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Time to Eat?
The Relationship Between Household Proxies of Time Resources and Food Spending Patterns.

Introduction

Understanding the relationships between time-constraining household characteristics and food spending behavior is important for policy makers, nutritionists and anti-hunger advocates interested in the cost of a nutritious diet and assessments of the food price environment. The frequency of grocery shopping and the allocation of food spending have implications for methods of estimating food costs. Because time is a limited resource for households, failure to account for the labor and time costs of purchasing and preparing low-cost but healthy meals may lead to underestimates of the cost of nutritious diets and overly optimistic assessments of their feasibility and appropriateness. A household that, because of time constraints, chooses to make larger but less frequent shopping trips may be better able to take advantage of quantity or bulk discounts. The typical market basket of a household that is more time-constrained may also differ in composition from that of other households. For instance, it may feature a greater allocation of the budget to more convenient forms of food, which could entail a price premium.

In this paper we use Consumer Expenditure Survey (CEX) data to examine a set of explanatory variables that serve as proxies for the time constraints facing US consumers and their relationship to household food spending behavior. Our overall strategy is to study several different food spending outcomes that are especially interesting because they may affect the nutrition quality of the diet, and they may be affected by explanatory variables that reflect the severity of time constraints. First, we identify a set of six household characteristics that are closely tied to the time resources of households. These include characteristics related to the composition of the household, namely household structure, household size, number of children, and number of elderly members, and variables affecting the opportunity cost of time for the household, namely fulltime work status and vehicle ownership.

We then estimate regression models where the six variables related to household time constraints are the main explanatory variables of interest and two different food spending outcomes are the dependent variables. The first outcome is the number of grocery shopping days during a two-week period, which serves as a measure of food shopping frequency. Characteristics that constrain household time resources are expected to reduce the number of shopping days. The second outcome is food spending share. For this outcome, we run models for food spending at three different levels of detail and examine spending on pairs of food categories requiring contrasting levels of labor and time resources in order to highlight the choices consumers make based on the convenience attributes of food. At the broadest level, we look at spending on food at home as a share of total food spending. Time-constraining household characteristics are expected to reduce the share of food at home spending and, by definition, increase the share of food away from home spending. At an intermediate level, we compare spending on fresh and processed vegetables as a share of food at home spending with spending on prepared food of all types as a share of food at home spending. Time-constraining household characteristics are expected to increase the share of food at home budget going to prepared food and reduce the share going to vegetables, which generally require more preparation time before

they can be eaten. Finally, at the most detailed level, we compare the share of food at home spending allocated to fresh vegetables to the share allocated to processed vegetables. Time-constraining household characteristics are expected to increase the share of their food at home budget going to processed vegetables and reduce the share of their food at home budget going to fresh vegetables, which may require more preparation time to clean, slice and prepare.

While this analysis could be conducted for a more comprehensive set of food items or groups, we select pairs of foods that are expected to be sensitive to time constraints but in opposite directions due to differences in convenience or time-saving attributes. Although differentiating the selected food items based on convenience attributes is possible given the structure and detail of the CEX data, not all foods in the CEX can be distinguished based on convenience or time-saving attributes. For instance, it is not possible using CEX data to distinguish between uncooked grains like rice and their more convenient forms, such as parboiled or instant forms, in the same way one can distinguish between fresh vegetables and canned or frozen vegetables.

This paper addresses the issue of household time constraints and their impact on food spending patterns in three novel ways. While there is an extensive literature looking at socio-demographic covariates of food expenditures, this study differs from previous studies by focusing specifically on household characteristics that are closely tied to the time resources of households and that can serve as proxies for household time constraints. To our knowledge, this is one of the first studies to use CEX information on the date of purchase for food items to calculate the number of shopping days for food at home and examine correlations with proxies for household time constraints. While other studies have looked at visits to food away from home establishments (Binkley 2006) or spending allocation among major food groups like fruits and vegetables (Ziol-Guest et al 2006), this study is unique in its attention to consumer choices based on the convenience attributes of food. It does so by comparing spending on food categories requiring different levels of labor and time resources in order to highlight consumer response to time constraints.

Few, if any, studies on the food price environment have examined the issue of time costs of preparing food at home and the price premiums for convenience and time-saving attributes in food items. One of the existing methods for assessing food costs relies on a market basket approach, which involves selecting a set of food items to be priced at different stores or locations. Researchers are free to decide what items to include in the market basket and the composition of the market basket used is generally motivated by the research questions to be addressed. Those interested in the cost of a healthier diet have created market baskets featuring food items with more desirable nutritional attributes or that comprise a diet that is considered healthy (see Chung and Myers, 1999; Andrews et al, 2001; Jetter and Cassady, 2006; Anderson et al, 2007). Efforts to estimate the cost of a nutritious diet have generally focused on the cost of food ingredients and have either ignored or underemphasized the time costs of purchasing and preparing these ingredients.

This exploratory research will help researchers develop and modify methods for measuring food prices in ways that better account for the time cost of shopping for and preparing food at home. Findings from this paper could be used to develop market baskets to measure food costs for time-constrained households that are not able spend as much time shopping for and preparing food or are not able to shop as frequently. For instance, market baskets that are more appropriate for time-constrained households could be developed that feature more convenient food items or larger package sizes. The price of these more convenient market baskets could then

be compared to reference market baskets to estimate the price premium for convenience attributes in food.

Background and Literature Review

Researchers have noted the rise in consumption of food away from home and packaged and ready-to-eat foods (Stewart et al 2004; Jabs and Devine 2006) and the coincident rise in obesity (Cutler et al 2003). The link has been attributed to the response of individuals and families to time constraints and the feeling of time pressure, seeking to reduce the time involved in acquiring and preparing food. Individuals and families may shift consumption towards relatively unhealthy prepared food, such as certain food from fast food restaurants, and away from relatively healthier ingredients, such as fresh vegetables, that require further preparation (Guthrie et al 2002). This creates a potential tradeoff between nutrition and convenience (Ziol-Guest et al 2006).

Studies using time use surveys, such as the American Time Use Survey (ATUS), have found a downward trend in the amount of time Americans spend preparing food (Zick and Stevens 2010). Individuals and households with certain characteristics may face time constraints that compel them to spend even less time on food-related activities like grocery shopping and food preparation. For example, gender, work status, and presence of children have been found to correlate with time spent on food preparation and other food-related activities (Hamrick and Shelley 2005; Cawley and Liu 2007; Mancino and Newman 2007).

While time use surveys like the ATUS provide information on how individuals and families allocate their time across different food-related activities, such as grocery shopping, food preparation, or restaurant visits, they usually lack detailed information on the specific types of foods being purchased, prepared or consumed. To investigate household food choices in greater detail, other studies, as this paper does, rely on household expenditure data, such as the CEX, or dietary intake data, such as the Continuing Survey of Food Intakes by Individuals (CSFII) or National Health and Nutrition Examination Survey (NHANES). However, these datasets have their own limitations, since they do not generally collect detailed information on time use or time resources. This paper fills an important gap in the literature by using available information on household characteristics in the CEX to infer household time costs and resources and to examine the relationship of these time-related proxies to detailed food spending patterns.

