MEXICAN CONSUMER PREFERENCES FOR BIOTECHNOLOGY

AND RETAIL FOOD OUTLETS

By

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Abstract

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The objective of this thesis is to better understand Mexican consumer preferences for biotechnology and retail food outlets. This objective is accomplished with two independent but related articles: an empirical study of Mexican consumer preferences and willingness to accept genetically modified (GM) food products and an empirical study of Mexican consumer preferences for retail food outlets.

The first article is based on analysis of data obtained from a survey conducted in Mexico in May 2004 as part of this thesis project. Using a dichotomous choice contingent valuation method, I analyze factors that affect the willingness to accept GM food in Mexico. The second article is also based on analysis of data obtained the same consumer survey conducted in Mexico in May 2004. In this article, I analyze factors that affect the choice of retail food outlets in Mexico. An implication of this thesis is that

there is an opportunity to market food segregated from GM product in Mexico. For those firms who want to market GM foods in Mexico, they need to convince Mexican consumers of the safety of their products with consumer education campaigns and credible risk communication. The thesis results will be of interest to food retailers in developing strategies to maintain a competitive advantage in this emerging retail food market place.

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CHAPTER ONE

INTRODUCTION

Consumer viewpoints regarding genetically modified (GM) food products are mostly pessimistic because of unknown environmental and health issues. Such issues include unexpected allergic responses, the spread of pest resistance or herbicide tolerance to wild plants, and inadvertent toxicity to wildlife (Curtis, McCluskey, and Wahl 2004). Consumers who are not well informed in the area of GM foods develop concerns that produce risks associated with GM products. These unknown risks range from obesity to diabetes, and to chemical toxicity.

Research Objectives

The major objective of this thesis is to better understand Mexican consumer preferences for biotechnology and retail food outlets. This study will help U.S. producers, food industry firms, and grocery store chains better evaluate the opportunities and challenges for marketing food products in Mexico. More specifically, the objectives in this study are to evaluate consumer responses to GM food products. Further, willingness to accept discounts for tortillas made with GM maize are calculated based on an in-person survey conducted for the purpose of this thesis. Next, the consumer choice of where to shop for food is analyzed. Also, factors which affect these choices are analyzed.

Thesis Format

The thesis is made up of an introduction, two independent but related articles, and a concluding chapter. The two articles are an empirical study of Mexican consumer preferences and willingness to accept genetically modified (GM) food products and an empirical study of consumer choice of food shopping in Mexico.

Summary of Findings

The first article (Chapter 2) is based on analysis of data obtained from a survey conducted with the purpose of eliciting Mexican consumers' willingness to accept genetically modified food products. In Mexico, a large U.S. export market, there has been some public opposition against GM foods. Using a dichotomous choice contingent valuation method, I find main shoppers in Mexico are more likely to ask for a higher discount rate for GM products. Not surprisingly, respondents who are favorable about use of biotechnology in food need a smaller discount to purchase GM-maize tortillas. Consumers who associate high risk with more biotechnology are more likely to ask discount for GM products. Respondents with smaller family size are more likely to ask for discounts for GM products. Strong environmental attitudes had the expected negative effect but were statistically insignificant.

The second article (Chapter 3) examines the factors that affect consumer choices of where to shop for food. Mexican consumers are asked in the survey where, when, and why they patronize certain shops. With this information obtained I estimate the likelihood of how often they shop at local "mom and pop" stores and commercial

retail stores like Wal-Mart. For the "mom and pop" stores, respondents who have location concerns, which are the most important factoring deciding where to buy groceries, are more likely to patronize local "mom and pop" stores rather than retail super centers. The results indicate that higher-educated consumers frequent "moms and pop" stores less. For the Super Center stores, consumers who have children under the age of 18 living in their household, with higher levels education and higher incomes are more likely patronize Super Centers. Further, consumers with higher education are more inclined to increase shopping in Wal-Mart, unlike consumers with medium education.

References for Chapter 1

Curtis, K.R., J.J. McCluskey, and T.I. Wahl "Consumer Acceptance of Genetically

Modified Food Products in the Developing World," *AgBioForum: The Journal of

Agrobiotechnology Management and Economics* 7(1-2)(2004):69-74.

CHAPTER TWO

CONSUMER RESPONSE TO GENETICALLY MODIFIED

FOOD PRODUCTS IN MEXICO

INTRODUCTION

Mexico's Ministry of Environment and Natural Resources has confirmed that

Mexican native maize varieties have been contaminated by DNA from genetically

modified maize. The contamination was discovered in the Mexican states of Oaxaca and

Puebla.   This is an outcome from México's importation of maize from the United States.

Consumer reactions seem to differ among different age groups; the younger generation

seems to be more reluctant to accept genetically modified (GM) maize compared to the

older generation. Price is the chief concern for the older generation.

Teosinte, a native weed in Mexico, was cross bred into productive modern

maize by selective plant breeding, a primitive form of transgenics, in Tehuacán Valley of

southern Mexico, by indigenous farmers some 7,000 years ago, now there are at least 59

different species of maize (Encarta 2004). Transgenic crops are produced by introducing

genetic material from other plant or animal species into the organism's DNA as a way to

create resistance to pests, specific herbicides and severe weather, or to improve crop

yields (Encarta 2004). In other words, transgenic crops are the result of crossing two

unlike organisms with a level of precision that cannot occur naturally or with traditional

plant breeding. For example tracking the anti freeze gene from an artic fish and transplanting it into tomatoes, thus making it frost resistant (Thomashow 1998).

Roughly 70 percent of Mexico's maize, five million tons a year, is imported from the United States and between 30 to 50 percent of that is genetically modified (Alvarez 2004). Maize crops in Mexico cover 8.5 million hectares of farmland, producing 19.3 million tons of the grain a year.

Most U.S. maize is genetically modified to produce a naturally occurring toxin known as *Bacillus Thuringiensis* (Bt), to ward off pests. It was that Bt-producing gene that was found in the Mexican government study. There are concerns that GM maize establishes a threat to Mexico's natural maize gene pool, where the prevalent stores of natural maize strains are located. Maize is open pollinated, and gene flow between GM maize and non-altered maize can take place easily (Carpentier 2004.)

The different species of maize illustrate widely differing characteristics: some varieties mature in two months; others take as long as eleven months (Encarta 2004). A loss in diversity increases the vulnerability of maize in the future. If a disease threatens the maize crop, then Mexico's natural maize gene pool might be of great help to commercial crops to overcome that disease or adverse effects in general.

Genetic contamination of native maize varieties is a concern because Mexico's maize tortillas are an essential part of the country's diet; 68 percent of all maize in Mexico is used for human consumption (Carpentier 2004). GM maize is permitted for animal feed and ethanol fuel, but studies indicate that GM maize has a potential to cause

rashes, diarrhea, respiratory problems, or other allergic reactions in humans (Sowinski 2002).

