CONSUMER PREFERENCES FOR EMERGING TRENDS IN ORGANICS: PRODUCT ORIGIN AND SCALE OF SUPPLY CHAIN OPERATIONS

by

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Abstract

Notable changes are occurring in the U.S. organic food sector. First, the U.S. organic food system is increasingly relying on imports, because the expansion in the organic production has failed to satisfactorily meet the rapidly growing demand for organic foods. Second, the "locally grown" concept has become appealing to consumers, with some evidence of consumers switching from certified organic foods to local, conventional foods. Third, organic food has penetrated the mass-market channel, and organic foods are no longer being sold exclusively in natural product stores. And fourth, the social and environmental awareness among consumers is increasing. Thus, consumers are also willing to pay a price premium to support small farmers.

To understand how these changes are affecting the demand for organic foods, this study used survey data to assess U.S. consumers' preferences for fresh organic apples that are sourced from various places and from supply chain operations that vary in scale. The survey was administered via the Internet to a random sample of 285 households across the U.S through a research company. Choice experiment was selected as the valuation method.

Results indicate that among the levels of the location attributes, the "locally grown" label was associated with the highest average WTP. The "regionally grown" was the second most preferred, "U.S. grown" the third, and "imported" the least. The "locally grown" label was valued higher than the "certified organic label". Also, consumers were willing to pay a higher value for apples produced on a small farm compared to those from a large farm. However, they did not distinguish the type of retail outlets where apples were offered. The analysis incorporating the effects of consumer characteristics suggest that the perceived importance of public benefits impacted the values of origin attributes more than the private ones; the type of retail outlet attributes became significant among certain gender and age segments; and the value

of small farm attribute increased with consumers' income. Finally, results from a theoretical model suggest that the variability in the WTP obtained among the origin attributes could be explained by the reputation of product quality depending on their origin.

Table of Contents

List of Figures

List of Tables

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CHAPTER 1 - **Introduction**

1.1 Background

The organics have been one of the highest growth sectors in the agricultural and food industries in recent years. The U.S. sales of organic food and beverages have grown from $3.5 billion in 1997 to $16.7 billion equaling 2.8% of total U.S. food sales in 2006, at an average annual growth rate of 18.3%, while the total U.S. food sales grew at an average annual rate of 3.4% (Organic Trade Association, 2008a; OTA). Organics appear to be increasingly incorporated into the lifestyles of many consumers. In 2008, over two-thirds of U.S. adult consumers bought organic products at least occasionally, with about 28 percent of organic consumers shopping for organic food on weekly basis (OTA, 2008b). On the production side, the overall certified organic acreage grew at an average annual rate of 25% from 1995 to 2005, increasing more than three times to 4 million acres representing 0.51% of the overall U.S. cropland. Since 2000, the number of certified organic farms increased 54% to reach over 10,000 in 2007 (USDA-ERS, 2009). However, the expansion in the organic production has failed to satisfy the rapidly growing demand for organic foods, which has given an open entrance to imports.

The U.S. Department of Agriculture (USDA) estimates show that the value of U.S. organic imports in 2002 was $1.0 to $1.5 billion, accounting for 12-18 percent of the $8.6 billion in U.S. organic retail sales in 2002, while the value of U.S. organic exports was $125 to $250 million (USDA-ERS, 2007a). Unexpectedly in 2008, the value of organic imports into the U.S. far exceeded the value of U.S. organic exports by as much as a 4 to 1 ratio (USDA-FAS, 2008). Canada, Latin America, Asia, and Europe are the major import sources, while the major organic imports include fresh fruits and vegetables, coffee, tropical produce and other products not grown in the U.S., as well as processed food and ingredients for manufactured products (USDA-ERS, 2007).

In addition to a variety of organic food products shipped from different locations, the "locally grown" concept has become increasingly appealing to consumers, with some evidence of consumers switching from certified organic foods to local, conventional foods (Wells, 2007). "Local" products are consumed by those interested in supporting small farms, community agriculture, sustainability, animal welfare and a host of issues once identified with organic products (Brown, 2003; Darby et al., 2006). The definition of "local" remains ambiguous. Some consumers and retailers define it by mileage or driving distance, while others by political and geographical boundaries. The definitions based on political boundaries vary according to counties where consumers reside, regions (surrounding neighboring states), and also the U.S. (Zepeda and Leviten-Reid, 2004).

Additionally, other notable changes are occurring at the retail level. Before the late 1990s, organic food was sold almost exclusively in natural product stores (Dimitri and Oberholtzer, 2006). This has been changing over the greater part of the last decade, with the entry of conventional and mainstream retailers. In 2006, about 38% of total organic food dollar volume was sold through the mass-market channel, representing the largest single distribution channel. The sales of larger grocery natural food stores combined with smaller independent natural food stores and chains accounted for 44% of organic food and beverage sales the same year, indicating that the natural food channels remain strong (OTA, 2008).

1.2 Consumer's Valuation of Organic Foods

Consumers face a challenge in evaluating the quality of a product when it depends not only on the attributes that are observable but also on those that cannot be directly observed, even after purchase and use, known as credence attributes. Thus, consumer's perceptions and preferences play an important role in determine whether or not to consume organic products.

Historically, the organic movement formally started in 1940's, evolving from the ideas of an integrated, decentralized, chemical-free agriculture in England. Although Albert Howard is considered the "father of organic agriculture", it was Walter Northburn, who first used the term "organic" to describe the farm as an "organism" in which the parts of the farm are orchestrated into a functioning whole (Edwards et al., 1990). In America, J. I. Rodale expanded on Howard's ideas of sustainability issues and gave further definition and clarification to what have become accepted as organic practices (Kuepper and Gegner, 2004). However, it was not until 1962 when Rachel Carson's publication *Silent Spring* ignited the environmental movement while raising public awareness of the ecological problems associated with agricultural chemicals and the excessive use of synthetic pesticides in agriculture (Baker, 2005; Heckman, 2006). Awareness of the consequences of modern farming practices led to pesticide regulation and created growing consumer demand for food grown without ecologically destructive and toxic chemicals. Many consumers considered organic food to be one such alternative (Baker, 2005).

However, purchasing organic food because of environmental concerns has become less important to today's organic food consumer than to those from a decade ago. As the market has grown, consumers and businesses have developed broader reasons for purchasing and producing organic foods. More recently, consumers indicated that health and nutrition, taste and food safety were the top three motivating factors behind organic food purchases, with the environment fourth (Dimitri and Oberholtzer, 2006).

Some studies have found typical consumers to be willing to pay a premium for organic food products, which are generally perceived as being safer, healthier, tastier, and more environmentally friendly than conventional foods (Huang, 1996; Corsi and Novelli, 2003; Durham and Andrade, 2005; Grebitus et al., 2007). Furthermore, private benefits are not the only factors motivating organic food consumption. Some studies have found that consumers prefer small farmers to receive the largest benefit from food purchase (Josling, Roberts, and Orden, 2004; Chang and Lusk, 2008). Regardless of its nature -which can be public or private- none of these quality attributes can be observed at the moment of purchase or after the items are consumed, requiring a prohibitively costly verification of the production methods. In other words, consumers do not know whether a product is organic unless they are told so, situation that can arise a mislabeling problem, where producers or retailers sell conventional product as "organic" and take advantage of the price premium while benefit from the cost savings associated with conventional production.

1.3 Current Issues in the National Organic Program

Since 2002, the National Organic Program (NOP) has established a unified standard for food labeled as organic. Yet, the NOP standards are distinct from consumers' preferred definitions of organic (Conner and Christy, 2004), with many organic producers identifying the USDA standards being too lax or the organic standards not being enforced consistently across various industry participants as a major concern (Peterson and Kastens, 2006). As a matter of fact, evidence presented by Giannakas (2002), showed that although labeling based on third party certification can mitigate asymmetric information problems in organic food, it is not sufficient for alleviating organic food market failures. He concluded that mislabeling is more likely to occur by certified organic producers who can procure conventional product and re-sell it as organically grown and/or by producers of both organic and conventional products who can misrepresent their conventional produce as organically grown. Hidden behind their organic certification, these producers are more likely to be successful in an attempt to misrepresent conventional product as organic.

To support these statements, several examples can be found in recent articles published on the media. In 2006, the Cornucopia Institute, which primary mission is the role of "government watchdog" at the USDA's National Organic Program (Kastel, 2006), presented a complaint concerning violations of the NOP's regulatory standards by the Aurora High Plains Organic dairy, the largest organic dairy producer in the U.S. The accusation was based on the evidence showing the confinement of cows with no access to grazing (contrary to the stipulated in the NOP standards) and utilization of conventional cows in the milking process. Aurora was sanctioned by the USDA after the agency's investigators found 14 "willful" violations of federal organic law and placed in one year probation (Cornucopia Institute, 2009a). Additionally, several cases of mislabeling in seafood including imported farmed salmon being falsely identified as wild Alaska salmon and frozen seafood being marketed as fresh product, or "organic" were reported in 2009 (Buck, 2009).

This type of violations can arise not only among producers, but also at the retail level. According to Kastel (2006), major food processors have recognized the meteoric rise of the organic industry and profit potential, and want to create what is in essence 'organic light,' taking advantage of the market cachet but not being willing to exert efforts required to earn the USDA organic seal. In 2007, Wal-Mart was accused of defrauding its customers by mislabeling non-organic products as organic (Wong, 2007). Furthermore, another U.S. major retailer, Target, was recently accused of misleading consumers into thinking some conventional food items it sells were organic, such as in the case of Silk milk, product that had switched to be produced with conventional soybeans (Cornucopia Institute, 2009b).

In such cases, discerning consumers may turn to the producer reputation as an alternative measure of the organic quality attributes and assurance. Loureiro and Hine (2002) argue that location of food's origin seems to be an important attribute that helps differentiate products and create new niche markets. Also, Lusk et al. (2006) suggest that consumers may use a country's reputation to predict the quality of products, which may be positive or negative. Furthermore, Chang and Lusk (2008) explain the presence of price premiums related to consumers' support for local merchants and small farmers. Yet, it remains an empirical question whether or not consumers associate producers from different locations and smaller scale players along the organic chain, with distinct reputations for organic quality attributes.

1.4 Research Objectives

The overall objective of this study is to assess U.S. consumers' preferences for organic foods that are sourced from various places and from supply chain operations that vary in scale. Specifically, the research objectives are:

(1) Examine whether or not U.S. consumers distinguishes organic foods by their origin and by the scale of supply chain operations.

(2) Estimate U.S. consumers' willingness to pay (WTP) for origin and scale-specific organic foods attributes.

(3) Identify demographic and attitudinal characteristics of consumers that share similar values for the origin and operational scale of production of organic foods.

(4) Explain the variability in willingness to pay for organic products by product origin.

To accomplish these objectives, a consumer survey was designed and administered to a random sample of U.S. households. The WTP for origin and operational scale attributes in organic foods is estimated from survey data, and model interactions with demographics and psychographic variables are used to identify market segments. To explain the variability in the WTP obtained, a theoretical model is developed based on the theory of collective reputations. The study focuses on the case of fresh organic apples because fruit and vegetables account for the largest share of total U.S. organic food sales (37% with totals just under $8 billion in 2008) (Nutrition Business Journal, 2009). Apples are the most highly consumed organic fruit in the U.S (Stevens-Garmon, Huang and Lin, 2007) and are sourced from a variety of locations. Apples are produced in most states and are imported from several countries, mostly in the Southern Hemisphere (Stevens-Garmon, Huang and Lin, 2007).

1.5 Organization of the Thesis

This thesis is organized into six chapters. The literature on the effects of location-of-origin attributes, preferences for retail outlets, fairness in the distribution of benefits to small farmers, and reputation for quality on organic foods is reviewed in Chapter 2. Chapter 3 is devoted to the methodology. Details about the econometric methods used in the calculation of WTP and the theory behind the theoretical model of producer's reputation are discussed. Next, Chapter 4 discusses the collection of data. The data obtained through the application of the survey instrument, and the data used in the empirical examination of the theoretical model are discussed in this chapter. Chapter 5 first discusses the results from the survey, followed by the results of the empirical examination of the producer's reputation model. Finally, Chapter 6 will report conclusions derived from this study and discuss implications for the agricultural and food industry and suggestions for future research.

CHAPTER 2 - **Literature Review**

2.1 Introduction

The literature review is organized in three sections. The first section discusses studies on product origin, with special emphasis in consumer preferences and WPT for organic products. The next section presents an analysis of studies on collective reputation. And the last section focuses on relevant studies related to consumer preferences on purchasing locations for organic foods and consumer's perception of fairness in the organic food market.

2.2 Studies on Product Origin and Organic Products

Location of origin has become the focus of several studies that deal with consumer perceptions of quality for fresh produce, while in processed products it has also been one of the attributes of interest, because of its implications for quality differentiation. Thilmany, Bond and Bond (2006), Karipidis and Galanopoulos (2000), and Scarpa, Thiene and Marangon (2008) are some examples of studies that analyze the effect of location of origin in fresh produce, while Hu, Woods and Bastin (2009) and Gubanova et al. (2008) are examples for processed products. In the case of organics, however, there is few evidence of product differentiation using the "origin" attribute.

In contrast, there are several studies that compare the impact of the organic claim versus the location of origin claim, in the consumer purchasing behavior. Loureiro and Hine (2002) used contingent valuation techniques to compare the consumers' willingness to pay (WTP) for local, organic and GMO-free potatoes in Colorado. They conducted a consumer-intercept survey in supermarkets in different locations of the state of Colorado, and in total 437 questionnaires were collected. Respondents in their study were willing to pay a 10% premium for "Colorado grown" potatoes over the ones labeled with organic and GMO-free claims. They also indicated that although consumers are willing to pay more, there must be certain quality linked to the product in order to pay the premium. Furthermore, consumers who preferred to purchase organic potatoes were the ones concerned about food safety and the ones with a higher education level.

Similarly, James, Rickard and Rossman (2009) studied the differences in WTP for applesauce in Pennsylvania using choice experiment valuation. They distributed a survey to 3,000 residents in rural Pennsylvania and over 1,500 responses were collected (56% response rate). The product was differentiated by "organic", "Pennsylvania preferred", "no sugar added" and "low fat" labels. The locally grown designation was associated with the highest WTP implying the largest positive effect on the likelihood of a product been selected. "No sugar added" was the second most valuable attribute, and "organic" the third. Further, the likelihood of selecting a product varied across consumers with different levels of knowledge of the attributes, which was measured by their consumption of organic and local products in the past year. The results indicated that the presence of organic attribute decreased the likelihood of a product being selected for those consumers who did not consume organic and local foods in the past year, as opposed to those who reported previously purchasing organic food. For those consumers who had frequently purchased local and organic food, the presence of "Pennsylvania preferred" attribute had a positive impact in their likelihood of select a product.

Vander Mey (2004) conducted two surveys in South Carolina and across the U.S. to analyze consumer preferences towards food differentiated by several attributes including origin and organic claims. The South Carolina survey had 201 respondents and the nationwide survey had 819 respondents. One relevant finding was that American consumers preferred U.S. grown and processed foods over imported foods. Also, results indicated that grown under sound environmental practices, grown or processed under safe conditions, locally grown, grown in U.S., and grown organically, were the top five product claims for which the majority of consumers were willing to pay more.

In the consumer economics literature, there are several studies dealing with the assessment of consumer perceptions towards origin claims. Mabiso et al. (2005) collected data from primary shoppers in Florida, Georgia and Michigan using a Vickrey (fifth-priced sealed bid) experimental auction and a survey questionnaire to provide a sample of 311 observations useable for analysis. He found that 79% and 72% of the consumers surveyed were willing to pay a premium for apples and tomatoes labeled as "grown in the U.S." respectively. Quality perceptions and trust in information received from U.S. government agencies were found as critical factors driving the consumption decision making process of respondents. It was also found that those consumers who take food safety concerns into consideration were willing to pay a higher premium for the "U.S. grown" label. Loureiro and Umberger (2005) found similar results for meat products; consumers perceived certified U.S. meat as being safer than meat from major exporting countries consistent with the findings from previous studies they cited. To elicit consumer's WTP they used dichotomous choice questions. Five thousand surveys were mailed to households in the continental U.S., and 632 returned complete (13% response rate).

Several other studies pointed out food safety as one of the reasons to choose products according to their designation of origin (Lobb and Mazzocchi, 2006; Puduri, Govindasamy and Onyango, 2006; Dinopoulus, Livanis and West, 2005). Ehmke (2006) performed a meta-analysis using 13 country-of-origin (COO) studies with 27 consumer WTP estimates to determine significant trends in the COO literature. Findings suggest that credence attributes such as organic production and traceability have a significant positive effect on the value of own COO. Also, results indicated that consumers in different areas of the world tend to have significantly different own COO values. Ehmke, Lusk, and Tyner (2008) used a conjoint experiment to examine COO preferences among consumers from different countries. In total, they used 346 student subjects from different locations to conduct the experiment and the survey. Despite the expected response from consumer to prefer products from their own country, results indicated that COO information was not as important as genetically modified content information in France, U.S., and Niger, or organic production information in China. Also, individuals with quality and food safety information needs placed higher importance on genetically modified and organic food information than on COO information.

In association with origin claims, availability of the so-called “local” foods had impacted the consumer purchasing behavior in the past years. One determinant of the success of specialty or local products is the collective reputation of the product. When the collective reputation of the product is good, the designation will be a powerful tool to signal quality (Winfree and McCluskey, 2005). Zepeda and Leviten-Reid (2004) performed a focus group study using 43 primary food shoppers to investigate consumer perceptions towards local foods. Results show that organic food shoppers were more willing to purchase local foods compared with conventional food shoppers. Also, consumers indicated that their willingness to purchase local foods was related to the perception of direct benefits to the environment, to the local community, to farmers, and to their personal health. In addition, Darby et al. (2006) used a customer-intercept survey of 530 food shoppers in a variety of direct markets and traditional grocery stores in the state of Ohio. Using choice experiment as their valuation method, they found that consumers were primarily paying a premium for the freshness of locally grown produce and also for supporting family farms or small scale agriculture, and for better taste.

In contrast, Zepeda and Li (2006) found that attitudes about nutrition and health, energy conservation, and the importance of farmers receiving adequate prices had no significant effect on the willingness of purchasing local foods. However they found that the variable "enjoying cooking very much" which is associated with knowledge of food and food quality was significant, affecting positively the intentions to buy local foods by 32%. They used data from a national survey of 956 food shoppers (522 were mail surveys and 434 telephone surveys) to estimate a Lancaster-Weinstein model using probit analysis. Adams and Adams (2008) calculated WTP for local foods using data from 97 consumer-intercept surveys conducted at two farmer's markets in Florida. They found out that 86% of the consumers surveyed were willing to pay a more than 30% premium for locally grown, fresh produce. Consumer demographic characteristics demonstrated that female shoppers were willing to pay more for local foods than male, as well as consumer engaged in gardening activities over the ones who are not.