Household structure is expected to have strong implications for the time resources of households. Others have found that households headed by a single adult spend less time on food preparation (Mancino and Newman 2007), spend more on food away from home (Zick et al 1996; Stewart et al 2004; Ziol-Guest et al 2006), and spend less on fruits and vegetables than two-adult households (Ziol-Guest et al 2006). We expect that households headed by single adults will be more time constrained than those headed by two adults, since the latter may have more flexibility and ability to share household responsibilities.

Some studies have found that larger households spend less on food away from home (Stewart et al 2004) and shop for groceries more frequently (Bawa and Ghosh 1999), while others have found that larger households have varied schedules that results in less time preparing and eating family meals (Jabs and Devine 2006). We expect that household size will vary in its effect on a household's time resources. Additional household members allow for greater flexibility in sharing household responsibilities, including shopping and preparing food. In this case, increasing the number of household members could potentially ease time constraints related to food acquisition and preparation. In addition, larger household size may have

economies of scale effects that make food preparation at home more economical in terms of both time and cost. It allows for purchasing food in bulk sizing, which tend to cost less per unit. Labor time involved in food preparation per household member also goes down. For instance, preparing and cooking food for four people may not require much more time than cooking for three people. However, after a certain point, increasing the household size further could increase the time constraints that the household faces as it must manage the increasingly complex task of food acquisition and preparation for a large number of people.

The presence of children and elderly members in the household is expected to influence the time resources of a household. Households with children have been found shop for groceries less frequently (Kim and Park 1997) and spend an increased amount of time on housework, including food-related activities (Jabs and Devine 2006). We expect that caring for children increases the time constraints on households. The presence of elderly member could potentially increase the time resources of a household or be a time-constraining factor. Retired elderly members may have more time to attend to household functions, including food acquisition and preparation (Bawa and Ghosh 1999). However, certain elderly members may also require additional care from other household members, increasing the time constraints facing the household. We expect that on the whole, elderly members tend to be retired and no longer working, increasing the time resources of the household and reducing household time constraints.

Studies have found that working adults shop for groceries less frequently (Kim and Park 1997; Bawa and Ghosh 1999), spend less time on food-related activity (Hamrick and Shelley 2005; Cawley and Liu 2007; Mancino and Newman 2007), are more likely to purchase prepared food (Cawley and Liu 2007), spend more on food away from home (Stewart et al 2004; Binkley 2006; Ziol-Guest et al 2006), and are more likely to feel that time pressure is a barrier to healthy eating (Welch et al 2009). We expect that full time work among household adults will be a time-constraining characteristic, since these adults will have less time for food-related activities such as grocery shopping, food preparation and cleanup.

Vehicle access or ownership has been associated with better health outcomes even after controlling for income (Macintyre et al 2001), food security (Martin et al 2004), reduced consumption of fruits and vegetables (Rose and Richards 2004), increased consumption of vegetables (Bodor et al 2007), and less frequent shopping (Clifton 2004). Vehicles influence the manner in which households interact with the food environment. We expect that vehicle ownership will reduce the time constraints facing a household. Access to a vehicle can reduce the time cost of traveling to and from food retail and expand the number of food retailers that are accessible to the household. It also increases the cargo-carrying ability of the household compared to other forms of transportation, making trips to food retail more time-efficient.

The first outcome we consider is the number of shopping days. Retailing and marketing studies have found that households with certain characteristics, such as full-time employment among adults, presence of children, smaller household size, or younger household head, shop for groceries less frequently (Kim and Park, 1997; Bawa and Ghosh, 1999). In addition, a negative relationship exists between shopping frequency and market basket size (Kim and Park, 1997; Bell and Lattin, 1998; Bawa and Ghosh, 1999). We hypothesize that households with time-constraining characteristics, such as full-time employment or presence of children, are expected to consolidate their food shopping activities and shop less frequently in order to reduce the time and opportunity costs associated with food shopping.

The second outcome we look at is food spending share, or the composition of food spending. A number of studies have looked at covariates of spending on or consumption of food away from home. Demand for food away from home is correlated to many factors, including income, household structure, presence of children, attitudes towards nutrition, and convenience (Stewart et al 2004; Binkley 2006). The literature on the relationship between time-constraining household characteristics and spending allocation on food at home is less extensive. Ziol-Guest et al (2006) found differences in food budget allocation patterns between dual parent and single parent households. We expect that households with time-constraining characteristics will allocate a greater share of their food budget to food categories that require less time to prepare and a smaller share of their budget on food categories that require more time to prepare, all else equal.

Data

This paper uses public use microdata from the Diary Survey component of the 2008 CEX. The CEX is conducted by the US Census Bureau under contract with the Bureau of Labor Statistics and provides yearly information on the spending habits, income, assets and liabilities, demographic and socioeconomic characteristics of American consumers. The survey sample is designed to provide population estimates that are representative of the total non-institutionalized population in the US.

The CEX consists of two parts, the Interview and Diary components, each with its own sample. The sample for each component consists of about 7,500 Consumer Units. In this paper we use the terms Consumer Unit and household interchangeably. The Interview component is a quarterly survey that collects information on expenditures that respondents are able to recall over a time period of three months or more. Because of the relatively long time frame, this survey captures larger expenditures, such as spending on property, automobiles, and major durable goods, and those that occur on a regular basis, such as rent or utilities. The Diary component collects information on spending occurring during two consecutive one-week periods, or a total of 14 consecutive days. The shorter time frame is designed to capture smaller, more frequently purchased items, such as food and beverages. Respondents use a diary to record virtually all expenses incurred during the two consecutive one-week periods. Participants receive each weekly diary during a separate visit by a Census Bureau interviewer.

Information on expenditures in the public use microdata is aggregated at the Universal Classification Code (UCC) level (see Appendix A). There are over 600 expenditure UCCs in the 2008 CEX, of which 165 are food and beverage related. With UCCs, it is possible to distinguish between spending on fresh apples and on fresh bananas, but not between spending on different varieties of apples. Furthermore, only food items that capture a significant share of overall population expenditures are assigned their own distinct UCC. For example, there are distinct UCCs for apples, for bananas and for oranges, but all other fresh fruits are grouped into a single UCC, “other fresh fruit.”

The Diary Survey sample of the 2008 CEX consists of 7,436 Consumer Units. Not all Consumer Units participate in both weeks of the survey. For analysis related to food spending shares, only units participating in both weeks of the survey with valid food expenditure data are retained. The final sample for these analyses consists of 6,554 Consumer Units. For the analysis examining the number of shopping days, households with missing purchase date information are also dropped. The sample for shopping frequency consists of 6,064 Consumer Units.

The CEX uses stratified random sampling with systematic sampling within the strata rather than a simple random sample. To calculate unbiased and design-appropriate standard

errors using the CEX, this complex survey design must be accounted for using replication methods. These methods select sub-samples repeatedly from the full sample, calculate the statistic of interest for each sub-sample, and use the variability among the sub-samples to estimate the standard error of the full-sample statistic (Blaha 2003). The standard errors reported in the Results section of this paper are estimated using this replication method. All regressions described below were run using STATA version 10.1 (Stata Corp, 2007).

