AN ANALYSIS OF CONSUMER CHARACTERISTICS ASSOCIATED WITH THE PURCHASE OF BEEF AND PORK VARIETY MEATS

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Abstract

This analysis uses a dichotomous qualitative response model to assess the influences of several economic and demographic characteristics of consumers on the purchase decision for variety (edible organ and offal) meats. Specific factors considered include education, age, income, household size, and ethnic heritage. Data collected from a survey of 3,340 consumers are utilized. Results confirm strong income, age, household size, and ethnic effects on the purchase of variety meats.

Key words: variety meats, qualitative response models, consumer preferences.

Beef and pork variety meats make up a small but important component of U.S. red meat consumption. In 1960, U.S. per capita consumption of variety meats was 10.9 pounds, accounting for over 8 percent of total per capita red meat consumption on a retail weight basis. By 1986, U.S. per capita consumption had fallen to 8.8 pounds, accounting for just over 6 percent of total red meat consumption (American Meat Institute). Table 1 summarizes recent consumption patterns for variety meats. Variety meats commonly purchased by U.S. consumers include beef and pork liver, heart, tongue, kidney, thymus glands (sweetbreads), stomach (beef tripe and pork maws), brains, and pigs' feet (Koudele *et al.*). Individual consumers often exhibit strong attitudes regarding the consumption of organ and offal meats. While some consumers may show strong preferences for a certain variety meat, others will display a strong distaste for the consumption of organs and other edible offals (Koudele *et al.*). A variety of economic, demographic, and sociological factors may be responsible for the strong opinions often exhibited in consumer attitudes toward variety meat consumption.

Table 1. Consumption Patterns For Variety Meats: Per Capita Disappearance And As A Proportion Of Overall Consumption Of Red Meats (Retail Weight Basis)

Year	Per Capita Disappearance of Variety Meats (pounds)	Per Capita Red Meat Consumption (proportion)
1960	10.9	.081
1961	10.7	.081
1962	10.7	.080
1963	10.1	.072
1964	11.1	.078
1965	10.4	.077
1966	10.6	.076
1967	11.1	.076
1968	11.2	.075
1969	11.0	.074
1970	11.2	.074
1971	11.3	.072
1972	10.8	.071
1973	9.8	.069
1974	10.7	.071
1975	10.2	.071
1976	10.6	.069
1977	10.4	.068
1978	9.8	.067
1979	9.6	.066
1980	9.5	.064
1981	9.4	.065
1982	8.6	.062
1983	9.1	.063
1984	9.3	.065
1985	8.8	.061
1986	8.8	.062

Source: American Meat Institute, *Meat Facts*, 1987 edition.

Edible offals, comprised of variety meats, tallow, and lard, are of major economic importance to beef and pork producers and processors. For a 1,050 pound steer, the yield of variety meats and edible tallow averages 30.8 and 13.5 pounds, respectively (American Meat Institute). Edible offals also play a major role in the international trade of U.S. meat products. In 1987, the U.S. exported over 232,000 metric tons of variety meats (U.S. Department of

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Agriculture, Economic Research Service). Principal world consumers of U.S. variety meats include the European Community (EC) and Japan (U.S. Department of Agriculture, Economic Research Service). However, this sector of trade has recently been threatened by the EC ban on imports of U.S. meat products containing anabolic steroids. With the elimination of this market, domestic producers and processors of variety meats are faced with the problem of developing new marketing opportunities as well as enhancing existing markets for their products. To this end, a thorough understanding of the components and characteristics that influence U.S. consumer preferences for variety meats is essential.

Consumer preferences for edible offals, including variety meats, have received very limited attention in the empirical literature. A pervasive attitude among many consumers is that edible offals are inferior and thus relatively insignificant meat commodities. This attitude is reflected in the empirical literature by the fact that, in spite of the relative economic importance of edible offals, limited attention has been directed toward gaining an understanding of factors that influence the consumption of variety meats in the U.S. In a study based on the 1977-1978 Nationwide Household Food Consumption Survey, Haidacher *et al.* analyzed demand responses for domestic consumption of variety meats. They found that race and household size had significant influences on quantities consumed and expenditures on variety meats. However, their results regarding income levels and household age distribution effects on variety meat consumption were inconclusive.

