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Analysis of Quick-serve, Mid-scale, and Up-scale Food Away from Home Expenditures

ABSTRACT: U.S. households spend nearly one-half of their food budget for food away from home (FAFH) with an increasing share for fast-food facilities. These trends can impact the structure of the food distribution industry, nutritional intake of U.S. households, and demand for goods at the farm level. This analysis investigates the effects of socio-economic and demographic variables, both on the decision to consume FAFH by facility and on the decision of how much to spend on FAFH by facility. Based on National Panel Diary data, three facility types are considered: quick-serve, mid-scale, and up-scale.

While analyses for aggregate food away from home (FAFH) expenditures have been recorded in the literature, there has been little focus on disaggregate FAFH expenditures. Through the only previous empirical work done for disaggregate FAFH expenditures, the value of household time was found to be a key determinant for increased consumption at limited-menu facilities, while full-menu expenditures were less affected by the value of household time(McCracken and Brandt, 1987). Estimates of income elasticities were 0.34 for full-menu expenditures and 0.04 for limited-menu expenditures, meaning that an increase in income would raise expenditures at full-menu restaurants eight times more than at limited-menu restaurants. Household size and composition were found to be more important determinants for limited-menu expenditures than for full-menu expenditures. Estimates of household size elasticities were 0.26 for limited-menu expenditures and

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0.02 for full-menu expenditures. Because the information for the McCracken and Brandt (1987) study was from the 1977-1978 USDA Nationwide Food Consumption Survey, these results have become somewhat dated.

U.S. households spend almost one-half of their food budget on FAFH (Food Institute, 1993). Trends away from full-service restaurants to fast-food type facilities may impact: (1) the structure of the food distribution industry; (2) nutritional intake of U.S. households; and (3) demand for goods at the farm level. The main objective of this paper is to investigate the effects of socioeconomic and demographic variables, both on the decision to consume FAFH by facility and on the decision of how much to spend on FAFH by facility. In this analysis, we consider three types of commercial food-service facilities: (1) quick-serve; (2) mid-scale; and (3) up-scale.

STUDY

Scope

Specifically in this study, we: (1) develop the empirical framework for the decision process; (2) estimate the socioeconomic effects on the probability of participation by facility; (3) estimate the socioeconomic effects on the household expenditures by facility; and (4) discuss the results and implications.

Data

The National Panel Diary (NPD) Survey data, covering the 1982 through 1989 period, were used for the analysis. The survey provides disaggregate FAFH consumption information by facility for each household with corresponding socioeconomic and demographic information. Dumagan and Myers (1992) provide a detailed description of this data source.

The NPD data source provides expenditure information by type of food establishment. This privately collected data source began in 1976 as a service to the restaurant industry. Approximately 12,800 households participated in the survey each quarter. The full-menu industry is segregated into mid-scale and up-scale classifications. Both classifications require at least some form of table service. Up-scale facilities are locations that offer full alcohol service and accept credit cards. The limited-menu classification is defined as quick-serve for the NPD data with no table service. The proportion of food away from home (FAFH) expenditures represented by quick-serve facilities has risen from 41% in 1982 to 47% in 1989 (Byrne, 1994). Over this time period, the proportion of sales represented by up-scale facilities remained constant at about 22%, while the share for mid-scale facilities fell from 37 to 31%. Quick-serve sales are expected to be the majority of commercial eating facility expenditures in the future.

Theoretical Framework

For total FAFH consumption analysis, labor participation by the household manager has been shown to have a positive relationship with FAFH likelihood and expenditures (McCracken and Brandt, 1987; Byrne, Capps, and Saha, 1996; Yen, 1993; Kinsey, 1983). Household production theory allows for food production in the household to be driven by the household manager's available time, income, and preferences represented by demographic factors. Hence, consumption of food outside of the home would be influenced by these factors as well, though in potentially different ways. Byrne, Capps, and Saha (1996) used the NPD data for total FAFH analysis and developed a framework based on household production theory. To remain consistent with this previous study, the framework used in the total FAFH analysis can be adapted for FAFH expenditures by food facility as:

$$E_{lj} = f(t_{wj}, M_j, D_j), \tag{1}$$

where E_{lj} represents FAFH expenditures for the *l*th food facility by the *j*th household, t_w represents hours worked by the household manager in the *j*th household, M_j denotes income of the *j*th household, and D_j refers to other sociodemographic characteristics for the *j*th household. In terms of the variables used in our analysis, we may rewrite (1) as follows:

$$\begin{aligned} OFA_{lj} = f(&INC_j, HMHOUR_j, MW_j, SO_j, WE_j, MS2_j, -MS4_j, BLAC_j, \\ &OTHE_j, HISP_j, AESI_j - AESI_j, COLL_j, GEN_j, SING_j, OWK_j, OFAF_j) \end{aligned} \tag{2}$$

where *l* represents the three industry segments—quick-serve, mid-scale, and upscale. The other variables are defined in Table 1. The coefficient sign for the household manager's labor participation variable may be different for this disaggregate case versus the aggregate situation. It has been hypothesized that households with working food managers are more likely to purchase FAFH because of time constraints for the household. However, there is also an opportunity cost and time requirement associated with FAFH consumption. The likelihood of quick-serve purchases would be expected to increase more because of higher market labor participation by the household manager than because of establishments specializing in full service (Kinsey, 1983; McCracken and Brandt, 1987). More working hours reduce the time available for leisure activities such as table service dining. Effects of labor participation for the full service facilities could potentially be negative since these dining types usually require more time. Consequently, the effects of the HMHOUR variable may differ by type of food facility. Previous research supports the notion that the value of household time is a relatively more important determinant for expenditures at limited-menu facilities than for those at full-menu establishments (McCracken and Brandt, 1987).

Table 1. Definitions of Variables Used for Total FAFH Expenditure Analysis

Variable	*Definition*
AES	Size of household decomposed by age and gender (figure 1)
BLAC	1 for black households, 0 otherwise
COLL	1 if household head has at least some college, 0 if household head has no college
DEC	1 if OFA>0, 0 if OFA=0
GEN	1 if household manager is female, 0 if male
HISP	1 if Hispanic, 0 otherwise
HMHOUR	Market labor participation of household manager in hours
HSIZE	Total number of household members
INC	Annual household income in dollars
MS2	1 if household located in MSA with population of more than 500K but less than 1 million, 0 otherwise
MS3	1 if household located in MSA with population of more than 1 million but less than 2.5 million, 0 otherwise
MS4	1 if household located in MSA with population of more than 2.5 million, 0 otherwise
MW	1 if household located in the Midwest, 0 otherwise
OFA	Total FAFH expenditures for a two-week period in dollars
OFAF	Number of FAFH visits for a two-week period
OTHE	1 for other races, 0 otherwise
OWK	Proportion of FAFH visits on weekends
SING	1 if household head is single, 0 if married
SO	1 if household located in the South, 0 otherwise
WE	1 if household located in the West, 0 otherwise

Methodology

In the extant literature, total FAFH consumption has been characterized as a two-step decision process. We argue that disaggregate consumption by facility should be viewed as a three-step process. First, the decision is made whether to consume FAFH, known as a participation stage. Second, the decision is made as to which type of facility will purchase FAFH; this is a second participation stage. Finally, the decision, referred to as the expenditure level decision, is made with respect to the level of consumption or expenditure to be made at the facility.

Prior to McCracken and Brandt (1987), and Kinsey (1983), empirical analyses dealing with FAFH consumption of households used a single-equation ordinary least squares (OLS) procedure (Prochaskaand Schrimper, 1973; Sexauer, 1979). Ignoring the multi-step nature of the decision process leads to potential bias and inconsistency concerns that result from censored responses. McCracken and Brandt (1987), and Kinsey (1983) sought to circumvent this problem through the use of the Tobit technique. The effects of the explanatory variables on the participation decision and the level decision from a single parameter estimate were estimated using the Tobit procedure. The single parameter paradigm of the model imposes the same effect direction (that is, positive or negative) for both the participation probability decision and the expenditure level decision. For

FAFH, households in one region of the country may be more likely to consume FAFH than households in other regions; however, their expenditures for FAFH may be less than other regions due to types of FAFH consumed or regional price differences.