Methods

This paper examines the relationship between a set of six socio-demographic variables that serve as markers for household time resources and two different household food spending outcomes. The following linear functional form introduces the basic structure of the approach:

$$Y_{ij} = \beta_0 + \beta_1 X_i + \beta_2 Z_i + e \quad (1)$$

Y_{ij} Food spending outcome for consumer unit i and food category j

X_i Vector of time-related explanatory variables for consumer unit i

Z_i Vector of consumer unit control variables

Explanatory Variables

The set of explanatory appearing on the right-hand side are the same in each of the regression models. Six variables serve as proxies or markers for the time constraints facing the Consumer Unit and are the explanatory variables of interest. Rather than develop an index of time-constraint, we examine each characteristic individually to see if it is a significant covariate of food shopping days or food spending shares. Because the CEX does not collect actual time use information, it is not possible to estimate the effects or relationships in terms of hours or minutes in this analysis. We include additional variables on the right-hand side to control for other socioeconomic and demographic characteristics.

Time-Related Variable 1: Household Structure

Consumer Units are classified into one of four primary household structures: single adult, two adults, and all other households. All else equal, we expect Consumer Units with two adults to have more flexibility and ability to share household responsibilities, making it easier to manage demands on their time. Consumer Units with one adult are expected to have fewer shopping days, reduce the share of the food budget going to food at home, and increase the share going to prepared foods and processed.

Time-Related Variable 2: Household Size

The number of members in the Consumer Unit is another variable we expect to affect household time resources. Additional household members allows for more flexibility in sharing household responsibilities, including shopping and preparing food. In this scenario, increasing the number of household members could potential ease time constraints related to food acquisition and preparation. Larger household size may have economies of scale effects that make food preparation at home more economical in terms of both time and cost. It allows for purchasing food in bulk sizing, which tend to cost less per unit. Labor time involved in food preparation per household member may also go down. For instance, preparing and cooking food

for four people may not require much more time than cooking for three people. On the other hand, increasing the household size may add complexity to the household routine and schedule and could increase the time constraint facing the Consumer Unit. We therefore include a quadratic term for household size to capture nonlinear effects. We expect that increasing the household size will increase the number of shopping days but that the marginal effect is decreasing. Increasing household size is also expected to increase the share of the food budget allocated to food at home, and reduce the share going to prepared food and processed vegetables. The marginal effect will be decreasing.

Time-Related Variable 3: Number of Children

We include the count of children under 18 years of age. Increasing the number of dependent children is expected to increase the time constraints faced by the Consumer Unit, reducing the number of shopping days and the share of food at home, while increasing the share of prepared food and processed vegetables.

Time-Related Variable 4: Number of Elderly Members

We include the count of elderly members over the age of 64. The presence of elderly members could reduce the time constraints faced by the Consumer Unit by providing additional help and experience in handling household chores, including food acquisition and preparation. Increasing the number of elderly members is expected to reduce the time constraints faced by the Consumer Unit, increasing the number of shopping days and the share of food at home while decreasing the share of prepared food and processed vegetables.

Time-Related Variable 5: Work Status

We look at the effect of Consumer Unit work status by creating a dummy variable indicating that the reference person and spouse, if present, each work 40 or more hours a week. Full-time work status is expected to increase the time constraints on the Consumer Unit, reducing the number of shopping days and the share of food at home, while increasing the share of prepared food and processed vegetables.

Time-Related Variable 6: Vehicle Ownership

The CEX has information on vehicle ownership but not access to a vehicle. We include a dummy variable that indicates that the Consumer Unit owns at least one vehicle. Vehicle ownership may provide greater logistical flexibility to carry out household functions and reduce the opportunity cost of traveling to food retail. It may also facilitate travel to different food retailers on different days. In this sense, vehicle ownership could increase the number of shopping days. On the other hand, the cargo-carrying capacity of vehicles may allow Consumer Units to consolidate shopping and make fewer, but larger shopping trips. Vehicle ownership may reduce the opportunity cost of travel, freeing up more time to prepare food at home. It may also increase the ability to participate in activities away from home, including eating out, resulting less time to prepare meals at home.

Other Control Variables

In addition to the time-related explanatory variables that are the primary interest of this paper, we control for a number of other demographic and socioeconomic characteristics. These are meant to capture factors such as taste and preferences as well as geographic variations in

food prices and food retailer density and distribution. We control for household income by including the percentile ranking of the household income, Food Stamp Program participation in the past month, urban residence, geographic region, and reference person characteristics, namely age, race/ethnicity, and educational attainment.

Outcome Variables

Outcome 1: Number of Shopping Days

The first outcome we consider is the number of shopping days for food at home. We expect that households that are more time-constrained will consolidate their shopping and shop on fewer days in order to reduce the time cost of shopping for food. Shopping frequency has implications for the cost of food. Households that make fewer but larger shopping trips may be better able to take advantage of lower unit costs due to bulk or quantity discounts. To our knowledge, this is one of the first studies to use information on the date of purchase in the CEX to create a measure of shopping frequency for food at home. In this analysis we use the number of times a Consumer Unit shops for a food item or group of food items during a given time period. CEX Diary Survey respondents record the date of reported expenditures, but not the time. While it is not possible to precisely count the number of times a Consumer Unit shops for a given food item or group of food items, it is possible to determine whether or not the Consumer Unit made a relevant purchase on a given day. In this model, the number of shopping days is defined as the number of days during the 14-day diary period that the Consumer Unit reported expenditures on food at home.

Outcome 2: Food Spending Share

The second outcome we consider is food spending share. The typical market basket of a household that is more time-constrained may differ in composition from that of other households, such as the relative importance of convenience foods. To highlight choices that consumers make based on the convenience attributes of food, we compare spending shares on pairs of foods that require different amounts of labor and time. If more convenient forms of food carry a price premium, this has important implications for the cost of food.

In this model, we define food spending shares in the following manner:

1. Calculate the total spending by each consumer unit on the food category in the denominator (see below) over the 14-day survey period.
2. Calculate the total spending by the consumer unit on the food category in the numerator (see below) over the 14-day survey period.
3. Divide the result in 2) by the result in 1) to calculate the spending share.

We run this model for three different levels of food spending. At the broadest level of food spending, we examine the share of total food spending allocated to food at home. We expect that households with time-constraining characteristics will allocate a smaller share of their food budget to food at home and, by definition, a greater share on food away from home. Purchasing, preparing and cleaning up food prepared at home represent the less convenient option for time-pressed households.

At the intermediate level of food spending, we compare the share of food at home spending allocated to vegetables and to prepared food. Some examples of prepared food include canned soups, frozen meals, and prepared salads. Preparing vegetables for meals at home will

tend to require more preparation time than prepared food, which may require nothing more than reheating. We expect that households with time-constraining characteristics will allocate a greater share of their food budget to prepared food and a smaller share of their budget on vegetables.

At the most detailed level of food spending, we compare the share of food at home spending allocated to fresh vegetables and to processed vegetables. Processed vegetables include frozen, canned and dried vegetables. We expect that households with time-constraining characteristics will allocate a greater share of their food budget to processed vegetables and a smaller share of their budget on fresh vegetables.