2.3 Studies on Collective Reputation

In the theoretical framework, a situation in which consumers decide whether or not to purchase and what products to purchase given their perception of the quality level of output produced by the farms in different locations is considered. Thus, for products originating from a region with a reputation of being high quality (i.e., adhering to organic farming practices according to the NOP standards), consumers are willing to pay a higher premium. Products of low quality are produced using farming practices that do not meet the NOP standards. The production of high quality products entails higher costs. A higher premium provides a greater incentive to exert the costly effort to follow organic practices compared with that for the firms located in regions without such reputation. Because of heterogeneity among producers in production costs, consumers always entertain the possibility that a given product that is claimed to be organic was, indeed, produced without following the NOP standards, which are below the consumers' preferred quality (Conner and Christy, 2004). And so, the reputation of a growing region depends on the belief of the consumers about the share of the producers in the region who follow organic practices according to the NOP standards.

In the economics literature, several approaches to model collective reputation can be found. According to Mailath and Samuelson (2006), reputation is the situation where agents believe a particular agent to *be* something (i.e., a case of adverse selection), which is different to the situation where agents expect a particular agent to *do* something (i.e., a case of moral hazard), usually referred to trust. This distinction is sometimes blurred and the two approaches can be combined to obtain a richer framework in which one can analyze formation of reputation. Bootstrap mechanism based on repeated interaction is the approach that has been used to model trust, and Bayesian updating based on the history of performance and experiences with the product is used to model reputation.

Before discussing the model in greater detail, some examples of studies dealing with collective reputation from a general perspective are reviewed. Carriquiry and Babcock (2005) developed a repeated-purchases model under three different scenarios -monopoly, duopoly with collective (public) reputation, and duopoly with private reputation- to explore which factors control the choice of different quality assurance systems, and compare the welfare of processors and their customers. They concluded that monopolist will invest more heavily in quality assurance than duopolists, because they are the ones that will lose the most if a quality deviation occurs and is detected. On the other hand, when reputation is public, processors find incentive to invest in quality assurances if their rivals also invest, otherwise they do not invest. Also, in this case duopolists will reduce their expected quality, because they may obtain higher levels of benefits by free riding on the efforts of other chain participants. In the case of duopoly with private reputation, processors find worthwhile to invest in quality assurances when their rivals are not, and to reduce their own expenses to capture higher profit, otherwise. Finally, in terms of welfare, they suggested consumers prefer the duopoly with private reputations over the other two scenarios considered. However, in cases when consumers can easily observe the level of quality, they will prefer the monopoly over the duopoly with public reputations.

Fishman et al. (2008) presented two theoretical models to compare the "reputation effect of branding" in collective brands and individual firms. They showed that despite the incentive to free ride, members of collective brands have a greater incentive to invest in quality than individual firms. Small firms may be unable to establish individual reputations on their own, and therefore invest in quality. In such cases, they concluded collective branding increases the value of reputation, and incentive firms to invest in quality. However, if brand can deter free riding by perfectly monitoring member's investment in quality, it will not always be the case when brand is unable to monitoring. Thus, brand will need to keep from getting to large, otherwise the incentive of free riding will override the reputation effect.

Winfree and McCluskey (2005) presented a collective reputation model in which reputation is modeled as a common property resource. They analyze a differential game in which all players choose their control variables (product quality) simultaneously and jointly influence the dynamic process that governs the evolution of reputation. They argued that in a collective reputation scenario, as the number of firms increases the average quality decreases. They stated that when the returns to quality are diluted but the costs are not, firms have a lower incentive to provide quality. As a possible solution, they suggest the implementation of minimum quality standards that should be controlled by the group. However, if this solution is not feasible, they proposed so called “trigger strategies” which is a way for firms to threaten other firms if they deviate, or defect, from some optimal path. In this case, the threat is producing a lower quality so that the defecting firm will lose profits from lower reputation.

Some applications of modeling collective reputation in the food industry were reviewed as well. Revoredo and Fletcher (2005) analyzed the empirical evidence showing that groundnuts’ country of origin is an important variable in explaining groundnuts prices in Rotterdam. They showed that despite being from the same quality (i.e., same observable characteristics), groundnuts from U.S. received a higher premium compared to the rest of the origins. They suggested that the “suppliers’ reliability” might be an element explaining part of the price premiums. In the absence of statistical evidence, they developed a theoretical model to support this idea. Based on the model results, in which an imported compares two possible suppliers -one traditional and reliable supplier and one newcomer- they concluded that price premium might be explained by the importers’ perception of the supplier’s reputation.

McCluskey (2000) and McCluskey and Loureiro (2005) emphasized in their studies, the importance of reputation when a product has unobservable quality attributes (credence attributes), particularly for those products with claims of using special production standards (i.e., organic foods). They concluded that an increase in monitoring is needed in order to find some reward mechanism for encouraging firms to produce high quality, which can increase the true level of product quality in the market for goods with unobservable production standards (credence goods).

Quagrainie, McCluskey and Loureiro (2001) analyzed the reputation of Washington apples through the estimation of price premiums using a dynamic multiple-indicator multiple-cause framework. This procedure suggests that price premiums are good indicators of reputation.

Because the reputation variable was common for all apple varieties used in the analysis, the situation conveys into a collective reputation analysis. These results are similar to those reported by Landon and Smith (1997) in the case of Bordeaux wine, and Scarpa, Thiene and Marangon (2008), where reputation is found to have a large impact in the consumers' willingness to pay.

2.4 Other Relevant Studies

In the agricultural economics literature, there is little evidence of studies that assess consumer's preferences towards retail outlets and consumer perceptions on fairness. Bond, Thilmany and Bond (2009) estimated a multinomial logit model to analyze the difference among consumers that prefer to purchase from a direct source always, occasionally (seasonally and as a secondary source), and never, using a national dataset of fresh produce consumers. They conducted an online survey using a sample of 3,170 consumers, and a total of 1,549 responses were returned, providing a 48.9% response rate. Their findings suggested that frequent direct purchasers associate a greater share of their fresh produce premium with a desire to support local business. They concluded that to increase the loyalty of current costumers, producers may emphasize the availability of fresh, superior, vitamin rich and locally grown products.

On the other hand, Chang and Lusk (2008) conducted a conjoint-type experiment using data from a survey from a random sample of the U.S. population. A total of 2,000 surveys were mailed, and 207 completed surveys were returned (10.4% response rate). Their objective was to determine whether consumers, when purchasing food products, are concerned about the distribution of benefits across the participants in the agricultural supply chain (small farmers, large farmers, agribusiness, supermarkets, and the consumer). They found that consumers prefer small farmers to receive the largest benefit from food purchase.

CHAPTER 3 - **Methodology**

3.1 Introduction

This chapter contains the discussion of methods of analysis used to achieve the research objectives. In order to estimate the consumers' WTP for origin and scale-specific organic foods attributes, and identify consumers segments derived from demographic and attitudinal characteristics, choice experiment was selected as the valuation method. Choice experiment (CE) is based on stated preferences rather than revealed preferences methods. While revealed preferences make use of actual purchasing data from consumers when assessing their preferences, stated preferences allow estimating demand for new products with new attributes (Louviere, Henser, and Swait, 2000, p21). Thus, a stated choice method is appropriate, given the current marketplace where the location of origin of organic foods is typically not labeled and the distinction between foods produced by small- versus large-scale operations is not explicit. Then, the theoretical model based on the theory of collective reputations developed by Tirole (1996), is derived to explain the variability in willingness to pay for organic products by product origin.

3.2 Choice Experiment

The choice experiment analysis is based on Lancaster's new consumer theory (Lancaster, 1966) and random utility theory (Thurstone, 1927). Lancaster (1966) proposed that utility for a good can be decomposed into utilities for attributes found in the product. Random utility theory states that the utility for the *i*th individual obtained from consuming the *j*th product, denoted as U_{ij}, is the sum of a systematic component, V_{ij}, and a random component, ε_{ij}.

(1) $$U_{ij} = V_{ij}(W_{ij}) + \varepsilon_{ij}$$

The random component contains unobservable influences of individual characteristics or product attributes as well as measurement error. The systematic component depends on $W_{ij} = \lfloor X_{ij}, Z_i \rfloor$ which consists of X_{ij}, a vector of attributes of product j, which could be individual-specific, and Z_i, a vector of individual i's characteristics that are constant across product attributes. The product attributes and individual characteristics are both observable.

In a CE, respondents are asked to choose from a set of alternatives with varying combinations of product attributes. Consumers choose alternatives that maximize their utility. From collected data, conditional logit models can be estimated relating the probability of an alternative being chosen to its utility. Specifically, the probability of the jth alternative being chosen by the ith individual from her choice set C_i is modeled as (McFadden, 1973):

(2) $$\Pr(y_i = j) = \frac{e^{V_{ij}}}{\sum_j e^{V_{ij}}}, j \in C_i,$$

where y_i represents the choice made by individual i. A basic conditional logit model that relates only the attributes to utility can be specified assuming V_{ij} to be linear in X_j as:

(3) $$V_{ij} = \beta' X_j,$$

with β as a parameter vector.

To account explicitly for the relationship between the choices and the individual's characteristics, the characteristics can be incorporated into a conditional logit model through interaction terms with the attributes. That is, the utility function is specified as:

(4) $$V_{ij} = \beta' X_j + \delta'(X_{ij} \circ Z_i),$$

where δ is a vector of parameters on the interaction terms. Equation (4) reflects the assumption that one part of utility is common to all individuals while the other is individual specific.

The calculation used to represent the consumers' WTP for a product attribute is shown in equation (5). The baseline WTP for product attribute *j* by consumer *i*, denoted as WTP_{ij}, is calculated as the negative ratio between the estimated marginal utility for product attribute *j*, denoted as β_j, and the estimated marginal utility for the monetary attribute, denoted as β_{price} (Gao and Schroeder, 2008). Equation (5) also includes an additional measure of the marginal utility for product attribute *j* that is specific to consumer *i*. Here characteristics for consumer *i*, denoted as Z_i, are combined with the additional marginal utilities of the attributes in product j for individual *i*, denoted as δ_j.

$$(5) \qquad WTP_{ij} = -\frac{\beta_j + \delta_j' Z_i}{\beta_{price} + \delta_{price}' Z_i}$$

Equation (5) quantifies the implicit price changes associated with a unit increase in the selected product attributes; each WTP_{ij} calculation represents the part worth of product attribute *j* for consumer characteristic *i* (James, Rickard and Rossman, 2009). The standard errors of these WTP estimates can be computed using the delta method, which is a technique, based on Taylor series expansions, of approximating expected values of functions of random variables when direct evaluation of the expansion is not feasible (Oehlert, 1992).

3.3 A Producers' Reputation Model

Collective reputation of origin in organic fresh fruits and vegetables producers is the conceptual foundation of this analysis. The framework is based on Tirole's (1996) approach to modeling collective reputation, i.e., the reputation of a growing region or a group of producers, for quality. He modeled the idea of group reputation as an aggregate of individual reputations, where the current incentives of a member are affected by his past behavior as well as by the past behavior of the group, because his track record is observed only with noise. The model consider a setting that combines the elements of adverse selection and moral hazard in which consumers form beliefs about the share of producers who are properly following organic standards in a specific location. In this study, the Tirole's model is applied to an organic agricultural market.

Consumers are willing to pay more for products from regions that have the reputation of producing higher quality organic food products. This reputation may be self-sustaining because producers in regions that have a reputation for high quality have a greater incentive to follow organic standards. This is because failure to adhere to the organic practices may result in the producer's loss of the organic certification, which is more valuable in the regions with high reputation. The market is supplied by producers from various regions. In each period, t, consumers perceive the region's average quality of organic products produced in the preceding period, $t-1$. A product's perceived quality is worth either high (H) if producers are adhering to organic farming practices according to the NOP standards, or low (L) if producers follow farming practices that do not meet the NOP standards. In the current application to organic foods, the unobservable credence attributes are assumed to be translated into public and private benefits perceptions. It is also assumed that consumers are risk neutral and offer a price equal to their willingness to pay based on the expected quality of the product produced in certain region.

In a production region, a continuum of firms supplies organic products each period $t = 1,...,\infty$. The cost of following organic practices is $c \in [0, \bar{c}]$, which is distributed among producers in accordance with the distribution function $F(c)$. Unlike Tirole's model, a cost distribution function was used to differentiate the type of producer in a specific region. Thus, the producers incurring some costly effort are the ones providing high quality food products and producers exerting no effort are those producing low quality food products.

Each firm stays in the industry with probability λ. If a firm does not follow organic practices and sells its products in the organic market in period t, it will be detected in any of the subsequent periods with probability x. The firm that is caught cheating exits the market, which can be interpreted as a complete loss of reputation. For each exiting firm (either due to the normal competitive process or because the firm is excluded from the organic market following the detection of false claims), a new firm immediately enters the market. The cost of producing organic foods c for this new firm is independently drawn from $F(c)$. Producers discount future payoff at rate γ.

Suppose that in equilibrium there exists a threshold value $\hat{c}$ such that all producers with $c \le \hat{c}$ follow organic practices and all producers with $c > \hat{c}$ do not. In the long run, the share of the firms who follow organic practices is given by:

(6) $$F(\hat{c})(1-\lambda+(1-\lambda)\lambda+(1-\lambda)\lambda^2+...)=F(\hat{c}),$$

and the share of the firms who do not follow organic practices is given by:

(7) $$(1-F(\hat{c}))(1-\lambda+(1-\lambda)\lambda(1-x)+(1-\lambda)(\lambda(1-x))^2+...)=(1-F(\hat{c}))\frac{1-\lambda}{1-\lambda(1-x)}.$$

To understand the last expression, note that the firms that do not follow organic practices exit at a higher rate than the firms that follow organic practices because some of the non-followers will be caught cheating and excluded from the group before their natural lifetime in the industry ends. Hence, the expected quality consumers are willing to pay each period can be written as:

(8) $$p=\frac{F(\hat{c})}{F(\hat{c})+(1-F(\hat{c}))\frac{1-\lambda}{1-\lambda(1-x)}}H+\frac{(1-F(\hat{c}))\frac{1-\lambda}{1-\lambda(1-x)}}{F(\hat{c})+(1-F(\hat{c}))\frac{1-\lambda}{1-\lambda(1-x)}}L.$$

Let $M(c)$ denote the value function of a producer with cost c who has not been detected as cheating in the past. If the producer follows organic practices he earns:

(9) $$M(c) = p - c + \gamma\lambda M(c).$$

Simplifying (9):

(10) $$M(c) = \frac{p-c}{1-\gamma\lambda}.$$

In each period each producer follows organic practices if:

(11) $$p - c + \gamma\lambda M(c) \geq p + \gamma\lambda(1-x)M(c).$$

Simplifying (11):

(12) $$c \leq \gamma\lambda x M(c).$$

Let $\hat{c}$ denote the threshold cost that solves this equality:

(13) $$\hat{c} \leq \gamma\lambda x M(\hat{c}).$$

Substituting from (9) yields:

(14) $$\hat{c} \leq \gamma\lambda x \frac{p-\hat{c}}{1-\gamma\lambda}.$$

This expression is equivalent to:

(15) $$\hat{c} = \frac{\gamma\lambda x}{1-\gamma\lambda(1-x)} p.$$

Substituting from (8) and for simplicity, setting $H = 1, L = 0$ yields:

(16) $$\hat{c} = \frac{\gamma\lambda x}{1-\gamma\lambda(1-x)} \frac{F(\hat{c})}{F(\hat{c}) + (1-F(\hat{c}))\frac{1-\lambda}{1-\lambda(1-x)}}.$$

A low quality equilibrium (no organic output) with $\hat{c} = 0$ always exists. In the case of the uniform distribution, $F(c) = c$ on $[0,1]$, the detection rate $x = 1$ implies:

(17) $\hat{c} \leq 1+\gamma-\frac{1}{\lambda} \in (0,1)$ if $\frac{1-\lambda}{\lambda} < \gamma < \frac{1}{\lambda}$.

Equation (17) implies that if the expected life-span of an organic producer is sufficiently long (i.e., the probability of staying in the industry, λ, is close to one), there exists an equilibrium in which a positive share of producers, $1+\gamma-\frac{1}{\lambda} > 0$, follows organic practices.

The above framework implies that when growing regions differ by the parameters such as the survival probability, λ, the detection probability, x, the discount factor, γ, and the distribution of the costs of following organic practices across the growers in the region $F(c)$, the regions may converge to distinct equilibria with varying proportions of producers adopting organic practices. The shares of producers who follow organic practices, in turn, determine the reputation of the regions for producing high quality organic food products and the differences in the premiums that consumers are willing to pay for organic products from different growing regions. This is a testable hypothesis that explains the variability in consumers' valuation of organic foods from various locations.

It is difficult to directly estimate either the probability with which producers, who shirk the efforts required by the NOP standards but market their output under the organic claim, or the probability with which such false claims are detected. Instead, inferences can be made from observing the equilibrium conditions, production cost values for conventional and organic production, and consumers' willingness to pay.

CHAPTER 4 - **Data**

4.1 Introduction

A detail description of the data used to examine whether or not U.S. consumers distinguishes organic foods by their origin and by the scale of supply chain operations is presented in this chapter. In order to elicit consumer's WTP for origin and scale-specific organic foods attributes, and identify their demographic and attitudinal characteristics, data were collected from a survey instrument. The survey section describes the survey design and each part of the survey components, and also includes the methods used to design the choice experiment framework. Additionally, apple production costs data were obtained from the literature to explain the variability in willingness to pay for organic products by product origin.

4.2 Survey

The survey consisted of four sections. In the first section, we elicited consumer's food shopping habits for conventional and organic products, including the frequency of consumption and the locality of the stores. The second section asked consumers about their preferences towards conventional and organic fresh fruit and vegetables, and tested consumer knowledge of organic and local foods. The third section contained the valuation questions, and in the last section, demographic information was collected.

The choice experiment (CE) was selected as our valuation method, because it is easier to add additional quality attributes than in contingent valuation and experimental auction methods and it is consistent with Lancaster's theory (1966) of utility maximization (Gao and Schroeder, 2008). The respondent was asked to choose between two 3-pound bags of fresh gala apples differentiated by five attributes with their respective levels (Figure 4.1). This product was chosen because gala is the leading organic apple variety produced in the state of Washington (Kirby and Granatstein, 2008), which in turn is the largest apple producer state in U.S. (USDA-NASS, 2009). Also, the 3-pound bag product presentation was the most convenient because of price data availability. Furthermore, the "neither" choice was included in each set for those respondents who did not feel attracted to either product (Lusk and Schroeder, 2004). The five attributes were: price, production process, product origin, scale of farm, and type of retail store.

