Analysis of Factors Influencing the Frequency of Catfish Consumption in the United States

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Introduction

The consumption of seafood, including catfish has become an important part of the diet for consumers in the United States. Although the average quantity of seafood consumption in the U. S. is not as high as beef and chicken, the consumption of seafood has been increasing. Per capita seafood consumption in the United States rose from 11.7 pounds in 1970 to a high of 16.1 pounds in 1987. Per capita seafood consumption in the 2000 was 15.6 pounds (USDA). Fresh and frozen seafood currently accounts for approximately 67% of seafood consumption, compared to 57-60% in the 1970's (USDA). Among the fresh and frozen seafood products, finfish consumption increased from 4.5 pounds in 1970 to a high of 6.9 pounds in 1987. Finfish consumption in the 1990s ranged from 5.9 to 6.4 pounds per capita.

Over the past decade, catfish consumption has more than doubled and marketing efforts have helped drive sales to nearly 592 million pounds in 1997. According to the National Agricultural Statistical Services, the 633.8 million pounds of farm-raised catfish were processed for consumption in 2000. This figure rose by approximately 10% to 647.2 millions pounds in 2001 (NASS). Per capita consumption of catfish increased from 0.41 pounds in 1985 to 0.90 pounds in 2001 (Mississippi State University).

The growth in consumption has offered new opportunities and challenges to producers, processors and marketers of catfish. For example, catfish consumption is uneven among different geographical regions, ethnic groups, and income and educational levels. In addition to price, consumer perceptions regarding nutrition, safety, appearance, etc, might influence catfish consumption. Constantly changing product form, marketing practices and government policy

also affects consumption. Therefore, for the rapid growth of the industry, new information is constantly needed on the factors that influence catfish consumption. The goal of this study is to investigate the factors that influence the decisions to consume and the frequency of consumption of catfish. Identification of factors that are significant in the decisions to and frequency of consumption of catfish could be helpful in developing marketing strategies for the industry.

Model

Cheng and Capps (1988) and Yen and Huang (1996) both recognized the restrictions of using a tobit model in demand analysis for finfish and shellfish. The tobit model assumes the factors that affect level of consumption are the same as those that determine the probability of consumption. Cheng and Capps used Heckman's two-step procedure and Yen and Huang used a generalized double hurdle model to analyze household demand for finfish. As a result of information obtained in focus groups and the preliminary visual appearance of the data, Cragg's (1971) double hurdle model, similar to the model used by Yen and Huang, is used in this study.

The double-hurdle model has separate participation and consumption equations that are related in the following manner:

$$y_i = y_i^* \quad \text{if } y_i^* > 0 \text{ and } d_i > 0 \tag{1}$$

$$= 0 \quad \text{otherwise} \tag{2}$$

where y_i^* represents the consumption decision and d_i is a latent variable describing participation as shown below:

$$y_i^* = x_i' \beta + \varepsilon_I \tag{3}$$

$$d_i^* = z_i' \alpha + \eta_I \tag{4}$$

where x_i and z_i are vectors of explanatory variables β and α are vectors of parameters. Estimation of the double-hurdle model is straight-forward. Maximum-likelihood estimation of a probit equation is used to evaluate the censoring rule ($z_i' \alpha$), while maximum-likelihood estimate

that account for a truncated normal distribution are used for the sub-sample of uncensored observations. A specification test that evaluates the restrictions imposed by the tobit specification (assumption that the decisions are based on the same parameters) is obtained through a comparison of the log-likelihood function values of the tobit, probit, and truncated normal regression models. Specifically, assuming that the same explanatory variables appear in all three equations, the following value will be distributed as a χ^2 random variable with degrees of freedom equal to the number of explanatory variables under the null hypothesis that the tobit specification is correct:

$$\lambda = -2(f_{\text{Tobit}} - f_{\text{Probit}} - f_{\text{Truncated}}), \quad (5)$$

where the f_is represent the respective log-likelihood function values.

