Working Paper Series

FSWP2005-02

Determinants of Fast Food Consumption

Jasper Fanning
Kansas State University

Thomas Marsh
Washington State University

Kyle Stiegert
University of Wisconsin-Madison.

Socioeconomic determinants are investigated for both the likelihood of consuming fastfood and household expenditure on fastfood using the 1994-98 USDA Continuing Survey of Food Intakes by Individuals. The logit model is used to estimate an empirical relationship between probability an individual will consume fastfood and socioeconomic variables. The Tobit model is used to estimate an empirical relationship between expenditure on fastfood and socioeconomic variables. Significant socioeconomic variables impacting the likelihood of consuming fastfood and household expenditure on fastfood included age, income, household size, hours at work, eating occasion and education level.

WAEA Selected Paper
Long Beach, CA
July, 2002

Food System Research Group
University of Wisconsin-Madison
http://www.aae.wisc.edu/fsrg/

January 2005

This research was supported by a USDA grant to the Food System Research Group, University of Wisconsin, Madison.

FSRG *Working Papers* are published with the intention of provoking discussion and helping drive future work. The papers are not formally edited.

All views, interpretations, recommendations, and conclusions expressed are those of the author(s) and not necessarily those of the supporting or cooperating institutions.

DETERMINANTS OF FAST FOOD CONSUMPTION

by
Jasper Fanning, Thomas Marsh, and Kyle Stiegert

INTRODUCTION

Food away from home is a large and growing component of U.S. food expenditure. Eating and drinking purchases have dominated food away from home expenditures over the last three decades (Putnam and Allshouse). As a share of disposable personal income, food away from home expenditure has risen from 3.6% in 1970 to 4.1% in 1997, while food at home has decreased from 10.2% in 1970 to 6.6% in 1997 (Putnam and Allshouse). Given this change in food consumption, there is a considerable need to identify the determinants of fast food consumption and the implications of these changes for the fast food industry.

Jekanowski, Binkley, and Eales examined the effect of price, income, and demographic characteristics on fast food. They suggest that growth in the fast food consumption was related to an increasing supply of convenience, their research utilized aggregated fast food measures at the Metropolitan Statistical Area level, using a composite price index for fast food price. It seems consumers would not increase consumption of fast food unless they had incentive to do so, in other words fast food must be relatively cheap with respect to price, time, and/or taste.

Ekelund and Watson also found that fastfood consumption was empirically related to opportunity costs of the household. They argue that preparing ethnic foods has a relatively high time cost and that the effect of this cost is shown in the decreasing proportion of ethnic to total fastfood sales.

McCracken and Brandt identified household income, time value, size, and composition as important determinants of total household expenditures on food a way from home. They found

that the importance of these factors varied between conventional restaurants, fastfood facilities, and other commercial establishments. Decomposition of Tobit elasticities indicated the importance of household size, income, and time value on market participation.

The main objective of our paper is to identify and quantify the relationship between an individual's socioeconomic characteristics and their decision to consume fast food and their household expenditure decision. The paper proceeds in the following manner. First, data are discussed. Second, empirical issues are addressed. Third, results are presented and interpreted. Finally, conclusions are provided.

DATA

The data set used is the 1994-98 USDA Continuing Survey of Food Intakes by Individuals. The USDA survey is designed to gather data on food intake by individuals to assess nutritional intake and pesticide residue exposure from food consumption. The data set also contains demographic characteristics of survey respondents as well as the source of the food item. Possible sources included fast food restaurants, which were separable from other food away from home. Thus, observations of food consumption included socioeconomic or demographic variables and whether or not the food item was purchased from a fast food restaurant. These data are adequate for estimating the probability of individuals consuming fast food.

Individual expenditure data were not included in the USDA individual consumption survey. However, household expenditure on fast food was elicited in the household survey. Hence, individual and household surveys were linked by identification number allowing demographic variables of the head of household to be applied to the corresponding household. Household survey participants were allowed to enter household fastfood expenditure estimates

by week or month. The survey fastfood expenditure responses were converted to annual expenditure estimates for the purposes of this study.

Table 1 provides descriptive statistics on selected variables from the individual and household data as well as a description of each variable. There were 217,939 individual consumption observations. The data indicated that the average individual was 22 years of age and worked about 10 hours per week. Observations of age ranged from individuals less than 1 year of age to 90 years of age. Individuals in the survey indicated they spent as much as 140 hours at work. The largest segment of individuals were college educated and lived in suburban areas. When head of household demographics were projected onto the household there were only 7992 household surveys with a corresponding head of household individual survey. The average age of the head of household was 51 years of age. The average household income was $40,123 in the data set. Only 1.7% of food consumption decisions in the data were related to fastfood consumption. Furthermore, only 57% of food consumption was for main meals, breakfast, brunch, lunch, dinner, or supper, leaving 43% of food consumption that was non-meal associated. Food consumption was evenly spread throughout the day as dinner or supper comprised of 21% of eating occasions, while breakfast and brunch or lunch were both 18% of eating occasions.

EMPIRICAL ISSUES

Consider a relationship between fastfood, *Y*, and a matrix of socio-demographic factors and income, *X*. Formulating a linear regression model yields

$$Y = X\beta + e$$

where *e* represents unknown error terms and β are parameters to be estimated. Given the censored survey data for fastfood, two limited dependent variable models were estimated.

A logit model is specified to identify the relationship between sociodemographic variables and an individual's likelihood of purchasing fast food. The probability of purchasing fast food or "Participation Decision" is modeled by

(1) $P(y_i > 0) = e^{BX_i}/(1+e^{BX_i})$,

where household variables include the number of individuals in the household, the geographical region the household is located within, whether the household is located in an urban or rural area, and household income. Individual Demographics include age, typical number of hours spent working per week, typical number of hours spent watching television per day, sex, race or ethnic origin, and the highest education level achieved. Other variables not really household or individual related include the month and day of the week the food item was consumed, the name of the meal (i.e. breakfast, lunch, etc.), and whether or not the food item was purchased at a fast food restaurant or not.

The "Expenditure Decision" is modeled at the household level with household expenditure as a function of sociodemographic variables. For the Tobit regression model (Tobin 1958), household fast food expenditure is modeled as

(2) $E(y_i) = \Phi(\beta X_i/\sigma)[\beta X_i + \phi(\beta X_i/\sigma)/\Phi(\beta X_i/\sigma)]$,

where $\phi(\cdot)$ and $\Phi(\cdot)$ represent the normal probability density and cumulative distribution functions. Head of Household variables include sex, age, hours typically spent at work, and race or ethnic origin. Household variables include number of individuals living in the household, household income, geographical region, and whether the household is in an urban or rural area.