The objective of this paper was to investigate the economic, demographic, and psychographic factors that influence a consumer's decision regarding the purchase of beef and pork variety meats. Specific objectives were to isolate and to quantify the effects of such factors on a consumer's willingness to purchase variety meats and to identify target groups inclined to purchase variety meat products. The analysis utilized data collected from a survey of 3,340 consumers at a dispersion of Kansas retail food stores.

The first section of this paper develops a qualitative choice model that relates a consumer's variety meats purchase decision to several relevant explanatory variables. In the second section, the data utilized to assess the purchase decision are discussed. The third section contains an empirical application of the qualitative choice model. The final section contains a brief review of the analysis and offers some concluding remarks.

A MODEL OF QUALITATIVE CHOICE

The goal of this analysis was to determine the effects of various exogenous factors on the decision of a consumer to purchase variety meats. Given the dichotomous nature of the consumer's decision, a qualitative response model was appropriate. Qualitative response models relate the probability of the occurrence of an event to various independent variables. Such models are often useful in assessing consumer characteristics that are associated with purchase decisions (Capps *et al.*). Three alternative qualitative response models are commonly used in empirical analyses of discrete choice. These are the linear probability model, the logit model, and the probit model. Econometric problems associated with the linear probability model are well-recognized[1] (Amemiya) and necessarily limit its suitability for empirical work. Although there are subtle differences, the probit and logit specifications usually yield nearly identical results and are thus difficult to distinguish from one another statistically (Capps and Kramer; Amemiya). Given this equivalence, the logit specification was arbitrarily chosen for the empirical analyses undertaken in this paper.

A dichotomous random variable y_i, for which $y_i = 1$ if consumer i purchases variety meats and $y_i = 0$ otherwise, is defined. Assume that the probability of purchase, P_i, depends on a vector of independent variables associated with consumer i, X_i, and a vector of unknown parameters β. For the logit model, this probability is determined by:

$$(1) \quad P_i = F(X'_i \beta) = \frac{1}{[1 + \exp(-X'_i \beta)]} .$$

Note that with the logit specification, the cumulative distribution function (CDF) is represented by the transformed logistic distribution.

The purchase of variety meat products was hypothesized to depend upon a variety of demographic as well as economic factors. In particular, the consumption of variety meats may be strongly tied to demographic factors such as an individual's ethnic heritage, age, and educational level. In this analysis, an individual's variety meats purchase decision was hypothesized to be influenced by the individual's ethnic heritage, age, income level, household size, education, and sex.

[1] The linear probability model suffers from heteroskedasticity, from nonnormal residual errors, and from the fact that predicted values of the dichotomous dependent variable are not required to lie between 0 and 1.

The statistical model used for $X_i\beta$ in (1) to evaluate a consumer's purchase decision regarding variety meats is given by:

$$(2)\ PUR = \beta_0 + \beta_1\ ETHNIC + \beta_2\ AGE1 + \beta_3\ AGE2 + \beta_4\ AGE4 + \beta_5\ AGE5 + \beta_6\ AGE6 + \beta_7\ INCOME1 + \beta_8\ INCOME3 + \beta_9\ INCOME4 + \beta_{10}\ PEOPLE1 + \beta_{11}\ PEOPLE3 + \beta_{12}\ PEOPLE4 + \beta_{13}\ COLLEGE + \beta_{14}\ SEX + \beta_{15}\ CITY2 + \beta_{16}\ CITY3\ .$$