Data and Procedures

The data for this study was obtained through a mail survey. The questionnaire was mailed to a sample of 9,000 households in the United States, with 1,000 mailed to each of the nine major census regions (shown in Figure 2). The stratified sample was chosen as region is expected to be a significant determinant of both the choice to consume and the choice of how often to consume catfish. The surveys were mailed in late 2000 and early 2001, with households receiving a second copy of the survey if they did not return the first. This approach resulted in a return of 1,790 surveys or a response rate of 20.1% (after accounting for 'return-to-sender' surveys). Of these responses, 1,491 responded to the questions regarding consumption of catfish. Overall, 931 responded to all information needed and were included in this study. Table 1 provides descriptive statistics for the responses used in this study.

Respondents were asked to indicate how often they consumed catfish for breakfast, lunch, and dinner, both at home and away from home. This differs from most previous studies (including Cheng and Capps and Yen and Huang) that analyze at-home consumption only. Overall, 45.2% of the respondents indicated that they never ate catfish. Frequency of consumption of catfish for the different meal occasions is shown in Table 2. As expected, consumption of catfish, as well as other seafood products, differed by region of the respondent's residence (Figure 1).

Additionally, respondents were asked to identify and rank the top three reasons they consumed and did not consume catfish. Results from the question on reasons non-consumers do not consume catfish and why consumers do not consume more catfish provide an interesting insight into the data (Figure 2). Visual inspection of the results from this question may provide support for the double-hurdle model, as it appears non-consumers have different reasons for not consuming compared to consumers decision on frequency of consumption.

A number of factors were hypothesized to be relevant to the consumption and frequency of consumption decisions. The same set of variables was used as regressors in both equations as theory provides no guidance for differences and to allow for the specification test. The dependant variable was constructed from responses to a set of six questions regarding frequency of consumption of catfish for breakfast, lunch, and dinner at-home and away-from-home. If a respondent indicated they never consumed oysters for each of the six questions, the value of the dependant variable was set to zero. For the sample, 45.2% of the responses were zero. For the remainder of the sample, the responses were summed to determine the frequency of consumption in one month. For example, if a respondent answered they consumed catfish once per month for dinner at home and once per month for dinner away from home, but never for lunches and

breakfasts, their frequency of consumption for the month was two. Those who did eat catfish consumed catfish on an average of 2.93 times per month. Quantity of catfish consumption was not obtained in this survey, as respondents were not asked how much was consumed (or by how many in the household) due to time and space limitations of the survey. Additionally, because the survey was asking for all consumption, including away from home and recreational catch, it was determined from the focus groups and test surveys that respondents were having difficulty answering in terms of quantity (i.e. pounds or ounces).

Factors included as independent variables included demographic variables (age, gender, ethnicity, religion, household income), variables relating to the respondents geographic location and variables relating to stated preference. For geographic location, a dummy variable was included representing the census region the respondent belonged to, as well as one variable that represented how close the respondent currently lives to a coast. It was hypothesized that persons living closer to the coast might have a higher probability of consuming fish. Other expected explanatory variables included the top reasons for eating and not eating catfish as indicated by the respondent. A set of variables was included to determine if the location of purchase of seafood affected either decision. Descriptive statistics for all variables are shown in Tables 1 (demographic) and 3 (other).

Empirical Results

Using the double-hurdle model with frequency of catfish consumption as the dependent variable, the model was estimated with the variables described in Table 4. The coefficients from the probit and truncated tobit equations, as well as the marginal effects (calculated at the means) are reported in Table 5. The probit model correctly predicted a consumers likelihood to consume

or not consume catfish 88% of the time. The results of the test shown in equation (5) indicate the double hurdle model is a better specification than the traditional tobit ($\lambda = 234.95$, df = 49). As expected, the results indicated that different variables affected the decision to consume versus frequency of consumption.

Results indicated that if a person bought seafood (any seafood, not just catfish) at grocery specialty stores (OTHERCS) (such as fish markets or gourmet stores), they were more likely to be catfish consumers and people who consumed seafood from restaurants or recreational catch were more likely to consume catfish less frequently. A potential explanation for these results is that if a person purchases seafood (again, any seafood) from specialty stores, they are a different type of seafood consumer than someone who purchases from a restaurant or eats recreational catch. Perhaps they are more "dedicated" seafood consumers than those who eat at restaurants, hence more likely to eat catfish, as well as consume different types of seafood. It is also possible that those who eat recreational catch eat catfish less frequently because they are eating their catch, which may not be catfish (and if it was, may not be expected to be the same quality of farm-raised catfish). Following this line, a person who does eat catfish, but is a restaurant or recreational catch consumer is likely to consume catfish less frequently. Our results indicate the average catfish consumer consumes oysters 2.93 times per month. Respondents who purchased seafood from restaurants were likely to consume seafood 0.73 times less often, or 2.20 times per month. Those who indicated recreational catch as a source of seafood were likely to consume 0.38 times less frequently, or 2.55 times per month. Additionally, the more frequently consumers ate other seafood products, the more frequently they ate catfish.