Studies do not conclude that GM maize is a hazard for human consumption and there is not a great deal of evidence to suggest otherwise (Padgette 1996). The fear in addition to human health, is losing cultural identify. Maize is more than just a plant to the people but a source of identity and pride. Ethics also comes into play in situations where humans are manipulating with natures genetic make up. Consumers maybe scared that GM crops are hazardous, but it is assumed that existing natural strains are safe (Beringer 2000)

Consumers make choices of whether or not to purchase GM food on a cost and benefit basis. Costs can include: financial costs, negative health effects, adverse environmental effects, and ethical objections. Benefits can include: improve taste, texture and nutritional value (Thomashow 1998). Consumers establish their opinion on GM food by weighing the pros and cons of the product. If the product is more prone to negative effects than positive effects than it is quite simple to determine, what the consumer will purchase. In most cases consumers have no idea that they are purchasing GM products since the US law does not require GM labeling.

The purpose of this research is to identify the Mexican consumer's perceptions about GM food, specifically GM maize. The study's main objective is to recognize what factors contribute to the consumer's willingness or reluctance to accept GM maize products across different various population groups, i.e., youth versus elderly or gender, and to better understand Mexican consumer preferences for biotechnology and

retail food outlets. The results should indicate if GM maize is a marketable product in Mexico. The goals of this study are to analyze factors that induce consumers to choose GM-food and to estimate Mexican consumers' relative willingness to purchase GM-food compared with discounts relative to non-GM food.

Previous Studies

In recent years, the issue of GM labeling has received considerable attention. round 67.7 million hectares of GM crops are being grown commercially, mostly in North America (Clive 2003). The most commonly developed GM crops, soybean and maize, are those with modified agronomic traits, such as, herbicide resistance and increased nutritional value. The foodstuffs from these commodity crops are now integrated into a large array of processed foods (Dunwell 1999). Approximately two-thirds of all processed food now in the United States supermarket shelves contain some sort of GM ingredients (Clive 2003). Approximately 20 percent of U.S. consumers recognize that they have consumed GM foods. Less than 15 percent of all consumers realize how widespread these foods are (McGowan 2001)

Genetically modified crops have undergone increased scrutiny; the rationale behind this distrust is rather weak. About 41 percent of 1,002 U.S. participants in a 1999 survey expressed that they did not comprehend biotechnology enough to give an accurate opinion (Gap 1999). Whol (1999) determined that with a simple cost-benefit model, we can examine what factors influence consumer views on modified crops and analyze them in an attempt to explain consumer's reactions.

Moon and Balasubramanian (2001) recognized that consumer support of GM food was positively correlated to risks and benefits associated with the modified crops. Consumer's perceptions about corporations, trust in government and knowledge of science were determined to be factors in consumer's reluctance to accept GM foods. Normally positive attitudes towards genetically modified foods in developing nations come from the availability and nutritional content of food; risk may be less significant due governmental trust, optimistic view of science, and positive media influence. This is opposite to the negative attitudes found in many developed countries thus, a decreased acceptance of GM foods (Curtis, McCluskey, and Wahl 2003). In surveys conducted between 1997 and 2001, 50-60 percent of consumers were likely to purchase GM crops that were altered to taste better or fresher, and more than 70 percent said they would purchase GM crops that were altered to protect them from insect damage (Wirthlin 2001).

The world population by the year 2050 is predicted to double, making food security a significant concern for the next 30 year (Hiroshi, et al. 2002). Herrera-Estrella (2000) states that GM crops are the most promising solution for augmenting agricultural production and productivity to solve the food shortage in the future, if properly implemented in current farming techniques. This is only possible if consumers reactions toward GM crops are positive. If not, the dilemma of feeding the world will become a difficult task indeed.

Biotechnology in agriculture has become a social and ethical issue; some are troubled by the social consequences of farmer's dependence on corporations for their means of production. Others are concerned that biotechnology will facilitate

underdeveloped countries production of commodities which developed countries already produce; therefore, decreasing the developed countries exports. These concerns may to global instability (Junne1991; Galhardi 1995).

<u>Data</u>

The survey used in this study was pre-tested with students at Washington State University and conducted at the following locations in Mexico: Aguascalientes , Leon Guanajuato, and San Juan de Los Lagos Jalisco during May 2004. Aguascalientes is a large industrial state in central Mexico. It is also the capital of the state of the same name with a population around 640 thousand (http://www.mexicostartupservices.com/ info.php?ID=1). Leon, Guanajuato with a population of around one million citizens is said to be the shoe capital of the world because of its large number of factories producing shoes and leather articles of high quality (http://www.donquijote.org/guanajuato/ city3.asp). San Juan de Los Lagos, Jalisco is a city with a population of approximately 40,000. San Juan has a large concentration of hotels, and restaurants (http://www. mexicodesconocido.com.mx/espanol/cultura_y_sociedad/religion/detalle.cfm?idpag=105 6&idsec=19&idsub=0). Novelty items are sold on almost every maizeer in the city center. Items sold include, candles, photos, and Virgin Mary posters. All this commerce added up make for a large collective total.

The survey data was collected with in-person interviews. By collecting data from consumers at the same time and place where actual purchase decisions are made, we hoped to better elicit consumers' true preferences about the products. Respondents were

selected randomly with the criterion that the interviewer was to solicit every third customer who came in the survey area. Every respondent was given a bottle of Coke (worth approximately U.S. $0.50) as a reward in return for participation in the survey. The turndown rate was about ten percent as observed by interviewers when they asked for participation.

In total, 903 consumers were surveyed. The majority of respondents are the primary food shoppers of the household (55 percent) and female (60.5 percent). Approximately 64 percent of those shoppers shop for groceries daily or between two and five times a week. The mode age reported was lass than 30 years old (47.6 percent) followed by 30-50 years (41.3 percent). About (65 percent) of all Mexican respondents reported to have children under the age of 18 years of age living in their household. The mode household income falls into the middle class for the 2003 fiscal year as compared to the Mexican average where 40 percent are below poverty level (http://www.cia.gov/cia/publications/factbook/geos /mx.html#Econ). The average education level of the respondents was high school, which is higher than the Mexican average which is 35 percent with no school (Encarta 2004). Summary statistics and variable descriptions are presented in Table 2.1.

The survey solicited information regarding respondents' attitudes about the environment and food safety, their self-reported knowledge and perceptions about biotechnology. Information about environmental and food safety attitudes was obtained by presenting trade-off situations between environmental quality and economic growth, and between food safety and low prices, respectively (see APPENDIX 2.1 for actual tradeoff questions in English and APPENDIX 2.2 for Spanish). Eliciting these attitudes

from trade-off scenarios was an effective way of ensuring that the survey information was informative as well as useful in an empirical modeling context. For example, without the tradeoff, most respondents will say that they value the environment highly. The resulting lack of variation in response can lead to a lack of statistical significance of the effect of the environmental variable. In addition, respondents were asked, "What are source of risk associate with GM food?" The responses varied greatly.