To complete the model specification of the independent variables the multivariate polynomial functional form was assumed. Based on the literature review and preliminary investigations of the data, a set of explanatory variables were chosen and it was hypothesized that a second order multivariate polynomial maintained sufficient flexibility to capture responses from the explanatory variables. First and second order interaction terms were included to test for significance of the relative influence of each variable on one another. The model specification the structure of $\mathbf{X}\beta$ is defined as:

$$(3) \quad X\beta = \beta_0 + \sum_{i}^{z} \beta_{1i} X_i + \sum_{i,j=1,i>j}^{k} (\alpha_{1ij} X_i X_j) + \sum_{i,j=1,i>j}^{k} (\alpha_{2ij} X_i^2 X_j) + \sum_{i,j=1,i>j}^{k} (\alpha_{3ij} X_i X_j^2) + \sum_{i,j+1,i>j}^{k} (\alpha_{4ij} X_i^2 X_j^2) + \sum_{i}^{z} \beta_{2i} X_i^2$$

where continuous variables (e.g., age, income, hours at work; n=k) enter into the linear, interaction, and quadratic terms of the regression equation. Discrete variables (e.g., region, urban, gender, race, origin, or urban; n=z) enter into the linear terms of the regression equation, but not in the interaction or quadratic terms, with the exception of education variables which interact with age.

RESULTS

Results are reported for both the participation and expenditure models. The participation model attempts to identify the factors that influence the decision of individuals to consume or not consume fast food for a given meal. The expenditure model establishes an empirical relationship between household expenditure and factors determining amount of expenditure. The intercept term in each model represents the representative individual, when continuous variables are equal

to zero. The representative individual is a white male, from the Midwest, with no education, in the Tobit model the representative individual is the head of household.

Participation Decision

Factors that may influence the decision of individuals to consume fast food or not consume fast food for a given meal are many. They include age, education level, sex, hours at work per week, the meal of the day the decision is being made for, income, time spent watching television, whether the individual or their family owns or rents their home, the region of the U.S. in which the person lives, the size of household the individual is from, the time of year, and possibly numerous interactions between these factors. Impacts of the socioeconomic variables on the probability an individual will consume fast food are reported in Table 2, with selected variables discussed in more detail below. The logit model estimated was statistically significant with a Likelihood Ratio Test Probability <.0001.

Figure 1 illustrates the relationship between the probability of purchasing fastfood, age of the individual, and household income. The probability of purchasing fastfood increases to about 30 years of age and then decreases until about age 50. Individuals are most likely to consume fastfood when household income levels are above $66,667. In general, age (0-50 years) and income both have a nonlinear effect on the probability of purchasing fastfood. The interaction between age and income appears to be that the closer the individual is to 30 years of age the more nonlinear the effect of income is. For instance at 10 and 50 years of age income has little effect, but at ages 20, 30, and 40 income has a clear quadratic effect.

The effects of household size and age of the individual on the probability of consuming fastfood are presented in Figure 2. Household size positively influences the probability of consuming fastfood, increasing up to a household size of 7 and decreasing thereafter. Age

exhibits effects similar to those in Figure 1. Individuals from household sizes above 12 and over 50 years of age are far less likely to consume fastfood. There exists a quadratic effect over the range of household sizes with a household size of about 8 having the highest probability of purchasing fastfood. The quadratic effect of household size seems to interact with age as did income in figure 1.

Figure 3 illustrates the effects of household size and household income on an individual's probability of consuming fastfood. The interaction is relatively apparent, as household size increases peak probabilities tend to occur at higher income levels. Again both income and household size exhibit a quadratic like effect that increases and then decreases across the range of observed values.

Hours spent at work and household income both display a relationship with an individual's probability of consuming fastfood (Figure 4). Individuals who work 40 hours or less per week are the most likely to consume fastfood, the linear effect of hours at work is negative, while the quadratic effect is positive. Here the predicted probability of consuming fast food increases slightly with household income. The most likely individual to consume fastfood is one who works very little to not at all, but still has a relatively high household income. Thus, nonworking spouses and dependents seem to be the most likely individuals to consume fastfood.

Some of the more interesting dummy variable coefficient estimates were associated with college, dinner, supper, and other meal (Table 2). College graduates or those currently in college are less likely than those less educated to consume fastfood. While dinner or supper comprise of the most eaten meals, they are less likely to be eaten at fastfood establishments. People may prefer to eat at nicer restaurants in the evening or these meals could be the easiest to prepare in

the home. Lunch is the most likely meal to be eaten at a fastfood restaurant, likely because of work related time constraints.

Expenditure Decision

Expenditure for fast food by the household was modeled as a function of household variables (e.g., head of household age, head sex, time spent working, race, and education level). In the Tobit model relative to the logit model, far fewer socioeconomic variables were significant (Table 3). Age of head of household and the number of hours they spend at work appear to be the most important continuous variables influencing household expenditure on fast food. Size of the household was the only household demographic variable other than region with a significant impact on expenditure. The Tobit Model estimated was statistically different from a model with only an intercept, when testing the hypothesis that all coefficients were equal to zero a Likelihood Ratio Test with $P<.0001$ resulted.

Figure 5 shows impacts of head of household age and household income on predicted household fastfood expenditure. Fastfood expenditure decreases as head of household age increases and as income decreases. The effect of head of household age is similar to the effect of age on the probability of consuming fastfood in figures 1 and 2. Income appears to have a nonlinear effect on expenditure.

The influence of head of household age and household size are illustrated in Figure 6. Fastfood expenditure increases until household size reaches about 6 and then decreases thereafter. Again, head of household age has a decreasing effect on fastfood expenditure. The largest household expenditure on fastfood is predicted for households where the head of household is less than 30 years of age with a household size of about 6. Similar to figure 2, individuals from household sizes above 12 are far less likely to expend on fastfood.

In Figure 7, predicted fastfood expenditures are provided across household size and income. Household income also has a linear effect, where the maximum predicted expenditure for household sizes below 16 occur at household income equal to $100,000. Expenditure increases as income increases. There is an intuitive interaction between household size and income with expenditure increases as both income and household size increases.

Figure 8 presents the effects of hours spent at work by the head of household and household income on predicted fastfood expenditure. Expenditure on fast food increases as income increases and head of household working hours increase. Both household income and head of household hours at work have a nonlinear effect. Predicted fastfood expenditure strictly increases with head of household hours at work throughout the range of typical working hours.

