

**A FIELD EXPERIMENT ON CONSUMER WILLINGNESS TO PAY FOR
ORGANIC GRAPE TOMATOES BASED ON PURCHASING VENUE**

by

Shuiqin Yu

A thesis submitted to the Faculty of the University of Delaware in partial
fulfillment of the requirements for the degree of Master of Science in Agricultural and
Resource Economics

Summer 2015

© 2015 Shuiqin Yu
All Rights Reserved

ProQuest Number: 1602379

All rights reserved

INFORMATION TO ALL USERS

The quality of this reproduction is dependent upon the quality of the copy submitted.

In the unlikely event that the author did not send a complete manuscript and there are missing pages, these will be noted. Also, if material had to be removed, a note will indicate the deletion.



ProQuest 1602379

Published by ProQuest LLC (2015). Copyright of the Dissertation is held by the Author.

All rights reserved.

This work is protected against unauthorized copying under Title 17, United States Code
Microform Edition © ProQuest LLC.

ProQuest LLC.
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106 - 1346

**A FIELD EXPERIMENT ON CONSUMER WILLINGNESS TO PAY FOR
ORGANIC GRAPE TOMATOES BASED ON PURCHASING VENUE**

by

Shuiqin Yu

Approved: _____
John C. Bernard, Ph.D.
Professor in charge of thesis on behalf of the Advisory Committee

Approved: _____
Titus O. Awokuse, Ph.D.
Chair of the Department of Applied Economics and Statistics

Approved: _____
Mark Rieger, Ph.D.
Dean of the College of Agriculture and Natural Resources

Approved: _____
James G. Richards, Ph.D.
Vice Provost for Graduate and Professional Education

ACKNOWLEDGMENTS

First of all, I would like to express my gratitude to my advisor, Dr. Bernard, for his continuous advice, suggestions and supervisions during my master's studies. He always puts students first and provides students with the best guidance and help.

Second, I would like to thank all the committee members Dr. Pesek, Dr. Toensmeyer, for their encouragement, support and comments. Their constructive ideas and questions helped this thesis become comprehensive.

Third, I would like to thank all the research assistants in the Agricultural and Natural Resources Program. We had a great time together, both academically and casually. I spent the most beautiful two years with you. I will cherish that in my lifetime. In addition, I owe many thanks to Erma and Maggie, the secretaries in the graduate office, who always bring joy and happiness to me and helped me a lot.

Last but not least, I am grateful for my parents. I owe too many thanks to them for their unconditional patience and encouragement throughout all my school years. Whenever I feel tired or exhausted, just thinking about them and communicating with them will make me energetic and cheerful again. I have the greatest parents.

TABLE OF CONTENTS

LIST OF TABLES	vi
LIST OF FIGURES	vii
ABSTRACT	viii
Chapter	
1 INTRODUCTION	1
1.1 U.S. Organic Food Sales and Production	1
1.2 Organic Grape Tomatoes	1
1.3 The Development of Retail Outlets	2
1.4 Definitions of Purchasing Outlets	3
1.5 The Objectives of This Study	6
2 LITERATURE REVIEW	7
2.1 Consumers' Perceptions on Organic Food	7
2.2 Consumers' Willingness to Pay for Organic Food	9
2.3 Research on Consumers in Various Purchasing Locations	13
3 METHODOLOGY	17
3.1 Introduction	17
3.2 Auction Experiments	17
3.3 Experimental Design	18
3.4 Survey Design	18
3.5 Tobit Model	20
3.6 Ordered Logit Model	21
4 DESCRIPTIVE STATISTICS	23
4.1 Introduction	23
4.2 Demographic Statistics	23
4.3 Perceptual Response	27
5 EMPIRICAL RESULTS	33
5.1 Introduction	33
5.2 Tobit Model	33
5.3 Tobit Model Results on Consumers' Perceptions	38
5.4 Ordered Logit Model	43

6	CONCLUSIONS AND IMPLICATIONS	53
6.1	Introduction	53
6.2	Data and Methods.....	53
6.3	Consumers' Willingness to Pay for Organic Grape Tomatoes	53
6.4	Consumers' Perceptions on Organic Grape Tomatoes.....	55
6.5	Consumers' Perceptions and Demographic Characteristics.....	56
6.6	Limitations and Suggestions.....	58
	REFERENCES	60
	Appendix	
A	INSTITUTIONAL REVIEW BOARD APPROVAL LETTER	69

LIST OF TABLES

Table 1.1	The definitions of various purchasing venues	4
Table 4.1	Demographic Statistics of the Survey	24
Table 4.2	Consumers' Average Bid and Rating for Perceptual Questions	32
Table 5.1	Description of Variables.....	34
Table 5.2	Tobit Regression Results	38
Table 5.3	Consumers' Perception Regression	39
Table 5.4	Delawarean and Illinoisan Consumers' Perception Regression Results..	42
Table 5.5	Score Test for the Proportional Odds Assumption- Taste Perception.....	45
Table 5.6	Ordered Logit Regression- Taste Perception	47
Table 5.7	Score Test for the Proportional Odds Assumption- Confidence Perception	48
Table 5.8	Ordered Logit Regression- Confidence Perception.....	49
Table 5.9	Score Test for the Proportional Odds Assumption- Safety Perception...	50
Table 5.10	Ordered Logit Regression- Safety Perception.....	52

LIST OF FIGURES

Figure 4.1	Consumers' Shopping Frequency of Fresh Produce at Different Outlets	26
Figure 4.2	Consumers' Gender and Their Shopping Frequency on Organics	27
Figure 4.3	Safe Perception of Organic Grape Tomatoes from Different Outlets	28
Figure 4.4	Taste Perception of Organic Grape Tomatoes from Different Outlets	29
Figure 4.5	Confidence Perception of Organic Grape Tomatoes from Different Outlets	30

ABSTRACT

Organic food sales have grown rapidly in the past decade, becoming an important sector in the food retailing industry and reaching 39.1 billion dollars in 2014 (Organic Trade Association, OTA). This rising market share had led to an accompanying large number of studies examining consumer perceptions, understanding and willingness to pay (WTP) for organic foods. However, most of these studies examined these issues in the abstract, without a consideration of the purchasing venue. Of the small number that did, typically only two fairly generic venues were investigated. The purpose of this study was thus to determine the influence of four different possible purchasing outlets on consumers' attitudes and WTP for organic foods.

Specifically, the goals of this study were to examine whether the purchasing outlet has an influence on consumers' perceptions and WTP for organic grape tomatoes. Four different purchasing outlets were selected: supermarkets (e.g. ACME, Shoprite), farmers' markets, supercenters (e.g. Walmart, Target) and fresh format stores (e.g. Whole Foods, Fresh Market). Grape tomatoes were selected as a common, easy to eat food that was in season at the time of the study. Data was collected through a series of field experiments conducted in Delaware and Illinois in 2014. Locations included local parks, supermarkets, farmers markets and college campuses. A total of 205 consumers participated in the study, with about half in each state allowing for a test of regional differences.