As in all surveys, it is of concern that the sample is representative of the population under study. Given the preceding concerns, we acknowledge that the extent to which the findings can be fully generalized to broader populations is uncertain.

Empirical Analysis

The empirical analysis associated with this research is divided into three sub-sections. The first discusses the contingent valuation dichotomous choice methodology used in this study. The second introduces the econometric model used in the quantitative analysis of the data. The third analyses factors that affects consumers' willingness to pay for GM-foods.

Contingent Valuation Dichotomous Choice Methodology

The contingent valuation method (CVM) is a standard approach to elicit people's willingness to accept (WTA) through dichotomous choice, market-type questioning format with a direct survey such as via telephone, mail, and in-person questionnaire (Kanninen 1993). In the dichotomous choice CVM, each respondent is asked whether or not he/she would be willing to accept a particular discount for a

particular good in a hypothetical market, letting him/her answer with "yes" or "no" along with the discounts "bid" amounts offered to each individual.

There are typically two types of bidding procedures used in the CVM: the single-bounded and double-bounded dichotomous choice with the double-bounded model gaining popularity (Kanninen 1993). The single-bounded model approach recovers the bid amount as a threshold by asking only one dichotomous choice question (Hanemann, Loomis, and Kanninen 1991). The statistical efficiency of this approach can be improved by use of the double-bounded model, which engages in two bids. Recent work in this area includes Yoo and Yang 2001. In the first study, the authors provide empirical evidence of the gains in the statistical efficiency of both benefit and parameter estimates obtained by analyzing follow-up responses with Double Bounded interval data analysis.

Our survey included contingent valuation questions regarding willingness to accept a discount to purchase tortillas containing genetically modified maize. The hypothetical market for the good in question must be as close as possible to a real market in order to reveal people's true preferences if an actual market existed (Pearce and Turner 1990). The food product (maize tortillas) used in this study are appropriate to be examined since they are frequently consumed food products by the most Mexicans: 688 out of 872 respondents (78.9 percent) said they consume tortillas daily.

Customers were first asked if they were willing to pay the same price for the GM-tortillas as the corresponding, non-GM tortilla. If the customer's answer to this question was "no," a follow-up question would be asked where the respondent was offered a percentage discount on the GM-food product relative to the corresponding non-GM product. The discounts were set at one of the following levels: 5, 15 30, 50 and 90

percent. Each level of discount was used for one fifth of the surveys. The assignment of survey version (and thus, discount) was random to the respondent. Similarly, if the respondent's answer to the first question was "yes", a follow-up question would be asked where the respondent was offered a percentage premium on the GM product relative to the non-GM product. The premiums were set at one of the following levels: 5, 10, 15, 20, and 50 percent, with each level of premium used for one fifth of the surveys. Of the 873 respondents, 54.41percent said that they would be willing to purchase the genetically modified tortillas at the same price as the corresponding non-GM tortillas. Overall, 12.58 percent of respondents said that they would still choose the GM tortillas if they were more expensive (the "yes, yes" group), and 54.41 percent of respondents would buy the GM tortillas at equal prices but not pay extra for them (the "yes, no" group). Further, 21.73 percent of consumers in the sample stated that they would be willing to purchase the GM tortillas if they were less expensive than the corresponding non-GM products (the "no, yes" group). The rest of the respondents, that is 69.32 percent were not willing to purchase the GM tortillas even with the discount (the "no, no" group). For more specific statistics on the distribution of responses over the various discounts, see Table 2.3.

<center>Econometric Model</center>

In the double-bounded model used here there are four possible outcomes: (1) the respondent is not willing to purchase the GM product at the same price as non-GM product, nor at a discount relative to the non-GM product, i.e. "no" to both bids; (2) the respondent is not willing to purchase the GM product at the same price as the non-GM

product, but is willing to purchase the GM product at the random discount offered, a "no" followed by a "yes;" (3) the respondent is willing to purchase the GM product at the same price as non-GM product, but is not willing to purchase it at a premium, i.e. a "yes" followed by a "no;" (4) the respondent is willing to purchase the GM product at the same price as non-GM product and also willing to purchase at a random premier offered relative to the non-GM product, i.e. "yes" to both bids.

The model most applicable to examine the outcomes of our survey is the standard double-bounded logit model (Hanemann, Loomis, and Kanninen 1991). In this model, the initial bid (B_0) equals zero and implies no price difference between the GM product and the non-GM product. The second bid is contingent upon the response to the first bid. It will be a discount bid (B_D), if the respondents answer that they would not buy the GM product at the same price as the non-GM product. If they answer that they would buy the GM product at the same price as the non-GM product, it becomes a premium bid (B_P).

The sequence of questions isolates the range in which the respondents true WTP for GM products relative to non-GM products lie. The second bid, B_D or B_P, in conjunction with the response to the initial preference decision, allows an upper bound and a lower bound to be placed on the respondent's unobservable true WTP for GM food products.

Let WTP_i denote an individual's WTP (bid function) for GM food products. The following discrete outcomes of the bidding process are observable:

$$(1) \qquad D_g = \begin{cases} 1 & WTP_i < B_D \\ 2 & B_D \le WTP_i < B_0 \\ 3 & B_0 \le WTP_i < B_P \\ 4 & B_P \le WTP_i \end{cases}$$

Respondents who indicated they would require no discount and accepted the highest premium fall into the fourth group. Those indicating no discount and premium less than B_P fall into the third group. Next, respondents who required a discount greater than or equal to B_D, fall into the second group. Finally, the first group contains respondents indicating the lowest WTP. Consumers in this group are not willing to purchase the GM-product at the discount offered. The WTP function for GM food products for individual i is

$$(2) \qquad WTP_i = \alpha - \rho B_i + \lambda' z_i + \varepsilon_i \text{ for } i=1,\ldots.n$$

where B_i is the ultimate bid individual i faces, z_i is a column vector of observable characteristics of the individual, ε_i is a random variable accounting for random noise and possibly unobservable characteristics. Unknown parameters to be estimated are α, ρ, and λ. Linearity in z and ε is assumed for all individuals. Furthermore, the distribution of the error term is assumed to follow $\varepsilon \sim G(0, \sigma^2)$, where $G(0, \sigma^2)$ denotes a cumulative distribution function with mean zero and variance σ^2. Under these assumptions, the choice probabilities for individual i can be characterized as:

$$(3) \qquad prob(D = j) = \begin{cases} G(\tilde{\alpha} - \tilde{\rho}B_D + \tilde{\lambda}'z) \\ G(\tilde{\alpha} - \tilde{\rho}B_0 + \tilde{\lambda}'z) - G(\tilde{\alpha} - \tilde{\rho}B_D + \tilde{\lambda}'z) \\ G(\tilde{\alpha} - \tilde{\rho}B_P + \tilde{\lambda}'z) - G(\tilde{\alpha} - \tilde{\rho}B_0 + \tilde{\lambda}'z) \\ 1 - G(\tilde{\alpha} - \tilde{\rho}B_P + \tilde{\lambda}'z) \end{cases} \text{ for } j = \begin{cases} 1 \\ 2 \\ 3 \\ 4 \end{cases}$$