In the Tobit model age of head of household had a negative impact on fastfood expenditure while hours at work and household size had a positive effect on fastfood expenditure. In spite of data restrictions factors that significantly impact the demand for fast food were able to be identified and quantified.

Further Discussion

The ability of the Logit model to predict 89% of individual choices indicates that there is a structural decision making process, influenced greatly by variables captured by the socioeconomic variables included in this model. The high concordance rate of the logit model is largely a function of the high rate of zero observations. The logit model seems to under predict the probability of participation, while the Tobit model seems to over predict the expenditure level.

In both the Logit and Tobit models household income has a positive impact. However, the magnitude of the linear and quadratic effects is unique in each model. The age has a negative

linear effect in the Tobit model, while it has a quadratic effect in the Logit model, this is due to age being the age of the individual in the Logit model and the age of the head of household in the Tobit model, where age has a different distribution in each model. The biggest difference between the two models is that hours at work by an individual decreases the probability an individual will consume fastfood, but if that individual is the head of household it increases the household's expected expenditure on fastfood

CONCLUSION

The intent of this paper was to investigate the socioeconomic and demographic determinants of fastfood consumption. To do so, we specified both a participation and expenditure model. The participation model attempts to identify the factors that influence the decision of individuals to consume or not consume fast food for a given meal. The expenditure model establishes an empirical relationship between household expenditure and factors determining amount of expenditure.

We find that several socioeconomic and demographic variables have significant influences on an individual's probability of consuming fast food and household expenditure on fast food. Some of the more significant variables were age, income, education level, hours spent at work, and the number of household members. In general both probability of consuming and expenditure increase with income and household size, but decrease with age and education. The effects of independent variables are unique between the participation and expenditure models.

The lack of knowledge about household composition with respect to knowing the demographics of each member of the household may limit the ability to estimate household demand. Future research could include using individual consumption data along with a price index of fastfood to estimate individual expenditure patterns. The inclusion of a price index in

future research would allow the calculation of price elasticities as well. Another topic for future research would be to investigate determinants of specific products such as wheat based fastfood products. For example, most fastfood products contain bread or tortillas and thus likely affect wheat food use.

References

Blaylock, J. R. and W. N. Blisard. " U.S. Cigarette Consumption: The Case of Low-Income Women." American Journal Agricultural Economics; (August 1992):698-705.

Burton M.; Dorsett R.; Young T. "An investigation of the increasing prevalence of nonpurchase of meat by British households." Applied Economics; 15 December 2000, vol. 32, no. 15, pp.1985-1991(7)

Cragg, J. G. "Some Statistical Models for Limited Dependent Variables with Applications to the Demand for Durable Goods," Econometrica; 39:(1971)829-44.

Deaton, A.S., and J. Muellbauer. *Economics and Consumer Behavior*. Cambridge University Press, 1980.

Greene, W.H. *Econometric Analysis*. 3rd edition. 1997, Prentice-Hall, Inc. Upper Saddle River, NJ 07458

Jekanowski, M.D., J. K. Binkley, and J. Eales. "Convenience, Accessibility, and the Demand for Fast Food." Journal of Agricultural and Resource Economics; (July 2001):58-74.

Ekelund, R.B. Jr., J.K. Watson. "Restaurant Cuisine, **Fast Food** and Ethnic Edibles: An Empirical Note on Household Meal Production." Kyklos; 44(4), 1991, pages 613-27.

McCracken, V.A., J.A. Brandt. "Household Consumption of Food-Away-from-Home: Total Expenditure and by Type of Food Facility." American Journal of Agricultural Economics; 69(2), May 1987, pages 274-84.

Newman C., Henchion M., Matthews A. "Infrequency of purchase and double-hurdle models of Irish households' meat expenditure." European Review of Agricultural Economies; 1 December 2001, vol. 28, no. 4, pp. 393-420(28)

Putnam, J. J. and J. E. Allshouse. "Food Consumption, Prices, and Expenditures, 1970-97." Food and Rural Economics Division, Economic Research Service, U.S. Department of Agriculture. Statistical Bulletin No. 965, April 1999.

Tobin, J. "Estimation of Relationships for Limited Dependent Variables", Econometrica; (1958)**2**6, 24-36.

Table 1. Descriptive Statistics on Selected Individual and Household Data.

Variable	Description	N	MIN	MAX	MEAN	Std. Dev.
FASTFOOD	Dummy Variable 1= fastfood consumption	217939	0	1	0.017	0.131
FFEXP	Annual household fastfood expenditure	7992	0	7280	411.985	613.923
AGE	Age of Individual Logit Model	217939	0	90	22.698	25.083
AGE	Age head of household Tobit Model	7992	15	90	51.300	17.000
INCOME	Annual household income	217939	0	100000	40123	27473
HHSIZE	Number of individuals in household	217939	1	16	2.7	1.439
WORKHOURS	Hours of work per week	217939	0	140	10.239	18.919
TV	hours watching TV per day	217939	0	99	3.644	11.773
MIDWEST	Dummy Variable 1= Midwest Region	217939	0	1	0.240	0.427
NORTHEAST	Dummy Variable 1= Northeast Region	217939	0	1	0.186	0.389
SOUTH	Dummy Variable 1= South Region	217939	0	1	0.325	0.468
WEST	Dummy Variable 1= West Region	217939	0	1	0.249	0.433
MALE	Dummy Variable 1= Male	217939	0	1	0.508	0.500
FEMALE	Dummy Variable 1= Female	217939	0	1	0.492	0.500
DIET	Dummy Variable 1= Dieting	217939	0	1	0.086	0.280
WHITE	Dummy Variable 1= Caucasian	217939	0	1	0.762	0.426
BLACK	Dummy Variable 1= Black	217939	0	1	0.118	0.322
ASIAN	Dummy Variable 1= Asian	217939	0	1	0.028	0.166
NATIVE	Dummy Variable 1= Native American	217939	0	1	0.008	0.091
Mexican	Dummy Variable 1= Mexican	217939	0	1	0.068	0.252
PRTORICO	Dummy Variable 1= Puerto Rican	217939	0	1	0.013	0.112
CUBAN	Dummy Variable 1= Cuban	217939	0	1	0.002	0.050
ORACE	Dummy Variable 1= Other Race	217939	0	1	0.084	0.277
OWNHOUSE	Dummy Variable 1= Own House	217939	0	1	0.646	0.478
RENTHOUSE	Dummy Variable 1= Rent House	217939	0	1	0.329	0.470
CITY	Dummy Variable 1= Metropolitan Area	217939	0	1	0.296	0.457
SUBURBAN	Dummy Variable 1= Suburban Area	217939	0	1	0.482	0.500
RURAL	Dummy Variable 1= Rural Area	217939	0	1	0.222	0.415
PREGNANT	Dummy Variable 1= Pregnant	217939	0	1	0.003	0.057
NOSCHOOL	Dummy Variable 1= No Schooling	217939	0	1	0.002	0.042
ELEMENTARY	Dummy Variable 1= Elementary Education	217939	0	1	0.039	0.193
HIGHSCHOOL	Dummy Variable 1= High School Education	217939	0	1	0.199	0.399
COLLEGE	Dummy Variable 1= College Education	217939	0	1	0.330	0.470
JAN	Dummy Variable 1= January	217939	0	1	0.049	0.217
FEB	Dummy Variable 1= February	217939	0	1	0.092	0.289
MAR	Dummy Variable 1= March	217939	0	1	0.075	0.264
APR	Dummy Variable 1= April	217939	0	1	0.062	0.242
MAY	Dummy Variable 1= May	217939	0	1	0.099	0.299
JUN	Dummy Variable 1= June	217939	0	1	0.087	0.282
JUL	Dummy Variable 1= July	217939	0	1	0.090	0.287
AUG	Dummy Variable 1= August	217939	0	1	0.108	0.310
SEP	Dummy Variable 1= September	217939	0	1	0.083	0.276
OCT	Dummy Variable 1= October	217939	0	1	0.102	0.303
NOV	Dummy Variable 1= November	217939	0	1	0.096	0.294
DEC	Dummy Variable 1= December	217939	0	1	0.033	0.180
SUN	Dummy Variable 1= Sunday	217939	0	1	0.178	0.382
MON	Dummy Variable 1= Monday	217939	0	1	0.178	0.382
TUE	Dummy Variable 1= Tuesday	217939	0	1	0.178	0.382