A session with a consumer lasted about 10 minutes and began with a BDM auction for a pint of organic grape tomatoes from each of the four venues. Bids were restricted to between \$0 and \$5. After entering their bids, each answered several

survey questions regarding their opinions of organic foods and how they might vary based on purchasing outlet. Next, a random envelope with the name of an outlet and a binding bid price was selected to determine the outlet and price for the auction.

While results showed no significant differences in the WTP between farmers markets' and fresh format stores, both were significantly higher than from supermarkets, which were significantly higher than the WTP for those from supercenters. This same ranking order and significance held for questions regarding the safety and health of the tomatoes from each outlet. Perhaps tellingly, this held for a question on how confident consumers were that tomatoes labeled organic at the various locations were truly organic. In terms of taste perceptions, the supercenter again fell to the bottom. Model results additionally suggested that gender and having a child under 18 in the household played a role in these differences. These findings demonstrate that consumers' attitudes and opinion towards organic were not generic, but depended importantly on the purchasing venue. Locations such as farmers' markets and fresh format stores could use this to perhaps achieve much larger premiums than some of their competitors while supercenters clearly could have to spend a lot of effort towards improving their image and trust with organic consumers.

Chapter 1

INTRODUCTION

1.1 U.S. Organic Food Sales and Production

U.S. organic food sales grew rapidly in the past decade. Organic sales skyrocketed from 3.6 billion dollars in 1997 to 39.1 billion dollars in 2014 (Organic Trade Association (OTA), 2015). The annual growth rate of U.S. organic food sales was above 10% from 1998 to 2008. Although the growth rate of the sales of organic food plummeted to 1.31% in 2009 due to the economic crisis, it recovered to 11.50% in 2013, nearly reaching the normal growth rate before the crisis.

With the growing sales of organic food, consumers now have more access to organic food than before. They could either purchase organic food from Walmart supercenters, or from Whole Foods Markets. Along with the changing landscape with organic food sales, consumers' perceptions, perceived value, and their purchasing decisions on organic food could also change. In this study, we sought to find out how consumers' purchasing intentions vary in different retail outlets.

1.2 Organic Grape Tomatoes

Organic grape tomatoes were selected as representatives of fresh organic fruits. They could be eaten fresh, or cooked and added into salads and other dishes. Thus, they represented fruits and vegetables well.

According to the U.S. Organic Industry Survey from 2014, organic fruits and vegetables were the largest sector in organic food sales, which accounted for \$11.6

billion in 2013(OTA, 2014). According to the Economics Research Service at U.S. Department of Agriculture (USDA) and Nutrition Business Journal (NBJ), fruit and vegetables accounted for the largest sector of the organic categories from 2005 to 2014, which included “dairy”, “beverages”, “packaged foods”, “breads and grains”, “snack foods”, “meat, fish, poultry”, and “condiments”.

Organic grape tomatoes were widely sold in many retail outlets. They were often packaged in plastic boxes. The common package weight was one pint. It was very easy for consumers to distinguish them from tomatoes.

1.3 The Development of Retail Outlets

Organic food sales have been closely related with the development of retail outlets. The first grocery store in the U.S. was A&P, which developed from a small store selling tea and coffee in 1859 into the country’s largest retailer with 16,000 stores in its prime in 1930. Along with the development of vehicles and consumer demand, the retail industry started to boom with the emergence of supermarkets in the 1940s. The number of supermarkets in the US has skyrocketed since the first one launched in New York City. With 3.4 million employees (Source: Bureau of Labor Statistics) and \$485 billion sales in 2014 (Source: Progressive Grocer Magazine), supermarkets surely constitute an essential part of the retail industry.

Consumers’ daily grocery shopping is not limited to supermarkets. They sometimes needed to shop several different stores, such as pharmacies or alcohol stores to satisfy their daily needs. Based on this kind of consumer demand, supercenters, which aimed at providing consumers with every item they need in one stop, were created.

Farmers' markets are a kind of retail markets where food is sold directly from farmers to consumers. Farmers' markets reduce the transactions before food is accessible to consumers. This kind of direct marketing allows consumers to buy local fresh produce, farm food and so on. It also saves farm producers' transaction time and storage cost and benefits local communities. The U.S. Department of Agriculture (USDA) started to count farmers' markets in 1994. According to the Marketing Service Division of Agricultural Marketing Service (AMS) at USDA (2014), the number of farmers' markets burgeoned from 1755 in 1994 to 8268 in 2014.

Fresh format stores offer consumers natural food, organic food, and ethnic food, among other types. They focus on foods that are environmentally friendly, and food that is processed from humane treatment of animals. This kind of store distinguishes themselves from traditional supermarkets or other forms of retail outlets. In 2014, the market share of fresh format stores was 1.2%, however, they were expected to gain an annual growth rate of 12.1% until 2018(source: Willard Bishop).

There are other retail outlets that sold fresh produce, such as wholesale clubs, limited-assortment stores, and small grocery stores. However, in this study, we selected the four most commonly shopped purchasing venues of organic fresh produce: supermarkets, farmers markets, supercenters and fresh format stores, to examine how these purchasing venues could affect consumers' WTP.

1.4 Definitions of Purchasing Outlets

The summary of definitions of the four retail outlets selected in this study were listed in Table 1.1.

Table 1.1 The definitions of various purchasing venues

Venue	Definition	Definition Source	Examples
Supermarket	"Stores offering a full line of groceries, meat, and produce with at least \$2 million in annual sales and up to 15% of their sales in general merchandise/health and beauty care. These stores typically carry anywhere from 15,000 to 60,000 stocking keeping units (SKUs), and may offer a service deli, a service bakery, and/or a pharmacy."	The Future of Food Retailing, 2014, Willard Bishop	ACME, ShopRite
Farmers' Market	"A farmers' market is defined as a multi-stall market at which farmers sell agricultural products directly, such as fresh fruit and vegetables (but also meat products, dairy products, and/or grains)."	U.S. Department of Agriculture, 2015	
Supercenter	"A hybrid of a large traditional supermarket and a mass merchandiser. Supercenters offer a wide variety of food, as well as non-food merchandise. These stores average more than 170,000 square feet and typically devote as much as 40% of the space to grocery items."	The Future of Food Retailing, 2014, Willard Bishop	Walmart supercenters, Super Target

Table 1 (Continued)

Venue	Definition	Definition Source	Examples
Fresh Format Store	"Fresh format stores emphasize perishables and offer center-store assortments that differ from those of traditional retailers, especially in the areas of ethnic, natural, and organic."	The Future of Food Retailing, 2014, Willard Bishop	Whole Foods, Fresh Market

Supermarkets, farmers' markets, supercenters, and fresh format stores were the four main channels that sell organic grape tomatoes. To help research subjects distinguish each outlet, we added ACME and ShopRite in the brackets right after the supermarket option. Similarly, we listed Walmart and Target as examples for supercenters. In addition, Whole Foods and Fresh Market were the examples for fresh format stores.