Thus, the log-likelihood function becomes:

$$(4) \qquad L = \sum_i \begin{cases} I_{D_i=1} \ln G(\tilde{\alpha} - \tilde{\rho}B_{Di} + \tilde{\lambda}'z_i) \\ + I_{D_i=2} \ln[G(\tilde{\alpha} - \tilde{\rho}B_{0i} + \tilde{\lambda}'z_i) - G(\tilde{\alpha} - \tilde{\rho}B_{Di} + \tilde{\lambda}'z_i)] \\ + I_{D_i=3} \ln[G(\tilde{\alpha} - \tilde{\rho}B_{Pi} + \tilde{\lambda}'z_i) - G(\tilde{\alpha} - \tilde{\rho}B_{0i} + \lambda'z_i)] \\ + I_{D_i=4} \ln[1 - G(\tilde{\alpha} - \tilde{\rho}B_{Pi} + \tilde{\lambda}'z_i)] \end{cases}$$

where I_K is an indicator function for the event K, and $D_i = j$ denotes that the jth

alternative occurred. In the empirical implementation of the model, we define $G(.)$ to be

the standard logistic distribution function with mean zero and standard

deviation $\sigma = \pi / \sqrt{3}$. The bid information and other demographic information were used

to estimate the magnitude of those factors, which affect Mexican consumers' WTP for

GM food tortillas.

Analysis of Factors that Affect WTA for GM-Food

The bid information and other information about the respondents were used to

estimate the magnitude of factors that affect the consumers' choice of whether to

purchase GM-foods and, specifically, how much of a relative discount Mexican

consumers will require to purchase GM maize tortillas. The model given in (2) was

estimated where *z = main shopper, environment, risk, daily, family size*, and *opinion*.

Variable definitions and descriptions are given in Table 2.2. Parameters to be estimated

were $\boldsymbol{\lambda}' = \{\lambda_1 \quad \lambda_2 \quad \lambda_3 \quad \lambda_4 \quad \lambda_5 \quad \lambda_6\}$ in addition to α, ρ. Not all of the potential

variables from the survey could be used in the empirical analysis because of

multicollinearity issues. Variables were chosen based on results from previous studies

and goodness of fit. Attitude variables are included in the empirical model because they

have been statistically significant in previous studies. In their investigation of U.S.

consumers' acceptance of GM maize flakes, Baker and Burnham (2001) found that

cognitive variables (opinions, beliefs, knowledge) have a significant influence on

consumer preferences. The parameters estimates are given in Table 2.4.

Main shoppers in Mexico are more likely to ask more discount rate for GM

products. Not surprisingly, respondents who are favorable about use of biotechnology in

food need a smaller discount to purchase GM-maize tortillas. Consumers who associate

high risk are more likely to ask discount for GM products. Respondents with smaller

family size are more likely to ask discount for GM products. Strong environmental

attitudes had the expected negative effect but were statistically insignificant.

<div align="center">Conclusions</div>

In this paper, I analyzed factors that induce Mexican consumers in my sample

to choose genetically modified maize tortillas and estimated the discount required for

them to choose this GM product. The data includes the results of in-person interviews

with 903 shoppers in the following locations in Mexico: Aguascalientes, Leon GTO, and

San Juan de Los Lagos during May 2004. A better understanding of Mexican consumers'

attitudes and behaviour toward genetically modified food products and how these

attitudes affect the purchasing choices for such food products is essential for marketing

GM food products in Mexico.

Still, one can infer from the results that a transformation of Mexican

consumers' perceptions and attitudes are needed for GM food products to successfully

enter the Mexican market.

To the extent that these findings apply more generally, this research highlights

the effects of consumer attitudes about biotechnology, socio-demographic characteristics,

and price on Mexican consumers' decision on GM maize tortillas.

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TABLE 2.1: Summary Statistics for Demographic Variables

Variable	Description	Distribution of Survey Responses
Age	≤ 30 years	47.63%
	30 to 50	41.32%
	50 to 70	10.33%
	>70 years	.72%
Female	1 if female	60.5%
	0 if male	39.5%
Shopper	1 if main shopper	55.54%
	0 otherwise	44.41%
Education	1 Elementary	24.44%
	2 HS Diploma	49.32%
	3 Some University	13.63%
	4 Completed University	6.64%
	5 Post University (Post Grad)	1.13%
	6 No Response	4.84%
Children	1 if children younger than 18 year	65.20%
	in household	34.80%
	0 otherwise	
Income	High	8.45%
	Medium	61.72%
	Low	29.83%
Household	Number of people in household	
	Medium	4.87
	Std. Dev.	2.27

TABLE 2.2: Summary Statistics for Consumer Information and Perception Variables

Variable	Description and Coding	Distribution of Responses
Environment	Importance of environmental sensitivity vs. economic growth (scale: 1 to 10, where 1 = Economic growth is all-important and 10 = Environment is all-important)	Mean = 6.46 Std. Dev.= 2.3985
Safety	Importance of food price vs. food safety (scale from 1 to 10, where 1 = Food prices all-important 10 = Food safety all important)	Mean = 4.554 Std. Dev. =2.729
Risk	Risk associated with GM foods 1—high risk 0—otherwise	20.07% 79.93%
Opinion	Opinion about use of biotechnology 1—positive opinion 0—neutral or do not know -1—negative opinion	21.73% 60.81% 17.47%
Knowledge	Self-Reported knowledge about biotechnology 1 Very Informed 2 Little Informed 3 Not Informed	5.42% 60.61% 33.97%
Label	Importance of labeling GM foods 1 Very Important 2 Somewhat Important 3 Not important	70.31% 17.38% 12.31%
Daily	1—buy maize tortillas daily 0—otherwise	78.9% 21.1%

TABLE 2.3A. Range and Distribution of Response Rates to Discount Offers

%Discount	15%	30%	5%	50%	90%	Total
yes	28	30	32	31	33	**154**
no	74	70	65	68	71	**348**
Total	102	100	97	99	104	**502**

TABLE 2.3B. Range and Distribution of Response Rates to Premium Prices

%Premium	10%	15%	5%	20%	50%	Total
yes	23	21	24	16	29	**113**
no	88	77	87	82	73	**407**
Total	111	98	111	98	102	**520**

TABLE 2.4. Parameter Estimates for WTP Model

Parameter	Estimate	Standard Error	Z-test	p-value
Constant	0.10317489	0.61408845	0.16801307	0.86657299
Bid	-3.3714576	0.41335543	-8.1563161	3.454e-16
Main shopper	-0.45308072	0.26276466	-1.7242833	0.084656706
Environment	-0.071446923	0.055750195	-1.2815547	0.19999891
Risk	-1.0124439	0.31323108	-3.2322588	0.0012281576
Daily shopper	0.30927721	0.33712067	0.91740803	0.35892887
Family size	0.098384263	0.05167049	1.9611332	0.049863490
Opinion	0.37744377	0.18796061	2.0081003	0.044632634

APPENDIX 2.1

Consumer Survey

M / F	Place:	Date:
Interviewer's Name:		

Q.1 Are you the person who purchases the groceries in your household?