Noting the concerns with OLS and Tobit analysis, Yen (1993) employed the use of Cragg's (1971) double-hurdle model. With the double-hurdle model, the ability to estimate separate parameters is achieved for both decisions. Yen (1993) employed the double hurdle to account for zero expenditure occurrence that may have resulted from purchase infrequency. The Bureau of Labor and Statistics Consumer Expenditure Diary Survey, used for the Yen (1993) study, represents a one-time accounting of expenditures for a one-week period. Consequently, the likelihood of purchase infrequency was assumed to be high. Purchase infrequency would not appear to be a major concern with the NPD data since quarterly two-week reports are used. Also, Yen employed a maximum likelihood estimation procedure that would be quite problematic to adapt for a system of equations.

Heien and Wessells (1990) adapted Amemiya's (1974) two-step approach that, unlike the Heckman approach, uses all of the observations in both steps and is workable for system estimation. The first step involves a probit regression to determine probability of participation or consumption. From the probit estimation, the inverse of Mill's ratio is calculated and employed in the second step as an instrument that yields a representation of the unobservable influences on the participation decision. The second stage of the estimation process incorporates the use of the censoring of latent variables (inverse of Mill's ratio) in a multiple regression system. According to Heien and Wessells (1990), this approach provides improved results based on goodness-of-fit statistics and prior expectations of elasticity values. The technique yields separate parameter estimates for each decision stage, uses all of the observations for both stages, and treats the related group of commodities as a system. Heien and Wessells (1990) conclude that not only is this procedure computationally simple but also that it is consistent and asymptotically more efficient than other two-step estimators. Byrne et al. (1996) also used this approach for total FAFH expenditure analysis with the NPD data.

Step 1: FAFH Participation Decision

The initial decision for estimation, referred to as a participation decision, is whether the household chooses to consume FAFH. Previous works have shown that factors such as income, household size, household manager labor participation, regionality, urbanization, race, education, gender, marital status, and seasonality are potential influences on the decision to consume FAFH (McCracken and Brandt, 1987; Byrne et al., 1996; Yen, 1993; Kinsey, 1983; Prochaska and Schrimper, 1973). This step has been previously estimated in the work by Byrne et

al. (1996). The probit specification from that analysis, which gave an estimation of the probability of FAFH participation (P[DEC=1]), was expressed as:

$$P[DEC = 1] = \Phi(\beta' x) = \frac{1}{\sqrt{2\pi}} e^{\frac{(-\beta' x_1^2)}{2}}, \quad (3)$$

where

$$\beta_0 + \beta_1 * INC_j^2 + \beta_3 * HSIZE_j + \beta_4 * HMHOUR_j + \beta_5 * MW_j + \beta_6 * SO_j + \beta_7 * WE_j + \beta' x = \beta_8 * MS2_j + \beta_9 * MS3_j + \beta_{10} * MS4_j + \beta_{11} * BLAC_j + \beta_{12} * OTHE_j + \beta_{13} * HISP_j + \beta_{14} * INJ_j HSIZE_j + \beta_{15} * HSIZE_j^2 + \beta_{16} * COLL_j + \beta_{17} * GEN_j + \beta_{18} * SING_j + \beta_{19} * Q2_j + \beta_{20} * Q3_j + \beta_{21} * Q4_j, \quad (4)$$

where variables are defined in Table 1. $\Phi(\ )$ denotes the cumulative distribution function of the standard normal distribution. The quadratic functional form with respect to income and household size was used to capture possible economies of scale effects in the probability of participation. Dummy variables were specified to capture seasonal variations in expenditures by quarters as defined by the NPD survey. The NPD quarters are defined as: 1) December to February (base group); 2) March to May (Q2); 3) June to August (Q3); and 4) September to November (Q4). Prior to 1986, information was not collected for the Hispanic variable, and as such, there is not a β_{13} estimated for these years. Data and model specification for this step are identical to the previously mentioned NPD study (Byrne et al., 1996).

Step 2: FAFH Participation by Facility

Once the household members make the FAFH participation decision, the next decision is what type(s) of food facilities they will visit. This decision involves three separate participation questions. The participation decisions for facility types were estimated using the same specification described in Equation 4, with the addition of the MILLS variable estimate derived from the first step. The inverse of Mill's ratio variable (MILLS) for households was obtained from the first step and included as an independent variable in the second step, easing omitted variable concerns. If the associated coefficient for the MILLS variable is statistically significant, then sample selection bias would have resulted if variable was omitted from the specification.

The expectations of coefficient values for each facility type are not necessarily equivalent to the first step. Conditional income effects would be expected to be positive for facility visits that represent higher meal costs, such as fine dining. Income effects would not be expected to be as influential for the likelihood of quick-serve participation because of the lower expected cost per visit. Income probability effects for mid-scale facilities would be expected to fall between upscale and quick-serve establishments.

Effects from the level of labor participation by the household manager would be based on a time requirement comparison between producing the food at home or purchasing the food at a particular facility. Quick-serve facilities would be expected to be the most attractive facility alternative from a time constraint perspective. Consequently, we hypothesize a positive relationship between labor participation and the purchases at quick-serve restaurants. The traditional full-service establishments could possibly approach or surpass the time requirements for preparing food at home. Hence, the expectations for labor participation effects would be less (and possibly negative) for mid-scale and up-scale facilities as a result of increased time requirements. Certain dining activities, such as up-scale visits, may be perceived as leisure events. So, households with working food managers may be more likely to frequent these establishments because this activity represents a transfer from time spent for household production to time spent for leisure. Therefore, these households may still be more likely to frequent up-scale facilities even though there is little to no time saved in the household production function.

Previous research showed that Midwestern and Southern households demonstrated a higher likelihood to consume FAFH than their Northeastern counterparts (Byrne et al., 1996). Regional tastes and preferences may also impact the facility type that the household chooses to visit the most often. The Northeast (for example, New York City) is commonly thought to have a heavier concentration of up-scale restaurants than other regions of the country. Consequently, the up-scale participation likelihoods are probably higher for the Northeast, but the quick-serve likelihoods may be higher for the other regions.

Tastes and preferences also may vary by the level of urbanization, which may lead to different effects for the different facility types. Diversity of available facility types would also seem to be affected by population density. Rural areas tend to have fewer fine dining establishments, restricting the choices available to households in these areas. As a result of the wider selections available, residents of more heavily urbanized areas would be more likely expected to frequent finer restaurants and less likely to frequent quick-serve facilities. Residents of less-populated areas may have little choice, besides a quick-serve facility, in away from home consumption.

It is expected that it would cost less to take the household to a fast-food place than it would to take the household to a full service restaurant. Larger households would then be more likely to eat at quick-serve facilities while smaller households would be more likely to eat at mid-scale and up-scale facilities. Effects of race, education, gender, marital status, and seasonality are included to measure potential differences in preference. Sign expectations are not as strong for these variables, but the results discussion will provide some speculation or justification where appropriate.

STEP 3: FAFH Expenditure Decision

The final decision, referred to as a consumption or expenditure level decision, is the amount spent at the facility type(s). The specification of the expenditure equation differs from the two participation decision specifications. Contributions by household members are thought to differ by the age and gender of the household member. Previous studies have used demographic translations for household composition, which yields an estimated parameter for each age-gender classification (Heien and Wessells, 1979; McCracken and Brandt, 1987). However, the relative contribution by each household member cannot be retrieved. Further, the translation method precludes the estimation of a household size elasticity. Demographic scaling results in a nonlinear specification but does preserve the contribution of each household member type, allowing a form of household size elasticity measurement.