Descriptive Statistics

Table 1 presents summary statistics for the explanatory variables used in the models. The average Consumer Unit has 2.5 members, lives in an urban area (92 percent) and owns a vehicle (89 percent). About a third of Consumer Units have at least one child under 18. In about a third of Consumer Units, both the reference person and spouse, if present, typically work 40 hours or more a week. In approximately a quarter of Consumer Units, the reference person is of nonwhite race, and 60 percent of reference persons have more than a high school education.

Table 1: Summary Statistics for Explanatory Variables

Variable	Description	Mean	S.D.
ONEADULT	1=One adult Consumer Unit	0.33	0.47
TWOADULT	1=Two adult Consumer Unit	0.48	0.50
OTHCU	1=Other Consumer Unit	0.19	0.39
FAM_SIZE	Consumer Unit size	2.51	1.45
FAMSQ	$(FAM\_SIZE)^2$	8.41	10.19
PERSLT18	Number of children under 18	0.65	1.07
PERSOT64	Number of members over 64	0.31	0.62
FTEARN	1=all adults work fulltime	0.34	0.47
VEHICLE	1=vehicle owner	0.89	0.31
INC_RNKM	Ranking of Current Income	0.51	0.29
SNAP_MO	1=Food Stamps in past month	0.06	0.24
AGELT35	1=Reference person age < 35	0.24	0.43
AGE3549	1=Reference person age 35-49	0.30	0.46
AGE5064	1=Reference person age 50-64	0.27	0.44
AGEOT64	1=Reference person age > 64	0.20	0.40
NONWHITE	1=Reference person non-white race/ethnicity	0.27	0.45
HSORLESS	1=Reference person education HS or less	0.40	0.49
URBAN	1=Urban	0.92	0.28
NORTHEAST	1=Northeast region	0.18	0.39
MIDWEST	1=Midwest region	0.23	0.42
SOUTH	1=South region	0.36	0.48
WEST	1=West region	0.22	0.41

Source: 2008 CEX Diary Component

Table 2 shows the sample distribution for the first outcome, the number of shopping days for food at home. The mean and median number of shopping days are 4.4 days and 4 days,

respectively. Given that the time period for the Diary component is 14 days or two weeks, this amounts to roughly 2 shopping days per week for the average Consumer Unit. However, the modal value for shopping days is 2 days. Although this analysis did not examine the time interval between shopping days, this is suggestive of a weekly shopping pattern for many Consumer Units. A little over 2 percent of Consumer Units did not report any food at home spending during Diary period while less than 1 percent shopped every day during the two-week Diary period.

Table 2: Distribution of Number of Shopping Days for Food at Home in a 14-Day Period

# of Shopping Days	Share of all Consumer Units
0	2.4%
1	7.9
2	19.7
3	14.3
4	14.5
5	11.9
6	9.3
7	7.1
8	4.5
9	3.5
10	2
11	1.2
12	0.7
13	0.5
14	0.6

Mean = 4.37 S.D. = 2.72 Median = 4
Source: 2008 CEX Diary Component

Table 3 presents descriptive statistics for the second outcome, food spending shares. Nearly 40 cents out of every dollar spent on food went to food away from home. Combined with prepared food, 45 cents, or nearly half, of every food dollar was spent on food that was prepared by some entity other than the Consumer Unit. In contrast, slightly more than a nickel out of every food dollar was spent on vegetables.

Table 3: Average Annual Food Spending, 2008

Food Group	Average Annual Expenditure	Share of Total Food Spending	Share of Food at Home Spending
All Food	$6,256		
Food at Home	3,885	62.1 %	
Cereals and Bakery Products	532	8.5	13.7 %
Cereals and Cereal Products	178	2.8	4.6
Bakery Products	355	5.7	9.1
Meats, Poultry, Fish, and Eggs	866	14.2	22.8
Beef	249	4.0	6.4
Pork	172	2.7	4.4

Other Meats	112	1.8	2.9
Poultry	167	2.7	4.3
Fish and Seafood	133	2.1	3.4
Eggs	53	0.9	1.4
Dairy Products	452	7.2	11.6
Fresh Milk and Cream	176	2.8	4.5
Other Dairy Products	275	4.4	7.1
Fruits and Vegetables	691	11.0	17.8
Fresh Fruits	233	3.7	6.0
Fresh Vegetables	222	3.6	5.7
Processed Fruits	122	2.0	3.1
Processed Vegetables	113	1.8	2.9
Other Food at Home	1,324	21.2	34.1
Sugar and Other Sweets	136	2.2	3.5
Fats and Oils	110	1.8	2.8
Prepared Foods	440	7.0	11.3
Snacks, Condiments, and Seasonings	277	4.4	7.1
Nonalcoholic Beverages	361	5.8	9.3
Food Away From Home	2,371	37.9	

Source: 2008 CEX Diary Component

Regression Model Results

The number of shopping days is a count outcome. Estimating this limited dependent variable using linear regression can result in estimators that are inefficient, inconsistent, and biased (Long 1997; Wooldridge 2003). A common statistical response to this problem is to treat the process as Poisson and estimate the Poisson regression model (PRM) using maximum likelihood. A Poisson process is a stochastic process in which events occur continuously and events are mutually independent. It assumes that variation is due to observed heterogeneity and that the mean and variance are the same. Because of these and other assumptions, this model may not be realistic for economic processes and often does not fit in practice (Long 1997).

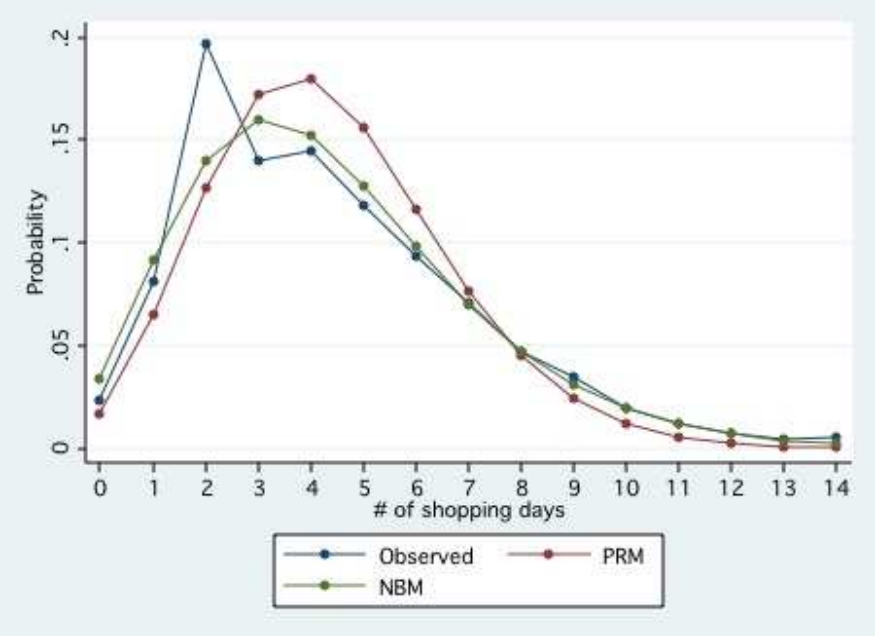
A slightly more flexible variation of the Poisson model is the Negative Binomial Regression Model (NBRM). It is used to fit models of count outcomes where there is more variation than would be expected under Poisson processes. It allows for variation due to different values of the independent variables but also due to unobserved heterogeneity. It is more appropriate than Poisson if there is overdispersion, where variance is greater than the mean (Long 1997). The negative binomial can be viewed as a Poisson model with specification error, with the error accounting for individual variation. We determined that NBRM is more appropriate than PRM in modeling food shopping behavior, given the degree of individual variation. We also ran diagnostic tests and determined that the variance is in fact greater than the mean, indicating that the NBRM is more appropriate for modeling the number of shopping days.

