.20
9-11 years	$26.30
Males	
12-14 years	$27.30
15-19 years	$28.00
20-50 years	$30.00
51 years and over	$27.10
Females	
12-50 years	$27.30
51 years and over	$26.70
Household size	**Economy of scale factor**
1	1.2
2	1.1
3	1.05
4	1.0
5 or 6	.95
7+	.90

Sources: USDA. December 2002. "Official USDA Food Plans: Cost of Food at Home at Four Levels, U.S. Average, October 2001." *Family and Economics Nutrition Review*, p. 74.

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Endnotes

1. Similarly, a focus group participant, who, when asked how long food stamps last, responded "really only one day because once you get them you use them' (Daponte and Bade 2000).
2. Due to the form of the questions in the survey about food acquisitions and the WIC program, it is possible that the coefficient for the effect of the WIC program is overestimated here. It may be that in a subset of the households receiving assistance from the WIC program, some of the amount reported as out of pocket expenditures may have actually been from the WIC program.
3. The Bureau of the Census actually collects the CEX under contract with the BLS.
4. The food stamp arrival dates are available beginning in 1982.
5. We chose the Thrifty Food Plan as a basis for the Extended Thrifty Food Plan because of the existence of a research history for the Thrifty Food Plan and the fact that USDA bases Food Stamp on the Thrifty Food Plan.
6. While conceptually, we would like to also take into account the special food needs of pregnant, postpartum, and lactating women, and also those with special food needs due to medical conditions, the CEX and CPS do not include enough detail on individuals for us to make such distinctions.
7. While the USDA (2002) assumes all infants breastfeed, our approach assumes that infants incur food costs. To account for the additional food needed by a lactating woman, the USDA adds 1/2 of the cost of the TFP for a one-year old (.5*$15.90 per week in 2000) to the cost of the household's TFP, excluding the infant. We believe that the higher WIC amounts ($22 per week in FY01) better capture the actual cost of feeding an infant.
8. The variable used to determine this was HRTYPE of the 2001 FSS of the CPS.