Figure 4-1 Choice experiment example

	Option A	Option B	Option C
			
Storefront	Mass-Market Supermarket	Independent Food Store	
Production process		Certified Organic	
Location of origin	Regional	National	None
Size of originating orchard	Small Farm	Large Farm	
Price / 3 lb	$ 3.79	$ 3.19	

The survey was pre-tested by a sample of 45 respondents (faculty and graduate students at Kansas-State University). Feedback helped to make some adjustments to the survey. In particular, the interval between the adjacent price levels in the CE was narrowed down from 50 to 30 cents. Thus in the actual survey, the price level was set at 30-cent increments above and below $3.49, which was the national average retail price for a 3-pound bag of conventional gala apples, reported in the weekly National Fruit and Vegetable Retail Report by the Agricultural Marketing Services from September 2008 to June 2009 (USDA-AMS, 2009). The production process had two levels: "certified organic" and "conventional". The conventional property was explained to the respondent as the assumed production method for apples with no specific claim for production attributes, which would involve the use of approved chemicals to control for pests and weeds. The definition for the certified organic label stated that apples were produced and packaged according to the National Organic Standards regulated by the U.S. Department of Agriculture.

The product origin attribute referred to the location where apples were produced, including: “local”, “regional”, “national” and “Chile”. Local apples were defined as “harvested from orchards in your area.” Regional apples were “harvested from orchards in your region” and for reference to the respondents, the U.S. Department of Agriculture’s grouping of the 48 states into 10 regions was provided. National apples were “harvested in the U.S.” and Chilean apples were “harvested in and imported from Chile.”

The scale attribute corresponded to the type and acreage of farm (or orchard) where the apples are grown. Thus, the “small” and “large” attribute levels were selected. The definitions for these attribute levels were based on the USDA categorization for farms and the apple orchard classification established in the 2002 Census of Agriculture. A “small” farm was defined as “an orchard with less than 25 acres or where the annual market value of agricultural product sold is less than $100,000” (USDA-NASS, 2002; USDA-ERS, 2007b). A “large” farm was defined as “an orchard with more than 60 acres or where the annual market value of agricultural product sold is more than $250,000.”

Finally, to represent where consumers purchase apples, “mass-market supermarket”, “natural grocery store”, and “independent food store” were specified as the attribute levels for the types of retail outlets. These outlet types were selected considering their importance in the organic retail sector. Altogether, they represented approximately 93% of U.S. organic food sales in 2005, according to the organic food channel distribution, presented in the OTA’s 2006 Manufacturer Survey. A mass-market supermarket was defined to the respondents as “a large store offering a wide variety of food and household merchandise, such as Wal-Mart Supercenter and Kroger store." A natural grocery store was defined as "a large store offering a variety of "natural" and organic food and household products, such as Whole Foods Market and Wild Oats Natural Marketplace." An independent food store was defined as "individually owned and operated retail shop, with no more than several storefronts" (USDA-ERS, 2002).

The OPTEX procedure of SAS software was used to generate the choice experiment design, using the modified Fedorov algorithm (SAS Institute Inc., 1999). Fractional-factorial designs that are both orthogonal and balanced are optimal. In orthogonal fractional-factorial experimental designs, each level of each attribute of a specific product is combined with every level of all other attributes of the same product. A design is balanced when each level occurs equally often within each factor (Kuhfeld, 2009). The D-efficiency criterion evaluates the precision of the design in percentage values. Our experiment design with 18 choice scenarios yielded a D-efficiency value of 91.4. Too many choices in a given setting can be overwhelming for individuals to evaluate (Gao and Schroeder, 2008). Thus, in order to minimize respondent fatigue, the choice scenarios were grouped into three, so the respondents would only be asked to complete six choice tasks.

4.3 Market Data

The producers' reputation model shows that in equilibrium not all organic producers in a given region may follow organic practices. Thus, low-cost producers are more likely to adhere to costly organic standards than high-cost producers. The cost distribution functions expressed in equations (6) and (7) can be estimated from the production cost data for conventional and organic apples. Ideally, production cost data from as many farmers as possible in a certain location, as well as from many different locations, and from the same year are needed to examine the model implications empirically. Due to the lack of sufficiently detailed cost data available, only the average increase in costs due to following organic practices was considered. Thus, the model can be empirically examined by comparing the change in production costs (deviating from organic to conventional practices) with the willingness to pay for the location of origin attribute obtained from the survey. The change in production costs represents the cost savings when producing conventional products and marketing them falsely as organic in a given region.

The studies comparing the economic performance of an apple orchard under different production systems (e.g., organic versus conventional) were few. Furthermore, it was especially difficult to obtain reliable and consistent estimates of the production costs for conventional and organic apple orchards from the same location and for the same time period from locations outside the U.S. Glover et al. (2002) performed a cost of production analysis of apples orchards managed under conventional, integrated and organic production systems, in the Yakima Valley of Washington State from 1994 through 1999. The financial data reflected greater costs associated with organic production as compared with conventional production. Since their findings pertained to the largest apple producing state in the U.S., these production costs were considered as representative of that for "regionally-grown" organic and conventional apples (among the four location of origin levels).

In a 2001 FAO publication, a case study of Argentina provided information about the development of the organic export sector in this country and contained the production cost estimates of organic and conventional apples from 1995 through 1997. For the subsequent analysis, these production costs were used to represent the category of "imported". Because our aim is to compare the increases in costs due to organic practices across different locations, the situation of not having the current cost data might not be relevant. However, it is likely that this increase in costs has diminished over the recent years.

CHAPTER 5 - **Results**

5.1 Introduction

An online survey was conducted during the first week of July in 2009. In total, 285 surveys were sent to respondents within the continental U.S. through a well known research firm, and 234 were successfully completed (82% completion rate). The survey was presented on 18 pages, requiring 23 minutes to be completed on average. At the beginning of the survey, the respondents were screened to ensure that all respondents were responsible for at least half of their household grocery shopping and consumed fresh fruit and vegetables. Consequently, 3.9% (11 respondents) dropped out the survey with these questions. At the end of the survey, the respondents were redirected to the research firm's web page to receive compensation. The distribution of the completed surveys was 81, 76 and 77 among versions 1, 2 and 3, respectively.

5.2 Respondent Characteristics

The respondents were mostly female (86%) with post high school education (88%). The age and household income distributions of the respondents are compared to those of the U.S. population in table 5.1. The sample represents proportionally fewer households earning over $100,000. In terms of ethnicity, the sample was slightly less diverse than the U.S. population, with 79% of respondents identified as white, compared to 74% of Americans according to the 2007 Census Bureau estimates. Finally, the respondents were geographically more concentrated in the Western and Southern regions, with 12 and 6 percentage points more respondents than the actual population in those regions, respectively, and 9 percentage points less respondents in each of the Northeast and Midwest regions.

Table 5-1 Demographic characteristics of the sample

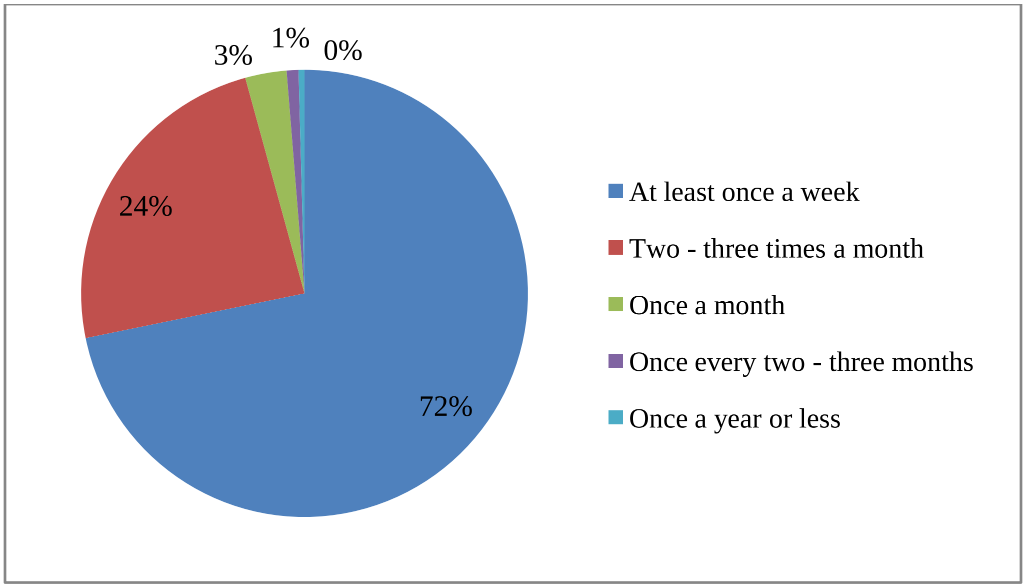
Characteristic	U.S. Population[1]	Survey Respondents	
	% Frequency	*n*	*% Frequency*
Gender			
Male	49.2	32	13.7
Female	50.8	202	86.3
Age			
18 - 24	10.6	24	10.3
25 - 34	14.4	42	17.9
35 - 44	15.3	54	23.1
45 - 54	15.6	49	20.9
55 - 64	11.6	37	15.8
65 and older	13.5	28	12.0
Race and Ethnicity			
White	74.1	184	78.6
Black or African American	12.4	27	11.5
American Indian/ Alaska Native	0.8	0	0.0
Asian	4.3	5	2.1
Native Hawaiian/ Pacific Islander	0.1	0	0.0
Other	6.2	2	0.9
Two or more races	2.1	1	0.4
Hispanic (of any race)	14.7	15	6.4
Education			
Elementary school (through 8th grade)	6.5	0	0.0
Secondary school (9th through 11th grade)	9.5	2	0.9
High school or equivalent	30.0	26	11.1
Some college or associate degree	27.0	87	37.2
Bachelor's degree	17.1	75	32.1
Graduate or professional degree	9.9	44	18.8
Household Income			
Less than $10,000	7.6	15	6.4
$10,000 - $24,999	16.9	38	16.2
$25,000 - $49,999	25.6	75	32.1
$50,000 - $74,999	18.8	57	24.4
$75,000 - $99,999	12.1	25	10.7
$100,000 - $200,000	15.3	24	10.3
More than $200,000	3.7	0	0.0

[1] Data from the U.S. Census Bureau. 2007.

5.3 Food Shopping Habits

This section included questions about consumer's food shopping tendencies. Seventy-two percent of the respondents declared to purchase fresh fruit and vegetables at least once a week (Figure 5.1). During their purchases of fresh fruit and vegetables, 14% of the respondents reported to be almost always shopping for organic items, 14% more often than not, 20% about half of the time, 29% less often than not, and 23% not at all likely (Figure 5.2).

Figure 5-1 Purchasing frequencies of fresh fruit and vegetables



When asked where they usually shopped for food in general, 80% identified supermarkets and/or supercenters (e.g., Wal-Mart, Kroger) as their "primary source", 33% and 32% identified independent grocery stores and health/natural supermarkets (e.g., Whole Foods, Wild Oats) as their "secondary source", and 42% selected the "direct from producers" option as their "seasonal source" (Figure 5.3). However, for organic foods, only 43% of the respondents chose supermarkets and/or supercenters as their "primary source", 25% chose health/natural supermarkets as their "secondary source" and 23% chose the "direct from producers" option as their "seasonal source" (Figure 5.4). These results are consistent with the consumer food shopping habits described by Knudson (2007), where consumers purchase organic foods mainly from supermarkets, followed by health/natural stores, and farmers markets.

Figure 5-2 Likelihood to purchase organic fresh fruit and vegetables when shopping for conventional food

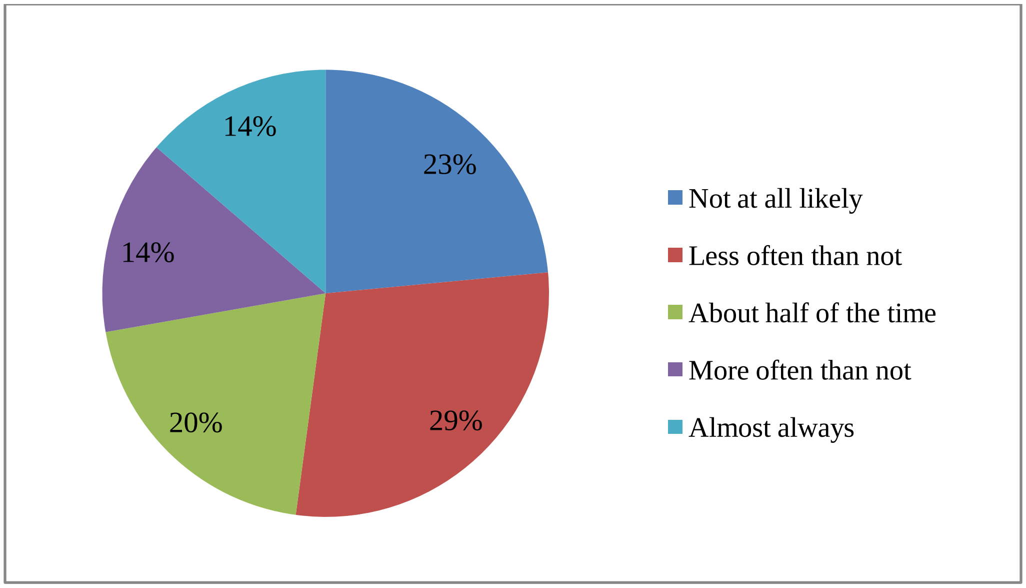


Figure 5-3 Type of retail store by source of food

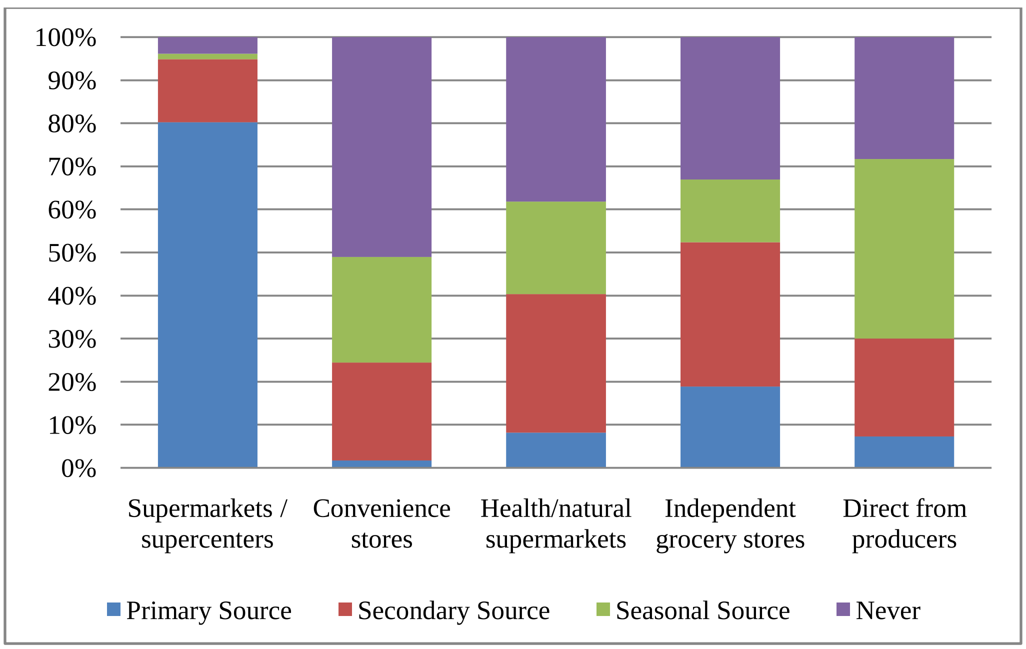
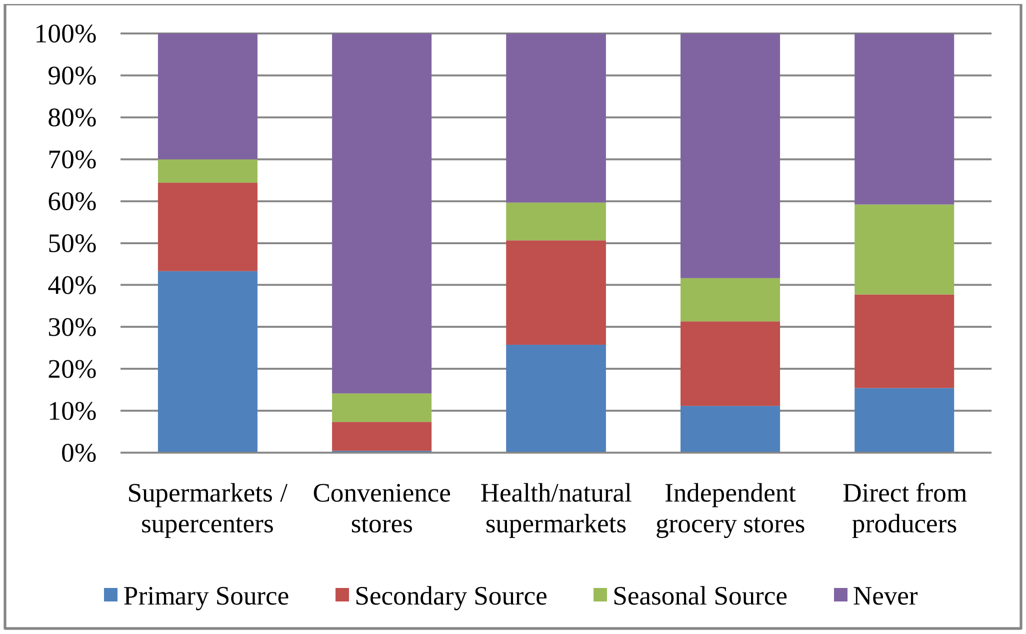
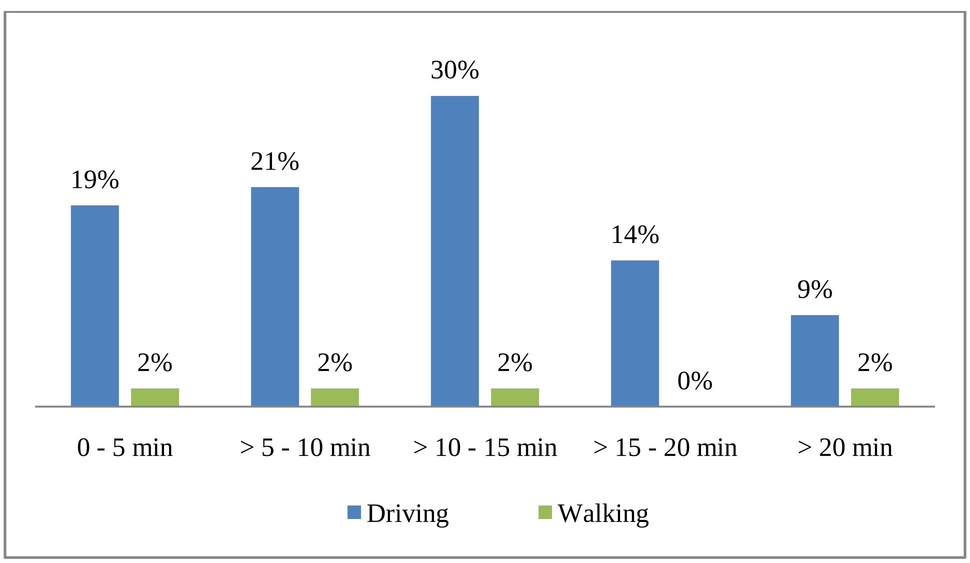


Figure 5-4 Type of retail store by source of organic food



Furthermore, 52% of the sample identified their primary source for food in general to be the same as their primary source for organic food. Among those who indicated that their primary sources for general and organic foods differed, 93% indicated their primary organic food store was located on average 13 minutes away via driving from their primary general food store, and 7% indicated their primary organic food store was located on average 23 minutes away via walking from their primary general food store. Figure 5.5 explains the time distribution.