Multivariate linear regression analyses (OLS) are used to model food spending shares.

Outcome 1: Shopping Days

Figure 1 shows the sample distribution of shopping days for food at home and the expected number of shopping days as predicted by the PRM and NBRM.

Figure 1: Histogram of Predicted and Observed Frequencies of Number of Shopping Days for Food at Home



Mean = 4.37 S.D. = 2.72 Median = 4
PRM : Poisson Regression Model
NBM: Negative Binomial Regression Model
Source: 2008 CEX Diary Component

The NBRM appears to do a better job predicting the sample frequencies throughout the distribution, although neither model is able to predict the spike in observed values for Consumer Units that shop twice during the two-week period. The variance of the number of shopping days for food at home, 7.40 shopping days, is greater than the mean of 4.4 shopping days, indicating that the NBRM may be more appropriate than the PRM in modeling this count variable. Furthermore, post-estimation diagnostic tests confirmed the presence of overdispersion, suggesting that the NBRM may be more appropriate than the PRM in modeling the number of shopping days.

The multivariate results of the Negative Binomial Regression Model for the number of shopping days for food at home appear in Table 4.

Table 4: Negative Binomial Regression Model of Number of Shopping Days, Food at Home

Time-Related Variables	**Coefficient**	**Standard Error**
ONEADULT[1]	-0.080 ***	0.029
OTHCU[1]	-0.079 ***	0.025
FAM_SIZE	0.175 ***	0.028
FAMSQ	-0.011 ***	0.003
PERSLT18	-0.031 *	0.017
PERSOT64	0.033	0.036
FTEARN	-0.047 **	0.020
VEHICLE	0.057 *	0.031
Other Control Variables		
INC_RNKM	0.037	0.041

SNAP_MO	0.108 **	0.043
AGELT35[2]	-0.116 ***	0.027
AGE5064[2]	0.077 ***	0.027
AGEOT64[2]	0.002	0.056
NONWHITE	0.010	0.023
HSORLESS	-0.077 ***	0.019
URBAN	-0.046	0.034
MIDWEST[3]	-0.097 ***	0.027
SOUTH[3]	-0.064 **	0.025
WEST[3]	0.004	0.020
CONSTANT	1.221 ***	0.073
Pseudo R-square	0.020	

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$
[1]Omitted category: TWOADULT
[2]Omitted category: AGE3549
[3]Omitted category: NORTHEAST
Source: 2008 CEX Diary Component

All of the time-related explanatory variables, with the exception of the number of elderly household members, are significant at the 10 percent significance level or better. This suggests that each of these time-related variables captures a distinct effect on household time resources. Furthermore, the number of shopping days for food at home responds to time-constraining characteristics in expected ways.

Households headed by a single adult have fewer shopping days than two-adult households. The coefficient of -0.080 for this variable implies that the expected number of food shopping days for households with only one adult is about 8 percent lower than for households with two adults. Households headed by two adults, by definition, have more person-hours available to manage household maintenance functions like shopping for food. They are also able to share responsibilities for tasks like shopping for food.

Household size has a positive, but decreasing marginal effect, on the number of shopping days. This suggests that initially having a few more household members may allow for more flexibility in terms sharing food shopping responsibilities and increase the number of shopping days, but eventually, the complexity of managing the needs, logistics, and schedule of a large household may reduce this effect.

A household with more children, all else equal, has fewer shopping days for food at home. The extra time that goes into caring for another child shifts time away from other activities, including shopping for food. Full-time work status among adults in the household is negatively related to the number of shopping days. Fulltime work reduces household time resources available to manage other household functions, including shopping for food.

Vehicle ownership has a positive effect on the number of shopping days, suggesting that the convenience and logistical flexibility that a vehicle affords may have a stronger effect in increasing the number of shopping days than the effect of cargo-carrying capacity has on decreasing the number of shopping days.

Turning to the other control variables in the bottom half of the table, the number of shopping days increases with the age and education of the reference person. Households residing in the Northeast shop on more days than those in the Midwest and South. The bivariate correlation between income and the number of shopping days is positive and significant, but this

association is no longer significant after controlling for all the other variables. Consumer Units that received Food Stamp benefits in the past month have more shopping days, all else equal. This finding is at odds with those of Wilde and Ranney (2000), who found that Food Stamp participants tend to shop less frequently than comparable non-participants. In that study, 42 percent of Food Stamp participants shopped once a month or less frequently. The sample used in this analysis only included households with food shopping information during the 14-day diary period, so it is possible that our sample included a disproportionate share of program participants with a preference or need to shop more frequently.

Outcome 2: Food Spending Shares

Next we turn to the multivariate results for the second outcome, starting at the broadest level of food spending. The results of the OLS regression models for food at home spending as a share of total food spending are presented in Table 5.

Table 5: OLS Regression Model of Share of Total Food Spending

	Food at Home		
Time-Related Variables	**Coefficient**		**Standard Error**
ONEADULT[1]	-0.039	**	0.015
OTHCU[1]	-0.027	**	0.013
FAM_SIZE	0.029	*	0.014
FAMSQ	-0.002		0.001
PERSLT18	0.007		0.010
PERSOT64	0.000		0.013
FTEARN	-0.034	***	0.011
VEHICLE	-0.009		0.015
Other Control Variables			
INC_RNKM	-0.193	***	0.021
SNAP_MO	0.070	***	0.021
AGELT35[2]	-0.076	***	0.011
AGE5064[2]	0.045	***	0.011
AGEOT64[2]	0.070	***	0.022
NONWHITE	0.003		0.011
HSORLESS	0.025	***	0.009
URBAN	-0.026		0.022
MIDWEST[3]	-0.003		0.017
SOUTH[3]	-0.026	*	0.013
WEST[3]	0.012		0.017
CONSTANT	0.724	***	0.033
R-square	0.108		

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

[1]Omitted category: TWOADULT

[2]Omitted category: AGE3549

[3]Omitted category: NORTHEAST

Source: 2008 CEX Diary Component

Because food at home and food away from home comprise mutually exclusive and exhaustive categories for total food spending, both models will have the same coefficients and standard errors, with the exception of inverted signs on the coefficients. We expect that households that are more time-constrained will reduce their food budget allocation to food at home. Among the time-related variables, household structure appears to have the largest practical significance. As expected, one-adult households spend a smaller share of their total food budget on food at home compared to two-adult households. The coefficient of -0.039 for this variable implies that, other factors being equal, households headed by one adult spend about 3.9 percentage points less on food at home as a share of total food spending than households headed by two adults. Household size has a positive and significant effect on food at home spending, suggesting that economies of scale may make food preparation at home more economical. As expected, full-time work has a negative and statistically significant effect on food at home spending share. Vehicle ownership, the number of children, and the number of elderly members are not significant in this model.