Table 1(cont.)

WED	Dummy Variable 1= Wednesday	217939	0	1	0.178	0.382
THR	Dummy Variable 1= Thursday	217939	0	1	0.178	0.382
FRI	Dummy Variable 1= Friday	217939	0	1	0.178	0.382
SAT	Dummy Variable 1= Saturday	217939	0	1	0.178	0.382
BREAKFAST	Dummy Variable 1= Breakfast	217939	0	1	0.184	0.387
BRUNCH	Dummy Variable 1= Brunch	217939	0	1	0.007	0.082
LUNCH	Dummy Variable 1= Lunch	217939	0	1	0.174	0.379
DINNER	Dummy Variable 1= Dinner	217939	0	1	0.129	0.336
SUPPER	Dummy Variable 1= Supper	217939	0	1	0.080	0.271
OTHMEAL	Dummy Variable 1= Other Meal	217939	0	1	0.426	0.495

Table 2. Logit Parameter Estimates.

Parameter	Estimate	Std. Error	Chi-Square	P>Chi-Square
Intercept	-5.8279	0.3128	347.1347	<.0001
HHSIZE	0.5370	0.1143	22.0826	<.0001
HHSIZE^2	-0.0421	0.0107	15.5957	<.0001
INCOME	0.000012	0.000016	0.5695	0.4505
INCOME^2	-1.00E-010	1.69E-010	0.3526	0.5527
AGE	0.3274	0.0152	466.0485	<.0001
AGE^2	-0.00732	0.000414	312.3290	<.0001
WORKHOURS	0.00325	0.00802	0.1639	0.6856
WORKHOURS^2	-0.00065	0.000173	13.9657	0.0002
TV	0.0747	0.0260	8.2655	0.0040
TV^2	-0.0306	0.00393	60.5878	<.0001
AGE*INCOME	8.327E-007	6.863E-007	1.4719	0.2251
AGE^2*INCOME	-1.52E-009	1.602E-008	0.0090	0.9245
INCOME^2*AGE	-1.79E-011	6.52E-012	7.5597	0.0060
AGE^2*INCOME^2	2.89E-013	1.43E-013	4.1076	0.0427
HHSIZE*INCOME	-0.00002	5.902E-006	9.1387	0.0025
HHSIZE^2*INCOME	1.604E-006	5.415E-007	8.7700	0.0031
HHSIZE*INCOME^2	1.61E-010	6.36E-011	6.4016	0.0114
HHSIZE^2*INCOME^2	-1.53E-011	5.99E-012	6.5277	0.0106
AGE*ELEMENTARY	-0.0833	0.0211	15.5677	<.0001
AGE*HIGHSCHOOL	-0.00633	0.00764	0.6869	0.4072
AGE*COLLEGE	0.1792	0.0159	127.5576	<.0001
NORTHEAST	-0.1738	0.0619	7.8872	0.0050
SOUTH	0.2861	0.0488	34.3790	<.0001
WEST	0.0340	0.0565	0.3616	0.5476
DIET	-0.2481	0.1094	5.1439	0.0233
BLACK	0.3857	0.0527	53.6029	<.0001
ASIAN	-0.2728	0.1209	5.0952	0.0240
NATIVE	1.0697	0.1291	68.7109	<.0001
ORACE	0.0423	0.0756	0.3135	0.5756
HISPANIC	0.0145	0.0652	0.0496	0.8237
PRTORICO	-0.1162	0.1686	0.4744	0.4910
CUBAN	-2.0877	1.0078	4.2913	0.0383
FEMALE	-0.0726	0.0360	4.0679	0.0437
PREGNANT	-1.1628	0.4682	6.1675	0.0130
ELEMENTARY	0.6035	0.4026	2.2467	0.1339
HIGHSCHOOL	-1.0134	0.1808	31.4028	<.0001
COLLEGE	-7.8141	0.4615	286.6788	<.0001
FEB	0.1745	0.0800	4.7539	0.0292
MAR	0.0731	0.0836	0.7642	0.3820
APR	0.0865	0.0914	0.8953	0.3441

MAY	0.1940	0.0782	6.1577	0.0131
JUN	-0.9439	0.1038	82.6915	<.0001
JUL	-2.0105	0.1505	178.4415	<.0001
AUG	-1.4121	0.1129	156.4119	<.0001
SEP	0.0637	0.0829	0.5910	0.4421
OCT	0.3697	0.0757	23.8676	<.0001
NOV	0.2450	0.0790	9.6200	0.0019
DEC	0.3011	0.0989	9.2609	0.0023
MON	-0.4804	0.0534	80.8377	<.0001
RENTHOUSE	-0.0730	0.0435	2.8074	0.0938
BRUNCH	0.5596	0.1744	10.2960	0.0013
LUNCH	1.4704	0.0470	979.0345	<.0001
DINNER	-2.4576	0.1569	245.3759	<.0001
SUPPER	-2.3919	0.1944	151.3110	<.0001
OTHMEAL	-0.8412	0.0587	205.5406	<.0001
Goodness of Fit Test		DF	Chi Square	P>Chi Square
Likelihood Ratio Test		55	11703.4089	<.0001

Table 3. Tobit Parameter Estimates.