Table 2. Variable Definitions

Variable Name	Description
PUR	1 if consumer purchased variety meats, 0 otherwise
ETHNIC	1 if consumer perceives his or her ethnic origins to influence tastes and preferences for variety meats, 0 otherwise
AGE1	1 if consumer is under 25 years of age, 0 otherwise
AGE2	1 if consumer is between 25 and 34 years of age, 0 otherwise
AGE4	1 if consumer is between 45 and 54 years of age, 0 otherwise
AGE5	1 if consumer is between 55 and 64 years of age, 0 otherwise
AGE6	1 if consumer is over 64 years of age, 0 otherwise
INCOME1	1 if household income was under $10,000 in 1985, 0 otherwise
INCOME3	1 if household income was between $25,000 and $39,999 in 1985, 0 otherwise
INCOME4	1 if household income was $40,000 or more in 1985, 0 otherwise
PEOPLE1	1 if the household had only 1 member, 0 otherwise
PEOPLE3	1 if the household had 3 or 4 members, 0 otherwise
PEOPLE4	1 if the household had over 4 members, 0 otherwise
COLLEGE	1 if consumer attended college or vocational school, 0 otherwise
SEX	1 if consumer is male, 0 if female
CITY2	1 if survey is collected in a Salina retail store, 0 otherwise
CITY3	1 if survey is collected in a Wichita retail store, 0 otherwise

The variables are defined in Table 2. Note that the explanatory variables are also of a qualitative nature. To avoid singularity problems, default categories were chosen to define a reference individual and the variables representing these categories were deleted from the statistical model. In this application, the base individual is a 35-44 year old female with no college education and an annual household income between $10,000 and $24,999, living in a two person household, who does not perceive her ethnic origins to have an influence on her variety meats purchase decision.

Variety meats are often considered to be "ethnic foods." In this light, an individual's ethnic heritage may be an important factor in influencing his or her decision of whether to purchase variety meats. A variable that attempts to capture this ethnic effect is included in the logit model. If the suggested ethnic effect is present, this variable should exert a positive influence on likelihood of an individual purchasing variety meats.

Consumption of these specialty meats might also depend upon traditions or other cultural influences associated with age. Table 1 indicates that both per capita consumption and the red meat consumption share of variety meats have shown steady declines in recent years. In this light, older consumers may show a stronger preference for the consumption of variety meat products. Qualitative variables that represent the age group of the consumer are also included in the logit model.

Variety meats are generally less expensive in terms of price per pound than choice meat products. This results from the fact that edible offals are considered to be by-products of the overall meat complex. In this light, differences in the probability of purchasing variety meat products may exist across different income groups. In particular, low income level households may be more likely to purchase variety meats than high income households. In addition, preparation of variety meats may be rather time intensive relative to most meat products. In this light, households with higher incomes may prefer more convenient meat alternatives because of the higher opportunity costs associated with preparing variety meat products. Qualitative variables representing the income level of consumers were included in the logit model.

Household size may also have a significant influence on the variety meats purchase decision due to the greater financial burden of feeding larger families. In light of the time intensive nature of preparing variety meat products, larger households may also hold an advantage in terms of a greater supply

of household labor. Qualitative variables representing household size were included in the logit model.

A consumer's educational level might also have a significant influence on the likelihood of purchasing a variety meat product. Variety meats certainly represent an atypical meat commodity. Higher levels of educational attainment might imply an enlightened and more receptive attitude toward unusual foods on the part of consumers. Redman has noted that a positive association exists between education and the nutritional consciousness of consumers. A well-educated consumer might also be more cognizant of variety meats' high nutritional value. Finally, it is possible that educational attainment is highly correlated with other omitted socioeconomic variables that influence the consumption of variety meats. A qualitative variable representing the educational attainment of consumers was included in the model.

The sex of the consumer may also have an influence on the variety meats purchase decision. Because of traditional sociological norms, female consumers may possess a greater knowledge of the nutritional characteristics of variety meats as well as greater expertise in the preparation of such specialty products.

Finally, the logit model contains qualitative variables that distinguish the three Kansas cities from which the survey responses were collected. These variables are included to allow for consumer differences that vary by city but are not captured by the variables included in the logit model.