Turning to the other control variables, income has a negative and marginally increasing effect on food at home spending. Recipients of Food Stamps are more likely to allocate their food dollars to food at home, which is not surprising given program rules that restrict benefit use to food at home purchases. Households with younger reference persons and more educated reference persons spend less on food at home.

Next we consider the multivariate results for the second outcome, focusing on the intermediate level of food spending. Table 6 presents the results of the OLS regression models for spending on vegetables and on prepared food as a share of food at home spending.

Table 6: OLS Regression Model of Share of Food at Home Spending

	Vegetables		**Prepared Food**	
Time-Related Variables	**Coefficient**	**Standard Error**	**Coefficient**	**Standard Error**
ONEADULT[1]	-0.009 **	0.004	0.019 ***	0.006
OTHCU[1]	-0.005 *	0.003	0.008 *	0.005
FAM_SIZE	-0.007 *	0.003	0.002	0.005
FAMSQ	0.001 ***	0.000	-0.001	0.001
PERSLT18	-0.006 ***	0.002	0.006 *	0.003
PERSOT64	0.007 *	0.004	-0.004	0.005
FTEARN	0.000	0.002	0.002	0.004
VEHICLE	0.001	0.004	0.016 ***	0.006
Other Control Variables				
INC_RNKM	0.007	0.005	0.001	0.008
INCSQ	-0.005	0.004	0.012	0.009
SNAP_MO	-0.006	0.003	0.016	0.006
AGELT35[2]	0.004 *	0.003	-0.007 ***	0.005
AGE5064[2]	-0.006	0.007	-0.002	0.009
AGEOT64[2]	0.008	0.003	-0.024	0.005
NONWHITE	0.000 ***	0.002	-0.009 ***	0.004
HSORLESS	-0.003	0.004	-0.003 **	0.011
URBAN	-0.010	0.003	0.009	0.007
MIDWEST[3]	-0.007 ***	0.003	0.005	0.004

SOUTH[3]	0.003 **	0.003	0.009	0.006
WEST[3]	0.097	0.007	0.092	0.015
CONSTANT	0.000 ***	0.002	0.002 ***	0.004
R-square	0.022		0.025	

* p < 0.1; ** p < 0.05; *** p < 0.01
[1]Omitted category: TWOADULT
[2]Omitted category: AGE3549
[3]Omitted category: NORTHEAST
Source: 2008 CEX Diary Component

We expect that households that are more time-constrained will reduce their food budget allocation to vegetables, which require more time and labor to prepare, and increase the allocation to prepared food, which may only need reheating before they are ready to eat. Again, household structure is statistically significant and has the greatest practical significance among the time-related variables. Households headed by one adult spend more on prepared food and less on vegetables than households headed by two adults. All else equal, households headed by one adult allocate nearly a percentage point less of their food at home budget on vegetables and 1.9 percentage points more on prepared food than households headed by two adults.

Household size matters for vegetable spending, where it has a negative but marginally decreasing effect, while it has a positive, but not statistically significant, effect for prepared food. The time and labor required to clean and prepare vegetables may be cumulative, so that preparing one pound of vegetables for four household members takes approximately twice as long as preparing half a pound for two members. This effect may be enough to reduce vegetable consumption as the household size increases. The same cumulative effect may not matter as much for prepared food, such as frozen microwaveable dinners, which require minimal preparation time to begin with.

The effect of the number of children is statistically significant in both models and has the expected direction. Increasing the number of children reduces spending on vegetables and increases spending on prepared food. The number of elderly members has a positive and marginally significant effect on spending on vegetables and a negative but insignificant effect on spending on prepared food. Elderly members may have the time and culinary experience working with vegetables that encourages more spending on vegetables compared to households with fewer or no elderly members.

Fulltime work is not significant in either model. One interpretation of this result is that households in which all adults are working fulltime shift more of their food dollars to food away from home (from Table 5), but that their allocation of food at home does not change significantly, at least at this intermediate level. Vehicle ownership has a positive effect in both models, but is only statistically significant for spending on prepared food. It is possible that the mobility that a vehicle affords reduces the opportunity cost of non-food-related activities even more than it reduces the opportunity cost of food-related activities. For instance, vehicle ownership may make it easier for household members to participate in social activities outside of the home, reducing the time resources available to prepare food at home and, in turn, making prepared food more attractive.

Turning to the other control variables, households with younger reference persons spend less on vegetables and more on prepared food, as do households with white reference persons. Geographic dummy variables are significant in the model for vegetable spending, but not for

prepared food, suggesting that regional variations in the availability or price of vegetables could be a factor.

Finally, we consider the multivariate results for the second outcome at the most detailed level of food spending. Table 7 presents the results of the OLS regression models for spending on fresh vegetables and on processed vegetables as a share of food at home spending.

Table 7: OLS Regression Model of Share of Food at Home Spending

	Fresh Vegetables		Processed Vegetables	
Time-Related Variables	**Coefficient**	**Standard Error**	**Coefficient**	**Standard Error**
ONEADULT[1]	-0.010 ***	0.003	0.001	0.002
OTHCU[1]	-0.006 **	0.003	0.001	0.001
FAM_SIZE	-0.008 ***	0.003	0.002	0.002
FAMSQ	0.001 ***	0.000	0.000	0.000
PERSLT18	-0.004 **	0.002	-0.002 *	0.001
PERSOT64	0.002	0.003	0.005 *	0.003
FTEARN	-0.003	0.002	0.003 *	0.001
VEHICLE	-0.001	0.004	0.002	0.002
Other Control Variables				
INC_RNKM	0.007	0.005	-0.001	0.002
SNAP_MO	-0.007 **	0.003	0.002	0.002
AGELT35[2]	-0.004	0.003	-0.002 *	0.001
AGE5064[2]	0.004	0.003	-0.001	0.002
AGEOT64[2]	0.000	0.005	-0.007	0.005
NONWHITE	0.007 ***	0.003	0.001	0.001
HSORLESS	-0.003	0.002	0.003 **	0.001
URBAN	0.004	0.004	-0.006 ***	0.002
MIDWEST[3]	-0.011 ***	0.003	0.001	0.002
SOUTH[3]	-0.009 ***	0.003	0.003 *	0.001
WEST[3]	0.006 *	0.003	-0.002	0.002
CONSTANT	0.075 ***	0.007	0.023 ***	0.004
R-square	0.031		0.014	

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

[1]Omitted category: TWOADULT

[2]Omitted category: AGE3549

[3]Omitted category: NORTHEAST

Source: 2008 CEX Diary Component

We expect that households that are more time-constrained will reduce their food budget allocation to fresh vegetables and increase the allocation to processed vegetables. As expected, one-adult households spend less on fresh vegetables than two-adult households. All else equal, one-adult households spend 1 percentage point less on fresh vegetables than two-adult households. Although the coefficient appears to be small, it is actually a substantive effect. Spending on fresh vegetables as a share of food at home spending is about 3 percent. One-adult households spend more on processed vegetables, but this effect does not rise to statistical significance.