Respondents were asked to identify the top three reasons they consumed catfish. These reasons give more insight to tastes and preferences of catfish consumers. If the person indicated

they ate catfish for the following reasons, they were more likely to be catfish consumers: enjoyed the flavor (FLAVOR), for health/nutritional reasons (HEALTH), tradition (TRAD), because of the price (PRICE), because products were available (AVAIL), to add variety to the diet (VDIET), and because the product was farm-raised (FARMRAISE). If a person indicated they ate catfish because it was available, they were 51.6% times more likely to be a catfish consumer than someone who did not indicate availability was a reason for purchase. People who indicated flavor as the reason for consumption were 45.9% more likely than those who did not indicate flavor to consume catfish. These variables become more interesting in the truncated tobit portion of the model. It was expected if people indicated reasons for liking catfish, those reasons would be significant factors in the probit model. However, the effect on frequency of consumption is slightly less obvious. Consumers who selected tradition, preparation knowledge, and that it was farm-raised, were more likely to consume catfish 0.45 (TRAD), 0.46 (KNOWHOW) and 0.60 (FARMRAISE) times more per month, respectively. If the consumer indicated they ate catfish to add variety to their diet, they were more likely to consume catfish, but more likely to consume it less frequently (0.62 time less per month). Intuitively this is attractive, as someone interested in adding variety might eat catfish, but not that frequently. The only factor that was indicated as a reason for consuming catfish, but was not significant was convenience (CONV).

Respondents were also asked to identify the top three reasons they did not consume catfish, or did not consume catfish more frequently. Two of these reasons significantly influenced the decision to consume catfish – lack of preparation knowledge (LPKLDGE) and taste (TASTE). Consumers who indicated they did not like the taste or catfish were significantly less likely (22.6%) to consume catfish. Additionally, those consumers were likely to consume catfish less frequently (0.98 times less per month). Consumers who indicated lack of preparation

knowledge as a reason for not consuming catfish were 12.4% less likely to be catfish consumers. Concerns about product safety did not influence the decision to consume catfish, but did have a negative affect on the frequency of consumption, with a person indicating a concern for product safety likely to eat catfish 0.76 times less per month than a person who did not indicate this as a top concern. Finally, those who indicated catfish was too time consuming to prepare were likely to eat catfish 0.43 times more frequently.

Demographics did have an effect on both the choice to consume and the frequency decision. Persons living in the East South Central (ESC), West North Central (WNC), and West South Central (WSC) regions of the country were more likely (26.3%, 15.3% and 28.9% respectively) to consume catfish than persons living in New England. Other regions did not significantly differ from the New England region. Persons in the Mid-Atlantic (MIDATL), Southeast Atlantic (SEATL) and Pacific (PACIFIC) regions were significantly likely to consume less frequently (0.70, 0.71, and 1.00 times per month respectively) and those in the East and West South Central were significantly likely to consume more frequently (0.76 and 0.75 respectively) than those in the New England region. Catfish production is concentrated near the East and West South Central regions in the United States so these results make intuitive sense.

Although response rates per region were similar, the responses to this survey did not include a representative portion of the non-Caucasian population in the United States (sample contained 89% Caucasian compared to 75% indicated in the 2000 U.S. Census). The survey is additionally biased towards more educated respondents (52% of the responses were from people with at least one college degree compared to 26% of the U.S. population according to the U.S. Census. In spite of this, and noting that future studies might benefit from specifically targeting these populations for information on seafood consumption, there were some relationships

between these variables and both choice to consume and frequency of consumption of catfish. Consumers with less than a college degree were likely to consume catfish more frequently than those with a college degree (0.48 times more frequently for those with some college and 0.52 times more frequently for those with high school or less). Younger consumers were less likely to be consumers (13.8% and 11.2% less likely for the middle two age groups compared to the oldest age group) and likely to consume less frequently (0.78 times less if they were in the 35 and under category and 0.54 times less if they were in the 36-50 age group). Finally, Caucasians were less likely to be catfish consumers (18.6% less likely) and likely to consume 0.88 times less frequently per month. Income was not significant in either the decision to consume of the decision on how often to consume.