For this study, households are defined in adult equivalence terms, wherein adult equivalence variables (AES1 through AES11) replace the household size variables used in the two probit regressions. The AES terms are defined as follows:

AES 1 = number of males <13 years
AES 2 = number of males 13–21
AES 3 = number of males 22–34
AES 4 = number of males 35–49
AES 5 = number of males 50–64
AES 6 = number of adults >65
AES 7 = number of females <13 years
AES 8 = number of females 13–21
AES 9 - number of females 22–34
AES 10 = number of females 35–49
AES 11 = number of females 50–64

Other variables added to the specification include: 1) number of FAFH visits during the two-week period (OFAF) and 2) proportion of FAFH visits made on the weekend (OWK). The participation level of the household manager in the labor force (HMHOUR) was omitted from the expenditure specification since the household manager's income is included in the income variable. Market labor hours constrain the amount of time available for household production and so are assumed to have a positive effect on the decision to consume FAFH. In addition, the number of hours may also affect the type of food facility selected for consumption. However, once the decisions to consume FAFH and to determine the type of facility at which to dine are made, there is little basis to suggest that the number of hours worked would affect the actual expenditure level.

Instead, the additional income would drive the expenditure level decision, which is already included in the annual household income (INC) variable. We do not have the ability to separate household manager income from total household income. McCracken and Brandt (1987) used the wage rate for household managers in both estimation steps because Tobit estimation requires the same vector of predetermined variables for both estimation stages. Yen's (1993) study did not include the wife's income for the household income measure variable. Therefore,

Yen used the wife's wage rate in the expenditure stage as an indication of additional household income. For this analysis, household income includes the household manager's income (if any), and the constraint on household production time is specified in hours rather than as a wage rate. Consequently, there is no theoretical restriction necessitating the inclusion of the labor participation variable in the expenditure relationship.

The resulting specification for the FAFH expenditure decision by facility is:

$$\begin{aligned} \text{OFAij} = \; & \alpha_0 + \alpha_1 *INC_j + \alpha_2 *INC_j^2 + \alpha_3 *MW_j + \alpha_4 *SO_j + \alpha_5 *WE_j + \\ & \alpha_6 *MS2_j + \alpha_7 *MS3_j + \alpha_8 *MS4_j + \alpha_9 *BLAC_j + \alpha_{10} *OTHE_j + \\ & \alpha_{11} *HISP_j + \alpha_{12}(\Sigma\mu_i AES_i)_j + \alpha_{13}(\Sigma\mu_i AES_i)_j^2 + \alpha_{14} *INC * \\ & (\Sigma\mu_i AES_i)_j + \alpha_{15} *COLL_j + \alpha_{16} *GEN_j + \alpha_{17} *SING_j + \\ & \alpha_{18} *MILLS_j + \alpha_{19} *OWK_j + \alpha_{20} *Q2_j + \alpha_{21} *Q3_j + \\ & \alpha_{22} *Q4_j + \alpha_{23} *OFAF_j + e_j , \end{aligned} \tag{5}$$

where variables are as defined in Table 1 and $I = 1,...,11$ refers to the AES classifications as defined previously.[1]

In summary, estimation of FAFH consumption by food facility is a three-step procedure. In Step 1, the decision is made whether or not to consume FAFH, a binary outcome. Step 2 is the decision as to which type(s) of facility to visit, a binary outcome for each facility type, respectively. In Step 3, the decision is then made as to the expenditure level for each facility type.

Empirical Results

Step 1: FAFH Participation Decision Results

Empirical results for the first step of the decision process are identical to a previous work analyzing total FAFH (Byrne et al., 1994). In summary, labor participation by the household manager, higher urbanization levels (MS2, MS3, and MS4), income, and education had a positive effect on the likelihood to consume food away from home. Blacks were less likely to participate in the FAFH market than whites while household size had a decreasingly negative effect (in absolute terms) on the likelihood from 1982 to 1988 and a positive effect in 1989. Other variables were not statistically significant determinants for FAFH participation likelihood.

Step 2: Participation Decision Results by Facility

All probit regressions for this decision step were statistically significant and provided prediction accuracies greater than a binary random prediction (table 2). The Cragg-Uhler R^2 values for each facility estimation ranged from: 1) 0.41 to 0.56 for quick-serve facilities; 2) 0.34 to 0.50 for mid-scale facilities; and 3) 0.29 to 0.34 for up-scale facilities. Estimated coefficients associated with the MILLS

Table 2. Corrected Marginal Probability Elasticities

Variable		Year							
		1989	*1988*	*1987*	*1986*	*1985*	*1984*	*1983*	*1982*
INC	QS	**-.1817**	**-.0433**	**-.5194**	**-.4287**	**-.4228**	**-.4256**	**-.4263**	**-.6070**
	MS	**.1864**	**.1325**	**-.3160**	**-.3087**	**-.3170**	**-.3206**	**.1431**	**-.4686**
	US	**.5018**	**.5812**	**.1555**	.0443	**.0824**	**.0850**	**.2853**	-.0045
HSIZE	QS	**.3667**	**.2694**	**.4363**	**.4134**	**.4435**	**.4748**	**.5129**	**.6307**
	MS	**-.0992**	**-.3611**	**-.2434**	**-.3564**	**-.2513**	**-.3519**	**-.0190**	**-.2682**
	US	**-.2927**	**-.2452**	**-.0973**	**-.2370**	**-.1867**	**-.2501**	**-.3328**	**-.1897**
HMHOUR	QS	**.0897**	**.1040**	**.0401**	**.0432**	**.0247**	**.0237**	**.0090**	**.0063**
	MS	**-.1942**	**-.1114**	**-.0808**	**-.0388**	**-.0536**	**-.0377**	**-.0466**	**-.0332**
	US	**-.1357**	**-.0844**	**-.0336**	.0045	**-.0040**	**-.0070**	**.0024**	**-.0038**
MW	QS	**-.0025**	.0172	**-.0181**	**-.0170**	**-.0252**	**-.0187**	**-.0330**	**-.0295**
	MS	**-.0006**	.0090	**-.0166**	**-.0213**	**-.0306**	**-.0359**	**-.0273**	**-.0279**
	US	**-.0942**	**-.0666**	**-.0779**	**-.0604**	**-.0729**	**-.0646**	**-.0507**	**-.0702**
SO	QS	.0227	**.0250**	.0098	.0135	**.0005**	**.0286**	**.0208**	.0117
	MS	**-.0228**	-.0016	**-.0165**	**-.0161**	**-.0087**	**-.0128**	.0013	**-.0188**
	US	**-.1064**	**-.1053**	**-.0899**	**-.0668**	**-.0716**	**-.0620**	**-.0607**	**-.0280**
WE	QS	.0032	-.0016	**-.0145**	**-.0099**	**-.0147**	**-.0121**	**-.0193**	**-.0334**
	MS	.0038	.0052	**-.0091**	**.0009**	**.0037**	**-.0134**	**-.0043**	**-.0161**
	US	-.0025	-.0054	**-.0139**	**-.0057**	-.0098	**-.0039**	.0070	**-.0025**
MS2	QS	**-.0146**	**-.0037**	**-.0027**	**-.0158**	**-.0182**	**-.0137**	**-.0095**	**-.0148**
	MS	**-.0227**	.0005	**-.0113**	**-.0142**	**-.0142**	**-.0148**	**-.0058**	**-.0092**
	US	**.0045**	**.0241**	.0073	.0106	**.0035**	.0039	.0114	.0032
MS3	QS	**-.0197**	**-.0126**	**-.0267**	**-.0252**	**-.0123**	**-.0199**	**-.0232**	**-.0190**
	MS	**-.0207**	-.0005	**-.0115**	**-.0236**	**-.0184**	**-.0170**	**-.0164**	**-.0105**
	US	**.0422**	**.0661**	**.0313**	**.0265**	**.0305**	**.0307**	**.0330**	**.0123**
MS4	QS	**-.0017**	-.0072	**-.0079**	-.0053	-.0041	-.0033	**-.0110**	**-.0216**
	MS	**.0071**	**.0019**	**.0041**	-.0037	**-.0034**	-.0008	**-.0064**	**-.0102**
	US	**.0570**	**.0613**	**.0480**	**.0410**	.0397	**.0443**	**.0393**	**.0163**
BLAC	QS	**.0086**	-.0027	**.0071**	**.0053**	**.0062**	**.0059**	**.0058**	**.0067**
	MS	**.0049**	**-.0067**	**.0030**	**.0042**	**.0040**	**.0025**	**.0025**	**.0035**
	US	**-.0022**	**-.0107**	**.0009**	**-.0010**	**.0004**	**.0003**	**-.0037**	**-.0003**
OTHE	QS	**.0017**	.0009	**.0007**	.0006	.0006	**.0025**	**.0012**	**.0031**
	MS	**.0023**	-.0005	-.0006	-.0007	-.0002	**.0025**	**.0018**	**.0025**
	US	.0006	-.0007	.0003	.0002	.0004	**.0013**	**.0009**	**.0013**
HISP	QS	.0004	.0006	.0001	.0001	na	na	na	na
	MS	-.0007	-.0005	**-.0012**	-.0008				
	US	**-.0032**	-.0023	**-.0027**	**-.0024**				
COLL	QS	**-.0839**	**-.0170**	**-.0631**	**-.0625**	**-.0781**	**-.0733**	**-.0704**	**-.0135**
	MS	**-.1174**	**-.0263**	**-.0727**	**-.1038**	**-.1029**	**-.0979**	**-.0856**	**-.0137**
	US	**.0143**	**.1210**	.0273	.0246	**.0068**	**.0064**	.0608	**-.0050**
GEN	QS	**-.1717**	**.0001**	**-.1650**	**-.1291**	**-.1700**	**-.2344**	**-.2400**	**-.2306**
	MS	.0327	**.1753**	**.1052**	**.1760**	**.2583**	**.0928**	**-.0784**	**-.1357**
	US	**-.1039**	-.0404	-.0632	**.0227**	**.0122**	**-.1215**	**-.0559**	**-.0987**
SING	QS	**.0232**	**.0162**	**.0179**	**.0185**	.0049	.0092	**-.0030**	**-.0077**
	MS	**-.0173**	**-.0107**	**-.0240**	**-.0263**	**-.0230**	**-.0427**	**-.0532**	**-.0288**
	US	**.0466**	**.0487**	**.0186**	**.0160**	**.0155**	.0021	**.0016**	**.0002**
Q2	QS	.0013	**.0538**	**-.0152**	**-.0103**	**-.0086**	.0032	.0001	**-.0042**
	MS	.0003	**.0443**	**-.0041**	**-.0015**	**-.0113**	-.0020	.0006	**-.0071**
	US	**-.0102**	**.0434**	**-.0121**	**-.0114**	**-.0095**	-.0007	**-.0069**	-.0005
Q3	QS	**.0051**	**.0615**	.0079	.0032	.0050	**.0163**	**.0007**	**.0186**
	MS	-.0030	**.0458**	.0062	**-.0102**	**-.0121**	**-.0019**	**.0001**	-.0021
	US	-.0057	**.0508**	.0028	**-.0067**	**-.0105**	.0011	**-.0006**	.0009