Increasing household size reduces spending on fresh vegetables, although this effect is marginally diminishing. Like household structure, household size is not statistically significant for processed vegetables. The effect of the number of children is negative and significant in both instances, although the reduction in fresh vegetable spending is twice that of processed vegetable spending. The number of elderly member has a positive and significant effect on processed vegetable spending.

The effect of full-time work has the expected direction, with a positive effect on spending on processed vegetables and a negative effect on spending on fresh vegetables. Only the effect on processed vegetables is statistically significant, however. Like full-time work, vehicle ownership has a positive effect on spending on processed vegetables and a negative effect on spending on fresh vegetables. Neither result is statistically significant, however.

Turning to the other control variables, recipients of Food Stamps allocate less of their food at home spending on fresh vegetables, while households with a non-white reference person spend more. Urban households and households with the youngest reference persons spend less on processed vegetables. The educational level of the reference person matters for processed vegetables, with lower education increasing spending. Geographic dummy variables are significant in the model for fresh vegetable spending, but not for processed vegetables, suggesting that regional variations in the availability or price of fresh vegetables could be a factor.

Discussion

Here we consider each of the proxies for household time constraints in turn. Among the time-related explanatory variables, we find that household structure is the most consistent, and in several cases the most practically significant, predictor of food shopping patterns across the different regression models. Household structure is a significant covariate in all the regression models except for processed vegetables. These findings suggest that one-adult households allocate their food budget differently from two-adult households, favoring choices that have the potential of reducing time spent on food acquisition and preparation. Compared to two adult households, one-adult households shop on fewer days, conforming to the hypothesis that time constraints may lead households to consolidate their food shopping and shop on fewer days. At the broadest level of food spending, one-adult households allocate more of their total food budget to food away from home and less to food at home, which is consistent with the time-constraint hypothesis. Findings based on intermediate food spending patterns are also consistent with this hypothesis. One-adult households allocate more of their food at home budget to prepared food and less to vegetables. Looking at the most detailed level of food spending, one-adult households reduce fresh vegetable spending and increase spending on processed vegetables, although only the effect on fresh vegetables is statistically significant.

The effect of household size indicates a nuanced relationship with food spending patterns. Larger households shop on more days, perhaps due to increased flexibility afforded by additional household members. However, the quadratic term is negative and statistically significant, suggesting that at some point the added complexity of schedules and logistics for large households may become a time-constraining factor. Larger households also allocate a greater share of their overall food budget to food at home, which could be consistent with the economies of scale thesis, both in terms of purchasing bulk food and reduced amount of food preparation time on a per household member basis. Household size has a negative affect on vegetable spending shares and a positive effect on prepared food spending shares, but only the

effect on vegetables is significant. Similarly, household size is associated with a reduction in budget allocation to fresh vegetables and an increase for processed vegetables, but only the effect on fresh vegetables is significant.

All else equal, a household with more children shops less frequently, spends more of its food dollars on prepared food and less on vegetables. This is consistent with the hypothesized effect. However, given associational nature of this analysis, it is difficult to separate the effect of children's preference and taste from the effect of time constraints. It is entirely plausible that the higher spending on prepared food and lower spending on vegetables is more a reflection of children's relative preferences rather than an effect of constrained time resources. This interpretation is reinforced by the fact the number of children is negatively and significantly related to food spending on both fresh and processed vegetables.

The number of elderly members is significant in only two of the models, having a positive effect on spending on vegetables and on processed vegetables. It is possible that the presence of elderly members may have effects in both directions. The presence of elderly members could reduce the time constraints faced by the household by providing additional help and experience in handling food acquisition and preparation responsibilities. On the other hand, if other members have to care for elderly members, the presence of elderly members may increase the time constraints faced by the household.

While the effect of full-time work status has the expected direction, this effect was statistically significant in only a few models. As expected, full-time work status is correlated with fewer shopping days. It is also related to a greater share of the food budget being allocated to food away from home. Households in which all adults are employed full-time have higher spending shares on processed vegetables. They have lower spending on fresh vegetables, but this effect is not statistically significant.

Vehicle ownership was a significant covariate in only a couple of models. Vehicle ownership had a positive effect on the number of shopping days, suggesting that the convenience and logistical flexibility that a vehicle affords may outweigh the effect of cargo-carrying capacity. In other words, having a car could reduce the opportunity cost of shopping for food, by making travel to and from food retail more convenient. However, vehicle ownership increased spending shares on prepared food, which runs counter to this time-saving argument. Other studies have found that access to car, rather than ownership, is the more critical factor affecting food access (Martin et al 2004). Information on car access, rather than car ownership, may provide a clearer picture of the interrelation between vehicles, food spending patterns, and time constraints.

Finally, it is interesting that the dummy variables for geographic region mattered most for vegetables spending and for fresh vegetables in particular. All geographic region dummy variables are significant in the model for spending shares on fresh vegetables. In contrast, none of them is significant in the model for spending on prepared food. This suggests the importance of future work on the role of regionality as well as seasonality on fresh vegetable purchase and consumption.

Although we attempted to control for differences in taste and preference by including demographic control variables for education, age, and race, the cross-sectional design of this analysis limits the ability to assess to what extent food preferences or other confounding factors are affecting either the explanatory variables or the food spending outcomes. We have already discussed the possible confounding effect of taste and preference in the relationship between the

number of children and vegetable spending. Preference for food away from home could be influential on a household's decision to acquire a vehicle, for instance.

Another limitation of this analysis is the 14-day time frame of the Diary component of the CEX. The analysis neither captures nor properly reflects households that shop for food relatively infrequently, such as once a month. Another limitation is that CEX data do not indicate the time and location of purchases, making it impossible to distinguish between one large trip to a food retailer and several smaller trips to various food retailers made on the same day. These food shopping patterns represent different demands on the time resources of households, but the analysis in this paper treats them the same way.

These findings highlight the need to take account of household characteristics that have a bearing on a household's time resources, such as household composition and full-time work status, when assessing the cost of acquiring and preparing a low cost but healthful meal. One of the criticisms of the Thrifty Food Plan is that it does not adequately reflect the time cost involved in purchasing and preparing low cost meals from scratch for time-pressed households (Jabs and Devine 2006; Mancino and Newman 2007; Rose 2007). Furthermore, meeting recommendations on vegetable consumption may be a challenge not only from a taste perspective, but also from a time perspective, if the households believe that they do not have the time, motivation or energy to prepare vegetables and integrate them into their meals.

The results from this paper indicate that the tradeoff between time costs and monetary costs in food products merits further examination. Does convenience in food cost more? In attempting to answer this question, one could envision collecting information on two versions of a market basket. The reference basket would assume more time and resources to shop and prepare food while the alternative or comparison basket would be geared towards households that are more time-constrained, such as households headed by a single adult, and feature more convenient but healthful substitutions, such as precut or pre-packaged vegetables, frozen vegetables, canned beans, or parboiled brown rice. The price of these more convenient market baskets could be compared to the reference market basket to estimate the price premium for convenience attributes in food.