These four different purchasing outlets had different focuses. While supermarkets and supercenters highlight on large selection and low prices, fresh format stores and farmers' markets emphasize fresh, perishable produce. There were even obvious differences within these two categories. Supermarkets were smaller and had less SKUs than supercenters. Farmers' markets directly sold farmers' fresh produce to consumers while fresh format stores offer ethnic, natural and organic items, many of which are not directly from farmers. Consumers' perceptions of fresh produce from those outlets may vary since each outlet has a different emphasis.

1.5 The Objectives of This Study

The objectives of this study were twofold. First, we sought to find out how consumers' perceptions towards a series of organic food topics such as safety, health and confidence of organic grape tomatoes when compared with conventional grape tomatoes varied in the four different purchasing venues listed above. Second, we hoped to elicit consumers' true willingness-to-pay (WTP) for one pint of organic grape tomatoes from the four outlets above using the Becker-DeGroot-Marschak (BDM) auction. This study tried to fill the gap between consumers' WTP and different purchasing outlets, and further understanding of consumers' WTP and perceptions for organic fresh produce.

Chapter 2

LITERATURE REVIEW

2.1 Consumers' Perceptions on Organic Food

There has been a growing body of literature on consumers' perceptions along with the increasing demand for organic food in the past decade. While consumers' perceptions might vary in different areas for various organic products, there was consensus that organic food is a kind of healthy food that motivates consumer purchases. Magnusson et al., (2001) found that Swedish consumers regarded organic food as healthier when compared with conventional counterparts. Similarly, Roitner-Schoberberger et al. (2008) demonstrated that respondents in Bangkok marked health benefits of organic food as the major influence on purchase. In addition, Radman (2005) surveyed 2000 subjects in Croatia and summarized that Croatian participants perceived better health, quality and taste from organic products. Further, Harper and Makatouni (2002) concluded that both health and food safety were the primary concerns of organic consumers.

A focus group study conducted by Padel and Foster (2005) identified that health was an important factor that contributed to organic food sales. Similar results can be found in a Norwegian consumer study. Torjusen et al., (2001) found that consumers in Hedmark County of Norway regarded health issues as very important in their decision-making process of organic food consumption. Research results from Pearson et al., (2010) pointed out that personal health concerns were the most important drive for organic food consumption, followed by food quality concerns, and natural environmental concerns. Tregear et al. (1994) supported the aforementioned findings from the retailers' perspective. Their results showed that Whole Foods

Markets' managers considered personal health (41%) and family health (45%) as the primary incentives to purchase organic food, while supermarket managers provided 27% of personal health concern and 27% of family health concern for their motivation to buy organic food.

In addition, a study of Aarset et al. (2004) provided support from the organic certifiers' perspective, illustrating that health quality was essential for organic animal production. However, a study conducted by Takiainen and Sunqvist (2005) disagreed with the statement that health was an important factor for organic food consumption. Their modified Theory of Planned Behavior (TPB) results suggested that there was no significant relationship between health concerns and purchasing perceptions for organic bread and flour products.

Besides health concerns, concerns for the environment have been widely addressed in the organic food literature (Padel and Foster, 2005, Torjusen et al., 2001, Pearson et al., 2010, Tregear et al., 1994). The results from Padel and Foster (2005) showed that environment and animal welfare concerns impacted consumers' choice on organic food. The findings in the study by Pearson et al. (2010), which demonstrated that concern for environmental protection played a role in deciding why consumers buy organic food, was in line with Padel and Foster (2005)'s study. Furthermore, in the Norwegian research conducted by Torjusen et al. (2001), both consumers and producers had the same concern for environmental issues. Moreover, Tregear et al. (1994) compared the environmental perceptions of managers from supermarkets and Whole Foods Markets and found that supermarket managers perceived more concerns for environment than Whole Foods Market managers.

2.2 Consumers' Willingness to Pay for Organic Food

Consumers' WTP for organic products over conventional products, as well as certain demographic traits have been widely studied for decades. Maguire, Owens and Simon (2004) used the hedonic model to elicit Italian consumers' price premium for organic babyfood, which was \$0.03 to \$0.04 per ounce when organic. In Spain, there was a different survey from Urena et al. (2008) aimed at examining gender effect on consumers' WTP, which identified that Spanish consumers would bid a general 10% higher price on organics. In the field of fresh produce, Cicia, Giudice, and Ramunno (2009) employed the multinomial logit model to estimate the premium of Campania consumers for organic tomatoes and certain organic attributes. They found that subjects were likely to bid 0.86€ more per kilogram for organic tomatoes provided that the price for conventional tomatoes was 1€/kg. Specifically, they bid an average of 0.46€/kg and 0.40€/kg for the health and environment attributes, respectively. In line with this study, Diaz et al. (2010) used the contingent valuation method to elicit consumers' WTP for organic tomatoes. Their findings suggested that subjects were willing to pay a mean maximum of 0.81€/kg for organic tomatoes. In addition, they pointed out that both the knowledge and the price of organic products were positively associated with their bids for organic foods.

As for the demographics that affected consumers' WTP for organic products, households that had a smaller size and higher income have been found to provide higher bids for organic fresh produce (Govindasamy and Italia, 1999). Similarly, Hsieh and Stiegert (2012) studied consumers' WTP for organic milk and eggs. They found that small households preferred organic eggs to conventional ones and having preschool children in the household increased the likelihood of buying organics. This finding was consistent with the results of Thompson and Kidwell (1998), which

pointed out that the presence of children under eighteen positively affected consumers' probability of purchasing organics. On the contrary, Loureiro and Hine (2001) demonstrated that having children in the household had negative effects on Colorado consumers' WTP for organic potatoes.

Education was usually considered closely related to consumers' perceptions about organic food. Education had a positive impact on research subjects' WTP for organic potatoes (Loureiro and Hine, 2001). However, education is not the same as participants' knowledge of organic products. Having a college degree or higher did not necessarily mean a full understanding of organic foods or higher possibility to buy organic foods. Instead, Thompson and Kidwell (1998) suggested that education negatively impacted consumers' probability of purchasing organics. Using the binary discrete choice model, Hsieh and Stiegert (2012) concluded that subjects who held a bachelor's degree were less likely to consume organic milk. Similarly, Diaz et al. (2010) used contingent valuation and the multivariate logit model and found that consumers' knowledge of organic food was positively associated with their bids on organic tomatoes.

The two most important factors that drove consumers to buy organic products were health concerns and environmental concerns (Magnusson et al., 2003; Magistris and Gracia, 2008). When examining consumers' perceptions on organic food, Urena, Bernabeu, and Olmeda (2008) pointed out that gender influenced participants' WTP for organic food. Their findings suggested that women paid more attention to organic related topics such as health, nutrition, and environment, while men were likely to bid higher than women.