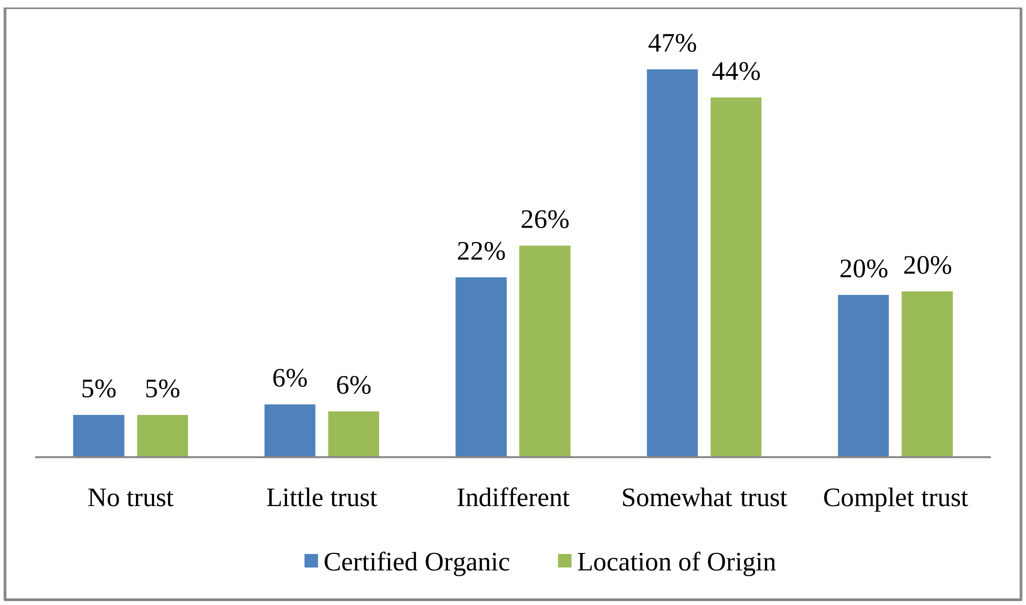
Figure 5-5 Distance between primary food store and primary organic food store



5.4 Preferences and Perceptions

The respondents were asked how much trust they placed in the accuracy of the certified organic and location-of-origin labels using a 5-point scale where 1 equaled no trust and 5 equaled complete trust. Regarding the "certified organic" label, only 20% indicated complete trust, and 47% somewhat trust, while the remaining 22%, 6%, and 5% demonstrated indifference, little trust, and no trust, respectively. Similarly, 20% respondents indicated to place complete trust, 43% somewhat trust, 26% indifference, 6% little trust, and 5% no trust for the "location of origin" label (Figure 5.6).

Figure 5-6 Consumer's trust in the certified organic and location of origin labels



In order to get a sense of what motivates consumers when deciding to shop for fresh fruits and vegetables, respondents were asked to rank a set of product attributes that drives their decision on a scale from 1 equaling "Not at all Important" to 5 equaling "Extremely Important". Means and standard deviations of each attribute variable are reported in table 5.2. The two equally most important attributes to respondents were freshness and taste, followed by appearance and risk of food poisoning. The certified organic attribute of fresh fruit and vegetables that are grown under USDA certified organic cultivation methods, was the lowest ranked among the included attributes. This result is consistent with the findings of Thilmany, Bond, and Bond (2006) who explained that specific claims (e.g., pesticide-free) might be more compelling to consumers than multi-dimensional certifications.

Table 5-2 Average ratings for fresh fruit and vegetables attributes

Variable	Mean	Std. Deviation
Freshness	4.684 [a]	0.799
Taste	4.684 [a]	0.701
Appearance	4.368 [b]	0.977
Risk of food poisoning	4.291 [b,c]	1.187
Price	4.218 [c]	0.985
Pesticide use	3.846 [c]	1.216
Imported or produced in the U.S.	3.406 [d]	1.278
Location of origin within the U.S.	3.291 [d]	1.337
Where it is sold	3.286 [d]	1.229
Certified Organic	2.872	1.277

Note: 1=Not at all important, 2=Slightly important, 3=Moderately important, 4=Very important, 5=Extremely important.

[a,b,c,d] Not significantly different at 5% level

In response to the same question but this time with regards to *organically grown* fresh fruits and vegetables, respondents considered taste and nutrition as the most important product attributes, followed by minimal chemical use. For respondents, attributes such as “supporting viable farming operations” and “promotion of social justice” were less important (Table 5.3). In the instructions, the respondent was given the alternative to choose “not at all important” in case they did not consume organically grown products. Similar to Bellows et al. (2008), our results support the findings of the existent literature in which organic consumers’ interests in private product benefits (such as health, taste, freshness) usually exceed public benefits (e.g., environmental well-being).

Table 5-3 Average ratings for organically grown fresh fruit and vegetables attributes

Variable	Mean	Std. Deviation
Taste	4.167 [a]	1.403
Nutritious	3.966 [a]	1.453
Minimal chemical use	3.692	1.462
No genetically modified organisms	3.350 [b]	1.487
Environment-friendly	3.325 [b]	1.373
Supporting viable farming operations	3.274 [b]	1.415
Promotion of social justice	2.684	1.384

Note: 1=Not at all important, 2=Slightly important, 3=Moderately important, 4=Very important, 5=Extremely important.

[a,b] Not significantly different at 5% level

Similarly, we asked respondents to rank the attributes related to where organically grown fresh fruits and vegetables come from (origin) and the farms that produce them (farms) and the stores where fresh fruit and vegetables (not necessary organic) can be purchased (stores). In the instructions, the respondent was given the alternative to choose “not at all important” in case they did not consume organically grown products. In the case of origin, “supporting the farming community” and “the reputation of a location regarding its products” were the most important attributes identified by respondents (Table 5.4). The responses indicated that consumers perceive farms’ reputation as an important attribute. In contrast, the amount of fuel needed to reach the consumer was the least important attribute. As for farm-related attributes, identifying farms that follow environment-friendly farming practices and the ones who are officially certified organic were the most important, as well as the ones who treat its on-farm labor fairly and the ones that are located in the U.S. while being a family farm and personally knowing the farmer(s) were the least important (Table 5.5). Lastly, in the assessment of the store-related attributes, respondents identified the quality of the products as the most important, while being personally familiar with the store owners/managers were the least important (Table 5.6).

Table 5-4 Average ratings for the origin attributes of organic fresh fruit and vegetables

Variable	Mean	Std. Deviation
Supporting the farming community	3.496 [a]	1.421
Reputation of the location regarding its products	3.376 [a]	1.403
Improvement in environmental quality	3.269 [a,b]	1.393
The amount of fuel needed in reaching you	3.064 [b]	1.333

Note: 1=Not at all important, 2=Slightly important, 3=Moderately important, 4=Very important, 5=Extremely important.

[a,b] Not significantly different at 5% level

Table 5-5 Average ratings for attributes of farms where organic fresh fruit and vegetables are grown

Variable	Mean	Std. Deviation
Follows environment-friendly farming practices	3.483 [a]	1.424
Is officially certified organic	3.423 [a]	1.395
Treats on-farm labor fairly	3.389 [a]	1.456
Is located in the U.S.	3.385 [a]	1.437
It is a family farm	2.944	1.368
Personally knowing the farmer(s)	2.244	1.398

Note: 1=Not at all important, 2=Slightly important, 3=Moderately important, 4=Very important, 5=Extremely important.

[a] Not significantly different at 5% level

Table 5-6 Average ratings for attributes of the stores where organic fresh fruit and vegetables are purchased

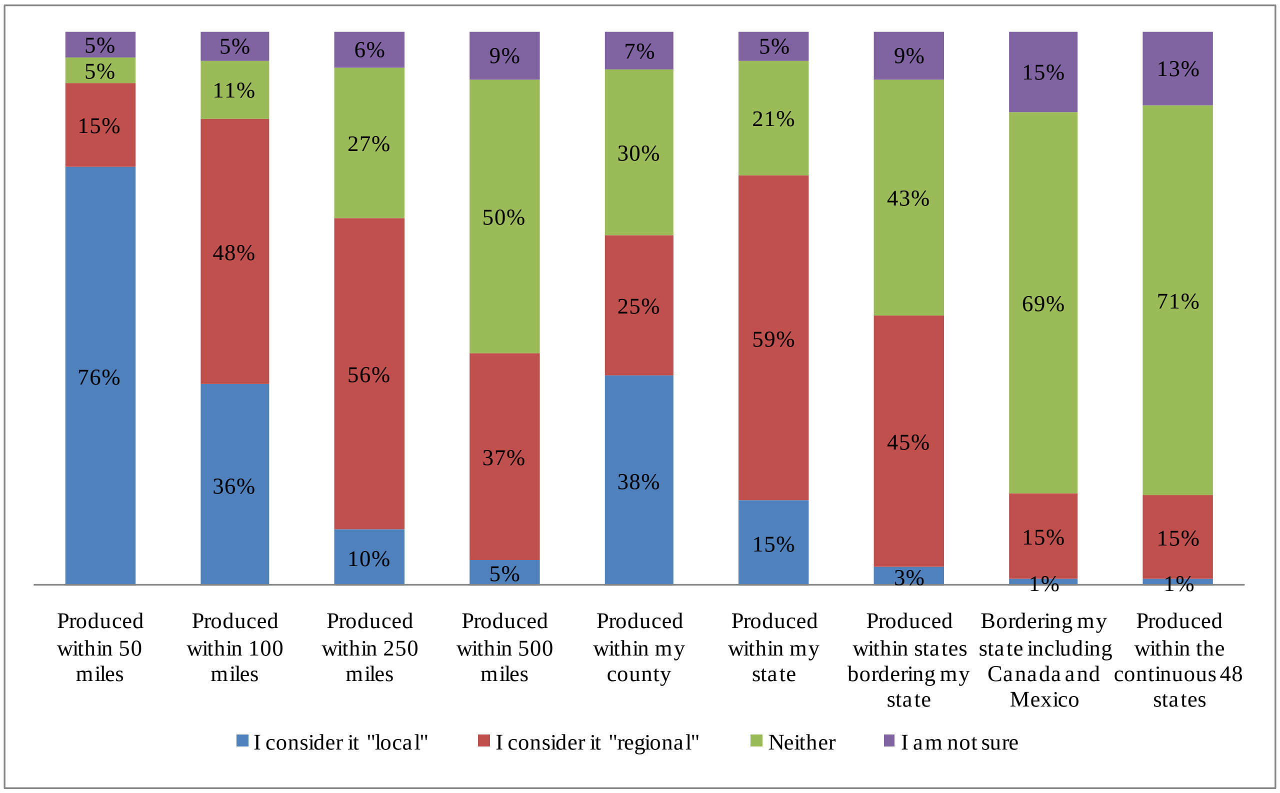
Variable	Mean	Std. Deviation
Quality of products	4.598	0.770
Selection / variety of offering	4.355	0.897
Price	4.278	0.915
Location	4.120	0.955
Store philosophy /value statement	3.124	1.210
Organizational structure	2.620	1.255
Personally familiar with the store owners / managers	2.269	1.270

Note: 1=Not at all important, 2=Slightly important, 3=Moderately important, 4=Very important, 5=Extremely important.

Next, the respondents were asked to identify products as being local or regional, in order to distinguish local products from regional products (Figure 5.7). The option to respond “I am not sure” was offered in case the respondent cannot differentiate to which category a product belongs. In terms of driving distance, 76% of the respondents defined those fresh fruit and vegetables produced within a 50-mile radius (about 1-hour driving) from where they lived as local, while 48% and 56% defined as regional to those fresh fruit and vegetables produced within a 100-mile radius (about 2-hour driving) and 250-mile radius (about half a day driving) from where they lived, respectively. The 500-mile radius (about one day driving) was considered as neither local nor regional by 50% of the respondents. These results can be compared to those presented by James, Rickard and Rossman (2009), where their sample defined locally-grown food as being produced within 100 miles of where it is marketed. The distinction between local and regional in terms of political boundaries resulted in a more diverse assessment. Only 38%

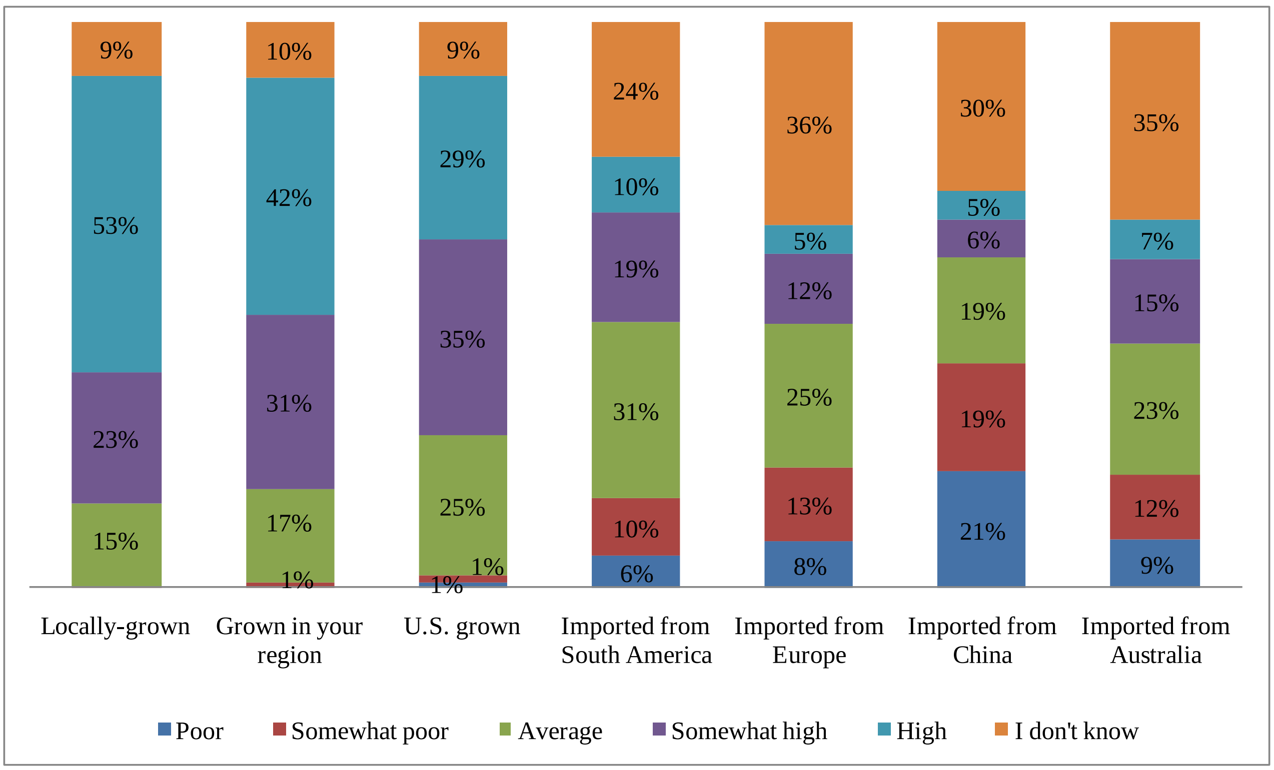
defined as local to the fresh fruit and vegetables produced within their county. Regional produce were defined as those produced within their state by 59% of the respondents, and produced within states bordering their state by 45% of the respondents. Fresh fruit and vegetables produced within states bordering their state, including Canada and Mexico, and produced within the contiguous 48 states, were regarded as neither local nor regional by many respondents (69% and 71%, respectively).

Figure 5-7 Consumer's perception of local and regional products



With the purpose of measuring reputation associated with origins, respondents were asked to rank a set of location-of-origin labels based on how they perceived the overall quality of fresh fruit and vegetables on a scale from 1 equaling "Poor" to 5 equaling "High," The option to respond "I don't know" was offered in case the respondent have never came across to produce from certain origin (Figure 5.8). Results indicated that locally-grown fresh fruit and vegetables, as well as those grown in their region, were the highest ranked by respondents (53% and 42%, respectively) among all regions, while the lowest ranked were those imported from China (21%). Also, considering imported fresh fruit and vegetables only, respondents ranked the produce from South America higher than Australia, Europe, or China. A possible explanation to these findings is the fact that consumers may associate quality and freshness with the proximity of where the fruit and vegetables are grown, implying that local produce travels over shorter distances (Zepeda and Li, 2006).

Figure 5-8 Percentage ratings of the overall quality perceptions for fresh fruit and vegetables origins



Finally, respondents were asked to compare fresh fruit and vegetables from different origins by assessing a set of attributes (appearance, availability, environmental impact, flavor, freshness, nutrition and safety) on a scale of 1 equaling “Definitely inferior” to 5 equaling

“Definitely superior”, with the option to respond “I am not sure”. Respondents first compared “locally-grown” versus “imported organic” fresh fruit and vegetables. In this case, the average respondent ranked all attributes of “locally-grown” fresh fruit and vegetables as superior, giving the highest value to freshness and safety attributes. In other words, respondents were most concerned about the safety and traveling distance associated with imported organic produce (Table 5.7). Likewise, when respondents compared “U.S.-grown organic” to “imported organic” fresh fruit and vegetables, U.S.-grown products were ranked superior with respect to all attributes. Here, the highest ranked attributes were freshness and environmental impact (Table 5.8). In the last comparison, where respondents were asked to evaluate “U.S. grown organic” versus “locally grown” fresh fruit and vegetables, the average scores hovered around the “about the same” ranking, with a tendency of favoring “U.S. grown organic” produce (Table 5.9).