Conclusions and Implications

The two main goals of this study were to determine if the factors that influenced the decision to consume catfish differed from the factors that influenced the decision of how often to consume catfish and to see what factors were significant that could be used to develop marketing strategies for the catfish industry. Results showed that the two decisions were based on significantly different factors, as suspected.

Significant, or lack thereof, or relationships between the demographic variables and the two decisions seem to provide some evidence of consistency with certain a priori expectations. For example, it might have been thought that catfish is seen as an inferior good. Although income was not significant, the result that consumption is higher in less educated groups may reflect this perception of catfish. Additionally, even with the biased sample, it was found that non-Caucasian consumers were more likely to consume catfish (and consume more frequently).

These results are consistent with the focus groups where African-American participants indicated a higher consumption of catfish.

Overall, this study does identify characteristics that the catfish industry can use to segment consumers for marketing purposes. In general, opportunities to expand sales for existing products can be grouped into two categories: market penetration and market expansion. Market penetration refers to increasing sales to (or frequency of consumption by) existing consumers. As expected, people living in regions nearest to catfish production are more likely to consume catfish and more likely to consume more catfish more frequently. An area for potential growth include other regions of the country where those who consumed catfish were likely to consume less frequently, including the Mid-Atlantic and Southeast Atlantic, two regions in close proximity to catfish production.

Factors that significantly increased frequency of consumption for catfish consumers included knowing how to prepare the product and understanding that the catfish was farm-raised. Perhaps some of the more interesting results from this study are the significance of the variables reflecting knowledge (or lack of knowledge) of preparation methods and that the source is farm-raised. Over the past years, the Catfish Institute has invested in educational campaigns to distribute recipes and increase knowledge of quick preparation methods of catfish. The results of this study indicate this is money well spent, as consumers who knew how to prepare catfish were likely to eat catfish an extra 0.46 times per month and consumers who did not know how to prepare catfish were 12.4% less likely to consume catfish. Additionally, the catfish industry has made a conscious effort to market their product as "farm-raised catfish." It also appears that these efforts should be successful, as those who eat catfish because it is farm-raised are likely to eat catfish 0.60 times more often per month.

Market expansion refers to expanding sales through new customers. In this case, we look to the results of the probit portion of the model to understand why some respondents chose whether or not to consume catfish. Availability of fresh products significantly increased the likelihood of the respondent to consume catfish. This is likely related to the regions of the country that are most likely to consume catfish (East and West South Central), as they are closest to production, and hence, most likely to see consistent availability of fresh catfish. Those who enjoyed the flavor of catfish were 45.9% more likely to consume catfish. As stated earlier, the industry has focused on recipes. In conjunction with these efforts, it may be worth considering efforts such as in-store taste tests. Although these could easily be conducted at grocery stores, it should also be noted that consumers who purchase seafood products at specialty stores might be a segment that could be targeted, as they are more likely to consume catfish. Finally, the catfish industry will need to address the fact that younger and more educated consumers were less likely to consume catfish.

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Table 1. Summary of demographics