(continued)

Table 2. (Continued)

Variable		Year							
		1989	*1988*	*1987*	*1986*	*1985*	*1984*	*1983*	*1982*
Q4	QS	**.0172**	**.0535**	**.0057**	**.0045**	**.0057**	**.0154**	.0146	**.0205**
	MS	**.0226**	**.0387**	**.0084**	**.0076**	.0023	**.0120**	**.0222**	**.0071**
	US	**.0107**	**.0491**	-.0032	-.0002	-.0019	-.0029	.0069	**.0060**
Mean Probability		.5859	.5597	.5854	.5870	.5832	.5795	.5731	.5744
		.5186	.5051	.5308	.5409	.5491	.5574	.5559	.5591
		.2591	.2438	.2529	.2596	.2529	.2514	.2438	.2445
Cragg-Uhler R^2		.5581	.4059	.5688	.5427	.5433	.5328	.5243	.5134
		.4627	.3414	.4879	.4786	.5004	.4963	.4961	.4886
		.3385	.2865	.3327	.3288	.3266	.3224	.3109	.3034

Notes: Bold denotes significance at the .05 level for the direct parameter estimate. All estimated parameters associated with the MILLS variable were statistically significant.
Calculated at the Sample Means for the Decision to Consume Food Away from Home by Food Facility (Quick-serve (QS), Mid-scale (MS), Up-scale (US), respectively), 1982 through 1989

were statistically significant for the 24 probit regressions, suggesting sample selection bias would have been present in these estimates. Corrected marginal probability elasticities for the independent variables by food facility are provided in table 2.

Income Effects

Income exerted stronger influence on the decision to eat at the costlier up-scale facilities, with marginal probability elasticity (MPE) of 0.50 for 1989. Income had a negative effect on the probability for quick-serve consumption, but this effect diminished over the study period. The MPE for the less costly quick-serve facilities was -0.61 in 1982 and was -0.18 in 1989, meaning that incomes 10% above the sample average were 1.8% less likely to consume at quick-serve facilities. McCracken and Brandt (1987) reported a positive income influence on quick-serve facilities. There are two major reasons for this discrepancy. First, the Tobit procedure is a two-step rather than a three-step procedure. Consequently, income effects for total FAFH likelihood also are represented in their estimate. Second, Tobit marginal effects for participation and expenditure level are derived from the same parameter estimate, which constrains the marginal effects to be the same direction for both considerations. The three-step procedure provides separate parameter estimates for each decision equation in each step, which removes the directional constraint.

Household Size Effects

Household size was an important determinant for quick-serve participation likelihood; however, the effects appear to have decreased over time. The MPEs ranged from 0.63 in 1982 to 0.37 in 1989. Still, the household size MPEs for quick-serve facilities were higher than those observed in the McCracken and Brandt (1987) study. Household size also was an important determinant for the full service facil-

ity types, but the effects were negative for these cases. The McCracken and Brandt estimate of MPE for household size was positive, a likely result of the concerns with the Tobit procedure. For households consuming FAFH, the quick-serve facility was probably more attractive to larger households because of the lower expenditures per person per visit. Higher per person expenditures for full service facilities would be an apparent deterrent to larger households.

Labor Participation Effects

As hypothesized, labor participation (HMHOUR) effects were significant and positive for the decision to frequent quick-serve facilities during the 1982 through 1989 study period. Increased hours in the market labor force by the household manager had a negative effect on mid-scale participation. Labor participation effects were also negative for up-scale dining but to a lesser extent.

Regional and Urbanization Effects

Examination of regional differences indicates that there exists little difference between regions in likelihood that household residents will consume FAFH at quick-serve facilities. Midwestern and Southern households were less likely to consume FAFH at up-scale facilities than Northeastern households were. Effects for urbanization (MS variables) were increasingly positive for up-scale participation likelihood, probably a result of better availability. Rural households were more likely to visit quick-serve restaurants than they were to visit the more urbanized areas (MS2-MS4).

Ethnic Effects

Overall, black households exhibited a slightly higher likelihood to visit quick-serve and mid-scale facilities, but black households, as compared to white households, were less likely to eat at up-scale facilities. No consistent trends, relative to white households, were noted for other races or Hispanics in food facility selection.

Education, Gender, and Marital Status Effects

Household heads with at least some college education were more likely to consume FAFH at up-scale facilities and less likely to consume it at quick-serve and mid-scale facilities. Households with female household managers were less likely to consume FAFH at quick-serve and up-scale facilities and more likely to consume at mid-scale facilities than were their male counterparts. Unmarried households had a higher probability of consuming FAFH at quick-serve and up-scale facilities and a lower probability of frequenting mid-scale facilities. Three possible explanations for the behavior of singles are: 1) Mid-scale facilities are often family oriented and, as so, less alluring to singles; 2) single adults may visit up-scale restaurants as a result of "dating"; and 3) single adults may have more discretionary income.