Variable	Estimate	Standard Error	Chi Square	P>Chi Square
Intercept	503.1301	355.4991	2.0030	0.157
HHSIZE	184.8623	60.2306	9.4202	0.0021
HHSIZSQUARE	-23.9279	8.2624	8.3868	0.0038
INCOME	-0.003889	0.012240	0.1010	0.7506
INCSQUARE	6.43E-009	1.34E-007	0.0023	0.9616
AGE	-24.3252	9.9167	6.0170	0.0142
AGESQUARE	0.02604	0.081180	0.1029	0.7484
WORKHOURS	2.76570	1.15934	5.6910	0.0171
WKHRSQUARE	-0.01227	0.017390	0.4977	0.4805
AGEINCOME	0.0004	0.0005	0.6262	0.4287
AGESQINC	-0.00000	0.000005	0.2759	0.5994
INCSQAGE	-5.984E-010	5.230E-009	0.0131	0.9089
AGESQINCSQ	-1.591E-011	5.183E-011	0.0942	0.7589
SZINC	1.50E-003	3.17E-003	0.2246	0.6355
SZSQINC	1.06E-004	4.28E-004	0.0613	0.8044
SZINCSQ	-0.00000	3.073E-008	0.0585	0.8088
SZSQINCSQ	1.376E-010	4.077E-009	0.0011	0.9731
AGEELEM	9.97E+000	5.45E+000	3.3503	0.0672
AGEHS	6.18E+000	5.16E+000	1.4314	0.2315
AGECLG	7.6943	5.2059	2.1845	0.1394
NORTHEAST	14.05176	29.15784	0.2322	0.6299
SOUTH	100.9528	24.2512	17.3289	<.0001
WEST	9.1782	29.0168	0.1001	0.7518
DIET	8.5765	21.2625	0.1627	0.6867
BLACK	103.33095	31.0371	11.0841	0.0009
ASIAN	-157.3586	65.7690	5.7245	0.0167
NATIVE	-2.8175	119.0946	0.0006	0.9811
ORACE	92.2745	54.9082	2.8242	0.0929
Mexican	-48.3296	57.4321	0.7081	0.4001
PRTORICO	-124.8463	104.7208	1.4213	0.2332
CUBAN	-207.0431	181.9093	1.2954	0.2551
FEMALE	-4.75679	19.54039	0.0593	0.8077
PREGNANT	-89.7983	68.4959	1.7187	0.1899
ELEMENTARY	-426.1636	302.8865	1.9797	0.1594
HIGHSCHOOL	-169.2142	280.0215	0.3652	0.5457
COLLEGE	-268.0824	281.2552	0.9085	0.3405
RENTHOUSE	41.0158	24.4210	2.8208	0.093
Scale	764.3810	7.9174		
Goodness of Fit Test		DF	Chi Square	P>Chi Square
Likelihood Ratio Test		36	912.65	<.0001

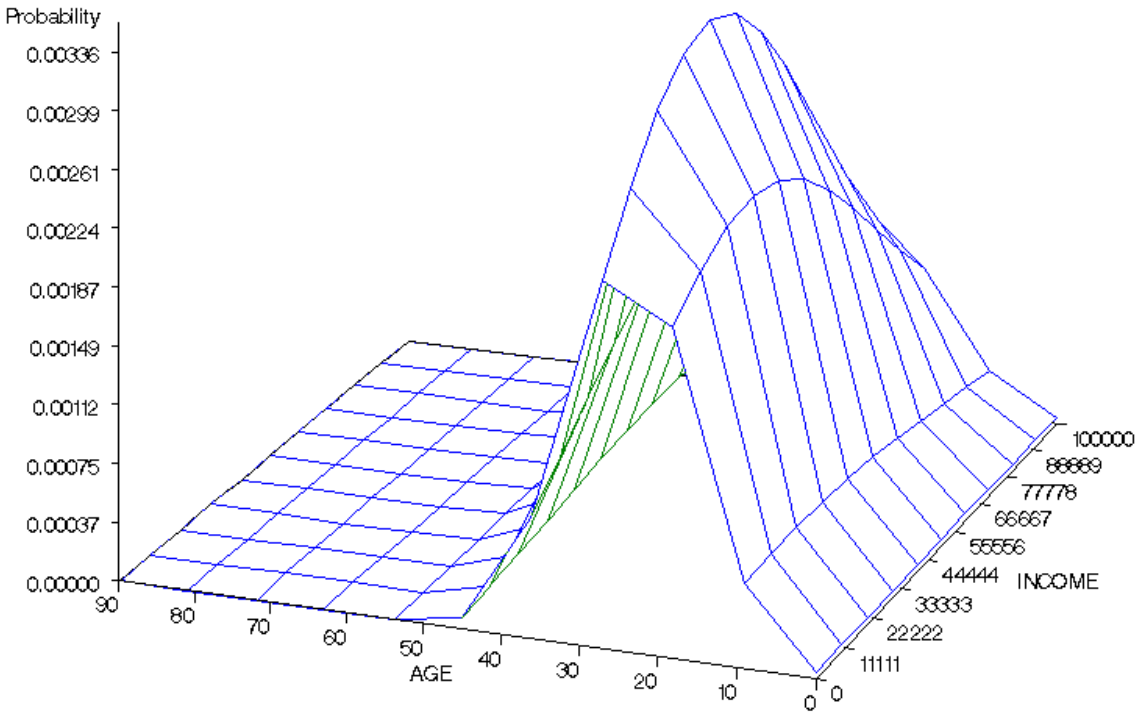

Figure 1. Probability of an individual consuming fastfood plotted against age and household income.