	Catfish Non-Consumers (%)	Catfish Consumers (%)	Overall Sample (%)
Age of Respondent			
Greater than 65	17.8	19.8	18.9
Between 50 and 65	38.5	35.9	37.1
Between 35 and 50	36.8	36.1	36.4
Under 35	6.9	8.2	7.6
Gender			
Percent Female	42.5	38.2	40.2
Household Income			
Less than $29,999	14.3	14.5	14.4
Between $30,000 and $59,999	36.6	35.3	35.6
Between $60,000 and $99,999	27.8	29.4	28.7
$100,000 or greater	21.4	2.08	21.1
Region of Residence			
New England	18.3	5.1	11.1
Mid-Atlantic	11.9	8.6	10.1
Southeast Atlantic	10.9	12.2	11.6
East North Central	11.2	12.4	11.8
East South Central	4.0	14.1	9.6
West North Central	10.7	13.9	12.5
West South Central	4.0	14.9	10.0
Mountain	15.9	11.6	13.5
Pacific	13.1	7.3	9.9
Lives within 50 miles of Coast	37.1	22.7	29.2
Religion			
Catholic	28.5	22.7	25.3
Christian	51.3	62.5	57.5
Other	20.2	14.7	17.2
Ethnicity			
Caucasian	92.2	86.5	89.0
Non-Caucasian	7.8	13.5	11.0
Education			
High School or less	16.9	18.0	17.5
Some College	29.0	31.2	30.2
College degree(s)	54.2	50.8	52.3

Table 2. Statistics on frequency of catfish consumption (n=931)

	Frequency of Consumption				
Variable	2-3 times per week	1 time per week	< 1 time per week	< 1 time per month	Never
Breakfast at-home	0.0%	0.4%	1.8%	6.4%	91.3%
Breakfast away-from-home	0.1%	0.1%	0.3%	2.9%	96.5%
Lunch at-home	0.1%	1.1%	3.9%	16.6%	78.3%
Lunch away-from-home	0.1%	1.4%	5.9%	28.1%	64.4%
Dinner at-home	0.3%	1.9%	10.0%	26.4%	61.3%
Dinner away-from-home	0.4%	1.5%	10.2%	35.2%	52.6%

Table 3. Statistics on factors included in the double-hurdle model

	Mean, Non-Consumers	Mean, Consumers	Overall Mean
Frequency of Catfish Consumption (dependent variable)	0/month (421 observations)	2.9/month (510 observations)	1.6/month
Frequency of Seafood Consumption	14.0/month	16.8/month	15.5/month
Indicated the following was a source of seafood for consumption:			
Grocery Store	85.3%	87.8%	86.7%
Restaurant	85.0%	91.0%	88.3%
Recreational Catch or Fish Farms	15.2%	25.9%	21.1%
Fish Market or Gourmet Store	22.1%	29.8%	26.3%
Indicated the following was one of the top three reasons for consuming catfish:			
Enjoy flavor	5.7%	74.3%	43.3%
Health/Nutrition	3.1%	34.7%	20.4%
Tradition/Habit	0.7%	14.1%	8.1%
Price is attractive	1.7%	22.5%	13.1%
Availability	0.7%	21.4%	12.0%
Convenience	1.4%	8.0%	5.0%
Variety in diet	2.6%	27.3%	16.1%
Know how to prepare	0.7%	8.8%	5.2%
Product is farm-raised	1.4%	16.1%	9.5%
Indicated the following was one of the top three reasons for not consuming catfish:			
Price too high	1.7%	26.1%	19.8%
No fresh products available	16.9%	19.0%	18.0%
Not part of custom	12.8%	8.0%	10.2%
Lack preparation knowledge	28.5%	17.1%	22.2%
Too time consuming to prepare	6.9%	16.5%	12.1%
Texture	24.5	5.5%	14.1%
Smell	28.7%	9.8%	18.4%
Taste	45.1%	6.9%	24.2%
Product safety concerns	9.7%	6.7%	8.1%