Table 3. Marginal Effects and Income and Adult Equivalence Elasticities for Food Away from Home Expenditures by Food Facility

		Year							
Variable		*1989*	*1988*	*1987*	*1986*	*1985*	*1984*	*1983*	*1982*
INC	QS	**.1507**	**.0906**	**.0848**	**.1113**	**.1745**	**.1097**	**.0710**	**.0733**
Elasticity	MS	**.1473**	**.1337**	**.1210**	**.1431**	**.1515**	**.1670**	**.1816**	**.1947**
	US	**.1535**	**.1650**	**.6436**	**.1611**	**.1961**	**.2390**	**.2625**	**.1896**
AES	QS	**.3383**	**.3191**	**.3262**	**.3854**	**.2822**	**.2728**	**.2231**	**.2687**
Elasticity	MS	**.3165**	**.3741**	**.3813**	**.3891**	**.3674**	**.2351**	**.2476**	**.2246**
	US	**.0118**	**.2623**	**.2750**	**.0345**	**.0445**	**.0143**	**.1621**	**.1986**
MW	QS	**-.6759**	**-.5348**	-.2569	-.0372	**.8174**	**.3991**	**.4950**	**.9577**
	MS	**-1.5018**	**-1.2365**	**-1.0337**	**-1.1621**	**-.7968**	**-.7022**	-.2276	-.4063
	US	**-2.6618**	**-1.7887**	**-1.8540**	**-1.4454**	**-1.6645**	**-1.3430**	**-2.1474**	**-1.3504**
SO	QS	**-.7925**	**-.6106**	-.2704	-.1273	**.7841**	.3126	.2696	**.7184**
	MS	-.3375	-.1100	**.1847**	-.0580	**-.2280**	.1727	.2204	.0830
	US	**-2.2454**	**-1.2908**	**-1.6642**	**-1.0778**	**-1.1413**	**-1.0956**	**-1.7151**	**-.7792**
WE	QS	.2338	.1472	**.6123**	.4713	**.9760**	**1.1193**	**1.1465**	**1.4461**
	MS	**.5880**	.4651	**.8759**	**.5490**	**.2806**	**.7469**	**.7901**	**1.1427**
	US	**-2.9411**	**-2.0877**	**-2.1012**	**-1.7163**	**-1.6786**	**-1.4008**	**-1.8309**	**-1.2940**
MS2	QS	**.9268**	.3258	.1489	.1508	-.0952	**.4635**	**.6208**	.2315
	MS	**.9264**	**.5654**	**.6571**	**.6900**	.5248	.1195	**.7262**	.3190
	US	**.8546**	**.4447**	.2120	.3218	.8702	**.7273**	**.5927**	.3673
MS3	QS	**.9355**	.3002	**.7658**	**1.1544**	**.4663**	**.7656**	**.5190**	**.4474**
	MS	**.7129**	**.6323**	**.8999**	**.8586**	**1.1597**	**.9692**	**1.0341**	**.6009**
	US	**.7964**	**.7291**	**.8432**	**1.1154**	**1.3688**	**1.0974**	**.5646**	**.6607**
MS4	QS	**1.4260**	.4659	**.8982**	**.7582**	**.4665**	**.5465**	**.8453**	**.4937**
	MS	**.8568**	**1.1509**	**1.5546**	**1.5017**	**1.2687**	**1.2628**	**1.1813**	**1.3895**
	US	**1.5651**	**1.1181**	**1.1567**	**2.1179**	**1.6016**	**2.0290**	**1.1140**	**1.8072**
BLAC	QS	-.0346	-.8036	.8539	**-1.5161**	**-1.5766**	.2016	-.7731	**-1.1163**
	MS	-.2657	**-1.3165**	-1.0724	**-.8926**	**-1.0068**	-.0726	**-1.1936**	**-1.6339**
	US	-.1181	**-.0545**	.1640	-.6517	**-.7107**	-.9942	.1411	-.0836
OTHE	QS	-.7320	-.7557	-.2741	-.0405	.6191	-.8298	.0287	-.3232
	MS	**4.8640**	1.1288	.4883	**1.8207**	1.3847	**2.0205**	**2.3515**	-1.2009
	US	1.2904	1.3188	-.3471	-1.3706	2.9444	-.0845	-.4997	.2358
HISP	QS	**2.5288**	.9977	**2.1564**	**1.9763**	na	na	na	na
	MS	.5965	.3845	**-.3219**	.6426				
	US	-.3460	.5325	**1.1893**	.4941				
COLL	QS	**-.5430**	**-.4327**	**-.5652**	**-.5200**	**-.6597**	**-.5951**	**-.4080**	.1629
	MS	**.3385**	-.0363	**.2715**	.1344	.0861	-.0755	**.3149**	-.0638
	US	**.5470**	**.1961**	.0539	.1372	.2801	.2932	**.3316**	-.0987
GEN	QS	-.4512	.3191	.1898	**.8589**	.2106	.6951	**.4520**	-1.4161
	MS	-.4629	**-1.3599**	**-1.8488**	**-1.2607**	-1.9175	-.6373	.0682	**-3.8334**
	US	-.5327	**-1.1340**	**-1.9416**	**-.9960**	**-1.4659**	**-1.9511**	**-1.3767**	**-6.7724**
SING	QS	**-.9213**	**-.7213**	**-.9259**	**.0770**	**-.3558**	**-.9109**	**-1.7646**	**-2.2178**
	MS	**-2.0822**	**-1.6030**	**-1.8193**	**-1.5095**	**-1.4878**	**-2.7347**	**-2.5347**	**-3.6414**
	US	**-2.5698**	**-.7952**	**-.6372**	**-1.8734**	**-1.3846**	**-1.5725**	**-.9522**	**-1.6294**
Q2	QS	.0033	**.4296**	.0826	.1544	.0380	.3040	.0229	.2139
	MS	**.7162**	**.8767**	**.4004**	**.5807**	**.5770**	**.6179**	**.6445**	**.5231**
	US	-.2567	.1094	-.1363	.1007	**.3394**	.2727	.2873	-.0985
Q3	QS	**1.4672**	**1.8749**	**1.3216**	**1.6211**	**1.3232**	**1.2980**	**1.1150**	**1.5428**
	MS	**1.6475**	**1.6133**	**1.4912**	**1.3019**	**1.5326**	**1.6098**	**1.9539**	**1.6398**
	US	.1579	.6056	.4361	.4623	**.8434**	**.5211**	**.8079**	.2872

(continued)

Table 3. (Continued)

Variable		Year							
		1989	*1988*	*1987*	*1986*	*1985*	*1984*	*1983*	*1982*
Q4	QS	.3403	**.6452**	.3810	.1722	-.0928	.3970	-.1651	**.5929**
	MS	**.7326**	**.8141**	**.4650**	.4123	.1520	.3940	**.7177**	**.8057**
	US	-.0740	**.1491**	-.0219	.1335	.2178	.0413	.0542	-.0932
OWK	QS	**6.5817**	**7.3373**	**6.7572**	**6.2797**	**6.2787**	**5.6246**	**5.8324**	**5.6181**
	MS	**8.1627**	**7.3379**	**7.8816**	**8.2330**	**7.9850**	**8.0813**	**8.2837**	**8.6064**
	US	**7.6301**	**7.5239**	**8.0681**	**7.5666**	**9.6417**	**8.2507**	**8.9773**	**6.1001**
OFAF	QS	**3.9639**	**3.7926**	**3.7150**	**3.6077**	**3.4118**	**3.3739**	**3.2533**	**3.1761**
	MS	**5.8872**	**5.5858**	**5.3460**	**5.2191**	**4.9271**	**4.7045**	**4.6921**	**4.5452**
	US	**15.6786**	**15.0264**	**14.4506**	**14.6267**	**11.8732**	**12.3855**	**11.5720**	**13.8628**
Avg. Expenditure		19.5637	13.8628	18.1109	17.3161	16.0264	15.2669	13.9892	13.7934
		13.8492	12.9029	13.4067	13.6287	13.4606	13.6276	13.2372	13.5618
		9.4782	8.5484	8.5628	8.6711	8.1459	8.0384	7.4908	7.3975
Adjusted R^2		.6677	.6713	.6749	.6565	.6767	.6534	.6437	.6351
		.6024	.5986	.5992	.5977	.5546	.5721	.5467	.5591
		.5850	.6314	.6566	.6176	.6059	.6023	.5942	.6164