Table 5-7 Average rating of locally grown vs. imported organic attributes for fresh fruit and vegetables

Variable	n	Mean	Std. Deviation
Freshness	195	4.036	1.012
Safety	165	3.824 [a]	1.012
Flavor	188	3.819 [a]	0.975
Environmental impact	166	3.807 [a]	1.003
Nutrition	174	3.713 [a,b]	0.911
Appearance	187	3.658 [a,b]	0.956
Availability	188	3.612 [b]	1.086

Note: 1=Definitely Inferior, 2=Inferior 3=About the same, 4=Superior, 5=Definitely Superior.
[a,b] Not significantly different at 5% level

Table 5-8 Average rating of U.S. grown organic vs. imported organic attributes for fresh fruit and vegetables

Variable	n	Mean	Std. Deviation
Freshness	179	3.961 [a]	0.950
Environmental impact	163	3.816 [a]	1.020
Appearance	176	3.705 [b]	0.890
Safety	159	3.692 [b]	1.031
Flavor	168	3.655 [b]	0.966
Availability	175	3.617 [b]	1.021
Nutrition	162	3.611 [b]	0.973

Note: 1=Definitely Inferior, 2=Inferior 3=About the same, 4=Superior, 5=Definitely Superior.

[a,b] Not significantly different at 5% level

Table 5-9 Average rating of U.S. grown organic vs. locally grown attributes for fresh fruit and vegetables

Variable	n	Mean	Std. Deviation
Availability	183	3.120 [a]	0.888
Appearance	183	3.109 [a]	0.805
Nutrition	170	3.088 [a]	0.862
Safety	153	3.065 [a]	0.971
Flavor	180	3.039 [a]	0.874
Environmental impact	166	2.994 [a]	0.975
Freshness	187	2.925	0.975

Note: 1=Definitely Inferior, 2=Inferior 3=About the same, 4=Superior, 5=Definitely Superior.

[a] Not significantly different at 5% level

5.5 Values of Organic Produce Attributes

A conditional logit model that specifies the probabilities of chosen alternatives as functions of the attributes of the alternatives was estimated using the survey data (equation 18).

The type of retail store (mass-market, independent, and natural) was represented by two dummy variables (*INDEP* and *NATU*) with *MASS* (mass-market) as the base. The production process (organic and conventional) was defined by a binary variable, *ORG*, with *CONV* as the base. Location of origin (local, regional, national and Chile) was specified by four dummy variables, *LOC*, *REG*, *US*, and *CHI*, and finally, the size of the originating orchard (small and large) was expressed as a binary variable, *SM*, with *LAR* as the base. Thus, together with price, *P*, the model included nine attribute variables:

(18)
$$V_{ij} = \beta_{natural}NATU + \beta_{indep}INDEP + \beta_{org}ORG + \beta_{local}LOC + \beta_{region}REG + \beta_{national}US + \beta_{overseas}CHI + \beta_{small}SM + \beta_{price}P$$

The results obtained using SAS are presented in table 5.10. The standard errors for the WTP estimates were computed using the delta method. The likelihood ratio test suggested the overall model was highly significant. The likelihood ratio index is reported, although it has little intuitive interpretation of goodness-of-fit beyond being bound between 0 and 1 (Greene, 2003, p.831).

Table 5-10 Results of the conditional logit model

Variables	Coefficient		WTP		WTP (% from the base)
P	-2.264	*			
	(0.167)				
NATU	-0.153	***	-0.068		-1.654
	(0.093)		(0.041)		
INDEP	-0.106		-0.047		-1.145
	(0.094)		(0.041)		
ORG	0.343	*	0.151	*	3.700
	(0.069)		(0.033)		

Variables	Coefficient		WTP		WTP (% from the base)
LOC	9.839	*	0.253	*	6.189
	(0.612)		(0.049)		
REG	9.611	*	0.153	*	3.728
	(0.597)		(0.048)		
US	9.266	*	4.093	*	
	(0.597)		(0.076)		
CHI	8.499	*	-0.339	*	-8.276
	(0.578)		(0.052)		
SM	0.190	*	0.084	*	2.048
	(0.070)		(0.031)		
No. of observations					1,404
Log-likelihood ratio					925.46
McFadden's (1974) log-likelihood ratio index					0.3

*, **, *** Represent 1%, 5% and 10% significance level, respectively

All coefficients and the WTP values were statistically different from zero at the 1% level, except for the coefficients *NATU* (statistically significant at the 10% level), and *INDEP* (not statistically significant), and the WTP values for *NATU* and *INDEP* (also not statistically significant). Thus, respondents distinguished the production process, product origin and type of farm attributes, but not the type of retail outlet, from the base attributes. In the table, the WTP for the location of origin attributes are reported as differences from the $4.09 base price for 3-lb bag, conventional apples from the U.S. Also, the WTP were computed as percentages from this base price in the right-hand column.

Regarding the production process, the respondents were willing to pay a $ 0.15 average premium for organic gala apples in 3-pound bags than for conventional ones (3.7% premium over the base price). These results are similar to the ones found in Bond, Thilmany and Bond

(2008), where the average organic premium for New Red Fire lettuce in 4-ounces packages was 3.67%. Regarding the size of the originating farms, the average willingness to pay for apples produced in small orchards (orchard with less than 25 acres or where the annual market value of agricultural product sold is less than $100,000) was $0.08 higher than those produced in large orchards (2.05% premium).

Respondents were willing to pay on average $0.25 (6.19% premium) and $0.15 (3.73% premium) for locally-grown and regionally-grown gala apples in 3-pound bags, respectively, over the base. However, the average WTP premium for Chilean apples was -$0.34 (8.28% discount) over the base. Thus, the findings revealed clear preferences of the average respondent towards domestic produce over foreign produce, and among all domestic origins, towards locally-grown. These results are consistent with the documented interest in local foods around the nation. Taking the differences in the percentage premiums for local and organic apples indicates that respondents were willing to pay 2.5% more premium for locally-grown produce than for organic produce.

5.6 Values across Individual Characteristics

Lastly, to estimate the effects of individual characteristics on the marginal utilities of product attributes, the products attributes in the conditional logit model were interacted with selected demographic variables (e.g., gender, age, etc.) and attitudinal variables pertaining to public and private benefits (i.e., improvement of environmental quality, taste, etc.). The complete list of variables is presented in table 5.11. A model was specified for each variable in table 5.11. To illustrate, the utility function with the education variable (*EDU*) was:

$$
\begin{aligned}
V_{ij} = {} & \beta_{natural} NATU + \beta_{indep} INDEP + \beta_{org} ORG + \beta_{local} LOC + \beta_{region} REG \\
& + \beta_{national} US + \beta_{overseas} CHI + \beta_{small} SM + \beta_{price} P + \beta_{natural\times E} NATU \times EDU \\
& + \beta_{indep\times E} INDEP \times EDU + \beta_{org\times E} ORG \times EDU + \beta_{local\times E} LOC \times EDU \\
& + \beta_{region\times E} REG \times EDU + \beta_{national\times E} US \times EDU + \beta_{overseas\times E} CHI \times EDU \\
& + \beta_{small\times E} SM \times EDU + \beta_{price\times E} P \times EDU
\end{aligned} \tag{19}
$$

In total, fifteen models were estimated. In order to test the goodness-of-fit between the basic model and the models with interactions, a likelihood ratio test was performed. Results show that six models did not fit the data significantly better than the basic model at the 1% significance level: gender, region, education, income, presence of children and trust in the origin label. Although in these models the WTP does not appear to differ much from the basic model, some of the estimated coefficients are individually significant. Thus, all results are reported. Also, before analyzing the data, a likelihood ratio test was conducted in each model to check if coefficients vary significantly among each other. Results obtained indicate that all coefficients are different at 1% significance level. The estimates of the WTP by attribute are presented in tables 5.12 to 5.19, and the parameter estimates and other estimation statistics for each model are reported in appendix A. Results indicate that WTP estimates vary across product attributes and consumer segments.

Table 5-11 Definition and summary statistics of socioeconomic and attitudinal variables

Variable	Notation	Variable Description	Mean	Std. Dev.
Gender	*GEN*	Binary variable: 1 if individual is female; 0 otherwise.	0.86	0.34
Age	*AGE*	Ordinal scale: 1. Under 24, 2. 25-34, 3. 35-44, 4. 45-54, 5. 55-64, 6. 65 and older.	3.50	1.51
Education	*EDU*	Ordinal scale: 1. Elementary school, 2. Secondary school, 3. High school, 4. Some college, 5. Bachelor's degree, 6. Graduate school.	4.57	0.95
Income	*INC*	Binary variables: Annual Income ($)		
		INC1: 1 if <10,000, 0 otherwise;	0.06	0.26
		INC2: 1 if 10,000-24,999, 0 otherwise;	0.16	0.37
		INC3: 1 if 25,000-49,999, 0 otherwise;	0.32	047
		INC4: 1 if 50,000-74,999, 0 otherwise;	0.24	0.43
		INC5: 1 if 75,000-99,999, 0 otherwise;	0.11	0.31
		INC6: 1 if > 100,000, 0 otherwise.	0.10	0.30
Region	*RE*	Binary variables:		
		W: 1 if individual is West, 0 otherwise;	0.21	0.40
		WC: 1 if individual is West Central, 0 otherwise;	0.06	0.25
		C: 1 if individual is Central, 0 otherwise;	0.13	0.34
		EC: 1 if individual is East Central, 0 otherwise;	0.21	0.41
		SE: 1 if individual is South East, 0 otherwise;	0.22	0.41
		NE: 1 if individual is North East, 0 otherwise.	0.17	0.14
Children	*CHIL*	Binary variables:		
		CHIL1: if individual has children younger than 2; 0 otherwise;	0.05	0.22
		CHIL2: 1 if children's age is 3-5, 0 otherwise;	0.12	0.32
		CHIL3: 1 if children's age is 6-12, 0 otherwise;	0.25	0.43
		CHIL4: 1 if children's age is 13-18; 0 otherwise.	0.11	0.31

Variable	Notation	Variable Description	Mean	Std. Dev.
Trust Organic Certification	*TORG*	Likert-type scale to express individual's trust in the Certified Organic label: 1. No trust, 2. Little trust, 3. Indifferent, 4. Somewhat trust, 5. Complete trust.	3.70	1.02
Trust Location of Origin	*TORI*	Likert-type scale to express individual's trust in the Location of Origin label: 1. No trust, 2. Little trust, 3. Indifferent, 4. Somewhat trust, 5. Complete trust.	3.68	1.02
Environment-friendly	*ENV*	Likert-type scale to indicate the importance that individual place in the improvement of environment as an attribute of organic products: 1. Not at all, 2. Slightly, 3. Moderately, 4. Very, 5. Extremely.	3.32	1.37
Promotion Social Justice	*SJUS*	Likert-type scale to indicate the importance that individuals place in the promotion of social justice as an attribute of organic products: 1. Not at all, 2. Slightly, 3. Moderately, 4. Very, 5. Extremely.	2.68	1.38
Support Viable Farm Operations	*SFAR*	Likert-type scale to indicate the importance that individuals place in supporting viable farming operations as an attribute of organic products: 1. Not at all, 2. Slightly, 3. Moderately, 4. Very, 5. Extremely.	3.27	1.41
No Genetically Modified Organisms	*NGMO*	Likert-type scale to indicate the importance that individual place in no genetically modified organisms as an attribute of organic products: 1. Not at all, 2. Slightly, 3. Moderately, 4. Very, 5. Extremely.	3.35	1.49
Minimal Chemical Use	*MIN*	Likert-type scale to indicate the importance that individual place in the minimal chemical use as an attribute of organic products: 1. Not at all, 2. Slightly, 3. Moderately, 4. Very, 5. Extremely.	3.69	1.46
Nutritious	*NUTR*	Likert-type scale to indicate the importance that individual place in the nutrition as an attribute of organic products: 1. Not at all, 2. Slightly, 3. Moderately, 4. Very, 5. Extremely.	3.97	1.45
Taste	*TAS*	Likert-type scale to indicate the importance that individuals place in taste as an attribute of organic products: 1. Not at all, 2. Slightly, 3. Moderately, 4. Very, 5. Extremely.	4.17	1.40

5.6.1 Origin Attributes

Regarding the product origin, it is clear that consumers differentiated apples by whether they were produced locally, within their region, in the U.S., or imported from Chile. The WTP (premiums or discounts) estimates for local, regional and imported labels, presented in the tables 5.12, 5.13 and 5.15 respectively, are differences from the values for the U.S. label, presented in table 5.14. The general trend among all consumer characteristics and attitudinal variables was to have a higher value for local, followed by regional, then U.S., and the lower to the imported label. An exception where consumers valued the regional label higher than the local label was observed among male consumers, those with a graduate level of education, those with little trust in the location of origin label, and those for whom “no genetically modified” and “minimal chemical use” attributes of organic products were not at all important.

Furthermore, the WTP for local, regional, and U.S. labels increased with the consumer’s age (*AGE*), but in the case of the imported label, the WTP decreased with older consumers. The origin variables were also affected by consumers’ education (*EDU*) and level of income (*INC*). Results showed that with additional educational attainment, the values for local, regional and imported labels increased, but the value for the U.S. level decreased, all else equal. The values were not monotonically associated with the income categories. Also, the local label is valued less by those earning over $75,000. The regional label is valued less by those in the middle income range: $10,000 to $100,000, the U.S. label is valued less by consumers in the income category $25,000 to $100,000, and the individuals in the income category $50,000 to $75,000 valued imported apples more than the others. A possible explanation to these findings is the concept of “consumer ethnocentrism” (Lusk et al., 2006), which states that individuals’ buying habits are influenced by loyalties toward their own countries and/or antipathy toward other countries. Because this concept manifest differently across individuals, older people with lower educational attainment in our sample tend to have higher ethnocentric consumer tendencies, whereas younger and more highly educated individuals appear generally the least ethnocentric. We can also distinguish consumer segments across the U.S. geographic regions (*RE*). Particularly, consumers from the East Central and South East regions placed higher values to all origin variables than those from other regions. Also, the results suggest that for those consumers with children within ages 6 and 18 years, local products were more valuable and imported products were less valuable than for those consumers with children in other age groups. The consumers with children 3-5 years old valued regional products more than the others.

Another interesting result pertains to how trust in the organic certification and origin labels (*TORG*, *TORI*) affected the value of the origin variables. Findings suggest that the trust in organic certification and origin labels positively influenced the value of the origin labels. However, the premiums for regional and imported labels (with respect to the U.S. label) were influenced negatively. In other words, as the trust for the organic certification and origin labels increased, the premium for the local label also increased, whereas the premium for regional and imported labels decreased, all else equal.

Finally, the effects of consumers' attitudes towards characteristics of organic products in the WTP for origin variables were analyzed. In the case of "environment friendly" (*ENV*), "nutritious" (*NUTR*), and "taste" (*TAS*) attributes, the more the consumers regarded these attributes as important, the WTP for local and regional labels increased, and the WTP for the imported label decreased. Moreover, in the case of "supporting viable farming operations" (*SFAR*), the WTP for locally grown apples increased as the importance of supporting farms increased, as the WTP for apples being imported decreased. A contrasting tendency was observed for the “promotion of social justice” variable (*SJUS*), where as its importance increased, the WTP for the all origins varied little, with the exception of the regional label. Here, the WTP increased as promoting social justice became more important. These effects of the “supporting viable farming operations” and “promotion of social justice” variables will be discussed in more detail in the analysis of specific model variables.

According to the results, the characteristics of a consumer who placed the highest value to the local label (over the U.S. label) was male, with higher education, from the East Central region, with children between 12-18 years old, who supported small farmers, and promoted social justice (Table 5.12). This description is similar to the one presented by Zepeda and Leviten-Reid (2004), specifically in terms of the interest in public benefits, which are seemingly important drivers when purchasing local foods.

In the case of the regional label (Table 5.13), the highest WTP was given by a male consumer, with higher education, from the East Central region, with children between 3-5 years old, who supported environmental-friendly practices, and whose purchasing decisions were more influenced by public rather than private benefits such as social justice. The U.S. label was valued the highest among female consumers, with less education, from the North East region, with children between 12-18 years old, who supported environmental-friendly practices and whose purchasing decisions were more influenced by public rather than private benefits (Table 5.14). When assessing the value of the imported label, there is clear evidence that consumers preferred to support domestic farmers. The WTP for the imported label decreased as the importance of “supporting viable farming operations” increased (Table 5.15).

5.6.2 Organic and Other Attributes

Regarding how the organic label was valued among consumers (Table 5.16), it can be observed that male consumers, relatively young, with higher education, from the East Central region, and with children from 3 to 5 years old were the ones who stated the highest WTP. Notably, the organic label was valued positively with statistical significance among consumers with income levels lower than $75,000, (except for those in the income category $10,000 - $24,999), where the WTP decreased as income increased. It might be the case that consumers with lower income valued the organic attribute higher, since they perceived organic food as a luxury, while for higher income consumers, the perceived value of organicness has become less important. On the other hand, this finding can also imply that income is no longer a very good indicator of assessing consumer preferences towards organic food. Also, as it was expected, the value of the organic label increased as the trust in the organic certification (*TORG*) and the origin label (*TORI*) increased. This finding might be considered as an indicator of how important it is to build trust among consumers. Furthermore, it is interesting to see that consumers, who considered “supporting social justice” (*SJUS*) as the most important attribute of organic produce, valued the organic label the most. These consumers accounted for 13% of the respondents. On the other hand, consumers who considered “taste” (*TAS*) as the most important attribute, revealed the lowest WTP for the organic label and accounted for 65% of the respondents.

In the case of the size of farm attribute, the characteristics of the consumer who placed the highest value (over large farm) was female, younger than 65 years old, with an income level of $75,000 - $100,000, from the East Central region, and with children in the group of age 12 to 18 years old (Table 5.17). Finally, regarding the type of retail outlet (natural grocery store, independent food store, versus mass-market supermarket; tables 5-18 and 5-19), the values varied across consumers depending on whether they placed trust in the origin labels, the region they were from, gender, and age. Therefore, the consumer who valued the natural grocery store less than the mass-market supermarket statistically was male, younger than 45 years old, with bachelor's degree, with children in the group of age 3 - 5 years, who promoted social justice, and whose purchasing decisions were more influenced by public rather than private benefits (Table 5.18). Furthermore, the consumer who valued the independent food store less than the mass-market supermarket statistically was male, younger than 45 years old, with an income level below $10,000, who supported environmental friendly practices and whose purchasing decisions were more influenced by public rather than private benefits (Table 5.19). It is important to remark that these consumers were willing to pay a discount for apples sold in natural food stores and independent grocery stores relative to those sold at mass-market supermarkets, which could indicate that the average respondent valued the product selection and affordability at conventional supermarkets.