Table 4. Description of Independent Variables

Variate	Variable Name	Description
Source of purchase	GROCERY	1 if seafood is purchased at a grocery store
	RESTAUR	1 if seafood is purchased at a restaurant
	RECR	1 if seafood is from recreational catch
	OTHERSC	1 if seafood is purchased at a specialty fish markets or gourmet stores
Consumption of Seafood	FREQFISH	Frequency of consumption of other finfish and shellfish products.
Reasons for eating catfish		The following variables are 1 if this reason was listed as one of the top three reasons for consuming catfish:
	FLAVOR	Enjoy flavor
	HEALTH	Health/nutrition
	TRAD	Tradition
	PRICE	Price
	AVAIL	Availability
	CONV	Convenience
	VDIET	Variety in diet
	KNOWHOW	Knowledge of how to prepare
	FARMRAISE	Product is farm-raised
Reasons for not eating catfish, or not consuming catfish more frequently		The following variables are 1 if this reason was listed as one of the top three reasons for NOT consuming catfish, or not consuming MORE catfish:
	NOPRICE	Price
	NOFPAVAI	Lack of availability of fresh products
	NOCUSTOM	Custom
	LPKLDGE	Lack of preparation knowledge
	TOOTIME	Too time consuming to prepare
	TEXTURE	Dislike texture
	SMELL	Dislike smell
	TASTE	Dislike taste
	PRODSAFE	Product safety concerns
Region of residence (U.S. Census regions)	NEWENG	New England (omitted category)
	MIDATL	Mid-Atlantic
	SEATL	Southeast Atlantic
	ENC	East North Central
	ESC	East South Central
	WNC	West North Central
	WSC	West South Central
	MOUNTAIN	Mountain
	PACIFIC	Pacific
Religion	CHRISTIAN	Christian (omitted category)
	CATHOLIC	Catholic
	OTHERREL	Other religions
Race/Ethnicity	CAUC	1 if Caucasian, 0 otherwise
Income	INC1	<$30,000

	INC2	$30,000 - $59,999
	INC3	$60,000 - $99,999
	INC4	$100,000 or above (omitted category)
Education	EDUC1	High School degree or less
	EDUC2	Some College
	EDUC3	At least one degree from College (omitted category)
Proximity to Coast	PROXCST	1 if currently lives within 50 miles of a coast
Age	AGE1	Age 35 or less
	AGE2	Ages 36-50
	AGE3	Ages 51-65
	AGE4	Age 66 or above (omitted category)
Gender	GENDER	1 if female

Table 5. Empirical Results from Double-Hurdle Model

Variable Name	Probit Coefficient	∂F(z)/ ∂X	Truncated Coefficient	∂E(Y*)/ ∂X
Source of seafood for consumption				
GROCERY	0.113 (0.174)[a]	0.042	0.267 (1.135)	0.056
RESTAUR	-0.052 (0.174)	-0.019	-3.509* (1.201)	-0.729
RECR	0.029 (0.159)	0.011	-1.814*** (1.020)	-0.377
OTHERSC	0.423* [b] (0.158)	0.156	0.571 (0.875)	0.119
FREQFISH	0.005 (0.004)	0.002	0.228* (0.002	0.047
Top three reason for consuming catfish				
FLAVOR	1.248* (0.181)	0.459	0.282 (1.021)	0.059
HEALTH	0.393*** (0.206)	0.144	0.669 (0.827)	0.139
TRAD	0.577*** (0.326)	0.212	2.146** (1.082)	0.446
PRICE	0.699* (0.245)	0.257	-0.682 (0.941)	-0.142
AVAIL	1.402* (0.344)	0.516	0.597 (1.002)	0.124
CONV	0.246 (0.313)	0.090	-1.634 (1.471)	-0.340
VDIET	0.493** (0.213)	0.181	-2.971* (1.129)	-0.618
KNOWHOW	0.498 (0.363)	0.183	2.212*** (1.284)	0.460
FARMRAISE	0.485*** (0.257)	0.178	2.866* (0.968)	0.596
Top three reason for not consuming oysters, or not consuming more catfish				
NOPRICE	0.035 (0.173)	0.013	-0.198 (0.983)	-0.041
NOFPAVAI	-0.137 (0.176)	-0.050	-0.479 (1.110)	-0.100
NOCUSTOM	-0.113 (0.194)	-0.042	-0.241 (1.556)	-0.052
LPKLDGE	-0.338** (0.153)	-0.124	-1.883 (1.296)	-0.391
TOOTIME	0.105 (0.202)	0.039	2.077*** (1.135)	0.432
TEXTURE	-0.159 (0.204)	-0.059	-3.299 (2.375)	-0.686
SMELL	-0084 (0.171)	-0.031	-2.031 (1.820)	-0.422
TASTE	-0.616* (0.167)	-0.226	-4.716*** (2.490)	-0.980