1. Yes
2. No

Q.2 How often do you buy groceries?

1. Every Day
2. 2-5 a week
3. Once a week
4. Once every 2 weeks
5. Once a month

Q.3 Where would you place yourself on a scale from 1 to 10, if economic growth at all cost is a 1 and saving the environment at all cost is a 10. (CIRCLE JUST ONE)

1   2   3   4   5   6   7   8   9   10

Q.4 When you are purchasing food, how important lower food safety risks versus lower cost food on a scale of 1 to 10, where 1 means lower food safety risk is all important and 10 means lower food prices are all important?

1   2   3   4   5   6   7   8   9   10

Q.5 How informed are you in respect to biotechnology and GMO's?

1. Very Informed
2. Little Informed
3. Not Informed

How often do you buy groceries at the following places?

Q.6 Market Place

 a) Never
 b) Rarely
 c) Once a month
 e) 2 or 3 times a month
 f) Weekly
 g) 2 to 3 times a week
 h) Daily

Q.7 "mom-and-pop" grocery store (small family-owned store)

 a) Never
 b) Rarely
 c) Once a month
 e) 2 or 3 times a month
 f) Weekly
 g) 2 to 3 times a week
 h) Daily

Q.8 Super market

 a) Never
 b) Rarely
 c) Once a month
 e) 2 or 3 times a month
 f) Weekly
 g) 2 to 3 times a week
 h) Daily

Q.9 Super Center (such as Wal-Mart)

 a) Never
 b) Rarely
 c) Once a month
 e) 2 or 3 times a month
 f) Weekly
 g) 2 to 3 times a week
 h) Daily

Q.10 Other: _____ (Fill in blank)

    a) Never
    b) Rarely
    c) Once a month
    e) 2 or 3 times a month
    f) Weekly
    g) 2 to 3 times a week
    h) Daily

Q.11 Approximately what is the percentage of you household income spent on food in the following places?

    a) Market _____
    b) Mom and Pops _____
    c) Super Market _____
    d) Super Center(Wal-Mart) _____
    e) Other:_____

Q.12 How often do you eat out?

    a) Never
    b) Rarely
    c) Once a month
    e) 2 or 3 times a month
    f) Weekly
    g) 2 to 3 times a week
    h) Daily

Q.13 Do you own a car?   Yes____ No____

Q.14 What is the most important factor where you decide to buy your groceries?

    a) Prices
    b) Variety
    c) Quality
    d) Location
    e) What you want to cook/occasion

Q.15 In general, how do you feel towards the use of biotechnology in food?

1. Very Positive
2. Relatively Positive
3. Neutral
4. Somewhat Negative
5. Very Negative
6. Do not know

Q.16 What level of risk, if any, do you associate with GM foods?

1. High level of risk
2. Low level of risk
3. No risk (go to Q.9)
4. Do not know (go to Q.9)

Q.17 What is the origin of this risk? _____ (fill in blank)

Q.18 Would be you willing to buy food with ingredients genetically modified if they had additional vitamins or nutrients?

1. Yes
2. No

Q.19 Would be you willing to buy food with genetically modified ingredients if they reduced the quantity of pesticides applied to the cultivation?

1. Yes
2. No

Q.20 How important is it for you that the food with genetically modified ingredients be labeled?

1. Very Important
2. Somewhat Important
3. Not Very Important

Q.21 Do you prefer national over imported foods?

1. Yes
2. No

Q.22 How often do you buy maize tortillas?

1. Daily
2. At least once a week
3. At least once a month, but less than once a week
4. Less than once a week?

Q.23 Would you be willing to buy tortillas with genetically modified maize if they were offered at same price as tortillas made without genetically modified maize?

1. Yes (go to Q.27)
2. No

Q.24 Would you accept GM tortillas if they were offered to you for free? **Yes or No**

Q.25 Would you be willing to buy tortillas made with genetically modified maize if they were offered at price that is 5% less than tortillas made without genetically modified maize?

1. Yes
2. No

Q.26 Would you be willing to buy tortillas made with genetically modified maize if they were offered at price that is 5% more than tortillas made without genetically modified maize?

1. Yes
2. No

Q.27 Is there a child under 18 years of age in your household?

1. Yes
2. No

Q.28 For how many persons do you buy food for, including yourself? _____

Q.29 Which it is the maximum level of education that you have completed?

1. Elementary
2. High school
3. Some University
4. Complete University
5. Post University (post-grad)
6. No response

Q.30 Which was the level of income of your family group in the 2003?

Include level (high, med, low) and pesos

Q.31 Which of these categories best represents your state of employment:

1. Full-Time
2. Part-Time
3. Unemployed
4. House owner
5. Widow
6. No Response

Q.32 Can I ask you what year you were born in?
1. _____
2. No response

End

APPENDIX 2.2

Borrador de la Encuesta

H / M	Lugar:	Fecha:
Nombre del encuestador:		

Q.1 Es usted la persona que hace las compras de alimentos en su casa?

1. Sí
2. No

Q.2 Cuan a menudo usted compra alimentos?

1. A diario
2. Entre 2-5 veces a la semana
3. Una vez a la semana
4. Una vez cada dos semanas
5. Una vez al mes

Q.3 En una escala de 1 a 10 donde se ubica usted?, **crecimiento económico sin importar el costo es 1** y **salvar el medioambiente sin importar el costo es 10**.

1   2   3   4   5   6   7   8   9   10

Q.4 Cuando usted compra comida, cuan importante es un bajo riesgo de **contaminación** versus un bajo **precio** en la escala de 1 a 10, donde **1 significa que el bajo riesgo de contaminación es lo más importante, y 10 significa que los precios bajos son lo mas importante**?

1   2   3   4   5   6   7   8   9   10

Q.5 Que tan informado es usted respecto a la biotecnología y alimentos genéticamente modificados?

1. Muy informado
2. Algo informado
3. No informado

Que a menudo va a compra comida a las sigientes lugares.