Table 5-12 Willingness to pay for locally-grown apples over U.S. grown apples ($/3-pound bag)

Variable	Willingness To Pay					
GEN	Male	Female				
	0.264 **	0.245 *				
	(0.13)	(0.05)				
AGE	< 24	23-34	35-44	45-54	55-64	> 65
	0.164 **	0.193 *	0.226 *	0.263 *	0.307 *	0.359 *
	(0.08)	(0.06)	(0.05)	(0.05)	(0.08)	(0.13)
EDU	Elem. Sch.	Sec. Sch.	High Sch.	Some College	Bachelor's	Graduate Sch.
	0.114	0.152	0.190 **	0.228 *	0.266 *	0.306 *
	(0.18)	(0.14)	(0.09)	(0.06)	(0.05)	(0.09)
INC	< $10K	$10K-$25K	$25K-$50K	$50K-$75K	$75K-$100K	> $100K
	0.592 ***	0.317 **	0.219 *	0.307 *	0.137	0.142
	(0.31)	(0.14)	(0.08)	(0.10)	(0.14)	(0.15)
RE	West	West Cen.	Central	East Cen.	Southeast	Northeast
	0.078	0.125	0.165	0.424 *	0.341 *	0.211 ***
	(0.12)	(0.11)	(0.14)	(0.14)	(0.09)	(0.12)
CHIL	0-2	3-5	6-12	12-18		
	0.243	0.232	0.253 *	0.374 **		
	(0.18)	(0.17)	(0.06)	(0.17)		
TORG	No trust	Little	Indifferent	Some	Complete	
	0.037	0.113	0.195 *	0.285 *	0.383 *	
	(0.12)	(0.09)	(0.06)	(0.05)	(0.09)	
TORI	No trust	Little	Indifferent	Some	Complete	
	0.158	0.188 **	0.224 *	0.266 *	0.315 *	
	(0.11)	(0.09)	(0.06)	(0.05)	(0.09)	
ENV	No	Slightly	Moderately	Very	Extremely	
	0.128	0.178 *	0.233 *	0.296 *	0.368 *	
	(0.08)	(0.06)	(0.05)	(0.06)	(0.09)	
NGMO	No	Slightly	Moderately	Very	Extremely	
	0.157 **	0.191 *	0.231 *	0.282 *	0.347 *	
	(0.07)	(0.06)	(0.05)	(0.06)	(0.09)	
MIN	No	Slightly	Moderately	Very	Extremely	
	0.144 ***	0.176 *	0.214 *	0.258 *	0.312 *	
	(0.08)	(0.06)	(0.05)	(0.05)	(0.08)	
NUTR	No	Slightly	Moderately	Very	Extremely	
	0.112	0.156 **	0.205 *	0.259 *	0.319 *	
	(0.09)	(0.07)	(0.06)	(0.05)	(0.07)	
SJUS	No	Slightly	Moderately	Very	Extremely	
	0.247 *	0.245 *	0.242 *	0.239 *	0.236 **	
	(0.07)	(0.05)	(0.05)	(0.07)	(0.11)	
SFAR	No	Slightly	Moderately	Very	Extremely	
	0.210 *	0.227 *	0.245 *	0.265 *	0.288 *	
	(0.08)	(0.06)	(0.05)	(0.06)	(0.09)	
TAS	No	Slightly	Moderately	Very	Extremely	
	0.110	0.147 **	0.192 *	0.246 *	0.312 *	
	(0.09)	(0.07)	(0.06)	(0.05)	(0.06)	

Numbers in parenthesis represent standard errors

*, **, *** Represent 1%, 5% and 10% significance level, respectively

Table 5-13 Willingness to pay for regionally-grown apples over U.S. grown apples ($/3-pound bag)

Variable	Willingness To Pay					
GEN	Male	Female				
	0.333 **	0.122 **				
	(0.13)	(0.05)				
AGE	< 24	23-34	35-44	45-54	55-64	> 65
	0.093	0.114 ***	0.138 *	0.165 *	0.197 **	0.235 **
	(0.08)	(0.06)	(0.05)	(0.05)	(0.08)	(0.12)
EDU	Elem. Sch.	Sec. Sch.	High Sch.	Some College	Bachelor's	Graduate Sch.
	-0.237	-0.128	-0.018	0.094 ***	0.206 *	0.320 *
	(0.19)	(0.14)	(0.09)	(0.05)	(0.05)	(0.10)
INC	< $10K	$10K-$25K	$25K-$50K	$50K-$75K	$75K-$100K	> $100K
	0.251	0.102	0.159 ***	0.198 **	0.103	0.244
	(0.23)	(0.12)	(0.08)	(0.10)	(0.14)	(0.16)
RE	West	West Cen.	Central	East Cen.	Southeast	Northeast
	0.026	-0.046	0.083	0.286 *	0.244 *	0.100 ***
	(0.13)	(0.13)	(0.13)	(0.13)	(0.09)	(0.12)
CHIL	0-2	3-5	6-12	12-18		
	0.066	0.446 **	0.111 **	0.253		
	(0.20)	(0.20)	(0.05)	(0.16)		
TORG	No trust	Little	Indifferent	Some	Complete	
	0.230 ***	0.204 **	0.175 *	0.143 *	0.108	
	(0.12)	(0.09)	(0.06)	(0.05)	(0.08)	
TORI	No trust	Little	Indifferent	Some	Complete	
	0.295 **	0.249 *	0.195 *	0.132 *	0.057	
	(0.12)	(0.09)	(0.06)	(0.05)	(0.09)	
ENV	No	Slightly	Moderately	Very	Extremely	
	0.128	0.138 **	0.150 *	0.163 *	0.178 **	
	(0.08)	(0.06)	(0.05)	(0.06)	(0.09)	
NGMO	No	Slightly	Moderately	Very	Extremely	
	0.169 **	0.160 *	0.150 *	0.137 **	0.120	
	(0.07)	(0.06)	(0.05)	(0.06)	(0.09)	
MIN	No	Slightly	Moderately	Very	Extremely	
	0.146 ***	0.145 **	0.145 *	0.145 *	0.144 **	
	(0.08)	(0.06)	(0.05)	(0.05)	(0.07)	
NUTR	No	Slightly	Moderately	Very	Extremely	
	0.135	0.141 ***	0.146 *	0.153 *	0.160 **	
	(0.09)	(0.07)	(0.05)	(0.05)	(0.06)	
SJUS	No	Slightly	Moderately	Very	Extremely	
	0.124 ***	0.136 *	0.149 *	0.163 **	0.179 ***	
	(0.07)	(0.05)	(0.05)	(0.07)	(0.11)	
SFAR	No	Slightly	Moderately	Very	Extremely	
	0.171 **	0.160 *	0.148 *	0.135 **	0.120	
	(0.08)	(0.06)	(0.05)	(0.06)	(0.08)	
TAS	No	Slightly	Moderately	Very	Extremely	
	0.133	0.138 ***	0.144 *	0.151 *	0.159 *	
	(0.09)	(0.07)	(0.06)	(0.05)	(0.06)	

Numbers in parenthesis represent standard errors

*, **, *** Represent 1%, 5% and 10% significance level, respectively

Table 5-14 Base - Willingness to pay for U.S.-grown apples ($/3-pound bag)

Variable	Willingness To Pay					
GEN	Male	Female				
	3.906 *	4.112 *				
	(0.16)	(0.08)				
AGE	< 24	23-34	35-44	45-54	55-64	> 65
	4.032 *	4.046 *	4.062 *	4.081 *	4.102 *	4.127 *
	(0.12)	(0.10)	(0.08)	(0.08)	(0.12)	(0.18)
EDU	Elem. Sch.	Sec. Sch.	High Sch.	Some College	Bachelor's	Graduate Sch.
	4.188 *	4.159 *	4.130 *	4.101 *	4.072 *	4.042 *
	(0.31)	(0.23)	(0.15)	(0.09)	(0.08)	(0.14)
RE	West	West Cen.	Central	East Cen.	Southeast	Northeast
	3.934 *	3.795 *	4.064 *	4.194 *	3.962 *	4.361 *
	(0.17)	(0.15)	(0.20)	(0.20)	(0.14)	(0.22)
INC	< $10K	$10K-$25K	$25K-$50K	$50K-$75K	$75K-$100K	> $100K
	4.305 *	4.312 *	4.091 *	3.809 *	4.042 *	4.170 *
	(0.37)	(0.24)	(0.13)	(0.13)	(0.21)	(0.26)
CHIL	0-2	3-5	6-12	12-18		
	3.822 *	3.735 *	4.151 *	4.192 *		
	(0.24)	(0.21)	(0.09)	(0.24)		
TORG	No trust	Little	Indifferent	Some	Complete	
	3.675 *	3.825 *	3.988 *	4.166 *	4.362 *	
	(0.14)	(0.11)	(0.08)	(0.09)	(0.16)	
TORI	No trust	Little	Indifferent	Some	Complete	
	3.612 *	3.769 *	3.951 *	4.165 *	4.419 *	
	(0.14)	(0.11)	(0.08)	(0.08)	(0.17)	
ENV	No	Slightly	Moderately	Very	Extremely	
	3.907 *	3.992 *	4.088 *	4.196 *	4.319 *	
	(0.11)	(0.08)	(0.08)	(0.10)	(0.16)	
NGMO	No	Slightly	Moderately	Very	Extremely	
	3.829 *	3.931 *	4.054 *	4.208 *	4.404 *	
	(0.09)	(0.08)	(0.07)	(0.10)	(0.17)	
MIN	No	Slightly	Moderately	Very	Extremely	
	3.856 *	3.938 *	4.034 *	4.148 *	4.286 *	
	(0.10)	(0.09)	(0.07)	(0.08)	(0.13)	
NUTR	No	Slightly	Moderately	Very	Extremely	
	3.893 *	3.957 *	4.028 *	4.107 *	4.195 *	
	(0.12)	(0.10)	(0.08)	(0.08)	(0.11)	
SJUS	No	Slightly	Moderately	Very	Extremely	
	4.097 *	4.090 *	4.082 *	4.073 *	4.063 *	
	(0.11)	(0.08)	(0.08)	(0.11)	(0.16)	
SFAR	No	Slightly	Moderately	Very	Extremely	
	3.985 *	4.029 *	4.078 *	4.132 *	4.193 *	
	(0.12)	(0.09)	(0.07)	(0.09)	(0.14)	
TAS	No	Slightly	Moderately	Very	Extremely	
	3.816 *	3.888 *	3.974 *	4.077 *	4.204 *	
	(0.11)	(0.09)	(0.08)	(0.07)	(0.10)	

Numbers in parenthesis represent standard errors

*, **, *** Represent 1%, 5% and 10% significance level, respectively

Table 5-15 Willingness to pay for apples from Chile over U.S. grown apples ($/3-pound bag)

Variable	Willingness To Pay					
GEN	Male	Female				
	-0.053	-0.392 *				
	(0.12)	(0.06)				
AGE	< 24	23-34	35-44	45-54	55-64	> 65
	0.035	-0.102 ***	-0.259 *	-0.440 *	-0.650 *	-0.898 *
	(0.08)	(0.06)	(0.05)	(0.06)	(0.10)	(0.18)
EDU	Elem. Sch.	Sec. Sch.	High Sch.	Some College	Bachelor's	Graduate Sch.
	-0.680 *	-0.585 *	-0.490 *	-0.394 *	-0.296 *	-0.198 **
	(0.25)	(0.18)	(0.11)	(0.06)	(0.06)	(0.09)
RE	West	West Cen.	Central	East Cen.	Southeast	Northeast
	-0.625 *	-0.141	-0.497 *	-0.251 **	-0.260 *	-0.352 *
	(0.17)	(0.11)	(0.17)	(0.12)	(0.09)	(0.13)
INC	< $10K	$10K-$25K	$25K-$50K	$50K-$75K	$75K-$100K	> $100K
	-0.483 ***	-0.483 *	-0.416 *	-0.110	-0.419 *	-0.235 *
	(0.27)	(0.15)	(0.09)	(0.10)	(0.16)	(0.09)
CHIL	0-2	3-5	6-12	12-18		
	-0.112	-0.103	-0.365 *	-0.490 *		
	(0.20)	(0.17)	(0.06)	(0.16)		
TORG	No trust	Little	Indifferent	Some	Complete	
	-0.151	-0.217 **	-0.289 *	-0.368 *	-0.454 *	
	(0.12)	(0.09)	(0.06)	(0.05)	(0.09)	
TORI	No trust	Little	Indifferent	Some	Complete	
	-0.255 **	-0.282 *	-0.313 *	-0.349 *	-0.392 *	
	(0.12)	(0.09)	(0.06)	(0.06)	(0.10)	
ENV	No	Slightly	Moderately	Very	Extremely	
	-0.193 **	-0.256 *	-0.327 *	-0.407 *	-0.498 *	
	(0.09)	(0.06)	(0.05)	(0.06)	(0.10)	
NGMO	No	Slightly	Moderately	Very	Extremely	
	-0.161 **	-0.230 *	-0.315 *	-0.419 *	-0.553 *	
	(0.07)	(0.06)	(0.05)	(0.06)	(0.11)	
MIN	No	Slightly	Moderately	Very	Extremely	
	-0.193 **	-0.245 *	-0.306 *	-0.379 *	-0.466 *	
	(0.08)	(0.07)	(0.05)	(0.05)	(0.08)	
NUTR	No	Slightly	Moderately	Very	Extremely	
	-0.226 **	-0.261 *	-0.300 *	-0.343 *	-0.391 *	
	(0.10)	(0.08)	(0.06)	(0.05)	(0.07)	
SJUS	No	Slightly	Moderately	Very	Extremely	
	-0.322 *	-0.339 *	-0.357 *	-0.378 *	-0.400 *	
	(0.08)	(0.06)	(0.05)	(0.08)	(0.12)	
SFAR	No	Slightly	Moderately	Very	Extremely	
	-0.173 **	-0.244 *	-0.323 *	-0.410 *	-0.506 *	
	(0.08)	(0.06)	(0.05)	(0.06)	(0.10)	
TAS	No	Slightly	Moderately	Very	Extremely	
	-0.111	-0.170 **	-0.240 *	-0.324 *	-0.426 *	
	(0.09)	(0.08)	(0.06)	(0.05)	(0.07)	

Numbers in parenthesis represent standard errors

*, **, *** Represent 1%, 5% and 10% significance level, respectively

Table 5-16 Willingness to pay for organic apples over conventional apples ($/3-pound bag)

Variable	Willingness To Pay					
GEN	Male	Female				
	0.210 *	0.140 *				
	(0.08)	(0.04)				
AGE	< 24	23-34	35-44	45-54	55-64	> 65
	0.263 *	0.218 *	0.167 *	0.109 *	0.040	-0.040
	(0.06)	(0.04)	(0.03)	(0.04)	(0.05)	(0.07)
EDU	Elem. Sch.	Sec. Sch.	High Sch.	Some College	Bachelor's	Graduate
	-0.118	-0.043	0.032	0.108 *	0.184 *	0.262 *
	(0.12)	(0.09)	(0.06)	(0.04)	(0.04)	(0.06)
RE	West	West Cen.	Central	East Cen.	Southeast	Northeast
	0.263 *	0.134 ***	0.181 ***	0.264 *	0.031	0.118
	(0.10)	(0.08)	(0.10)	(0.09)	(0.06)	(0.08)
INC	< $10K	$10K-$25K	$25K-$50K	$50K-$75K	$75K-$100K	> $100K
	0.369 **	0.138	0.183 *	0.178 *	-0.007	0.145
	(0.18)	(0.09)	(0.06)	(0.06)	(0.10)	(0.10)
CHIL	0-2	3-5	6-12	12-18		
	0.023	0.338 *	0.147 *	0.043		
	(0.13)	(0.13)	(0.04)	(0.10)		
TORG	No trust	Little	Indifferent	Some	Complete	
	-0.028	0.036	0.105 *	0.180 *	0.263 *	
	(0.08)	(0.06)	(0.04)	(0.04)	(0.06)	
TORI	No trust	Little	Indifferent	Some	Complete	
	0.111	0.124 **	0.138 *	0.154 *	0.174 *	
	(0.08)	(0.06)	(0.04)	(0.03)	(0.06)	
ENV	No	Slightly	Moderately	Very	Extremely	
	-0.041	0.037	0.124 *	0.223 *	0.336 *	
	(0.05)	(0.04)	(0.03)	(0.04)	(0.07)	
NGMO	No	Slightly	Moderately	Very	Extremely	
	-0.014	0.048	0.124 *	0.218 *	0.338 *	
	(0.04)	(0.04)	(0.03)	(0.04)	(0.07)	
MIN	No	Slightly	Moderately	Very	Extremely	
	-0.074	-0.001	0.084 *	0.186 *	0.309 *	
	(0.05)	(0.04)	(0.03)	(0.03)	(0.06)	
NUTR	No	Slightly	Moderately	Very	Extremely	
	-0.098	-0.023	0.060 ***	0.153 *	0.257 *	
	(0.06)	(0.05)	(0.04)	(0.03)	(0.05)	
SJUS	No	Slightly	Moderately	Very	Extremely	
	-0.002	0.086 **	0.183 *	0.291 *	0.410 *	
	(0.04)	(0.03)	(0.03)	(0.05)	(0.09)	
SFAR	No	Slightly	Moderately	Very	Extremely	
	-0.005	0.061	0.134 *	0.214 *	0.304 *	
	(0.05)	(0.04)	(0.03)	(0.04)	(0.07)	
TAS	No	Slightly	Moderately	Very	Extremely	
	-0.099 ***	-0.035	0.041	0.133 *	0.245 *	
	(0.06)	(0.05)	(0.04)	(0.03)	(0.04)	

Numbers in parenthesis represent standard errors

*, **, *** Represent 1%, 5% and 10% significance level, respectively

Table 5-17 Willingness to pay for apples produced in a small farm over apples produced in a large farm ($/3-pound bag)

Variable	Willingness To Pay					
GEN	Male	Female				
	-0.007	0.105 *				
	(0.08)	(0.03)				
AGE	< 24	23-34	35-44	45-54	55-64	> 65
	0.094 ***	0.094 **	0.094 *	0.094 *	0.094 ***	0.093
	(0.05)	(0.04)	(0.03)	(0.03)	(0.05)	(0.07)
EDU	Elem. Sch.	Sec. Sch.	High Sch.	Some College	Bachelor's	Graduate Sch.
	0.164	0.142	0.120	0.097	0.074	0.052
	(0.12)	(0.09)	(0.06)	(0.04)	(0.03)	(0.06)
INC	< $10K	$10K-$25K	$25K-$50K	$50K-$75K	$75K-$100K	> $100K
	0.070	0.130	0.040	0.066	0.234 **	0.108
	(0.14)	(0.08)	(0.05)	(0.06)	(0.10)	(0.10)
RE	West	West Cen.	Central	East Cen.	Southeast	Northeast
	0.128	0.045	0.099	0.130 ***	0.117 **	0.023
	(0.09)	(0.07)	(0.09)	(0.07)	(0.05)	(0.08)
CHIL	0-2	3-5	6-12	12-18		
	0.069	0.160	0.064 **	0.157 ***		
	(0.13)	(0.11)	(0.03)	(0.09)		
TORG	No trust	Little	Indifferent	Some	Complete	
	0.171 **	0.139 *	0.104 *	0.065 **	0.023	
	(0.08)	(0.05)	(0.03)	(0.03)	(0.05)	
TORI	No trust	Little	Indifferent	Some	Complete	
	0.147 **	0.127 **	0.104 *	0.076 **	0.043	
	(0.08)	(0.05)	(0.04)	(0.03)	(0.06)	
ENV	No	Slightly	Moderately	Very	Extremely	
	0.081	0.079 **	0.078 **	0.076 **	0.074	
	(0.05)	(0.04)	(0.03)	(0.04)	(0.06)	
NGMO	No	Slightly	Moderately	Very	Extremely	
	0.123 *	0.108 *	0.088 *	0.065 ***	0.034	
	(0.04)	(0.03)	(0.03)	(0.04)	(0.06)	
MIN	No	Slightly	Moderately	Very	Extremely	
	0.126 **	0.110 *	0.091 *	0.068 **	0.041	
	(0.05)	(0.04)	(0.03)	(0.03)	(0.05)	
NUTR	No	Slightly	Moderately	Very	Extremely	
	0.146 **	0.125 *	0.102 *	0.077 **	0.048	
	(0.06)	(0.05)	(0.03)	(0.03)	(0.04)	
SJUS	No	Slightly	Moderately	Very	Extremely	
	0.109 **	0.092 *	0.072 **	0.050	0.026	
	(0.04)	(0.03)	(0.03)	(0.05)	(0.07)	
SFAR	No	Slightly	Moderately	Very	Extremely	
	0.103 **	0.093 **	0.082 *	0.069 ***	0.055	
	(0.05)	(0.04)	(0.03)	(0.04)	(0.05)	
TAS	No	Slightly	Moderately	Very	Extremely	
	0.160 *	0.139 *	0.114 *	0.084 *	0.047	
	(0.06)	(0.05)	(0.04)	(0.03)	(0.04)	