DATA DESCRIPTION

A survey of 3,340 shoppers at eight Kansas retail supermarkets produced 2,998 usable survey responses. Surveys not included in this analysis were omitted due to consumers' unwillingness to respond to certain demographic questions. The surveys were administered through personal interviews by trained research personnel over a seven month period beginning in late September, 1985 and ending in mid April, 1986.[2] Interviews were conducted during a busy four-hour period (2 to 6 p.m.) on the busiest shopping days (Thursday, Friday, and Saturday) in order to avoid repeated sampling from shoppers who had already been interviewed. The surveys were conducted in three Kansas metropolitan areas: Wichita, Topeka, and Salina. Two of the eight stores included in the survey were conventional retail outlets, while the remaining six were warehouse-type stores.[3] The stores were chosen to provide a cross section of the population in terms of ethnic groups, urbanization, income levels, and occupations.

One important issue should be noted at this point. Although every effort was made to ensure a heterogeneous sample of consumers, these results may still suffer from biases arising from the fact that the sample was drawn from only three midwestern cities. In this light, inferences drawn from this analysis should be made conditional on the fact that the sample may not be representative of national consumer attitudes regarding variety meats. However, Haidacher *et al.*'s finding that consumption and expenditure patterns for variety meats do not differ significantly across geographic regions of the U.S. would tend to moderate this concern.

Summary statistics of the variables utilized in this analysis are presented in Table 3. The means of the binary variables represent the proportions of consumers that fall into each particular category. In this sample, over 66 percent of the consumers had purchased variety meats in the previous year. Approximately 45 percent of the consumers perceived their ethnic heritage to have an influence on their tastes for variety meats, over 45 percent of the consumers had attended college or vocational school, and approximately 16 percent of the sampled consumers were male. The survey was fairly well dispersed across a wide cross section of consumer age groups. Approximately 6 percent of the sample were under 25 years old, 20 percent were between 25 and 34 years of age, over 21 percent were between 35 and 44 years old, over 17 percent were between 45 and 54 years old, 17 percent were between 55 and 64 years of age, and over 17 percent of the consumers were over 64 years of age. Likewise, the survey sampled a broad cross section of income groups. Over 16 percent of the households surveyed had less than $10,000 in annual income in 1985, over 35 percent had an annual household income between $10,000 and $24,999 in 1985, over 30 percent had between $25,000 and $39,999 in annual income in 1985, and almost 18 percent had an annual income

[2]Interviews were conducted by research personnel trained by the Departments of Food and Nutrition and Agricultural Economics at Kansas State University. The data are summarized in detail in Koudele *et al.*

[3]This particular mix of stores was suggested by the cooperating foodchain firm (Falley's Inc.) to ensure sampling from diverse consumer income and demographic groups. We must acknowledge that the empirical results should be conditioned upon the fact that warehouse-type stores comprise a large proportion of the overall sample. However, we also maintain that the economic and demographic variables utilized in the logit model should account for any consumer differences that might arise between conventional and warehouse-type stores.

Table 3. Descriptive Statistics Of Variables In Logit Model

Variables	Mean	Standard Deviation	Variables	Mean	Standard Deviation
PUR	.6614	.4733	INCOME4	.1761[a]	.3810[a]
				.2019[b]	.4017[b]
				.1629[c]	.1629[c]
ETHNIC	.4480[a]	.4974[a]	PEOPLE1	.1041[a]	.3054[a]
	.3695[b]	.4829[b]		.1103[b]	.3135[b]
	.4881[c]	.5000[c]		.1009[c]	.3012[c]
AGE1	.0624[a]	.2419[a]	PEOPLE3	.3769[a]	.4847[a]
	.0956[b]	.2941[b]		.4000[b]	.4901[b]
	.0454[c]	.2082[c]		.1790[c]	.3835[c]
AGE2	.2048[a]	.4036[a]	PEOPLE4	.1684[a]	.3743[a]
	.2680[b]	.4431[b]		.1478[b]	.3551[b]
	.1725[c]	.3779[c]		.1790[c]	.3835[c]
AGE4	.1748[a]	.3798[a]	COLLEGE	.4506[a]	.4976[a]
	.1271[b]	.3332[b]		.4936[b]	.4286[b]
	.1992[c]	.3995[c]		.4286[c]	.4950[c]
AGE5	.1738[a]	.3798[a]	SEX	.1568[a]	.3636[a]
	.1379[b]	.3450[b]		.1498[b]	.3570[b]
	.1921[c]	.3941[c]		.1604[c]	.3670[c]
AGE6	.1711[a]	.3767[a]	CITY2	.2281[a]	.4197[a]
	.1527[b]	.3599[b]		.1921[b]	.3942[b]
	.1805[c]	.3847[c]		.2466[c]	.4311[c]
INCOME1	.1661[a]	.3722[a]	CITY3	.3532[a]	.4781[a]
	.1320[b]	.3387[b]		.4010[b]	.4903[b]
	.1836[c]	.3872[c]		.3288[c]	.4699[c]
INCOME3	.3025[a]	.4594[a]			
	.3133[b]	.4641[b]			
	.2970[c]	.4571[c]			