Q.6 Mercado

    A. Nunca
    B. Rara vez
    C. Una vez al mes
    D. 2 o 3 vezes/mes
    E   Semanalmente
    F. 2 to 3 vezes/seman
    G. Diariamente

Q.7 Tiendas familiars

    A. Nunca
    B. Rara vez
    C. Una vez al mes
    D. 2 o 3 vezes/mes
    E   Semanalmente
    F. 2 to 3 vezes/seman
    G. Diariamente

Q.8 Super marketa

    A. Nunca
    B. Rara vez
    C. Una vez al mes
    D. 2 o 3 vezes/mes
    E   Semanalmente
    F. 2 to 3 vezes/seman
    G. Diariamente

Q.9 Super Centro (Como Wal-mart)

    A. Nunca
    B. Rara vez
    C. Una vez al mes
    D. 2 o 3 vezes/mes
    E   Semanalmente
    F. 2 to 3 vezes/seman
    G. Diariamente

Q.10 Otro:_____ (llene el espacio en blanco)

    A. Nunca
    B. Rara vez
    C. Una vez al mes
    D. 2 o 3 vezes/mes
    E Semanalmente
    F. 2 to 3 vezes/seman
    G. Diariamente

Q.11 Aproximadamente que es el por ciento de su en casa presupuesto de alimento que gasta en los lugares siguientes:

    A. Mercado _____
    B. Tiendas familiares _____
    C. Super Marketa _____
    D. super centro (Como Wal-mart) _____
    E. Otro:_____

Q.12 Que a menudo va a comer a un restaurante?

    A. Nunca
    B. Rara vez
    C. Una vez al mes
    D. 2 o 3 vezes/mes
    E Semanalmente
    F. 2 to 3 vezes/seman
    G. Diariamente

Q.13 Tiene un carro propio?   Si____ No____

Q.14 Cual es el factor mas importante que decide donde hace sus compras?

    A. Los Precios
    B. La Variedad
    C. La Calidad
    D. La Ubicacion
    E. Lo que quiero cocinar/ocasion

Q.15 En general, como se siente usted acerca del uso de la biotecnología en alimentos?

    A. Muy positivo
    B. Relativamente positivo
    C. Neutro
    D Algo negativo
    E. Muy negativo
    F. No sabe

Q.16 Que nivel de riego, si alguno, asocia usted a los alimentos genéticamente modificados?

    A. Alto nivel de riesgo
    B. Bajo nivel de riesgo
    C. No riesgo (vaya a Q.9)
    D. No sabe (vaya a Q.9)

Q.17 Cual es el origen de este riesgo?_____(llene el espacio en blanco)

Q.18 Estaría usted dispuesto a comprar alimentos con ingredientes genéticamente modificados si ellos tuvieran vitaminas o nutrientes adicionales?

    1. Sí
    2. No

Q.19 Estaría usted dispuesto a comprar alimentos con ingredientes genéticamente modificados si ellos redujeran la cantidad de pesticidas aplicados a los cultivos?

    1. Sí
    2. No

Q.20 Cuan importante es para usted que los alimentos con ingredientes genéticamente modificados sean etiquetados?

    1. Muy importante
    2. Mas o menos importante
    3. No muy importante

Q.21 Prefiere usted productos alimenticios nacionales o importados?

    1. Si
    2. No

Q.22 Cuan a menudo usted come tortillas de maíz?

A. A diario
B. Al menos una vez a la semana
C. Al menos una vez al mes, pero menos que una vez a la semana
D. Menos de una vez al mes

Q.23 Estaría usted dispuesto a comprar tortillas elaboradas con maíz genéticamente modificado si estas fueran ofrecidas al mismo precio a tortillas hechas con maíz no genéticamente modificado?

3. Sí (vaya a Q.27)
4. No

Q.24 Aceptaría las Tortillas de GM si ellos fueron ofrecidos a usted gratis? **Si o No**

Q.25 Estaría usted dispuesto a comprar tortillas hechas con maíz genéticamente modificado si ellas fueran ofrecidas a un precio que es 5% menos que tortillas elaboradas sin maíz genéticamente modificado?

1. Sí
2. No

Q.26 Estaría usted dispuesto a comprar tortillas hechas con maíz genéticamente modificado si ellas fueran ofrecidas a un precio que es 5% mas que tortillas elaboradas sin maíz genéticamente modificado?

1. Sí
2. No

Q.27 Hay algún niño menor de 18 años en su casa?

1. Sí
2. No

Q.28 Para cuantas personas usted compra alimentos, incluyendose usted mismo?_____

Q.29 Cual es el máximo nivel de educación que usted a completado?

A. Educación básica
B. Educación media
C. Universitaria incompleta
E. Universitaria completa
F. Universitaria avanzada (post-grado)
G. No responde

Q.30 Cual fue el nivel de ingreso de su grupo familiar en el 2003?

Incluir nivel de ingreso en pesos

Q.31 Cual de estas categorías representa mejor su estado de empleo:

- A. Empleado tiempo completo
- B. Empleado tiempo parcial
- C. Desempleado
- D Dueña de casa
- E. Jubilado
- F. No responde

Q.32 Podría preguntarle en que año nació usted?
  *1*_____
  2 No contesta

Fin

CHAPTER 3

MEXICAN CONSUMER CHOICE IN RETAIL FOOD OUTLETS

INTRODUCTION

Traditionally most Mexicans buy their eggs, produce, and packaged foods in
different stores, visiting three or more shops in their multiple weekly trips to the store.
However, recently American businesses have been gradually creeping into the Mexican
economy, and this may affect consumption and shopping patterns. American businesses
such as Blockbuster, Office Depot and Wal-mart are illustrations of such business that
have breached the border and have opened its doors to the Mexican consumer. "Mom
and pop" stores, a small business that is owned and managed by a family, have been, and
nonetheless are still the Mexican's choice for patronization (American Heritage 2000).
The Spanish term that is commonly used in Mexico for "mom and pop" stores is *tiendas
abarrotes*. Mexico's culture revolves around these local mom and pop stores. Most
people in Mexico are from lower income families, so many people cannot afford to shop
at modern American supermarkets (Leith 2003). Note that "mom and pop" stores
typically allow purchases on credit—so shopping there may be a necessity for liquidity
constrained shoppers, who cannot obtain credit elsewhere.

Mexican shopping is primarily linked with local mom and pop stores, and
markets; but they are also directly linked with what category they are associated with:

lower class, middle class, or upper class. The lower-class consumers primarily consume products from local mom-pop stores and markets. Although middle and upper classes do as well, but unlike the lower class they have an alternative. Since a large segment of the population is lower income in Mexico, there will be more consumption in the "mom and pop" stores.

Mexican consumers can shop at more expensive commercial stores, such as: Wal-Mart, which owns Sam's Club, Bodega, Wal-Mart Super center, Superama, Suburbia, and Vips. Mexican Wal-Mart's and all affiliated stores are predominantly for the middle and upper class, unlike the U.S. where its key targeted are lower income consumers.

Wal-Mart in Mexico

The arrival of Club Aurrera, a smaller version of Sam's club, in the suburbs of Mexico City was a joint venture among Wal-Mart and Mexico's leading retailer, Ciftra. Wal-Mart eventually took over, and in February 2000 Ciftra changed its name to "Wal-Mart de Mexico", which first opened in 1991 (Mexico City)

Wal-Mart's opening in Mexico was a way to test the market and to see if the theme in other countries, like the UK, Germany and Japan; instead of starting a new they bought out existing operations.