Numbers in parenthesis represent standard errors

*, **, *** Represent 1%, 5% and 10% significance level, respectively

Table 5-18 Willingness to pay for apples sold at a natural grocery store over those sold at a mass market supermarket ($/3-pound bag)

Variable	Willingness To Pay					
GEN	Male	Female				
	-0.191 ***	-0.038				
	(0.10)	(0.04)				
AGE	< 24	23-34	35-44	45-54	55-64	> 65
	-0.207 *	-0.162 *	-0.109 *	-0.049	0.021	0.104
	(0.07)	(0.05)	(0.04)	(0.05)	(0.07)	(0.10)
EDU	Elem. Sch.	Sec. Sch.	High Sch.	Some College	Bachelor's	Graduate Sch.
	0.010	-0.011	-0.032	-0.053	-0.075 ***	-0.097
	(0.16)	(0.12)	(0.08)	(0.05)	(0.05)	(0.08)
RE	West	West Cen.	Central	East Cen.	Southeast	Northeast
	0.166	-0.160	-0.100	-0.260 **	0.021	-0.116
	(0.11)	(0.10)	(0.12)	(0.11)	(0.07)	(0.10)
INC	< $10K	$10K-$25K	$25K-$50K	$50K-$75K	$75K-$100K	> $100K
	-0.362	0.013	-0.035	-0.088	-0.088	-0.095
	(0.23)	(0.11)	(0.07)	(0.08)	(0.13)	(0.13)
CHIL	0-2	3-5	6-12	12-18		
	-0.117	-0.259 ***	-0.024	-0.218		
	(0.17)	(0.15)	(0.05)	(0.15)		
TORG	No trust	Little	Indifferent	Some	Complete	
	-0.030	-0.045	-0.062	-0.080 ***	-0.099	
	(0.10)	(0.07)	(0.05)	(0.04)	(0.07)	
TORI	No trust	Little	Indifferent	Some	Complete	
	0.059	0.018	-0.029	-0.084 ***	-0.150 ***	
	(0.10)	(0.07)	(0.05)	(0.04)	(0.08)	
ENV	No	Slightly	Moderately	Very	Extremely	
	-0.202 *	-0.149 *	-0.089 **	-0.022	0.055	
	(0.07)	(0.05)	(0.04)	(0.05)	(0.08)	
NGMO	No	Slightly	Moderately	Very	Extremely	
	-0.164 *	-0.131 *	-0.092 **	-0.043	0.020	
	(0.06)	(0.05)	(0.04)	(0.05)	(0.08)	
MIN	No	Slightly	Moderately	Very	Extremely	
	-0.218 *	-0.172 *	-0.117 *	-0.052	0.026	
	(0.07)	(0.06)	(0.04)	(0.04)	(0.06)	
NUTR	No	Slightly	Moderately	Very	Extremely	
	-0.201 **	-0.160 **	-0.116 **	-0.066	-0.011	
	(0.08)	(0.06)	(0.05)	(0.04)	(0.05)	
SJUS	No	Slightly	Moderately	Very	Extremely	
	-0.130 **	-0.093 **	-0.053	-0.008	0.041	
	(0.06)	(0.04)	(0.04)	(0.06)	(0.09)	
SFAR	No	Slightly	Moderately	Very	Extremely	
	-0.206 *	-0.150 *	-0.089 **	-0.020	0.056	
	(0.07)	(0.05)	(0.04)	(0.05)	(0.07)	
TAS	No	Slightly	Moderately	Very	Extremely	
	-0.199 **	-0.166 *	-0.126 *	-0.079 ***	-0.021	
	(0.08)	(0.06)	(0.05)	(0.04)	(0.05)	

Numbers in parenthesis represent standard errors

*, **, *** Represent 1%, 5% and 10% significance level, respectively

Table 5-19 Willingness to pay for apples sold at an independent food store over those sold at a mass market supermarket ($/3-pound bag)

Variable	Willingness To Pay					
GEN	Male	Female				
	-0.209 **	-0.016				
	(0.11)	(0.04)				
AGE	< 24	23-34	35-44	45-54	55-64	> 65
	-0.139 **	-0.106 **	-0.069 ***	-0.025	0.025	0.085
	(0.07)	(0.05)	(0.04)	(0.05)	(0.07)	(0.10)
EDU	Elem. Sch.	Sec. Sch.	High Sch.	Some College	Bachelor's	Graduate Sch.
	-0.118	-0.097	-0.075	-0.053	-0.031	-0.009
	(0.16)	(0.12)	(0.08)	(0.05)	(0.05)	(0.08)
INC	< $10K	$10K-$25K	$25K-$50K	$50K-$75K	$75K-$100K	> $100K
	-0.733 *	-0.160	0.023	0.054	-0.099	0.086
	(0.26)	(0.11)	(0.07)	(0.08)	(0.13)	(0.13)
RE	West	West Cen.	Central	East Cen.	Southeast	Northeast
	0.209 ***	0.024	-0.147	-0.200 ***	-0.055	-0.115
	(0.11)	(0.10)	(0.12)	(0.10)	(0.07)	(0.10)
CHIL	0-2	3-5	6-12	12-18		
	-0.071	0.046	-0.056	-0.104		
	(0.17)	(0.15)	(0.05)	(0.13)		
TORG	No trust	Little	Indifferent	Some	Complete	
	-0.080	-0.073	-0.064	-0.055	-0.045	
	(0.10)	(0.07)	(0.05)	(0.04)	(0.07)	
TORI	No trust	Little	Indifferent	Some	Complete	
	0.073	0.034	-0.011	-0.064	-0.127 ***	
	(0.10)	(0.07)	(0.05)	(0.04)	(0.08)	
ENV	No	Slightly	Moderately	Very	Extremely	
	-0.154 **	-0.111 **	-0.063	-0.009	0.053	
	(0.07)	(0.05)	(0.04)	(0.05)	(0.08)	
NGMO	No	Slightly	Moderately	Very	Extremely	
	-0.109 ***	-0.090 ***	-0.067 ***	-0.039	-0.003	
	(0.06)	(0.05)	(0.04)	(0.05)	(0.07)	
MIN	No	Slightly	Moderately	Very	Extremely	
	-0.142 **	-0.114 **	-0.080 ***	-0.041	0.007	
	(0.07)	(0.05)	(0.04)	(0.04)	(0.06)	
NUTR	No	Slightly	Moderately	Very	Extremely	
	-0.119	-0.098	-0.074	-0.048	-0.019	
	(0.08)	(0.06)	(0.05)	(0.04)	(0.05)	
SJUS	No	Slightly	Moderately	Very	Extremely	
	-0.060	-0.053	-0.046	-0.038	-0.028	
	(0.06)	(0.04)	(0.04)	(0.06)	(0.09)	
SFAR	No	Slightly	Moderately	Very	Extremely	
	-0.115 ***	-0.089 ***	-0.059	-0.027	0.009	
	(0.07)	(0.05)	(0.04)	(0.05)	(0.07)	
TAS	No	Slightly	Moderately	Very	Extremely	
	-0.170 **	-0.140 **	-0.104 **	-0.060	-0.007	
	(0.08)	(0.06)	(0.05)	(0.04)	(0.05)	

Numbers in parenthesis represent standard errors

*, **, *** Represent 1%, 5% and 10% significance level, respectively

5.7 Empirical Examination of the Producers' Reputation Model

In order to examine the producers' reputation model empirically, production cost data from different farmers from the same location and from the same time period are needed to estimate the production cost distribution function for each location. Using equation (6), the share of producers who follow organic practices can be calculated assuming the distribution of costs is uniform. Equation (7) utilizes this value to determine the share of producers who do not follow organic practices. The values calculated from equation (6) and (7) can be used in equation (8) to estimate the average price (p) that a consumer is willing to pay for a 3-pound bag of organic apples from each location. The value of H (high quality) can be obtained using the highest WTP of organic apples among the four locations of origin, while the value of L (low quality) can be obtained using the lowest WTP of conventional apples among the same locations.

To estimate the threshold cost ($\hat{c}$) for each location, each producer from each location is assumed to stay in the industry for one more year with a probability 0.90 ($\lambda = 0.90$). In addition, we assume that organic producers are detected with a probability of 0.98 (χ = 0.98), if they are not following organic practices. The discount rate is set at 0.95 (γ = 0.95). The actual share of producers whom consumers perceive as following organic practices can be estimated as the difference between p (the WTP calculated based on the reputation model) and the lowest WTP estimated from the survey responses among all locations, divided by the difference between the highest and lowest WTP values estimated from the survey responses.

A higher value of ($\hat{c}$) will indicate that a smaller share of producers in that region follow organic practices compared to the other regions. On the other hand, a larger estimated share of producers following organic practices will indicate that consumers perceive organic apples from this region as being of higher quality, which might be a sign that product origin carries reputation for following organic practices.

Due to the lack of production cost estimates from different locations enough to make statistically significant inferences, the threshold cost and share could not be calculated. However, some preliminary results were obtained from the data for two production regions: Argentina and Washington state. The exercise illustrates how the prediction of the reputation model that relates the distribution of the production costs to the premium for organic produce can be tested if we had enough data on the organic production costs. The average cost of producing one pound of organic and conventional apples in the state of Washington and Argentina (representing apples of regional and foreign origin) during the same time period (1996) was calculated using the production cost data. Then, the average percentage decrease in cost due to converting from growing organic apples to conventional apples was calculated and reported as the percentage change in production costs (%ΔC) in table 5-20. This estimate represents the percentage savings in costs when producing conventional apples and trading them as organic in a given region, in other words, the percentage savings in costs from cheating.

The WTP for a 3 lb bag of conventional and organic apples was calculated for each region using the results from the survey. The WTP for conventional apples is equal to the average retail price of conventional apples ($3.49) plus the estimated price discount for imported apples (-$0.34) in the case of Argentina, or plus the estimated price premium for regionally-grown apples ($0.15) in the case of the state of Washington. The WTP for organic apples from different regions was calculated by adding the average retail price of conventional apples ($3.49) and the price premium for organic apples ($0.15) to the price premium for imported apples (-$0.34) in the case of Argentina, or to the price premium for regionally-grown apples ($0.15) in the case of the state of Washington. The percentage change in WTP for apples from region *i* ($\%\Delta WTP_i$) is equal to the percentage increase in WTP from conventional to organic apples.

Table 5-20 Preliminary model results

	Argentina	Washington
Production cost $/lb		
Conventional	0.07	0.16
Organic	0.12	0.29
WTP		
WTP_i conventional ($/3 lb bag)	3.15	3.64
WTP_i organic ($/3 lb bag)	3.30	3.79
Estimates		
$\%\Delta WTP_i$	0.048	0.041
$\%\Delta C_i$	0.39	0.45

The estimates indicate that growers in the state of Washington would save more from not follow organic standards than Argentina (45% versus 42%). Therefore, the model suggests that more producers will be deviating from organic to conventional production systems in Washington than in Argentina, all else equal, because the incentive of cheating is higher. At the same time, consumers were willing to pay a higher premium for organic apples from Argentina than those from the state of Washington (4.8% versus 4.1%). This is consistent with the model implication that regions with higher incentives to cheat produce products that are perceived to be of lower quality, as evidenced by lower WTP. Nonetheless, more data are needed to test this hypothesis rigorously and consequently make a stronger inference.

If sufficiently detailed data were available, the hypothesized relationship between the variability in consumers' WTP for organic apples from different locations and the perceived reputation for quality among these locations could be tested using the OLS regression represented in equation (20).

(20) $\%\Delta WTP_i = \alpha + \tau\%\Delta C_i + \nu_i$

where α is the intercept, τ is the coefficient on the percentage savings from cheating, and ν is the error term. A negative sign of τ is expected because as the savings from cheating increases, more producers will be deviating from organic to conventional production systems, and the consumers' WTP for organic apples will decrease. The null hypothesis will fail to be rejected if the sign of τ is negative and statistically significant.

Although it is not possible to determine whether consumers differentiate between organic apples from different locations by quality reputation, the current analysis gives sufficient directions on how the prediction of the reputation model, which relates the distribution of the production costs to the premium for organic produce, can be tested using a more complete set of organic production cost estimates.

CHAPTER 6 - **Conclusions**

6.1. Summary

The objective of this study was to assess U.S. consumers' preferences for organic foods that are sourced from various places and from supply chain operations that vary in scale. Whether or not U.S. consumers distinguished organic foods by these attributes was investigated through the estimation of the consumers' WTP for origin and scale-specific organic foods attributes, and the identification of consumers segments derived from demographic and attitudinal characteristics. Choice experiment was selected as the valuation method, and data was collected through a survey instrument. Then, to explain the variability in willingness to pay for organic products by product origin, a theoretical model based on the theory of collective reputations developed by Tirole (1996) was derived and empirically examined using production costs data obtained from the literature.

6.2 Implications

This study contributes to our knowledge of consumer demand for organic fresh fruit and vegetables. While consumer demand for attributes of organic foods such as food safety, nutrition, taste, low pesticide residue and environment conservation, have been the subject of many studies, this study focused on the location of origin and operational scale attributes, including the type of retail outlet and the size of farm, which can be regarded as different aspects of sustainable food systems.

Among the levels of the location attributes included in the assessment, the "locally grown" label was associated with the highest average WTP. The "regionally grown" designation was the second most preferred, "U.S. grown" the third, and "imported" the least. In the survey, respondents valued fresh fruit and vegetables coming from South America and Australia the highest among the importing sources included in the survey, followed by those produced in Europe, while they perceived those from China as having the lowest quality. Based on these results, it can be concluded that U.S. organic fresh fruit and vegetables, especially those grown locally, are preferred over the ones from any foreign origin.

Furthermore, the analysis incorporated the effects of consumer characteristics and attitudinal variables on the demand for fresh fruit and vegetables attributes, with the objective to distinguish consumer segments. In the case of origin attributes, it can be concluded that the consumer's valuation was highly influenced by the concept of "consumer ethnocentrism" which states that individuals' buying habits are influenced by loyalties toward their own countries and/or antipathy toward other countries. Also, valuing public benefits higher than private ones was a common trend among the origin attributes, suggesting that creating consciousness about improving environmental quality, promoting social justice, and supporting economically viable farming operations, among other public benefits, might be beneficial to the organic industry. Yet, the share of consumers who are primarily motivated by public benefits was smaller than the share of those who were driven mostly by private benefits. Moreover, consumer preferences towards the type of retail outlets differed among the gender and age segments but to a minimal degree. Finally, in the case of the size of farm, preferences were clearly related to the consumer's gender, where female consumers placed the highest value to the small farm attribute.

Another contribution of this study is the insight obtained about how the trends in organic and local foods might change over time. Although the premium for the local label (6.19% over the base) was higher than the premium for the organic label (3.70% over the base), which is consistent with Loureiro and Hine (2002), Vander Mey (2004), James, Rickard and Rossman

(2009), it is likely that the difference in premium between both labels will narrow over time. The current trend among local foods may decline as more fresh fruit and vegetables are labeled with the locally grown designation.

In the case of organic foods, because our findings suggest that consumers distinguish organic foods that are domestically produced and marketed from imported organic foods, and those produced in a small farm from the ones produced in a large farm, it can be concluded that the organic market is not homogeneous by any means. Therefore, producers, retailers and other major players in the organic industry may focus their marketing strategies on the origin of the organic products to differentiate them and target specific consumer segments.

Furthermore, when assessing the consumer's preferences towards the type of retail outlet, it was unexpected to observe that consumers were willing to pay price discounts for fresh fruit and vegetables sold in natural and independent grocery stores. A possible reasoning behind this finding might be the fact that an average respondent valued the product selection and affordability offered by conventional supermarkets more than all other attributes associated with shopping at natural and independent grocery stores. The implication of these results, together with the observed penetration of organic foods in the mass-market channel, suggest natural and independent grocery stores may need to consider marketing strategies involving price discounts to maintain their market share.

This study also aimed to explain the variability in WTP for organic fresh fruit and vegetables, by studying the link between price premiums and the origin of the product, as well as the producer's collective reputation, which is determined by the producer efforts to supply high quality products. WTP estimates were used for assessing an application of the model of collective reputation for organic and conventional apples from the state of Washington and

Argentina. The results showed that the extent of deviation from organic to conventional production systems is likely to vary across different regions. In regions where the incentive of cheating is relatively higher, smaller shares of producers may follow organic practices in equilibrium with a greater extent of cheating. Preliminary findings indeed showed that greater savings in cost from cheating were associated with a lower WPT for organic apples from the given region. Thus, the premium for organics might depend on the origin of the product and the producers' reputation.

Consumer perceptions play a determinant role in product choices. Along with other factors, producers may also affect the consumer perceptions by building reputation. In this study, reputation was measured by the producer's effort to supply high quality products, and according to the results, locally grown produce are perceived as having the highest reputation among produce from different origins. However, consumers may exhibit stronger preferences towards foods produced by firms with national reputation if the local producers fail to establish trust with their customers and build a reputation for supplying high quality products. While future research would be needed to test our hypothesis using complete cost data, our findings may offer guidance to organic producers and retailers in making decisions regarding the design of marketing, production, inspection, and procurement strategies.