[a]Calculated from entire sample.
[b]Calculated from those consumers who purchased variety meats.
[c]Calculated from those consumers who did not purchase variety meats.

of $40,000 or more in 1985. Over 10 percent of the households had only one member, 35 percent of the households had two members, almost 38 percent of the households had three or four members, and almost 17 percent of the households had five or more members.

EMPIRICAL APPLICATION AND RESULTS

Estimation of the logit model of qualitative choice was accomplished using maximum likelihood techniques. Parameter estimates and relevant statistics are presented in Table 4. In general, the parameter estimates are statistically significant, as evidenced by the relatively small standard errors and large t-ratios. The parameter estimates from the logit model indicate the direction of change in probability caused by a change in the independent variables. However, the parameters do not represent directly the change in the probability of purchase caused by a change in the independent variables. Such probability changes depend on the original probability and thus on the initial values of all the independent variables and their coefficients (Judge *et al.*). For the dichotomous logit model, the change in the probability that $y_i = 1$ (P_i) brought about by a change in an independent variable x_{ij} is given by[4]:

$$(3)\quad \frac{\Delta P_i}{\Delta x_{ij}} = \frac{P(y_i = 1 \mid x_j = 1) - P(y_i = 1 \mid x_j = 0)}{1 - 0}$$

Purchase probabilities and probability changes were calculated for each variable while holding the

[4]In the general case, the probability change brought about by a change in an independent variable xij in the logit model is given by: $\frac{\partial P_i}{\partial x_{ij}} = \frac{\beta_j \exp(-X_i'\beta)}{[1 + \exp(-X_i'\beta)]^2}$.

However, when independent variables are of a qualitative nature, as is the case for all of the explanatory variables utilized in this investigation, $\frac{\partial P_i}{\partial x_{ij}}$ does not exist in that x_{ij} is discrete and thus cannot vary continuously. In this case, probability changes must be obtained by evaluating P_i at the alternative values of x_{ij}.

other variables constant at their sample mean values. The probability changes are also presented in Table 4.

The parameter estimates in Table 4 correspond to a probability of purchase for the base individual of .5841 and to a probability of purchase of .6729 at the sample mean values. Goodness of fit statistics for the maximum likelihood estimates of the logit model are also included in Table 4. McFadden's R2 statistic has a value of .0555, which is reasonable for an analysis of cross sectional data. The likelihood ratio test statistic has a value of 213.18, which exceeds the chi-square critical value with 16 degrees of freedom at the .001 level of significance. This rejects the null hypothesis that all slope parameters are zero. These statistics indicate that the logit model should be of significant value in explaining factors that influence the consumption of variety meats.

Significant trends in consumption patterns across various demographic consumer groups are evident in the estimates and implied probability changes in Table 4. As anticipated, the propensity to purchase and consume variety meats is negatively influenced by income level and postively influenced by household size. These effects are statistically significant in nearly every case. Consumers with household incomes between $10,000 and $24,999 had a purchase probability of .6794. Consumers with household incomes of less than $10,000 were significantly more likely to consume variety meats than were consumers with higher incomes. In terms of probability, the probability of purchase for the low income group was .7610, which is .0816 greater than the probability of consumption for consumers with household incomes between $10,000 and $24,999. Higher levels of income lower the probability of consuming variety meats. The probabilities of consumption for households with incomes between $25,000 and $39,999 and over $40,000 are lowered by .0262 to .6532 and by .0806 to .5988, respectively.