Notes: Bold denotes significance at the .05 level for the direct parameter estimate. All estimated parameters associated with the MILLS variable were statistically significant.
(Quick-serve (QS), Midscale (MS), Up-scale (US), respetively), 1982 through 1989

STEP 3: FAFH Expenditures by Facility

The estimated coefficients associated with the inverse of Mill's ratio variable were statistically significant for the 24 expenditure equations (8 years by 3 facility times). The goodness-of-fit statistics, adjusted R^2, ranged from 0.55 for mid-scale facilities in 1983 to 0.68 for quick-serve expenditures in 1985, implying a close range of explanatory power for all equations (Table 3). Corrected marginal effects for the structural variables are provided in Table 3; coefficient estimates for the adult equivalence variables are exhibited in Table 4.

Income Effects

Income elasticities are relatively consistent between the facility types for the study period. Values are more inelastic than those reported by McCracken and Brandt (1987) as a result of time and/or estimation technique. Early in the study period, higher income elasticities were noted for up-scale facilities, but the differences in elasticities became quite similar in 1989. The low income elasticities indicate that food away from home is a necessary good as opposed to a luxury good for all facilities. A change in income has less effect on buyer behavior for necessary goods than for luxury goods. A one percent increase in income would result in a less than one percent expenditure increase for necessary goods and a greater than one percent increase for luxury goods.

Household Size Effects

In the participation step, larger households demonstrated a higher likelihood to consume FAFH at a quick-serve establishment. Household size also has a positive

Table 4. Coefficients Associated with Adult Equivalence Variables for Food Away from Home Expenditures by Food Facility

Variable		Year							
		1989	*1988*	*1987*	*1986*	*1985*	*1984*	*1983*	*1982*
AES1	QS	**1.0911**	**.8044**	**1.3813**	**.8490**	**1.3492**	**1.1531**	**2.1915**	**1.4486**
	MS	.0959	**.1925**	.0674	.1001	-.1137	-.0168	.0785	.0079
	US	.2225	**-.1369**	.1960	-.1276	**-.3463**	-.3408	-.0900	-.1778
AES2	QS	**1.2314**	**.4574**	**.9095**	**.6756**	**.8219**	**.9521**	**1.2571**	**.9632**
	MS	**.3290**	.1514	**.2453**	.1838	-.0626	.1485	.0866	-.0289
	US	.2640	**.3562**	**.8803**	**1.1881**	-.3455	**-.1039**	**1.3569**	.0030
AES3	QS	**1.0590**	**.8654**	**1.1851**	**.7378**	**.9633**	**.8812**	**1.0064**	**1.1024**
	MS	**.7476**	**.6730**	**.7361**	**.5393**	**.6990**	**.7096**	**.5211**	**.3717**
	US	-.3357	**.5307**	**1.1197**	-.2702	-.0563	.1092	**1.2075**	**.4176**
AES5	QS	**.6708**	**.4955**	**.5614**	**.6515**	**.7712**	**.5147**	**.6631**	**.7633**
	MS	**.7728**	**1.0117**	**1.0422**	**.9885**	**1.1647**	**1.2845**	**1.4149**	**.8538**
	US	**.6452**	**.4686**	**.7183**	-.1306	.2165	**.3409**	**.6128**	**.2858**
AES6	QS	.6008	.5321	**.5720**	**.6078**	**.5556**	**.4293**	**.4337**	**.5389**
	MS	1.2831	**1.6203**	**1.5942**	**1.4163**	**1.6483**	**1.9774**	**1.6420**	**1.3498**
	US	.6706	.7774	**.9548**	**.5743**	.0698	**.0515**	**1.1780**	**.4082**
AES7	QS	**.8959**	**.6933**	**1.2505**	**.6875**	**.9942**	**1.1047**	**1.6542**	**.8941**
	MS	.0084	.0034	-.0559	.0676	.0155	.0590	.0691	-.0039
	US	.0739	-.0377	.1216	**-.5722**	**-.6950**	-.3051	-.1050	.0128
AES8	QS	**.7934**	**.6755**	**.8619**	**.4404**	**.5884**	**.4483**	**.6342**	.2332
	MS	**.2451**	**.4051**	.1188	.1054	.1746	**.6307**	.0165	-.1348
	US	.1701	-.1137	-.1431	**-1.1705**	**-.5174**	**-.3991**	.9669	.1291
AES9	QS	**.8557**	**.7498**	**.6617**	**.6186**	**.5721**	**.4162**	**.6652**	**.7011**
	MS	**.8186**	**1.2376**	**1.3107**	**1.2947**	**1.4478**	**1.3505**	**.5477**	**.6394**
	US	.0116	**.5871**	**.3231**	.3614	**1.4352**	**.6466**	.0443	**.4252**
AES10	QS	**.8139**	**.6880**	**.6468**	**.6331**	**.6072**	**.3043**	**.5664**	**.6758**
	MS	**.7925**	**1.3756**	**1.3540**	**1.3610**	**1.4756**	**1.3386**	**.5261**	**.6843**
	US	**-.6275**	**.4646**	**.7692**	**1.5418**	**1.3032**	**.1649**	.6255	**.2320**
AES11	QS	**.7982**	**.6600**	**.7451**	**.6315**	**.5074**	**.4953**	**.5742**	**.6353**
	MS	**1.3336**	**1.7625**	**1.6647**	**1.4415**	**1.2299**	**1.6604**	**.5254**	**.7611**
	US	**.9899**	**.7680**	**1.1258**	.6454	**1.8470**	**-.0824**	.3666	**.2974**
$\sum\mu\overline{AES}$		1.9882	1.6053	2.0697	1.7084	1.9062	1.7339	2.4724	2.3523
		1.8707	2.4099	2.3832	2.2650	2.3356	2.7275	1.8603	1.6996
		.8233	1.1791	1.7189	.9763	1.1153	.3018	1.4273	.8225

Notes: Bold denotes significance at the .05 level for the direct parameter estimate. All estimated parameters associated with the MILLS variable were statistically significant.

impact on expenditures at quick-serve establishments, reflecting the higher expenditure that would correspond with a larger number of members taking part in the activity. The McCracken and Brandt (1987) household size elasticity measurement is equivalent to the 1982 measure for this study. Since that time, quick-serve expenditures have appeared to become slightly more sensitive to the size of the household. Most household members seem to contribute significantly to quick-serve expenditures, especially young males (Table 5). Lesser contributions were observed for males over 50 and the elderly. These results indicate that the presence of children is an important determinant of quick-serve expenditures.

Household size also out-paced relative income effects for mid-scale facilities in the determination of expenditures. Elasticity magnitudes were similar to those val-

ues estimated for quick-serve facilities; however, young males and females did not significantly contribute to household expenditures. Adults were largely responsible for contributions to mid-scale expenditures.

For the most part, household size had little effect on expenditures at up-scale facilities. Since household size was of little practical importance in determining expenditures for this category, then the specific effects were harder to envision from the coefficients associated with the adult equivalence measures; however, the weight of the evidence pointed to the fact that children did not play a significant role in up-scale expenditures.