The effects of locations and regional markets on consumers' WTP for organic fresh produce have been studied by a number of researchers. Mabiso et al., (2005) sampled 311 subjects to investigate whether location had an influence on consumers' perceptions of organic apples and tomatoes. The empirical Vickrey auction results showed that consumers in Lansing bid \$0.49 per pound more than their counterparts in Atlanta while consumers in Gainesville bid \$0.04 more than customers' bid in Atlanta. As for WTP for organic tomatoes in different regional markets, Huang and Lin (2007) used Homescan panel data to analyze consumers' WTP among four major markets in the United States. The premium for organic tomatoes in the New York-Philadelphia market, Chicago-Baltimore/Washington market, Los Angeles-San Francisco market and Atlanta-San Antonio market was \$0.25/lb., \$0.14/lb., \$0.14/lb. and \$0.29/lb., respectively. These two studies focused on geographic markets and their impact on consumers' perceptions and bids for organic fresh produce as opposed to looking at the individual stores. Thus, the information was limited regarding consumers' WTP in terms of purchasing venues.

While previous studies examined how demographic attributes and factors affect consumers' WTP for organic food, there had been few analyzing the influence of purchasing venue. Thompson and Kidwell (1998) surveyed 340 customers from specialty stores and cooperatives in Tucson, Arizona to study the impact of store format on consumers' likelihood to purchase organic fresh produce. Their research demonstrated that consumers who had an adequate budget for food tended to patronize specialty stores as opposed to cooperatives. Furthermore, they found that consumers from specialty stores quickly responded to price changes between organic and conventional products. Following this study, Yue and Tong (2009) chose one

hypothetical experiment and one choice experiment to elicit consumers' WTP for organic fresh produce. Their results concluded that experimental subjects who mainly shopped for fresh produce from cooperatives were most likely to buy organic tomatoes. Meanwhile, those who purchased fresh produce in specialty stores more than any other store formats were more inclined to buy organic tomatoes. In another study, Hsieh and Stiegert (2011) found that shoppers' perception of organic foods influenced their WTP as well as their choice of purchasing outlets. These studies provided general qualitative analysis on the relationship of consumers' WTP and their selection of purchasing outlets. They did not measure the quantitative relationship between consumers' purchasing premium and store formats. Further research is needed to examine how much consumers' WTP for organic foods can be changed by different purchasing outlets.

In the literature on store formats, there had been limited research about farmers' markets. According to a USDA report in 2004, farmers usually set a price premium for organic products that had higher quality. Using the multinomial logit model, Bond, Thilmany and Bond (2009) specified that the customers considered the availability of local fresh produce when deciding a purchasing venue. The aforementioned studies paid attention to the elements that affected consumers' choice of purchasing venue. However, they ignored the relationship between consumers' WTP and store format the other way around. In other words, they neglected how different purchasing outlets might affect consumers' perceptions on organic foods, thus affecting their WTP for organic fresh produce. In contrast, Onken, Bernard, and Pesek (2011) conducted choice experiments on consumers from the Mid-Atlantic region to examine their marginal WTP for organic, natural, local and state marketing-

promoted strawberry preserves. Their results demonstrated that participants were willing to pay a higher price for local or state program-promoted products from farmers' markets than from grocery stores. However, further research should expand to more purchasing venues and address consumers' perceptions on fresh produce from different purchasing outlets.

2.3 Research on Consumers in Various Purchasing Locations

According to a yearly survey conducted by the Food Marketing Institute in 2014, the most frequently shopped retail location was the regular full-service supermarket with a frequency of 85%, followed by the supercenter (46%), the conventional discount store (29%), and the natural organic food store (11%). In terms of organic food retailing, conventional grocery stores, natural food stores, and direct-to-consumer markets were the three venues where organic food is sold to consumers according to a report on the organic market from the USDA in 2014.

Along with the growing sales of organic food in the past decade, there was an increasing number of stores that sell organic fresh produce. There had been a small amount of literature on farmers' markets and their shoppers. The farmers' market is a direct selling store that sells produce from farmers to consumers. It had constituted an essential part in the previous literature in the field of organic food. Kezis et al (1998) researched on 239 consumers in Maine and found that primary farmers' market shoppers had higher education and higher household income when compared with census data. Trobe (2001) studied consumers' attitudes and shopping behavior for organic produce and genetically modified (GM) foods from farmers' markets in the UK. However, he neglected to study consumers' confidence in them and did not mention consumers' WTP for organic and GM foods. Similarly, Wolf (1997) focused

on the characteristics of produce from farmers' markets as opposed to supermarkets. Wolf, Spittler and Ahern (2005) surveyed 336 consumers to draw an image of the demographic profile of farmers' market consumers. Their results suggested that the average farmers' market consumer was female, married, and had a post-graduate degree. Similarly, Onianwa, Mojica and Wheelock (2006) examined Alabama consumers' perceptions of fresh produce and concluded that consumers' emphasis for fresh produce was on freshness, appearance, variety, produce variability, local items, price and atmosphere. Further, Govindasamy et al. (2002) examined consumers' shopping habits and venues for fruits and vegetables in farmers' markets. However, they did little research on consumers' WTP for organic fresh produce in different purchasing venues.

In the aforementioned studies on farmers' markets and consumers, some of them examined the profile of the primary shopper of farmers' markets (Wolf, 1997, Kezis et al, 1998, Wolf et al, 2005, Onianwa et al. 2006). Kezis et al. (1998) and Wolf et al.'s (2005) studies were consistent in finding that primary shoppers were more likely to be educated, married women. Moreover, Kezis et al. (1998) found that consumers' WTP for vegetables and fruits were likely to increase 17% more if they came from farmers markets. However, they did not expand on consumers' WTP for organic produce from farmers market. In addition, Onianwa et al. (2006) asked subjects to compare the fresh produce from supermarkets and farmers' markets and concluded that the majority of participants preferred farmers' markets in terms of freshness, appearance, variety, price, and selection.

Though there were a handful of studies on consumers and farmers markets, few paid attention to consumers' safety, health and confidence attitudes for organic

fresh produce and their WTP for organic fresh produce. In addition, there has been little research addressing consumers' WTP for organic fresh produce in various retailing outlets where organic fresh produce are available.

Several studies focused on supermarkets and consumers. Kyureghian et al (2013) studied the effect of access to supermarkets and grocery stores, convenience stores, specialty food stores, full-service restaurants, and limited-service eating places on consumers purchase of fresh produce and their findings suggested that there was a significant interaction effect of income and densities of supermarkets and other purchasing outlets in urban areas on consumers' purchase of fruit and vegetables. Moreover, Powell et al. (2007) examined the relationship between neighborhood characteristics and the availability of four types of stores: the chain supermarket, the non-chain supermarket, the grocery store and the convenience store. In terms of supermarkets and organic food, lots of studies have researched consumers' demand and WTP for certain attributes. For example, Glaser and Thompson (2000) reported that consumers' average price premium for organic milk was 60% of branded milk prices and 75% of private labeled milk prices in mainstream supermarkets.

Supercenters constitute a vital part of the retailing industry. Several studies have examined the effect of supercenters on consumers' purchasing behavior. Singh et al. (2004) found that consumers spent more on food items and continued to spend the same on non-food items. Further, Hwang and Park (2013) examined Wal-Mart supercenters' impact on consumers' purchasing patterns in Wal-Mart and other retailers. Their findings suggested that grocery stores lose the most revenue from Wal-Mart supercenters and Wal-Mart supercenters did not influence the retail sales of mass merchandisers, drugstores and warehouse clubs.