Household size also has a significant positive effect on the consumption of variety meats. The probability of purchase for a household with two members is .6433. The probability of a household with only one member purchasing variety meats is .5649, which is .0784 lower than that of a household with two members. The probability of purchase rises by .0490 to .6922 for households with three members and by .1030 to .7463 for households with four or more members.

These results suggest that variety meats may be considered inferior goods in that higher levels of income significantly lower the likelihood of purchase and consumption. Alternatively, in light of the significant preparation time associated with several of the meat specialty products, these results may reflect the greater convenience associated with conventional meat products.

As expected, the likelihood of purchasing variety meats increases with the age of the consumer. The probability of consumption for consumers between

Table 4. Maximum Likelihood Estimates For Logit Model.

Variable	Parameter Estimate	t-Ratio	Change In Probability[a]
INTERCEPT	.3395 (.1539)[b]	2.20	—
ETHNIC	.5346 (.0825)	6.48	.1161
AGE1	-.9022 (.1801)	-5.01	-.2201
AGE2	-.5018 (.1206)	-4.16	-.1205
AGE4	.5700 (.1368)	4.17	.1161
AGE5	.5160 (.1460)	3.53	.1063
AGE6	.3605 (.1548)	2.33	.0767
INCOME1	.4070 (.1270)	3.20	.0816
INCOME3	-.1180 (.1007)	-1.17	-.0262
INCOME4	-.3506 (.1198)	-2.93	-.0806
PEOPLE1	-.3286 (.1446)	-2.27	-.0784
PEOPLE3	.2210 (.1085)	2.04	.0490
PEOPLE4	.4892 (.1375)	3.56	.1030
COLLEGE	-.1313 (.0837)[b]	-1.57	-.0290
SEX	.1758 (.1119)	1.57	.0378
CITY2	.3014 (.1115)	2.70	.0621
CITY3	-.2508 (.0933)	-2.69	-.0571
Log of Likelihood Function:		-1918.9450	
McFadden's R2:		.0555	
Likelihood Ratio Test:		213.1800[c]	

[a]Calculated at the sample means.
[b]Numbers in parentheses are asymptotic standard errors.
[c]Test that $\beta_1 = ... = \beta_{16} = 0$

the ages of 35 and 44 was .6523. The probabilities of purchase for consumers under age 25 and between ages 25 and 34 were .4322 and .5318, respectively, which are .2201 and .1205 lower than the probability of purchase for consumers between 35 and 44 years of age. The probability of purchase rises by .1161 to .7684 for consumers between the ages of 45 and 54 and by .1063 to .7586 for consumers between the ages of 55 and 64. The probability of purchase for elderly consumers (over 65 years) is .7290, which is higher than that for consumers between 35 and 44 years of age by .0767. Overall, age appears to exhibit a statistically significant positive effect on the probability of purchasing variety meats. However, the likelihood of purchase does drop slightly for consumers over 54 years of age.

The variable representing perceived ethnic effects is highly significant in the logit model. This confirms expectations that conjectured a strong ethnic influence in purchase and consumption decisions for variety meats. In particular, the probability of purchase for consumers who perceived their ethnic origins to have significant influences on their tastes and preferences for variety meats was .7342, which is .1161 higher than that for consumers who were not influenced by their ethnic heritage.[5]

Sex and the educational attainment of the consumer did not have a strongly significant influence on the likelihood of variety meats purchase. Male consumers appear to be slightly more likely to purchase variety meats. However, this coefficient was not significant at the .05 level. Consumers who had attended college or vocational school appeared to be less likely to purchase variety meats. However, because of the low degree of statistical significance, this effect cannot be confirmed.[6]

Significant differences between cities were revealed in the logit model by the city indicator variables. The probability of purchase in a Topeka store is .6772. The likelihood of purchase in a Salina store is .0621 higher than that of purchase in a Topeka store. Conversely, the probability of purchase in a Wichita store is .0571 lower than in a Topeka store. It is likely that these distinctions are related to demographic differences between consumer groups in the alternative cities, which are not included in the information collected in the survey. As is common in empirical analyses utilizing cross sectional survey data, the overall explanatory power of the model is likely to be somewhat constrained by omitted information.