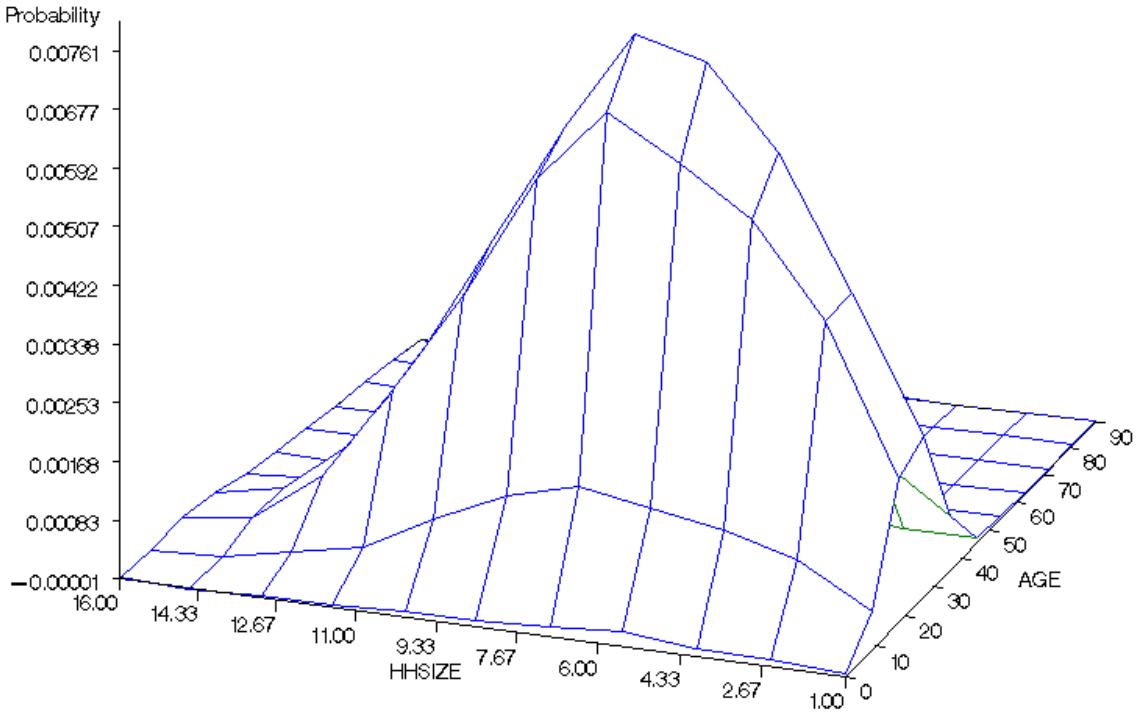

Figure 2. Probability of an individual consuming fastfood plotted against household size and age.

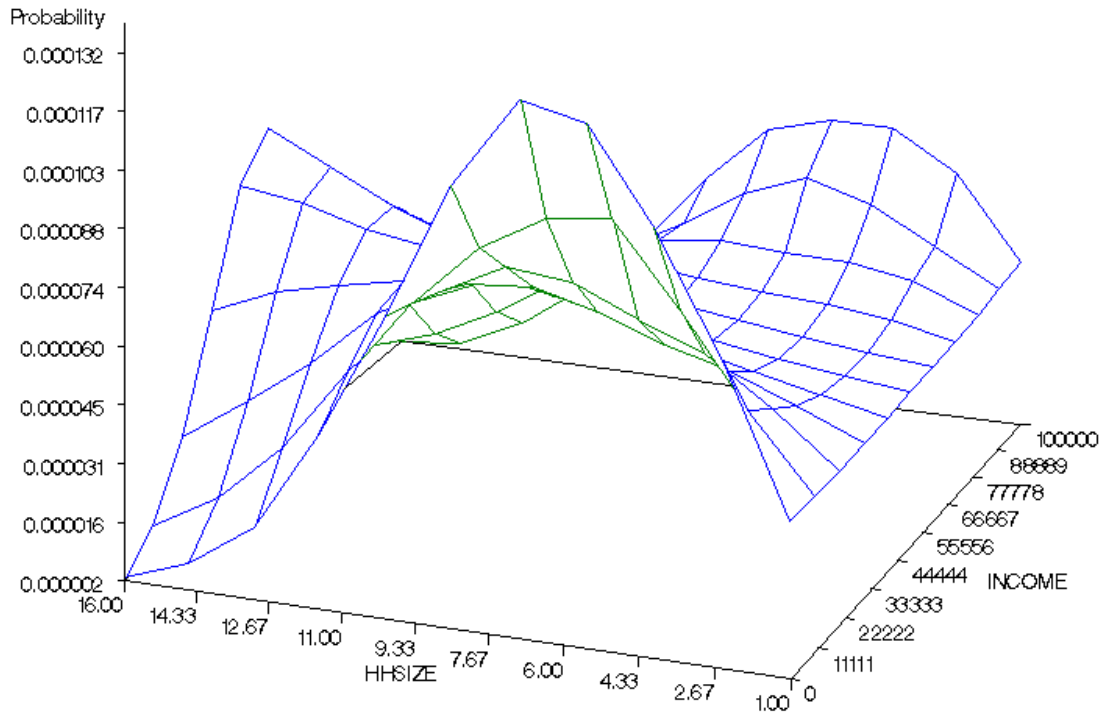

Figure 3. Probability of an individual consuming fastfood plotted against household size and income.