Consumers' buying preferences have also been examined. Bond, Thilmany and Bond (2006) indicated that 76% of participants preferred to do their primary shopping at supermarkets, followed by 19% for supercenters and 2% for health food stores. Wal-Mart supercenters not only impacted consumers' shopping behavior and preferences, they also impacted the commodity price. According to Volpe and Lavoie (2005), national brand commodity price reduced by 6 to 7% and private labeled item price decreased by 3 to 8%.

Consumers' willingness to pay for products was associated with their perceptions towards the products. Different WTP has been found possible because of various perceptions. Huang and Lin (2007) found that fresh tomatoes cost less at supercenters and warehouse clubs than at conventional supermarkets or specialty food shops.

Literature on organic food and supercenters remains sparse. Smith et al. (2009) examined data in the US organic fluid milk market and noted that the price of organic milk in supercenters or warehouse clubs was \$0.13 less than organic milk sold at other purchasing outlets.

This study addressed consumers' WTP and their perceptions on organic grape tomatoes from four different outlets, added to the limited knowledge in this area.

Chapter 3

METHODOLOGY

3.1 Introduction

This chapter examines the methods used in this consumer willingness to pay study. The main objective of this research was to discuss how purchasing venues effect consumers' willingness to pay for organic grape tomatoes. Furthermore, it also presents how consumers' safety, health and confidence perceptions varied for organic grape tomatoes based on venue. This chapter consists of four parts: the experimental design, the survey design, the Tobit model and the Ordered Logit model.

3.2 Auction Experiments

Auction experiments are generally considered as dependable methods because they put participants directly involved in the real scenario and participants have to deal with the outcomes of their decisions (Corrigan and Rousu, 2008). There are various types of auction experiments: the English auction, the Dutch auction, the BDM auction, the sealed first-price auction, the Vickrey auction and so on. There has been a myriad of studies investigated the consequences of different auctions within different laboratory settings. For example, Lusk et al., (2004) measured the effect of auction procedures on valuation estimates from the English auction, BDM auction, Vickery second price auction, and random n th price auction.

The BDM auction method was applied because of the following merits. First, it was incentive compatible. Irwin et al. (1998) reported incentive compatibility for the BDM mechanism in his ticket purchasing experiment. Further, Lusk et al. (2004) found that the BDM auction induced statistically equal bids when individuals were endowed with or without a good. Second, the BDM auction was convenient to

conduct. Other forms of auction experiments require more coordination and cooperation. For example, the English auction requires all participant to be present in the same room or area to bid against each other. However, the BDM mechanism is designed for only one subject because subjects were bidding against the random price instead of other participants. There was no competition between the bidders.

3.3 Experimental design

To estimate consumers' WTP for one pint of organic grape tomatoes, we conducted a Becker-DeGroot-Marschak (BDM) auction experiment for the research subjects. The BDM method was introduced by Becker, DeGroot, and Marschak (1964) as a procedure to elicit individuals' WTP. In a BDM auction experiment, research subjects bid separately from each other. After subjects bid, the auctioneer decides a random price within the certain interval. Those who bid higher than the random price would be able to buy the good with the random price, however, those who bid lower than or equal to the random price do not purchase the good.

In our experimental design, the subjects were required to bid between \$0 and \$5 for one pint of organic grape tomatoes from supermarkets, farmers markets, supercenters, and fresh format stores, respectively. Special instructions were given to research subjects so they would understand the strategy of bidding their true values. Then a random envelop was selected to decide which round would count and the price of one pint of organic grape tomatoes.

3.4 Survey Design

The main purpose of the survey was to collect subjects' attitudes on organic grape tomatoes from different outlets and their demographic information, thus the

survey was designed in two parts. The first part included the perceptual questions in terms of their safety, health, taste and confidence on organic grape tomatoes from each outlet. The second part comprised the demographic questions regarding age, education, income and shopping frequency of fresh produce.

In order to examine consumers' safety perceptions for the organic grape tomatoes from supermarkets, farmers markets, supercenters and fresh formats, we required consumers to rate how safe they consider organic grape tomatoes on a 1 to 7 scale with 1 representing very unsafe and 7 representing very safe. The same approach was also applied to consumers' health, taste and confidence perceptions. Furthermore, we compared consumers' safety, health, and taste perceptions of organic grape tomatoes to conventional grape tomatoes. For example, customers were asked to rate the taste comparison with 1 being organic tastes much worse, 4 being no difference and 7 representing organic tastes much better. In addition, consumers' knowledge on relative food safety topics were also examined.

Consumers' demographic traits such as their educational attainments and income, contributed to their purchasing decision of where and how much they wanted to buy organic food. In the demographic portion of the survey, consumers' shopping frequencies at the supermarket, the farmers' market, the supercenter, and the fresh format store were also reported. Moreover, we asked whether consumers were willing to try one organic grape tomato from the four above outlets. Consumers' taste perceptions on how the taste of the sample grape tomato met their expectations for that outlet was also recorded after they tasted.

3.5 Tobit Model

The Tobit model was developed by James Tobin to illustrate the relationship between a truncated non-negative dependent variable and independent variables. It is widely used in agricultural economics research. In this study, consumers' bids were distributed in an interval, of which the lower limit was 0 and the upper limit was 5. Consumers' WTP is assumed to be a latent variable because it could not be directly measured. When a consumer has negative WTP for organic grape tomatoes, it cannot be reflected by observed bids. At the same time, it also cannot be observed when the WTP is over 5. The two-limit Tobit model was applied to investigate consumers' WTP (Tobin, 1958; Maddala, 1991; Kaiser et al., 1992; Wang et al., 1997; Bernard and Bernard, 2010.) in the following form:

$$Y_i = 0 \quad \text{when } Y_i^* \leq 0 \quad (3.1)$$

$$Y_i = \beta X_i + e_i \quad \text{when } 0 < Y_i^* < 5 \quad (3.2)$$

$$Y_i = 5 \quad \text{when } Y_i^* \geq 5 \quad (3.3)$$

where Y_i represents consumers' WTP, X_i represents an array of independent variables, β is a vector of coefficients, and e_i is a vector of error terms.

Previous studies have examined the role of demographics on consumers' WTP for organic food. In this study, we paid attention to the role purchasing venues play in influencing consumers' WTP. Thus we wrote the model as:

$$Y_i = \beta_1 Supmkt + \beta_2 Supcntr + \beta_3 Freshf + \beta X_i + e_i \quad \text{when } Y_i^* > 0 \quad (3.4)$$

where *Supmkt*, *Supcntr*, *Freshf*, are dummy variables. *Supmkt* is coded as 1 if organic grape tomatoes are from supermarkets, 0 if not. *Supcntr* is coded as 1 if organic grape tomatoes are from supercenters, 0 if not. *Freshf* is coded as 1 if organic grape tomatoes are from fresh format stores, 0 if not. Farmers' market is deleted from the model to set as a reference level and to avoid multicollinearity.