A final measure of the goodness of fit of the logit model involves an in-sample evaluation of the predictive power of the estimated model. A classification table based on a 50-50 classification scheme is presented in Table 5. Such a procedure classifies the predicted value of y_i as 1 if $P_i \geq .5$ and 0 otherwise. A disadvantage of such an evaluation technique is that, when an event $y_i = 1$ takes place, an individual who classified the probability to be 0.49 is penalized the same as an individual who classified it to be 0 (Amemiya). The logit model correctly classifies 67.7 percent of the individual responses. The logit model has a false positive rate (predicted positives that were actually negative) of 30.9 percent and a false negative rate (true positives that were predicted to be negative) of 43.3 percent. The sensitivity of the logit model (true positives correctly predicted) is 92.5 percent. The specificity of the logit model (true negatives correctly specified) is 19.1 percent. On the basis of a simple 50-50 classification rule, the estimated logit model tends to predict more purchases than actually occur.

In all, the empirical application of the qualitative choice model offers valuable insights into the factors that influence consumption decisions regarding variety meats. The variety meats purchase decision was revealed to be negatively influenced by income levels, with the strongest likelihood of purchases occurring for the lowest income group. Household size exerts a positive influence on the likelihood of

Table 5.Classification Table For The Logit Model [a]

		Predicted		
		Negative	Positive	**Total**
True	Negative	194	821	**1015**
	Positive	148	1835	**1983**
	Total	**342**	**2656**	**2998**

Correctly Specified:	67.7%
Sensitivity[b]:	92.5%
Specificity[c]:	19.1%
False Positive Rate:	30.9%
False Negative Rate:	43.3%

[a]Based on a 50-50 probability classification scheme.
[b]True positives classified as positive
[c]True negatives classified as negative.

[5]Note that the measurement of this ethnic effect is somewhat subjective on the part of individual consumers. We can note that of those consumers who indicated that their ethnic origins had a positive influence on their purchase of variety meat products, 38% were of German origin, 35% were of British origin, and 18% were black.

[6]Educational attainment is likely to be correlated with income. In this light, the direct effect of education on the purchase of variety meats may be difficult to discern because of the presence of multicollinearity between education and income.

a household purchasing variety meat products. The likelihood of purchase was also shown to vary positively with the age group of consumers. However, the probability of purchase was shown to fall slightly for consumers over age 54. Finally, consumers' ethnic origins strongly influence the likelihood of purchasing variety meat products.

CONCLUDING REMARKS

This analysis has concentrated on the identification of factors that influence a consumer's decision of whether to purchase variety meats. In light of the often strong attitudes commonly exhibited when considering the consumption of edible meat offals, it is of interest to identify and quantify economic and demographic factors that influence variety meat consumption. Factors revealed to be important in determining a consumer's variety meats purchase decision included household income, household size, ethnic origins, and consumer age.

The results of the logit analysis may be useful in identifying socioeconomic groups inclined to purchase variety meat products. In light of the relative economic importance of variety meats to beef and pork producers and processors and the recent threats to U.S. export markets for variety meats, attention to developing domestic markets takes on increased importance. The results indicate that large, low income households are most likely to purchase variety meats. Ethnic groups also show a strong predisposition to purchase variety meats. These results may suggest that domestic market development begin by concentrating on these consumer groups.

Finally, it should again be acknowledged that these results are derived from a survey drawn from a limited sample of three midwestern metropolitan areas. Care should be exercised when extending these results to draw inferences on a national level. Additional research is needed on a more aggregate level to discern accurately whether these results are indeed applicable at a national level. A logical extension of this work would also give further attention to alternative demographic and socioeconomic factors that might be relevant to variety meats purchase decisions but are not included in this analysis. Future research might also benefit from further consideration of the convenience aspects of these products relative to traditional meat products.

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