In addition to its Wal-Mart Super centers and Sam's Clubs, Wal-Mart also posses the Bodega Aurrera and Superama supermarket chains, Suburbia department stores, and VIPs restaurants. In all, it operates 642 outlets in 64 Mexican cities (Wal-Mart de Mexico 2004). Since it first opened Wal-Mart de Mexico has quickly grown and has

become the largest retailer and largest private employer in the country. Wal-Mart's hold in Mexico's retail industry provides Wal-Mart the as the largest share in any one country outside the United States.

<div align="center">Previous Studies</div>

Factors that are of importance in food shopping behavior include location, prices, product variety, quality of service, quality of produce and store environment. Seiders, Simonides, and Tigert 2000 discovered that consumers usually prefer traditional supermarkets for convenience, quality, and service, and choose super centers for price and assortment. Turley and Milliman (2000) study the effect of atmospheric variables such as store layout or interior display influence on consumer evaluations and behaviors. Huddleston, Whipple, and VanAuken (2004) find that the factors that create store loyal purchase behavior include promotion, store location, convenience such as being open 24 hours a day and quick checkout, product assortment, good environment or atmospheric and friendly service. Low prices appear to be a factor that entices shopper to the store, but was not a key factor for loyalty purchases. Messinger and Narasimhan (1997) find that larger assortments become more important as time cost increase. Kim and Park (1997) segment shoppers into routine and random shoppers. The routine shoppers are time-pressed shoppers which have higher opportunity costs. In contrast, random shoppers have low cost of opportunity and search for the best price. They may shop in a larger store since they have more time and larger store provides various buying opportunities.

Although, consumers' shopping behaviors have been widely investigated, most of these studies have been restricted to store within the same format. Exceptions include Bhatnagar and Ratchford (2004), who study non-durable goods competition among supermarkets, convenient stores, and food warehouses. They assume that a consumer will choose the retail format that provides most attractive combination of price, inventory cost and travel cost. They conclude that convenient stores charge a higher price but it minimizes travel time and inventory cost. Supermarkets attract those shoppers who prefer larger assortment and therefore the supermarket should carry extremely broad assortments. Food warehouses are preferred by the heavy users. Fox, Montogomery, and Lodish (2004) study the consumers' shopping behaviors across supermarket retailer, mass merchandisers, and drug stores. They found that consumer expenditures response more to varying levels of assortment and promotion than price and those who shop more at mass merchandisers also shop more in all other formats.

<div align="center">Methodology</div>

Consumer choice is measured by asking a sample of consumers to individually indicate their consumption frequency. As the consumption frequency has the order from "never" to "daily", the use of ordinal logistic model is appropriate for this problem.

Here Y is a categorical response variable with six ordered categories.

$$(3.1) \qquad Y = \begin{cases} 0 = \text{Never} \\ 1 = \text{Rarely} \\ 2 \;\; = \;\; \text{remain} \quad \text{the} \quad \text{same} \\ 3 = 2 \text{ or } 3 \text{ times a month} \\ 4 = \text{weekly} \\ 5 = 2 \text{ to } 3 \text{ times a week or daily} \end{cases}$$

Let $\pi_j(x) = P(Y = j \mid X = x)$ be the probability for the realization of $Y = j$ given

$X = x, j = 0,1,2,3,4$. The cumulative probabilities become

$$(3.2) \qquad \gamma_j(x) = P(Y \geq j \mid X = x) = \pi_j(x) + \ldots + \pi_k(x), j = 0,1,2,3,4,5.$$

The cumulative probabilities are used in the generalized linear model

$$(3.3) \qquad f\{\gamma_j(x)\} = \alpha_j + \beta_j x, j = 0, 1, 2, 3, 4, 5.$$

Here we have five model equations and five regression coefficients to describe the

relationship between Y and X. Also we use the standard assumption that the regression

coefficient does not depend on j, so the model becomes

$$(3.4) \qquad f\{\gamma_j(x)\} = \alpha_j + \beta x, j = 0,1,2,3,4,5.$$

For the ordinal logistic model, the logit link is used and the model becomes

$$(3.5) \qquad \log\{\gamma_j(x)/(1 - \gamma_j(x))\} = \alpha_j + \beta x, j = 0, 1, 2, 3, 4, 5.$$

Data

The data come from a consumer survey in Mexico discussed in the previous chapter. An additional purpose of the survey is to investigate the household food shopping behavior across different grocery formats in Mexico. The survey was conducted through in-person interviews in Mexico in 2004. The numbers of observations are 903 with 544 usable data which is 60 percent of the total observations for the purpose of this analysis. The survey collected information on household shopping frequency in out door market place, "Mom and Pop," super markets, and super centers, and information on the household demographics. The detail description and summary statistics of these demographic variables are presented in Table 3.1. The majority of the 544 respondents are female (59.74 percent), with age lower than or equal to 35 (65.07 percent), and with a child under 18 years old in household (65.26 percent). 7.54 percent of the respondents complete at least University and 43.57 percent of them are full time employed. 54.23 percent of the respondents were primary food shoppers of the household and 34.74 percent of them have higher than five members in their households.

The statistics of household shopping frequency across grocery format are also shown in Table 3.1. The percentage of respondents that shop at least once a month in out door market-places and "Mom and Pop" stores are 67.1 percent and 78.7 percent, respectively. Mexican households' shopping frequency in super market and super center are much lower than that in out door market and "Mom and Pop" store. Only 25.6 percent households shop at least once a month in the super market and 39.5 percent in the super center. This implies that although supermarket grows rapidly in Mexico and takes

out the market share of Mexico's traditional shops, Mexican still shop mainly in the traditional type of markets.

Results

Equation 3.5 was estimated to evaluate "mom and pop" stores and Wal-Mart Super Centers. Discussed first are the "mom and pop" stores estimation results, e.g. the dependent variable is, consumers' frequency of shopping trips to "mom and pop" stores. Respondents who have location concerns, which are the most important factoring deciding where to buy groceries, are more likely to patronize local "mom and pop" stores rather than retail super centers. The result indicate that higher-educated consumers frequent "moms and pop" stores less.

Discussed next are the Super Center stores estimation results, e.g. the dependent variable here is, how often consumers' shop at Super Center stores. For Wal-Mart, consumers who have children under the age of 18 living in their household, with higher levels education and higher incomes are more likely patronize Super Centers. In our sample, consumers with higher education are more inclined to increase shopping in Wal-Mart, unlike consumers with medium education.

The results gathered from the surveys conducted in Mexico, illustrate to us that Mexican patrons do not regularly frequent large retail stores. The statistics support the idea that Mexicans for the most would rather patronize local mom and pop stores rather than large scale commercial entities like Wal-Mart. Reasons for this choice can vary from the more expensive price to the location of the super centers.