PRODSAFE	-0.035 (0.218)	-0.013	-3.667*** (1.920)	-0.762
Demographics				
MIDATL	0.075 (0.248)	0.028	-3.360*** (1.981)	-0.698
SEATL	0.192 (0.239)	0.071	-3.392*** (1.881)	-0.705
ENC	0.254 (0.249)	0.093	-2.841 (1.894)	-0.591
ESC	0.716* (0.283)	0.263	3.649** (1.561)	0.758
WNC	0.415*** (0.252)	0.153	1.741 (1.753)	0.362
WSC	0.786* (0.273)	0.289	3.617** (1.456)	0.752
MOUNTAIN	-0.009 (0.240)	-0.033	0.639 (1.851)	0.133
PACIFIC	-0.086 (0.233)	-0.032	-4.825** (2.122)	-1.003
CATHOLIC	-0.032 (0.145)	-0.012	-0.370 (0.979)	-0.077
OTHERREL	-0.196 (0.159)	-0.072	0.458 (1.174)	0.095
CAUC	-0.507* (0.184)	-0.186	-4.212* (0.990)	-0.875
INC1	-0.086 (0.214)	-0.032	-0.108 (1.512)	-0.022
INC2	-0.145 (0.169)	-0.053	1.167 (1.082)	0.024
INC3	-0.019 (0.174)	-0.069	0.385 (1.106)	0.080
EDUCAT1	0.055 (0.179)	0.020	2.476** (1.117)	0.515
EDUCAT2	0.210 (0.145)	-0.077	2.308** (0.925)	0.480
PROXCST	-0.363 (0.172)	-0.134	1.178 (1.074)	0.245
AGE1	-0.294 (0.258)	-0.108	-3.728** (1.778)	-0.775
AGE2	-0.304*** (0.171)	-0.112	-2.595** (1.180)	-0.539
AGE3	-0.376** (0.170)	-0.138	-1.708 (1.117)	-0.355
GENDER	0.106 (0.130)	0.045	-0.262 (0.771)	-0.055
Log-likelihood function	-294.04		-929.35	
Percent of correct predictions in probit model	87.6%			

[a] Standard errors of the coefficients are reported in parentheses.
[b] One, two, and three asterisks indicate significance at the 0.01, 0.05 and 0.10 levels, respectively.

Figure 1: Percent Consumption of Catfish By Region

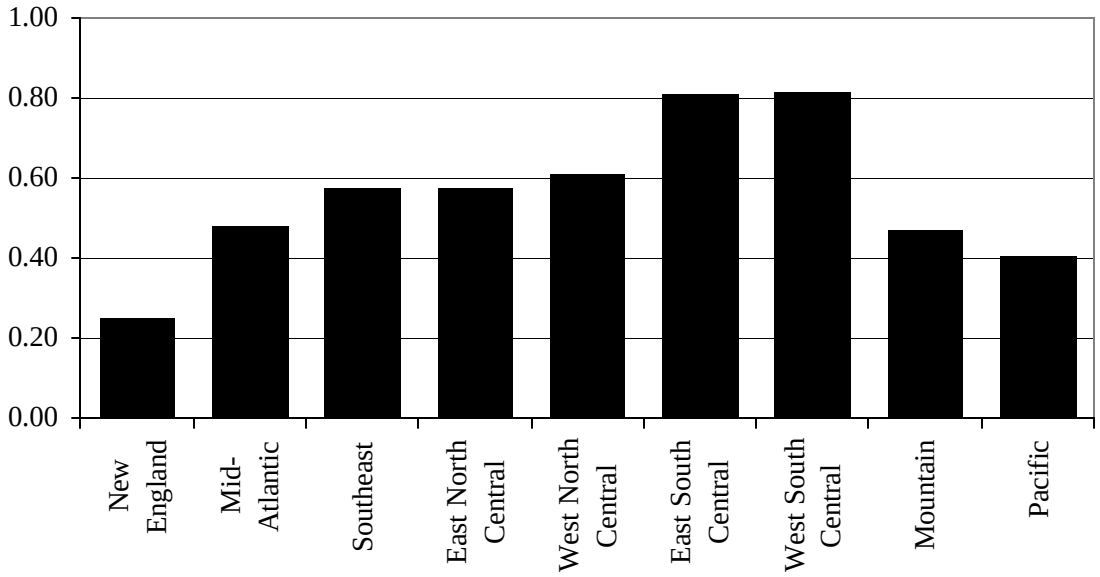

Figure 2: Reasons Given for Not Consuming Catfish, or Not Consuming More Catfish