Regional and Urbanization Effects

Midwestern households consistently spend less at each facility type as compared to Northeastern households. In 1989, the average Midwestern household spent $.68 less at quick-serve facilities; $1.50 less at mid-scale facilities; and $2.66 less at up-scale facilities for a biweekly period. In general, Western households spent more at quick-serve and mid-scale facilities and less at up-scale facilities compared to Northeastern residents. Midwestern, Western, and Southern households had increasingly lower expenditures for up-scale dining than Northeastern households over the study period. Urbanization exhibited a positive relationship with expenditures at all food facility types in general.

Ethnic Effects

Expenditure differences between white and black households were not consistently different for any of the food facilities, in general. Other races did exhibit a tendency to have higher expenditures at mid-scale facilities than whites. Hispanics had higher expenditures at quick-serve facilities than whites. This higher expenditures for Hispanics is correlated by the fact that facilities with Mexican menus have had the highest growth rate of all quick-serve facilities (Food Institute, 1993).

Education, Gender, and Marital Status Effects

Household heads with at least some college education had lower expenditures levels for quick-serve facilities, which may indicate a preference for higher-quality or healthfulness attributes. Unmarried households generally spent less than married households, regardless of facility type, which is probably a reflection of the fewer number of people involved in the FAFH occasion.

Seasonality, Time of Week, and Frequency Effects

Seasonality was not an important determinant for up-scale expenditures. Quick-serve and mid-scale expenditures were higher for the June through August period (Q3) compared to the December through January expenditures. This increase may result from increased activities and vacations that are traditionally associated with the summer period.

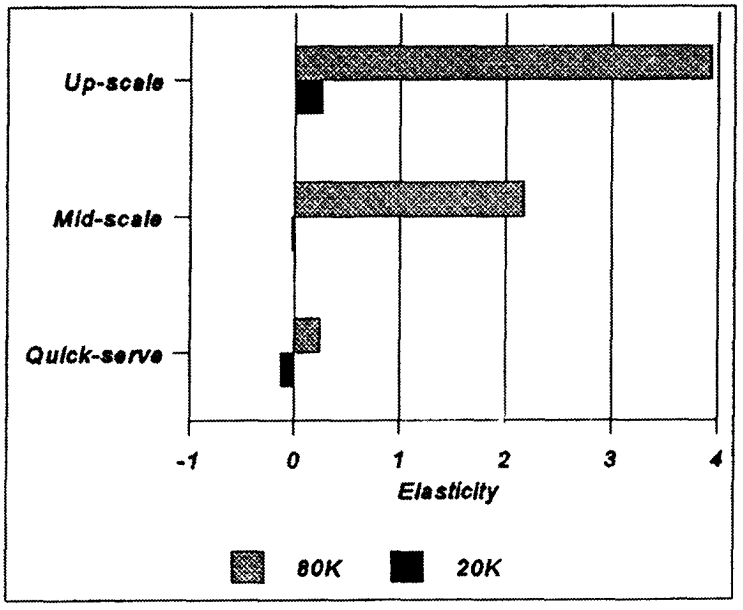


Figure 1. Biweekly Income Participation Elasticities for High vs. Low Income Households by Food Facility

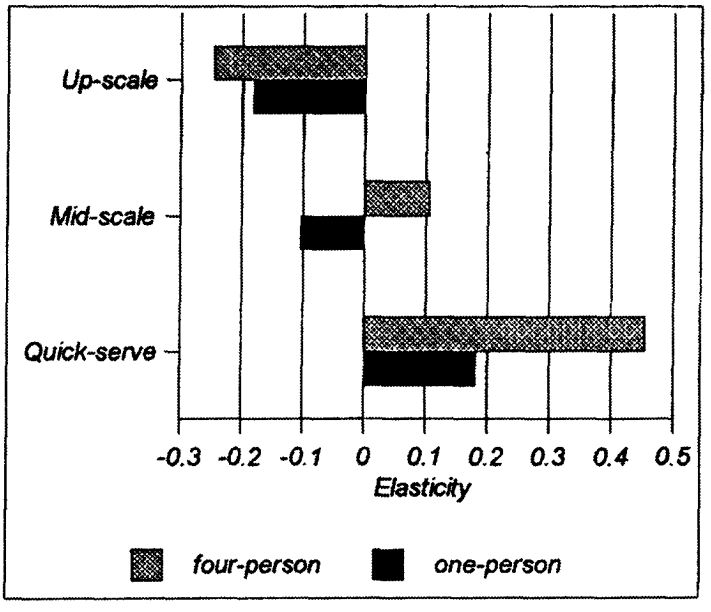


Figure 2. Biweekly Household Size Participation Elasticities for Four- vs. One-person Households by Food Facility

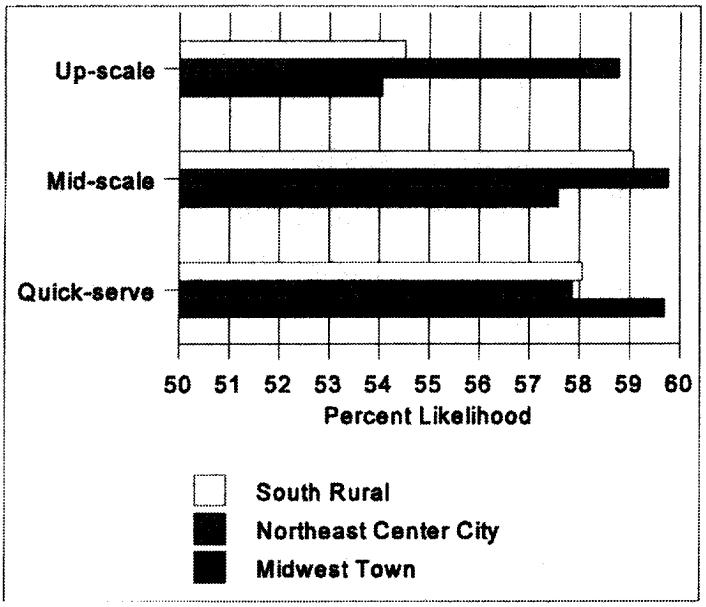
Weekend consumption resulted in higher FAFH expenditures at all facilities. Interestingly, the importance of weekend consumption for quick-serve facilities increased during the study period, but the importance did not change substantially for the other facilities. The reason for this phenomena is probably based on the number of respective visits. Single-visit expenditures are expected to be higher for up-scale facilities, but households visit lower-cost facilities more often. Coefficients associated with the OFAF variable account for the impacts of household visit frequency on expenditures. Households with a higher-visit frequency are assumed to expend more than single-visit households. Consequently, the parameter with OFAF associated reflects the cost of an additional visit by food facility. The average cost for an additional visit in 1989 was $3.96 for quick-serve; $5.89 for mid-scale; and $15.68 for up-scale facilities.

Extension of Results for Given Scenarios

The elasticities and marginal effects provided in Tables 2 through 4 are calculated at the sample means. This section extends the information for different scenarios of income, household size, region, and population density. Income participation elasticities by facility were calculated for households with $20,000 (low) income and households with $80,000 (high) income. High income households have a higher likelihood of participation for all three facility types (Figure 1). In fact, income participation elasticities for low income households are near zero, while high income participation elasticities increase from 0.24 for quick-serve to 3.93 for up-scale dining. During economic change, restaurant marketers will notice considerably more change in high income participation behavior than for low income households.

Household size participation elasticities were calculated for one-person households versus four-person households. Larger households are more likely to frequent quick-serve and mid-scale facilities than single-person households (Figure 2). A greater number of people in the household increases the likelihood that at least one person will consume away from home; however, the household is less likely to visit the costlier up-scale facilities.