Before we ran the Tobit model, we proposed a hypothesis that at least one of the coefficients for venue variable was not equal to 0, which meant that at least one of $\beta_1, \beta_2, \beta_3$ was not equal to 0.

3.6 Ordered Logit Model

The Ordered Logit model was selected when the dependent variables were ordinal. McCullagh (1980) explicitly discussed the regression with single response of an ordinal scale and multiple independent variables. Beggs, Cardell and Hausman first used a ranked-ordered logit model to analyze consumer data on electrical cars (Hausman and Ruud, (1987).) In this study, the consumers' perceptions were measured with categorical variables and there was equally distributed ordering in each variable. For example, the variable Taste was a categorical variable. Consumers were required to choose a value between 1 and 7, which evenly represented between very bad and very good. In this way, consumers' perceptions could be measured, compared, and analyzed.

To use the ordered logit model, the proportional odds assumption was an important prerequisite. The proportional odds assumption requires the logarithms of the odds to form an arithmetic sequence. Before running ordered logit model, we employed the score test to determine if the data met the assumption.

Follow McCullagh (1980), suppose response variable has n ordered categories, and the possibilities for each is $p_1(x), p_2(x), \dots, p_n(x)$ when the covariates could be presented as x . Let Y take the value in the categories of $1, \dots, n$. Suppose $\mu_i(x)$ is the odds for $Y \leq i$. The proportional odds assumption requires that

$$\mu_i(x) = \mu_i \exp(-\alpha^T x) \quad (1 \leq i < n) \quad (3.5)$$

where α is an array of estimates. The ratio of relevant odds

$$\frac{\mu_i(x_1)}{\mu_i(x_2)} = \exp\{\alpha^T(x_2 - x_1)\} \quad (1 \leq i < n) \quad (3.6)$$

only changes according to the change of $x_2 - x_1$.

The possibility for $Y \leq i$ is the sum of $p_1(x) + p_2(x) + \dots + p_i(x)$. The odds for $Y \leq i$ is $\varphi_i(x)/\{1 - \varphi_i(x)\}$, where $\varphi_i(x) = p_1(x) + p_2(x) + \dots + p_i(x)$.

The ordered logit model can be specified as:

$$\log[\varphi_i(x)/\{1 - \varphi_i(x)\}] = \delta_i - \alpha^T x \quad (1 \leq i < n) \quad (3.7)$$

where $\delta_i = \log(\mu_j)$. The ordered logit estimates are equal across the different categories when the proportional odds assumption hold in the model.

Chapter 4

DESCRIPTIVE STATISTICS

4.1 Introduction

This chapter is aimed at presenting the descriptive statistical results from the survey. It contains two parts. The first one reports the demographic statistics and compares them with the national census, the second part illustrates the perceptual responses.

4.2 Demographic Statistics

The auction experiments were conducted in the summer of 2014. The experiment locations were various, including university campuses, local parks, supermarkets, and natural food stores to allow for a wide demographic distribution. After several sessions, we collected 205 completed responses. The descriptive statistics are in the Table 4.1, along with the U.S. census population and income statistics.

As indicated in Table 4.1, there was a large difference in the percentage between female and male respondents in the survey compared with only a slight difference of those two groups in the census. This was plausible as this research focused on consumers of organic grape tomatoes at different purchasing outlets.

Table 4.1 Demographic Statistics of the Survey

Characteristic	Survey		US	DE Response		IL Response	
	Response		Census				
	Num.	Freq.	Freq.	Num.	Freq.	Num.	Freq.
Gender							
Male	66	32.20%	49.16%	34	35.05%	32	29.63%
Female	139	67.80%	50.84%	63	64.95%	76	70.37%
Age							
18-24	68	33.17%	16.60%	35	36.08%	33	30.56%
25-34	43	20.98%	6.62%	15	15.46%	28	25.93%
35-44	25	12.20%	6.68%	10	10.31%	15	13.89%
45-54	22	10.73%	14.58%	12	12.37%	10	9.26%
54-64	28	13.66%	11.82%	18	18.56%	10	9.26%
65-74	15	7.32%	3.76%	5	5.15%	10	9.26%
75+	4	1.95%	6.01%	2	2.06%	2	1.85%
Ethnicity							
White	142	69.27%	65.10%	71	73.20%	71	65.74%
Non-White	63	30.73%	34.90%	26	26.80%	37	34.26%
Education							
Less than high school	1	0.49%	12.86%	1	1.03%	0	0.00%
High school	59	28.78%	57.21%	35	36.08%	24	22.22%
Bachelor's degree	60	29.27%	19.40%	28	28.87%	32	29.63%
Graduate	85	41.46%	10.53%	33	34.02%	52	48.15%
Annual Income							
Less than \$24,999	54	26.34%	24.97%	17	17.53%	37	34.26%
\$25,000 - \$34,999	20	9.76%	11.06%	11	11.34%	9	8.33%
\$35,000 - \$49,999	23	11.22%	14.13%	10	10.31%	13	12.04%
\$50,000 - \$74,999	30	14.63%	18.10%	14	14.43%	16	14.81%
\$75,000 - \$99,999	24	11.71%	11.53%	14	14.43%	10	9.26%
\$10,000 - \$149,999	33	16.10%	11.94%	17	17.53%	16	14.81%
\$150,000 - \$199,999	10	4.88%	4.43%	7	7.22%	3	2.78%
\$200,000 or more	11	5.37%	3.83%	7	7.22%	4	3.70%

Note: Gender data are author's calculation from 2010 U.S. Census Bureau, other data are author's calculation from U.S. Census Bureau, Statistical Abstract of the United States: 2012

The age distribution in this research was different from the national age distribution. The largest age group in the survey was the 18-24 age group, accounting for 33.17%, twice of that in the census. Since this survey selected a proportion of campus students as research subjects, it could be explained that the average research subject was younger than that in the census. In terms of ethnicity, white participants, with a percentage of 69.27% constituted the primary ethnic group in this research. The other group was the non-white group, which was constituted of Hispanic, Asian and African Americans. It had a percentage of 30.73%. The ethnicity distribution matched with census data well. The education level in this survey was relatively higher than the national level since some of the research participants were full-time students in two universities. One was located in Delaware, the other was in Illinois. The annual household income represented the national level well. All categories of income level were close to the census data, within a 5% deviation. We hoped that subjects in this research could represent the US consumers well. Based on the comparisons at hand, we were satisfied with the survey data.

Consumers' shopping frequency data can be seen in Figure 4.1. As indicated in Figure 4.1, 33.33% of the research subjects always bought fresh produce at supermarkets. Moreover, 43.52% of the consumers often patronized at supermarkets. With more than three fourths of the consumers who often or always shopped at supermarket, it was the most popular purchasing venue for buying fresh produce among the four outlets. In contrast, more than one third of the research subjects never purchased fresh produce at fresh format stores, 33.64% of subjects never shopped at supercenters. In addition, 30.37% of the research participants sometimes shopped at

fresh format stores, which was the largest percentage among the “sometimes” category.