6.3 Limitations

One of the biggest challenges faced in this study was obtaining the production cost data for organic and conventional apple production systems from different locations (within the U.S. and overseas) and from the same time period. Even in locations within the U.S. the availability of this data was limited. Furthermore, many factors that contribute to the heterogeneity in production costs were ignored. The orchard's characteristics, growing practices used in each production system, and investment were some of the factors considered by Glover et al. (2002). In addition, the size, density, maturity and yield per acre of an apple orchard should ideally be standardized to calculate the production costs, as well as the amount of investment in land, infrastructure and machinery. Usually, apples trees do not produce fruit until the third or fourth year, and also, the production systems under organic practices might return a lower yield per acre and a smaller fruit size compared to the ones under conventional practices. Finally, it is necessary to account for other factors such as storage, handling, transportation and distribution costs, as well as seasonality and supply, to explain the variability in cost across locations. Due to the limitations in the data, none of these factors were accounted for in this study.

6.4 Opportunities for Future Research

This study answered a few questions but opens the door to many others. One topic worth examining further is how the current trends in organic and local foods affect the consumer's preferences for organics in a different food category, and compare how the results differ from the fresh fruit and vegetables category, which was focus of this research. Furthermore, it will be important to analyze how more complex interactions between product attributes and demographic and/or attitudinal variables influence the consumer's valuation of organic foods. For example, it can be important to examine how the interaction between demographic and attitudinal variables such as income and children, or education and environmental concerns influence the consumer's valuation of the origin attributes of organic products.

On the other hand, in addition to pursuing the empirical examination of the producers' reputation model using a more complete cost data, the collective reputation model can also be expanded to the retail sector. As mentioned in the introduction of this study, organic consumers are not only vulnerable to falsifications by producers, but also by retailers, who perform similar unethical practices, compromising the consumer’s trust. Thus, examining retailer’s reputation would likely provide an additional insight about the organic foods quality.

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Appendix A - Estimation Results of Conditional Logit Models with Interaction Terms

A-1 Conditional Logit Model with Interaction Terms: Gender

Variable	Coefficient		Std. Error
NATU	-0.470	***	0.26
INDEP	-0.516	***	0.27
ORG	0.517	*	0.19
LOC	10.262	*	1.61
REG	10.431	*	1.61
US	9.612	*	1.60
CHI	9.482	*	1.55
SM	-0.017		0.19
P	-2.461	*	0.45
NATU_GEN	0.384		0.28
INDEP_ GEN	0.479	***	0.29
ORG_ GEN	-0.201		0.20
LOC_ GEN	-0.410		1.74
REG_ GEN	-0.857		1.74
US_ GEN	-0.314		1.72
CHI_ GEN	-1.070		1.67
SM_ GEN	0.256		0.20
P_ GEN	0.200		0.48
No. Observations			1404
Log Likelihood			-1072
Likelihood Ratio			941.61
McFadden's LRI			0.3052

A-2 Conditional Logit Model with Interaction Terms: Age

Variable	Coefficient		Std. Error
NATU	-0.731	*	0.243
INDEP	-0.497	**	0.242
ORG	0.892	*	0.178
LOC	12.267	*	1.563
REG	12.078	*	1.513
US	11.858	*	1.509
CHI	12.320	*	1.495
SM	0.276		0.180
P	-2.950	*	0.427
NATU_AGE	0.155	**	0.065
INDEP_ AGE	0.110	***	0.064
ORG_ AGE	-0.162	*	0.048
LOC_ AGE	-0.611		0.420
REG_ AGE	-0.620		0.409
US_ AGE	-0.658		0.409
CHI_ AGE	-1.022		0.400
SM_ AGE	-0.016		0.048
P_ AGE	0.172		0.115
No. Observations			1404
Log Likelihood			-1049
Likelihood Ratio			985.94
McFadden's LRI			0.3196

A-3 Conditional Logit Model with Interaction Terms: Education

Variable	Coefficient		Std. Error
NATU	0.071		0.465
INDEP	-0.327		0.469
ORG	-0.448		0.344
LOC	10.042	*	3.091
REG	9.055	*	2.996
US	9.861	*	2.979
CHI	8.052	*	2.913
SM	0.435		0.347
P	-2.339	*	0.842
NATU_EDU	-0.048		0.100
INDEP_ EDU	0.051		0.101
ORG_ EDU	0.174	**	0.074
LOC_ EDU	-0.030		0.658
REG_ EDU	0.140		0.637
US_ EDU	-0.115		0.632
CHI_ EDU	0.112		0.621
SM_ EDU	-0.053		0.074
P_ EDU	0.012		0.179
No. Observations			1404
Log Likelihood			-1074
Likelihood Ratio			937.79
McFadden's LRI			0.3040

A-4 Conditional Logit Model with Interaction Terms: Income

Variable	Coefficient		Std Error
NATU	-0.084		0.169
INDEP	0.055		0.173
ORG	0.441	*	0.127
LOC	10.406	*	1.122
REG	10.262	*	1.090
US	9.878	*	1.090
CHI	8.874	*	1.054
SM	0.097		0.128
P	-2.415	*	0.305
NATU_INC1	-0.654		0.547
INDEP_INC1	-1.549	*	0.579
ORG_INC1	0.311		0.363
LOC_INC1	-0.427		3.328
REG_INC1	-0.979		3.236
US_INC1	-1.105		3.199
CHI_INC1	-1.085		2.977
SM_INC1	0.046		0.315
P_INC1	0.377		0.860
NATU_INC2	0.112		0.294
INDEP_INC2	-0.400		0.295
ORG_INC2	-0.143		0.219
LOC_INC2	-0.414		1.992
REG_INC2	-0.733		1.935
US_INC2	-0.570		1.940
CHI_INC2	-0.608		1.864
SM_INC2	0.184		0.218
P_INC2	0.256		0.540
NATU_INC4	-0.126		0.255
INDEP_INC4	0.072		0.254
ORG_INC4	-0.018		0.188
LOC_INC4	-0.661		1.637
REG_INC4	-0.775		1.592
US_INC4	-0.859		1.593
CHI_INC4	-0.116		1.555
SM_INC4	0.060		0.190
P_INC4	0.047		0.450
NATU_INC5	-0.131		0.343
INDEP_INC5	-0.296		0.346

Variable	Coefficient		Std Error
ORG_INC5	-0.458	***	0.270
LOC_INC5	-0.176		2.377
REG_INC5	-0.114		2.322
US_INC5	0.019		2.327
CHI_INC5	-0.003		2.230
SM_INC5	0.476	***	0.272
P_INC5	-0.034		0.658
NATU_INC6	-0.132		0.330
INDEP_INC6	0.140		0.344
ORG_INC6	-0.113		0.252
LOC_INC6	-0.654		2.143
REG_INC6	-0.279		2.094
US_INC6	-0.447		2.077
CHI_INC6	0.026		2.036
SM_INC6	0.147		0.253
P_INC6	0.153		0.586
No. Observations			1404
Log Likelihood			-1055
Likelihood Ratio			975.1
McFadden's LRI			0.3161

A-5 Conditional Logit Model with Interaction Terms: Region

Variable	Coefficient		Std. Error
NATU	-0.252		0.216
INDEP	-0.251		0.219
ORG	0.256		0.162
LOC	9.931	*	1.432
REG	9.689	*	1.390
US	9.472	*	1.388
CHI	8.708	*	1.348
SM	0.049		0.165
P	-2.172	*	0.388
NATU_W	0.585	***	0.306
INDEP_W	0.669	**	0.314
ORG_W	0.271		0.231
LOC_W	-1.877		1.961
REG_W	-1.738		1.901
US_W	-1.574		1.908
CHI_W	-2.065		1.860
SM_W	0.208		0.237
P_W	0.165		0.538
NATU_WC	-0.437		0.489
INDEP_WC	0.355		0.479
ORG_WC	0.320		0.379
LOC_WC	6.896	**	3.457
REG_WC	6.403	**	3.257
US_WC	6.817	**	3.403
CHI_WC	6.975	**	3.252
SM_WC	0.143		0.360
P_WC	-2.120	**	0.961
NATU_C	0.032		0.341
INDEP_C	-0.074		0.345
ORG_C	0.141		0.253
LOC_C	-0.634		2.235
REG_C	-0.571		2.185
US_C	-0.537		2.183
CHI_C	-0.865		2.116
SM_C	0.169		0.256
P_C	-0.026		0.610
NATU_EC	-0.278		0.310
INDEP_EC	-0.156		0.307

Variable	**Coefficient**	**Std. Error**
ORG_EC	0.281	0.223
LOC_EC	-0.529	1.973
REG_EC	-0.567	1.928
US_EC	-0.933	1.930
CHI_EC	-0.679	1.866
SM_EC	0.215	0.223
P_EC	0.136	0.536
NATU_SE	0.312	0.304
INDEP_SE	0.093	0.306
ORG_SE	-0.166	0.226
LOC_SE	2.482	2.155
REG_SE	2.442	2.098
US_SE	1.956	2.077
CHI_SE	1.972	2.008
SM_SE	0.288	0.232
P_SE	-0.713	0.585
No. Observations		1404
Log Likelihood		-1054
Likelihood Ratio		976.80
McFadden's LRI		0.3166

A-6 Conditional Logit Model with Interaction Terms: Children

Variable	Coefficient		Std Error
NATU	-0.054		0.104
INDEP	-0.125		0.104
ORG	0.328	*	0.077
LOC	9.837	*	0.686
REG	9.518	*	0.667
US	9.271	*	0.667
CHI	8.456	*	0.647
SM	0.142	***	0.077
P	-2.233	*	0.187
NATU_CHIL1	-0.302		0.494
INDEP_CHIL1	-0.090		0.528
ORG_CHIL1	-0.258		0.395
LOC_CHIL1	2.521		3.290
REG_CHIL1	2.300		3.095
US_CHIL1	2.348		3.082
CHI_CHIL1	2.823		3.084
SM_CHIL1	0.069		0.383
P_CHIL1	-0.807		0.887
NATU_CHIL2	-0.503		0.321
INDEP_CHIL2	0.224		0.322
ORG_CHIL2	0.400	***	0.238
LOC_CHIL2	-1.290		1.948
REG_CHIL2	-0.509		1.945
US_CHIL2	-1.223		1.926
CHI_CHIL2	-0.631		1.899
SM_CHIL2	0.203		0.236
P_CHIL2	0.079		0.545
NATU_CHIL4	-0.500		0.360
INDEP_CHIL4	-0.140		0.338
ORG_CHIL4	-0.217		0.258
LOC_CHIL4	1.795		2.351
REG_CHIL4	1.806		2.309
US_CHIL4	1.409		2.325
CHI_CHIL4	0.976		2.201
SM_CHIL4	0.258		0.247
P_CHIL4	-0.314		0.645
No. Observations			1404
Log Likelihood			-1062

Likelihood Ratio	960.27
McFadden's LRI	0.3113

A-7 Conditional Logit Model with Interaction Terms: Trust in Certified Organic Label

Variable	Coefficient		Std. Error
NATU	-0.043		0.351
INDEP	-0.237		0.356
ORG	-0.233		0.264
LOC	9.489	*	2.283
REG	10.267	*	2.269
US	9.576	*	2.248
CHI	9.333	*	2.190
SM	0.545	**	0.265
P	-2.707	*	0.638
NATU_TORG	-0.035		0.092
INDEP_ TORG	0.028		0.093
ORG_ TORG	0.161	**	0.069
LOC_ TORG	0.169		0.601
REG_ TORG	-0.106		0.592
US_ TORG	-0.015		0.588
CHI_ TORG	-0.165		0.573
SM_ TORG	-0.099		0.070
P_ TORG	0.106		0.167
No. Observations			1404
Log Likelihood			-1062
Likelihood Ratio			961.31
McFadden's LRI			0.3116

A-8 Conditional Logit Model with Interaction Terms: Trust in Location of Origin Label

Variable	Coefficient		Std. Error
NATU	0.283		0.360
INDEP	0.321		0.367
ORG	0.302		0.275
LOC	10.804	*	2.354
REG	11.416	*	2.322
US	10.411	*	2.316
CHI	9.716	*	2.239
SM	0.494	***	0.276
P	-2.996	*	0.656
NATU_TORI	-0.118		0.094
INDEP_ TORI	-0.116		0.095
ORG_ TORI	0.010		0.071
LOC_ TORI	-0.236		0.612
REG_ TORI	-0.463		0.601
US_ TORI	-0.285		0.600
CHI_ TORI	-0.306		0.581
SM_ TORI	-0.081		0.071
P_ TORI	0.192		0.169
No. Observations			1404
Log Likelihood			-1072
Likelihood Ratio			940.28
McFadden's LRI			0.3048

A-9 Conditional Logit Model with Interaction Terms: Environment

Variable	Coefficient		Std. Error
NATU	-0.694	*	0.248
INDEP	-0.535	**	0.246
ORG	-0.310	***	0.183
LOC	10.894	*	1.608
REG	10.991	*	1.587
US	10.660	*	1.581
CHI	10.280	*	1.534
SM	0.229		0.184
P	-2.783	*	0.445
NATU_ENV	0.162	**	0.070
INDEP_ ENV	0.129	***	0.070
ORG_ ENV	0.201	*	0.052
LOC_ ENV	-0.245		0.453
REG_ ENV	-0.343		0.443
US_ ENV	-0.350		0.442
CHI_ ENV	-0.479		0.431
SM_ ENV	-0.015		0.052
P_ ENV	0.144		0.124
No. Observations			1404
Log Likelihood			-1049
Likelihood Ratio			986.95
McFadden's LRI			0.3199

A-10 Conditional Logit Model with Interaction Terms: No Genetically Modified Organisms

Variable	Coefficient		Std. Error
NATU	-0.616	*	0.237
INDEP	-0.404	***	0.236
ORG	-0.214		0.175
LOC	12.504	*	1.585
REG	12.655	*	1.566
US	12.088	*	1.555
CHI	11.754	*	1.505
SM	0.440	**	0.178
P	-3.228	*	0.440
NATU_NGMO	0.131	**	0.065
INDEP_ NGMO	0.080		0.064
ORG_ NGMO	0.172	*	0.048
LOC_ NGMO	-0.690		0.427
REG_ NGMO	-0.807		0.418
US_ NGMO	-0.739		0.418
CHI_ NGMO	-0.883	**	0.405
SM_ NGMO	-0.075		0.049
P_ NGMO	0.264	**	0.117
No. Observations			1404
Log Likelihood			-1053
Likelihood Ratio			978.13
McFadden's LRI			0.3171

A-11 Conditional Logit Model with Interaction Terms: Minimal Chemical Use

Variable	Coefficient		Std. Error
NATU	-0.812	*	0.264
INDEP	-0.524	**	0.260
ORG	-0.432	**	0.195
LOC	12.243	*	1.765
REG	12.336	*	1.753
US	11.878	*	1.740
CHI	11.413	*	1.679
SM	0.439	**	0.197
P	-3.138	*	0.491
NATU_MIN	0.173	*	0.066
INDEP_ MIN	0.108	***	0.066
ORG_ MIN	0.214	*	0.049
LOC_ MIN	-0.544		0.439
REG_ MIN	-0.632		0.433
US_ MIN	-0.600		0.431
CHI_ MIN	-0.700	***	0.417
SM_ MIN	-0.071		0.050
P_ MIN	0.213	***	0.121
No. Observations			1404
Log Likelihood			-1049
Likelihood Ratio			987.57
McFadden's LRI			0.3201

A-12 Conditional Logit Model with Interaction Terms: Nutritious

Variable	Coefficient		Std. Error
NATU	-0.673	**	0.276
INDEP	-0.391		0.272
ORG	-0.471	**	0.208
LOC	11.070	*	1.841
REG	11.235	*	1.828
US	10.865	*	1.823
CHI	10.315	*	1.752
SM	0.467	**	0.209
P	-2.833	*	0.514
NATU_NUTR	0.130	**	0.066
INDEP_ NUTR	0.070		0.065
ORG_ NUTR	0.206	*	0.049
LOC_ NUTR	-0.245		0.435
REG_ NUTR	-0.347		0.429
US_ NUTR	-0.343		0.428
CHI_ NUTR	-0.404		0.413
SM_ NUTR	-0.072		0.049
P_ NUTR	0.130		0.121
No. Observations			1404
Log Likelihood			-1055
Likelihood Ratio			975.30
McFadden's LRI			0.3162

A-13 Conditional Logit Model with Interaction Terms: Promote Social Justice

Variable	Coefficient		Std. Error
NATU	-0.429	**	0.206
INDEP	-0.174		0.205
ORG	-0.217		0.152
LOC	11.399	*	1.391
REG	11.044	*	1.360
US	10.747	*	1.356
CHI	9.942	*	1.311
SM	0.330	**	0.154
P	-2.619	*	0.381
NATU_SJUS	0.103		0.068
INDEP_ SJUS	0.023		0.069
ORG_ SJUS	0.212	*	0.051
LOC_ SJUS	-0.518		0.449
REG_ SJUS	-0.470		0.438
US_ SJUS	-0.484		0.437
CHI_ SJUS	-0.487		0.425
SM_ SJUS	-0.055		0.052
P_ SJUS	0.114		0.123
No. Observations			1404
Log Likelihood			-1068
Likelihood Ratio			949.03
McFadden's LRI			0.3076

A-14 Conditional Logit Model with Interaction Terms: Support Farming Operations

Variable	Coefficient		Std. Error
NATU	-0.694	*	0.238
INDEP	-0.376		0.235
ORG	-0.177		0.173
LOC	11.145	*	1.562
REG	11.105	*	1.537
US	10.619	*	1.527
CHI	10.329	*	1.485
SM	0.302	***	0.176
P	-2.692	*	0.430
NATU_SFAR	0.162	**	0.067
INDEP_ SFAR	0.079		0.067
ORG_ SFAR	0.163	*	0.049
LOC_ SFAR	-0.348		0.440
REG_ SFAR	-0.410		0.431
US_ SFAR	-0.363		0.430
CHI_ SFAR	-0.518		0.418
SM_ SFAR	-0.037		0.050
P_ SFAR	0.119		0.121
No. Observations			1404
Log Likelihood			-1063
Likelihood Ratio			959.41
McFadden's LRI			0.3110

A-15 Conditional Logit Model with Interaction Terms: Taste

Variable	Coefficient		Std. Error
NATU	-0.758	**	0.304
INDEP	-0.655	**	0.302
ORG	-0.514	**	0.229
LOC	12.776	*	2.073
REG	12.950	*	2.063
US	12.518	*	2.048
CHI	12.315	*	1.979
SM	0.592	**	0.232
P	-3.335	*	0.580
NATU_TAS	0.143	**	0.069
INDEP_ TAS	0.128	***	0.069
ORG_ TAS	0.207	*	0.052
LOC_ TAS	-0.633		0.467
REG_ TAS	-0.733		0.462
US_ TAS	-0.714		0.460
CHI_ TAS	-0.855	***	0.445
SM_ TAS	-0.098	***	0.052
P_ TAS	0.241	***	0.130
No. Observations			1404
Log Likelihood			-1051
Likelihood Ratio			982.79
McFadden's LRI			0.3186