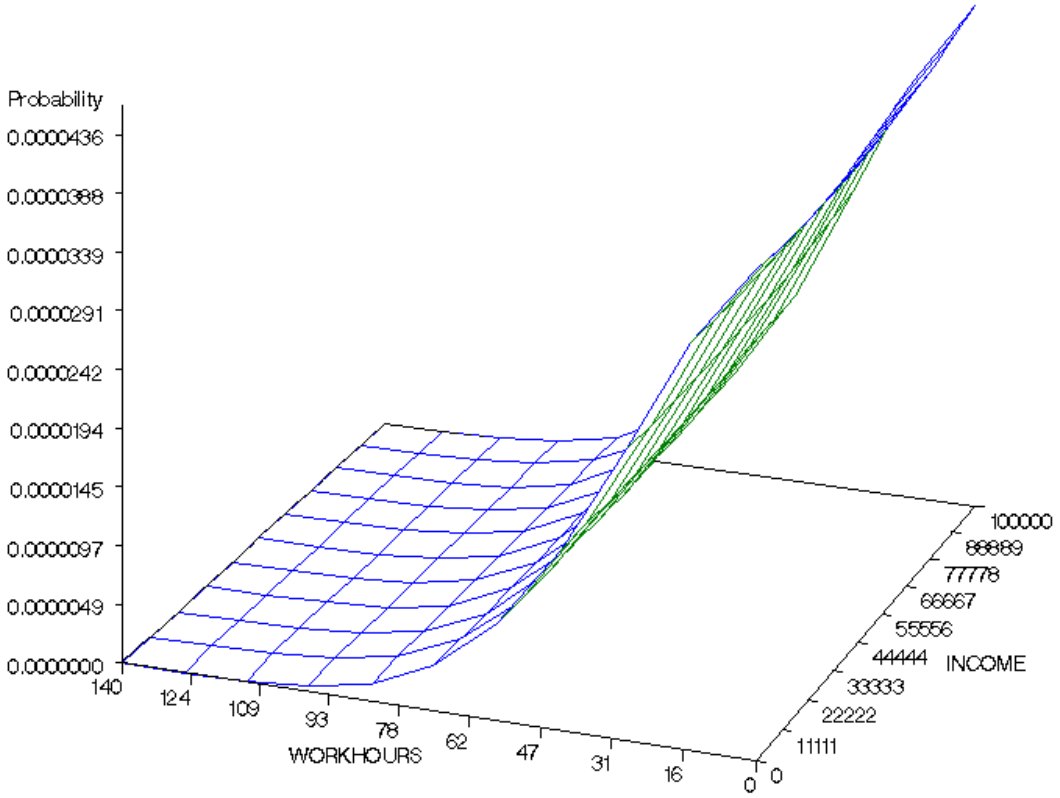

Figure 4. Probability of an individual consuming fastfood plotted against hours spent at work per week and income.

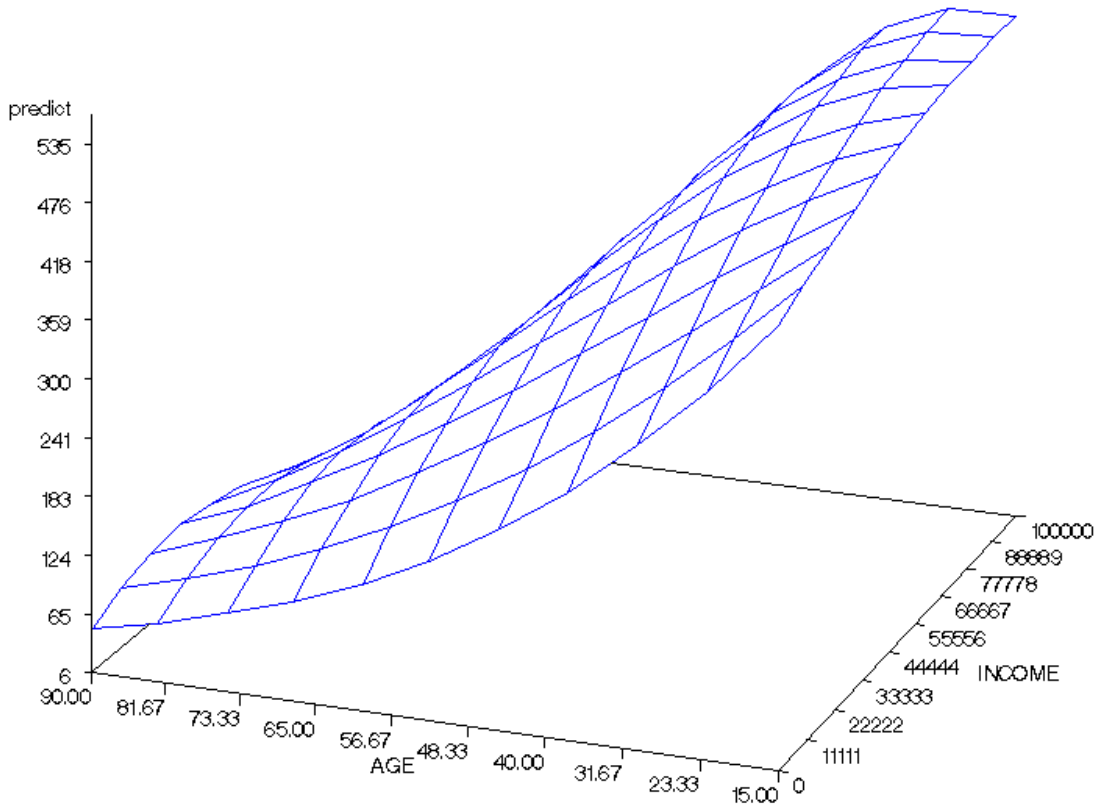

Figure 5. Predicted household fastfood expenditure plotted against head of household age and household income.

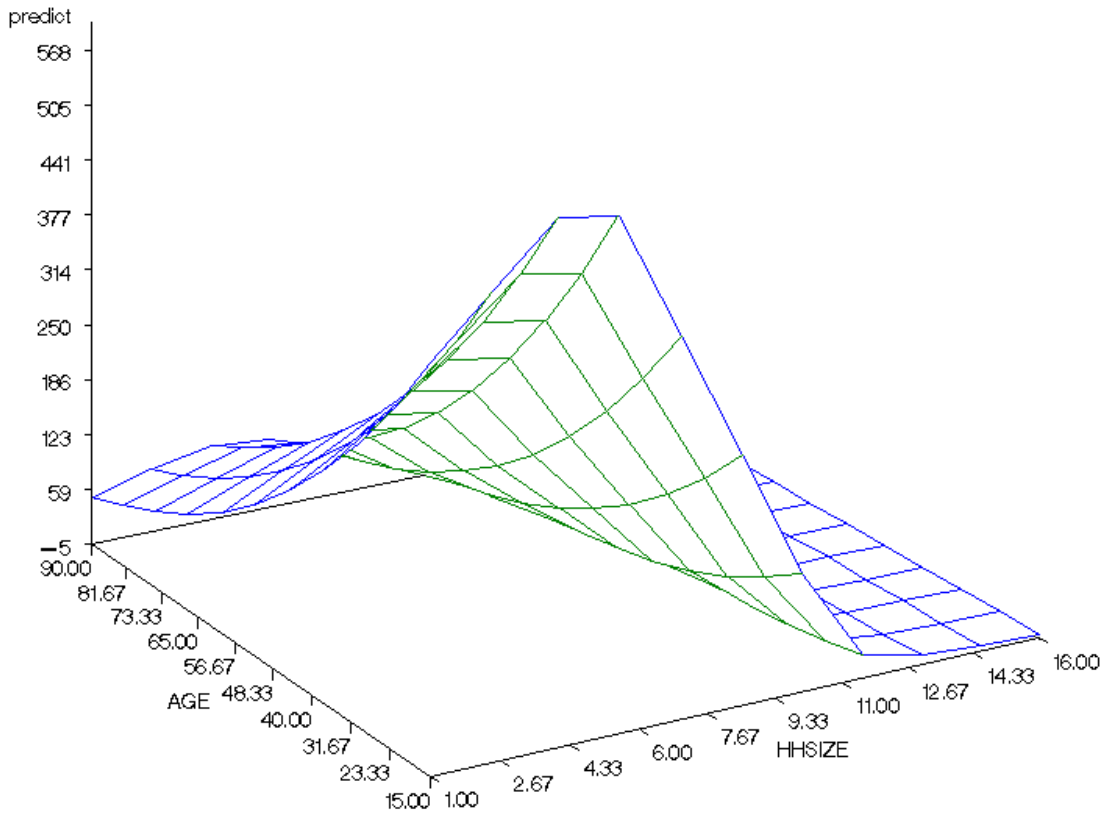

Figure 6. Predicted household fastfood expenditure plotted against head of household age and household size.