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Appendix A

Food Expenditure Universal Classification Codes (UCC)

UCC	Title
10110	FLOUR
10120	PREPARED FLOUR MIXES
10210	CEREAL
10310	RICE
10320	PASTA CORNMEAL OTH CEREAL PRODS
20110	WHITE BREAD
20210	BREAD OTHER THAN WHITE
20310	FRESH BISCUITS, ROLLS, MUFFINS
20410	CAKES AND CUPCAKES
20510	COOKIES
20610	CRACKERS
20620	BREAD AND CRACKER PRODUCTS
20710	DOUGHNUTS,SWEETROLLS,COFFECAKE
20810	FROZEN & REFRIG. BAKERY PROD.
20820	FRESH PIES, TARTS, TURNOVERS
30110	GROUND BEEF EXCLUDE CANNED
30210	CHUCK ROAST
30310	ROUND ROAST
30410	OTHER ROAST
30510	ROUND STEAK
30610	SIRLOIN STEAK
30710	OTHER STEAK
30810	OTHER BEEF (EXCLUDE CANNED)
40110	BACON
40210	PORK CHOPS
40310	HAM (EXCLUDE CANNED)
40410	OTHER PORK
40510	PORK SAUSAGE
40610	CANNED HAM
50110	FRANKFURTERS
50210	BOLOGNA, LIVERWURST, SALAMI
50310	OTHER LUNCHMEAT
50410	LAMB AND ORGAN MEATS
50900	MUTTON, GOAT, GAME
60110	FRESH & FROZEN WHOLE CHICKEN
60210	FRESH OR FROZEN CHICKEN PARTS

60310	OTHER POULTRY
70110	CANNED FISH AND SEAFOOD
70230	FRESH FISH & SHELLFISH
70240	FROZEN FISH & SHELLFISH
80110	EGGS
90110	FRESH MILK ALL TYPES
90210	CREAM
100110	BUTTER
100210	CHEESE
100410	ICE CREAM AND RELATED PRODUCTS
100510	OTHER DAIRY PRODUCTS
110110	APPLES
110210	BANANAS
110310	ORANGES
110410	OTHER FRESH FRUITS
110510	CITRUS FRUITS EXCL. ORANGES
120110	POTATOES
120210	LETTUCE
120310	TOMATOES
120410	OTHER FRESH VEGETABLES
130110	FROZEN ORANGE JUICE
130121	FROZEN FRUITS
130122	FROZEN FRUIT JUICES
130211	FRESH FRUIT JUICE
130212	CANNED/BOTTLE FRUIT JUICE
130310	CANNED FRUITS
130320	DRIED FRUITS
140110	FROZEN VEGETABLES
140210	CANNED BEANS
140220	CANNED CORN
140230	CANNED VEGETABLES MISC
140310	OTHER PROCESSED VEGETABLES
140320	OTHER PEAS
140330	OTHER BEANS
140340	OTHER VEGETABLES MISC
140410	FROZEN VEGETABLE JUICES
140420	FRESH & CANNED VEGETABLE JUICES
150110	CANDY AND CHEWING GUM
150211	SUGAR
150212	ARTIFICIAL SWEETENERS

150310 OTHER SWEETS
160110 MARGARINE
160211 FATS & OILS
160212 SALAD DRESSINGS
160310 NON-DIARY CREAM SUBSTITUTES
160320 PEANUT BUTTER
170110 COLA DRINKS
170210 OTHER CARBONATED DRINKS
170310 ROASTED COFFEE
170410 INSTANT/FREEZE DRIED COFFEE
170510 NONCARB FRUT FLAV/LEMADE NONFROZ
170520 TEA
170530 OTHER NONCARB. BEVERAGES/ICE
170531 OTHER NONCARB. BEVERAGES/ICE
170532 BOTTLED WATER
170533 SPORTS DRINKS
180110 SOUP
180210 FROZEN MEALS
180220 FROZ/PREP. FOOD OTH THAN MEALS
180310 POTATO CHIPS AND OTHER SNACKS
180320 NUTS
180410 SALT/OTHER SEASONINGS & SPICES
180420 OLIVES, PICKLES, RELISHES
180510 SAUCES AND GRAVIES
180520 OTHER CONDIMENTS
180611 PREPARED SALADS
180612 PREPARED DESSERTS
180620 BABY FOOD
180710 MISC. PREPARED FOODS
180720 VITAMIN SUPPLEMENT
190111 LUNCH AT FAST FOOD
190112 LUNCH AT FULL SERVICE
190113 LUNCH AT VENDING MACHINE
190114 LUNCH AT EMPLOYER
190115 LUNCH AT BOARD
190116 LUNCH AT CATERED AFFAIRS
190211 DINNER AT FAST FOOD
190212 DINNER AT FULL SERVICE
190213 DINNER AT VENDING MACHINE
190214 DINNER AT EMPLOYER

190215 DINNER AT BOARD
190216 DINNER AT CATERED AFFAIRS
190311 SNACKS AT FAST FOOD
190312 SNACKS AT FULL SERVICE
190313 SNACKS AT VEND MACHINE
190314 SNACKS AT EMPLOYER
190315 SNACKS AT BOARD
190316 SNACKS AT CATERED AFFAIRS
190321 BREAKFAST AT FAST FOOD
190322 BREAKFAST AT FULL SERVICE
190323 BREAKFAST AT VENDING MACHINE
190324 BREAKFAST AT EMPLOYER
190325 BREAKFAST AT BOARD
190326 BREAKFAST AT CATERED AFFAIRS
190911 BOARD AT FAST FOOD
190912 BOARD AT FULL SERVICE
190913 BOARD AT VENDING MACHINE
190914 BOARD AT EMPLOYER
190915 BOARD AT BOARD
190916 BOARD AT CATERED AFFAIRS
190921 CATERED AFF AT FAST FOOD
190922 CATERED AFF AT FULL SERVICE
190923 CATERED AFF AT VEND MACHINE
190924 CATERED AFF AT EMPLOYER
190925 CATERED AFF AT BOARD
190926 CATERED AFF AT CATERED AFF
200111 BEER AND ALC AT HOME
200112 NON ALCOHOLIC BEER
200210 WHISKEY AT HOME
200310 WINE AT HOME
200410 OTHER ALCOHOLIC BEV. AT HOME
200511 BEER AT FAST FOOD
200512 BEER AT FULL SERVICE
200513 BEER AT VENDING MACHINE
200514 BEER AT EMPLOYER
200515 BEER AT BOARD
200516 BEER AT CATERED AFFAIRS
200521 WINE AT FAST FOOD
200522 WINE AT FULL SERVICE
200523 WINE AT VENDING MACHINE

200524 WINE AT EMPLOYER
200525 WINE AT BOARD
200526 WINE AT CATERED AFFAIRS
200531 ALC. BEV EXC BEER/WINE FAST FD
200532 ALC. BEV EXC B/W FULL SERV
200533 ALC. BEV B/W VEND MACH
200534 ALC BEV EXC B/W AT EMP
200535 ALC BEV EXC B/W AT BOARD
200536 OTH ALC. BEV AWAY FROM HOME