A third scenario for comparison was developed using a combination of region and population density. South Rural refers to households located in the southern region in metropolitan statistical areas (MSAs) with populations less than 500,000 people. Northeast Center City refers to households in the northeastern region living in MSAs with populations exceeding 2.5 million people. Finally, Midwest Town refers to Midwestern households in MSAs with populations between 500,000 and 1 million. These combinations are for comparison purposes and are not intended to be inclusive of all potential combinations. Midwest Town households have the highest likelihood for quick-serve participation (Figure 3), while Northeast Center City and Midwest Town households have a higher likelihood of mid-scale participation. The most dramatic difference can be found for up-scale



Notes: [a] Midwest Town, where MW = 1 and MS2 = 1; others equal 0.
[b] Northeast Center City, where MS4 = 1; others equal 0.
[c] South Rural, where SO = 1; others equal 0.

Figure 3. Biweekly Participation Likelihood Scenarios for Midwest Town,[a] Northeast Center City,[b] and South Rural Households by Food Facility

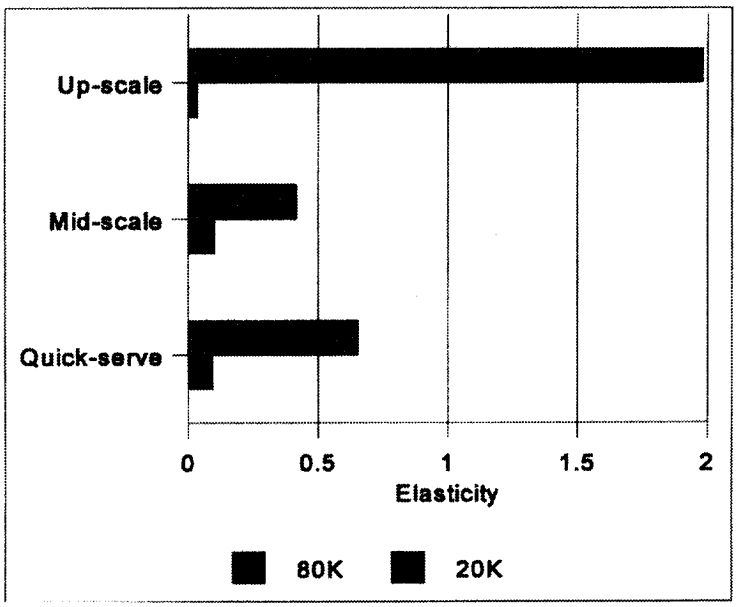
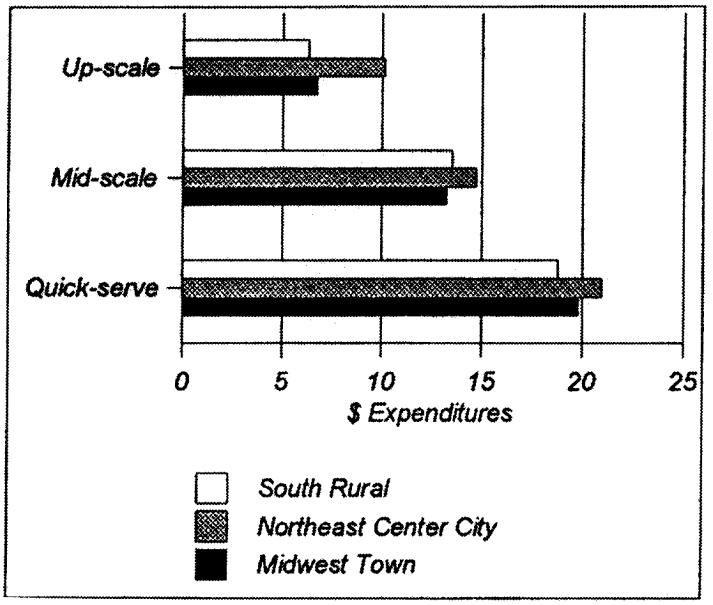


Figure 4. Biweekly Income Expenditure Elasticities for High vs. Low Income Households by Food Facility



Notes: [a] Midwest Town, where MW = 1 and MS2 = 1; others equal 0.
[b] Northeast Center City, where MS4 = 1; others equal 0.
[c] South Rural, where SO = 1; others equal 0.

Figure 5. Biweekly Expenditure for Midwest Town,[a] Northeast Center City,[b] and South Rural Households by Food Facility

participation, where Northeast Center City households are more likely to participate than the others. Certainly, this information can be useful when considering location planning of new restaurants. The results do not indicate if these probabilities are a result of preferences or availability.

Income expenditure elasticities were also higher for high income households (figure 4). The magnitude and difference is especially evident for up-scale dining. Coupled with the participation findings, these results suggest that low income households are fairly rigid in expenditure and participation levels for FAFH dining. Changes in income for these households would have little effect on their FAFH behavior patterns as compared to those patterns of high income households.

For each facility type, Northeast Center City households spend more, especially in the up-scale dining category. Since this region did not demonstrate a higher likelihood in each situation, this result most likely represents price differences between regions and population densities as well.

CONCLUSION

A three-step estimation systems approach was employed for the analysis of FAFH expenditures by food facility. Use of the censoring latent variable, inverse of

Mill's ratio, proved to be an important element for estimation of facility participation and expenditures. Direct estimation without the MILLS variable would have resulted in biased estimates for the majority of coefficient estimates. Probabilities of consuming and non-consuming FAFH households can be determined from the results of the first two estimation stages, while effects of exogenous variables for expenditures by facility may be gleaned from the final estimation stage.

Income played a significant role in determination of both likelihood and expenditures of FAFH dining. Household size was a major determinant of participation likelihood by facility, with positive effects on quick-serve probabilities and negative effects on the costlier food facility probabilities. Household size elasticities for facility expenditures were positive for all three types of facilities, but they were less important for up-scale expenditures. Labor participation of the household manager was positively correlated to quick-serve participation; however, hours worked by the household manager had a decreasing effect on full service establishment participation rates. The timing requirements of the different types of dining activities were assumed to be the motivation for these influences. Evidence did suggest that mid-scale dining and up-scale dining were not necessarily time-saving activities for the household manager.

FAFH participation likelihoods by facility also were affected by regional and urbanization differences, due to possible variations in facility availability and associated tastes and preferences. Significant seasonal differences were also noted for both quick-serve and mid-scale facilities, where expenditures for these facilities were highest during the summer months. Empirical results implied that children play a rather important role in quick-serve expenditures for the household, but children play a lesser role for full service facilities. The education level of the household head and the gender and marital status of the food manager have varying degrees of influence on participation likelihoods and expenditures by facility.

Certainly, evaluating FAFH participation and consumption is a complex procedure. Marketers and analysts must consider an extensive combination of factors in order to understand household behavior patterns. The NPD data set is large and detailed, but it still leaves some gaps in our understanding. Additional research that would include information on prices and quality differences within categories would enhance our knowledge for household behavior with regard to FAFH.

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NOTE

1. The model is nonlinear in parameters because the set of parameters corresponding to AES, μ_i, is simultaneously estimated with the α parameters. Males between the ages of 34 and 49 (AES4)

are restricted to a value of 1 adult equivalence (or μ_4 is equal to 1), with the relative expenditure contribution of all other household member types being determined by the corresponding estimated coefficient in comparison to the base male. The participation decisions were estimated with the SHAZAM econometrics package, which also provides estimates of the inverse of Mill's ratio values. The SAS statistical package was used for empirical estimation of the expenditure equation using the PROC MODEL procedure.

The inverse of Mill's ratio values are dependent on the results of the participation decision. With the exception of household manager labor participation, all of these variables are used in the expenditure decision. Consequently, the determination of marginal effects for these variables must take into account their impact on the inverse of Mill's ratio, which accounts for the probability of visiting the respective food facility type. Failure to do this would lead to biased estimates for the marginal effects (Saha, Capps, and Byrne, 1997). For this analysis, the marginal effects and elasticities are calculated using the procedure described by Saha et al. (1997). Details of these calculations are available from the authors upon request.

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