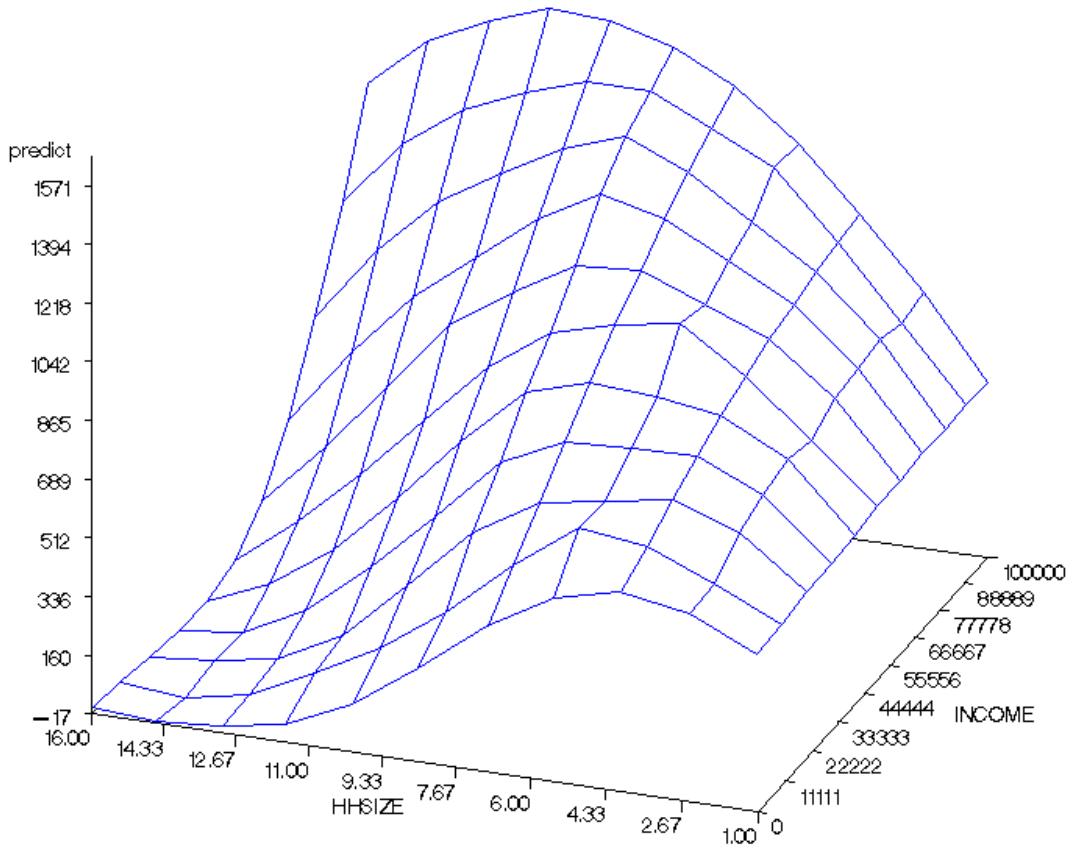

Figure 7. Predicted household fastfood expenditure plotted against household size and household income.

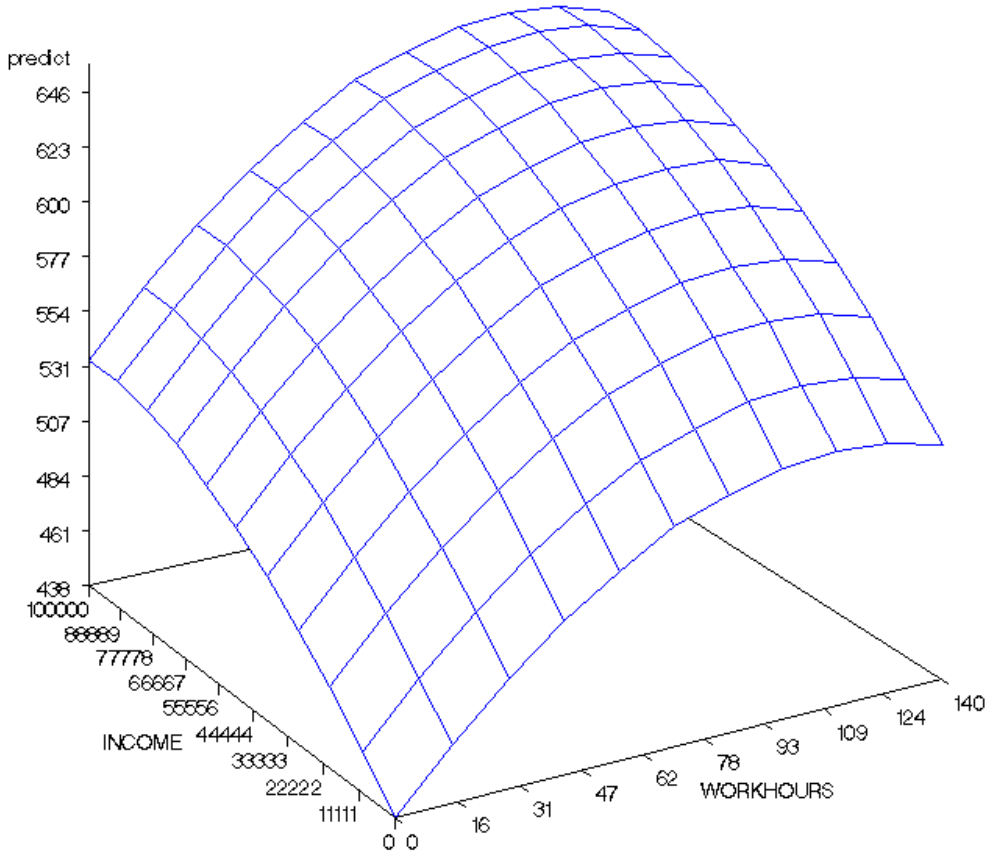

Figure 8. Predicted household fastfood expenditure plotted against head of household hours spent at work and household income.