In summary, consumers visited supermarkets and farmers markets for fresh produce more often than supercenters and fresh format stores.

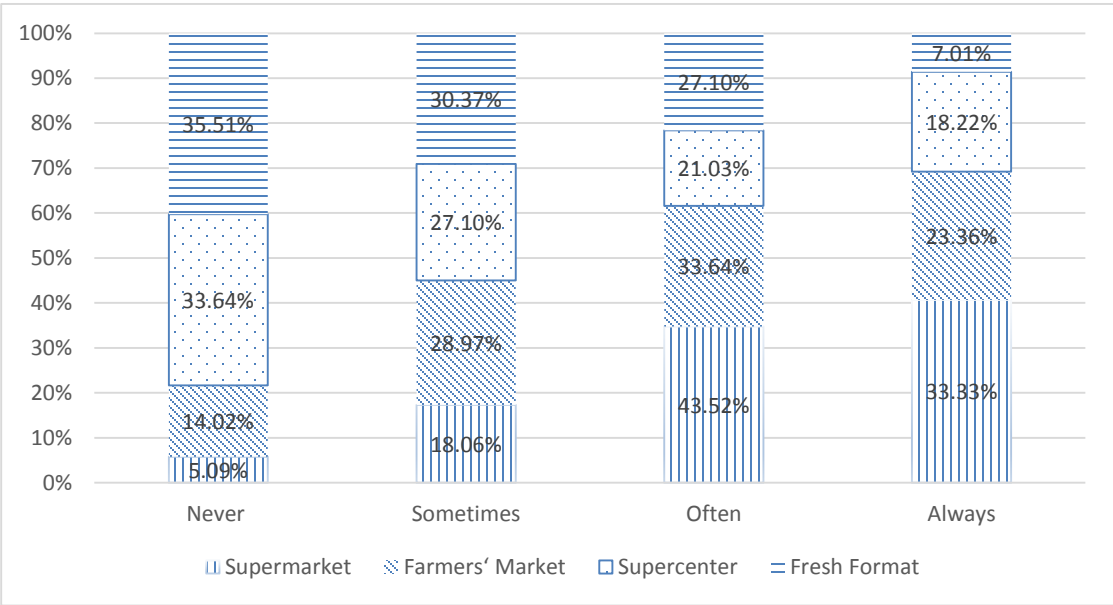


Figure 4.1 Consumers' Shopping Frequency of Fresh Produce at Different Outlets

Figure 4.2 shows the shopping frequency of organic foods for people: males and females. The percentage of male subjects who never shopped for organic foods surpassed female subjects by around 5%. In the sometimes category, male subjects had 2% more than female subjects. However, the percentage of female subjects that often purchased organic food exceeded male subjects' percentage by 5.26%. Similarly, female subjects outnumbered male subjects in the always purchasing organic produce

category. In a word, women had slightly higher shopping frequency for organics than males.

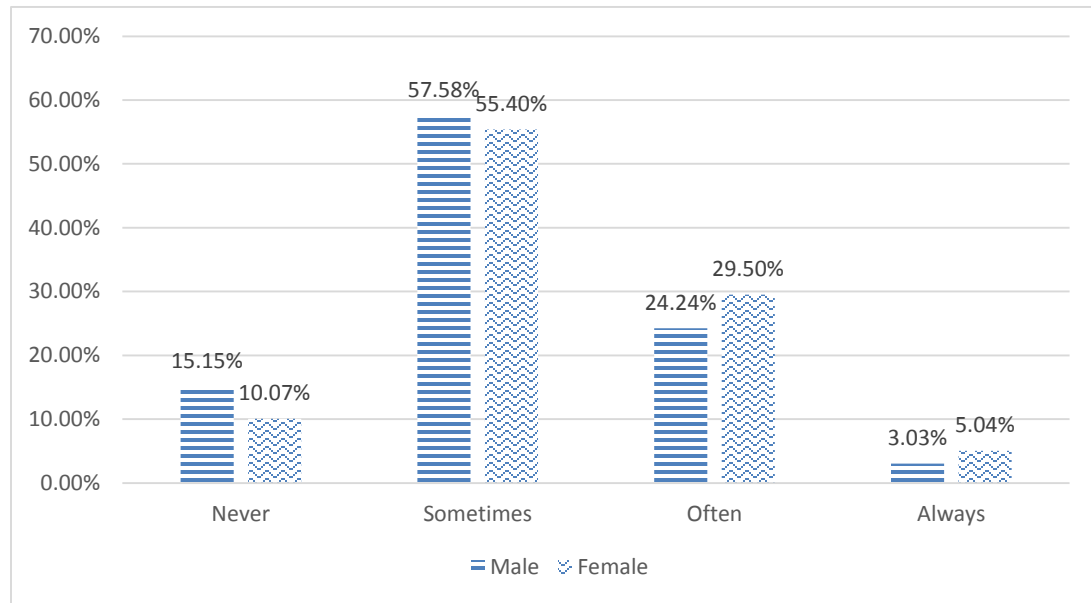


Figure 4.2 Consumers' Gender and Their Shopping Frequency on Organics

4.3 Perceptual Response.

Consumers' perceptions on the safety, health and confidence of the organic grape tomatoes were measured on a scale from 1 to 7. With 1 being the lowest, 4 being neutral, and 7 being the highest, the ranking was equally distributed.

Consumers' safety perceptions of the organic grape tomatoes from the four different purchasing outlets: supermarkets, farmers' markets, supercenters, fresh format stores, appear in Figure 4.3. In Figure 4.3, fresh format stores received less negative perceptions of being unsafe and had overall higher safe perceptions than the rest of stores. Farmers' markets also had less unsafe perceptions than supermarkets

and supercenters. The positive safety perceptions of farmers' markets were greater than supermarkets and supercenters. Consumers' willingness to pay for organic grape tomatoes was a complex issue decided by many factors. The following analysis would combine all the perceptual response from the survey.