The older generation in Mexico is more was more likely to shop at local mom and pop stores, because of tradition and the distance. Most commercial retail stores are located across town which makes them quite inaccessible to most people because of the lack of transportation.

<div align="center">Conclusions</div>

Supermarkets and super centers grow rapidly in Mexico. These retail formats carry larger product assortment and charge a lower price and create competition for the traditional grocery stores and out-door markets. On the other hand, Mexican shoppers shop frequently and traditional stores might attract shoppers because of smaller volume produces and more outlets. This research presents an empirical study of household shopping behaviors across retail formats and investigates how the household demographics affect their store selections. The findings include that respondents who have location concerns were more likely to shop at local "mom and pop" stores, because they are located conveniently through out the city.   The results included that consumers that were highly-educated visited "moms and pop" stores less. For Wal-Mart, consumers who have children under 18 living in their household have higher education, and higher incomes are more likely to increase their visits to Super Centers. The coefficients show that highly educated consumers are inclined to increase their consumption in Wal-Mart than median educated consumers. The results will be of interest to food retailers in developing strategies to maintain a competitive advantage in this emerging retail food market place.

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TABLE 3.1 Summary Statistics for Demographic Variables and Household Shopping

Frequency Across Grocery Format

Demographic Variables	Description (Coding)	Statistics
Gender	1 if male	40.3%
	0 otherwise	59.7%
Shopper	1 if main shopper	54.2%
	0 otherwise	45.8%
Children	1 if children under 18 in household	65.3%
	0 otherwise	34.7%
Family Size	1 if number of people in household higher than 5	34.7%
	0 otherwise	65.3%
Education	1 if at least complete University	7.5%
	0 otherwise	92.5%
Employment Status	1 if full time employed	43.6%
	0 otherwise	56.4%
Age	1 if greater than 35	34.9%
	0 otherwise	65.1%
Grocery Type	Percentage of respondents shops at least once a month	
Our Door Market Place	67.1%	
Mom and Pop	78.7%	
Super Market	25.6%	
Super Center	39.5%	

TABLE 3.2 Results

Predictor	Coef	SE Coef	Z	P
Constant (1)	-4.4028	0.9453	-4.66	0
Constant (2)	-2.6312	0.888	-2.96	0.003
Constant (3)	-1.8072	0.8797	-2.05	0.04
Constant (4)	-0.8844	0.875	-1.01	0.312
Constant (5)	0.3133	0.8739	0.36	0.72
Gender	0.2415	0.248	0.97	0.33
Environmenal Attitudes	-0.02148	0.04747	-0.45	0.651
Food Safety Attitudes	0.04029	0.04473	0.9	0.368
Car Ownership	0.0933	0.2408	0.39	0.698
Variety	-0.2039	0.2818	-0.72	0.469
Quality	-0.1278	0.2916	-0.44	0.661
Location	-0.3999	0.3899	-1.03	0.305
Occasion	-0.3598	0.4572	-0.79	0.431
Children	0.8323	0.2434	3.42	0.001
Household size	-0.08998	0.05714	-1.57	0.115
Q.29-2 Which it is the maximum level of education that you have completed? (Elementary, High School)	0.5438	0.2709	2.01	0.045
Q.29-3 Which it is the maximum level of education that you have completed? (University)	1.0024	0.3182	3.15	0.002
Q30-1 Which was the level of income of your family group in the 2003? (High, Medium, Low)	0.393	0.1871	2.1	0.036
Q.31-1 Which of these categories best represents your state of employment: (full-time)	-0.3858	0.5802	-0.66	0.506
Q.31-2 Which of these categories best represents your state of employment: (part-time)	-0.6154	0.6	-1.03	0.305
Q.31-3 Which of these categories best represents your state of employment: (unemployed)	0.0415	0.7039	0.06	0.953
Q.31-4 Which of these categories best represents your state of employment: (house owner)	-0.1921	0.623	-0.31	0.758
Q.31-5 Which of these categories best represents your state of employment: (widow)	0.645	0.9556	0.67	0.5
Q.32 Can I ask you what year you were born in?	-0.01613	0.0152	-1.53	0.125

TABLE 3.3 Mom and Pops Logistic Regression Table

Predictor	Coef	SE Coef	Z	P
Constant (1)	0.6013	0.968	0.62	0.534
Constant (2)	1.3067	0.9705	1.35	0.178
Constant (3)	1.8224	0.9738	1.87	0.061
Constant (4)	2.1881	0.9769	2.24	0.025
Constant (5)	3.2927	0.994	3.31	0.001
Gender	0.0394	0.2561	0.15	0.878
Q.3 Where would you place yourself on a scale from 1 to 10, if economic growth at all cost is a 1 and saving the environment at all cost is a 10.	-0.06287	0.05051	-1.24	0.213
Q.4 When you are purchasing food, how important lower food safety risks versus lower cost food on a scale of 1 to 10, where 1 means lower food safety risk is all important and 10 means lower food prices are all important?	-0.01493	0.04676	-0.32	0.749
Q.13 Do you own a car? Yes____ No____	0.2978	0.2581	1.15	0.249
Q.14-2 What is the most important factor where you decide to buy your groceries? (variety)	-0.1163	0.2942	-0.4	0.693
Q.14-3 What is the most important factor where you decide to buy your groceries? (Quality)	0.0483	0.3044	0.16	0.874
Q.14-4 What is the most important factor where you decide to buy your groceries? (Location)	1.083	0.4788	2.26	0.024
Q.14-5 What is the most important factor where you decide to buy your groceries? (What you want to cook/occasion)	0.5654	0.521	1.09	0.278
Q.27 Is there a child under 18 years of age in your household?	-0.2866	0.2504	-1.14	0.252
Q.28 For how many persons do you buy food for, including yourself?	0.05423	0.05579	0.97	0.331
Q.29-2 Which it is the maximum level of education that you have completed? (Elementary, High School)	-0.1242	0.2866	-0.43	0.665
Q.29-3 Which it is the maximum level of education that you have completed? (University)	-0.5594	0.3284	-1.7	0.088
Q30-1 Which was the level of income of your family group in the 2003? (High, Medium, Low)	-0.1251	0.1942	-0.64	0.519
Q.31-1 Which of these categories best represents your state of employment: (full-time)	-0.6937	0.6851	-1.01	0.311
Q.31-2 Which of these categories best represents your state of employment: (part-time)	-0.218	0.705	-0.31	0.757
Q.31-3 Which of these categories best represents your state of employment: (unemployed)	-0.8377	0.7972	-1.05	0.293
Q.31-4 Which of these categories best represents your state of employment: (house owner)	0.3925	0.739	0.53	0.595
Q.31-5 Which of these categories best represents your state of employment: (widow)	1.417	1.035	-1.37	0.171
Q.32 Can I ask you what year you were born in?	0.01336	0.01133	1.18	0.238