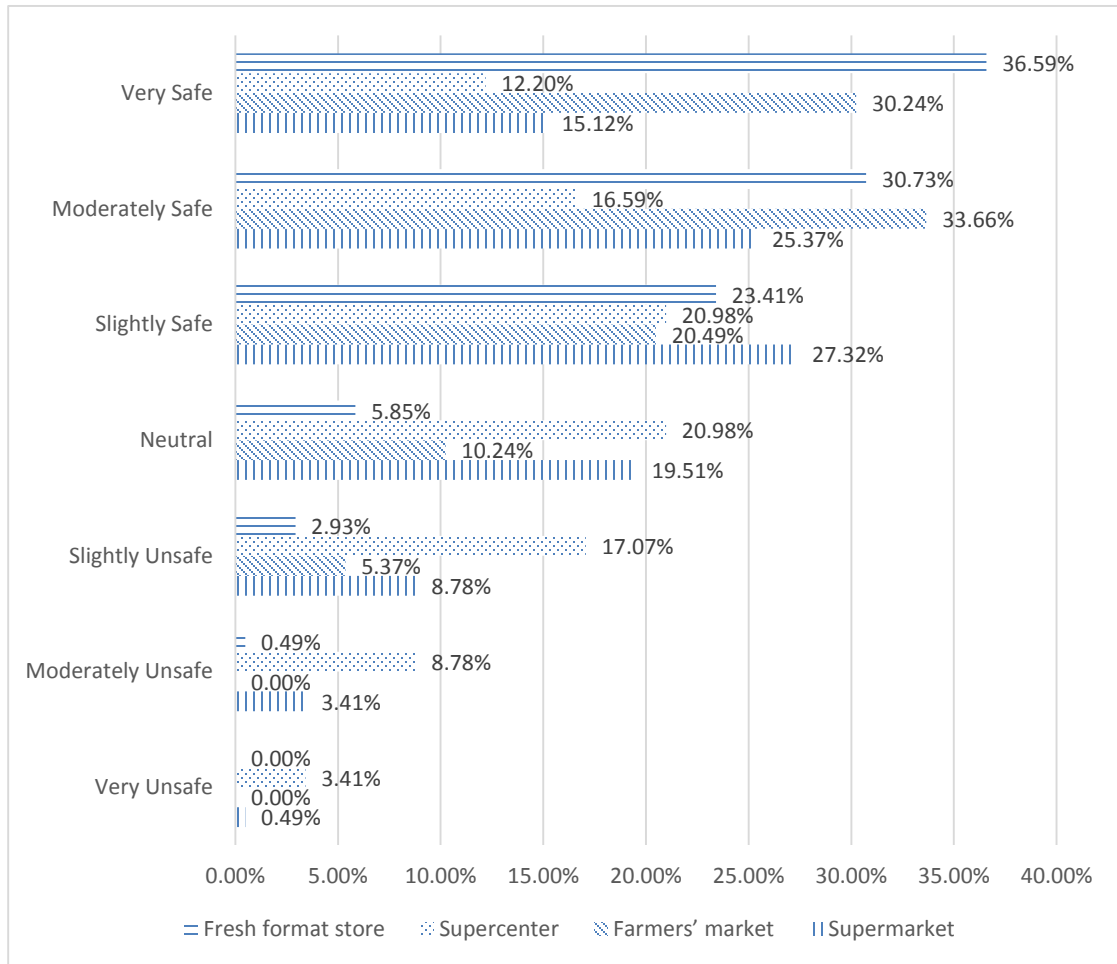


Figure 4.3 Safe Perception of Organic Grape Tomatoes from Different Outlets

Consumers' taste perceptions for organic grape tomatoes from the four kinds of stores are presented in Figure 4.4. Noticeably, farmers' markets received the highest very good taste percentage, 59.02%. It was way ahead of the second place, 40.98% from fresh format stores. The percentage of consumers' taste perception for organic grape tomatoes from supermarkets and supercenters increased when the level went from very good down to slightly good.

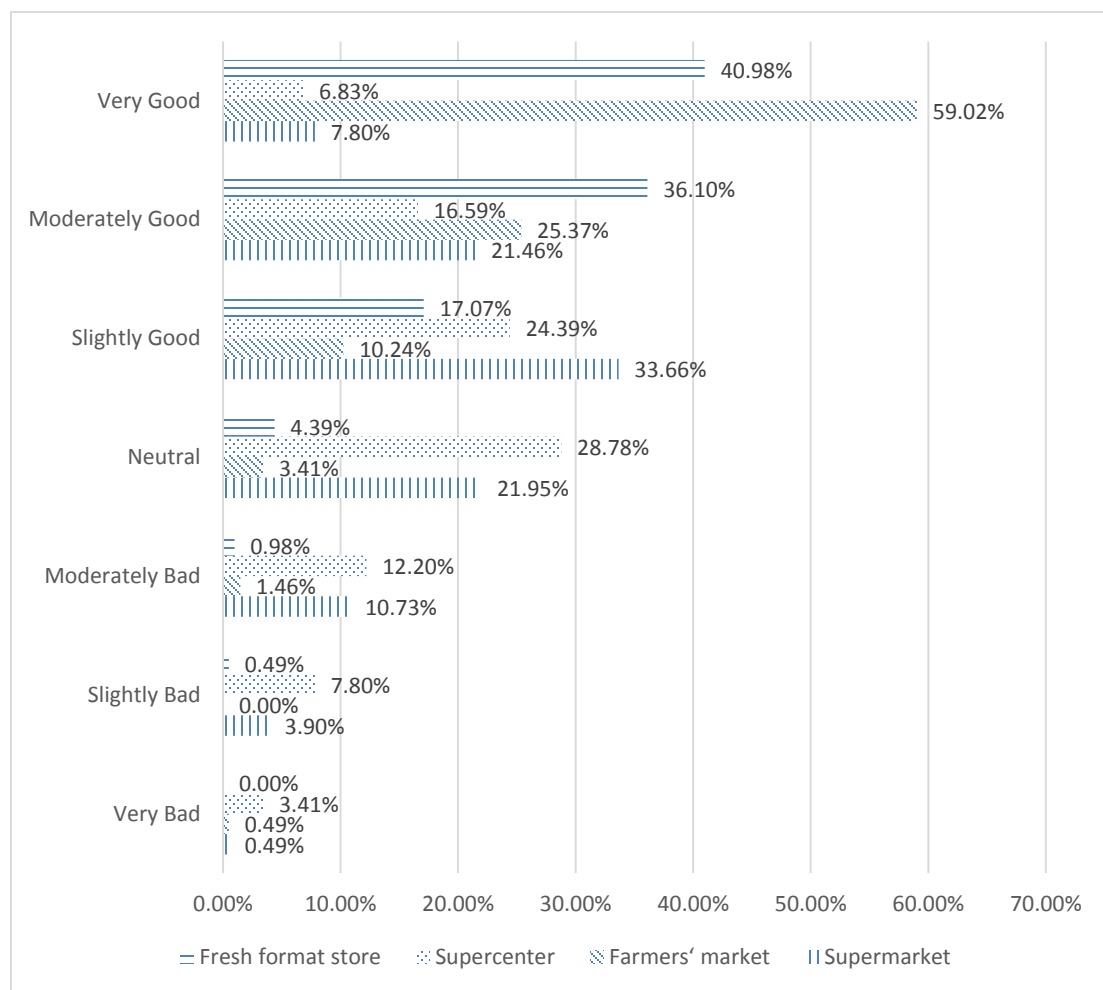


Figure 4.4 Taste Perception of Organic Grape Tomatoes from Different Outlets

There were 28.78% of subjects that held neither positive nor negative opinions on the taste of organic grape tomatoes from supercenters. This situation also happened to organic grape tomatoes from supermarkets. The percentage was 21.95% for supermarkets. Consumers gave the worst taste perceptions for organic grape tomatoes from supermarkets and supercenters among the very bad, slightly bad and moderately bad categories. In conclusion, farmers' markets and fresh format stores received better taste ratings than supermarkets and supercenters did.

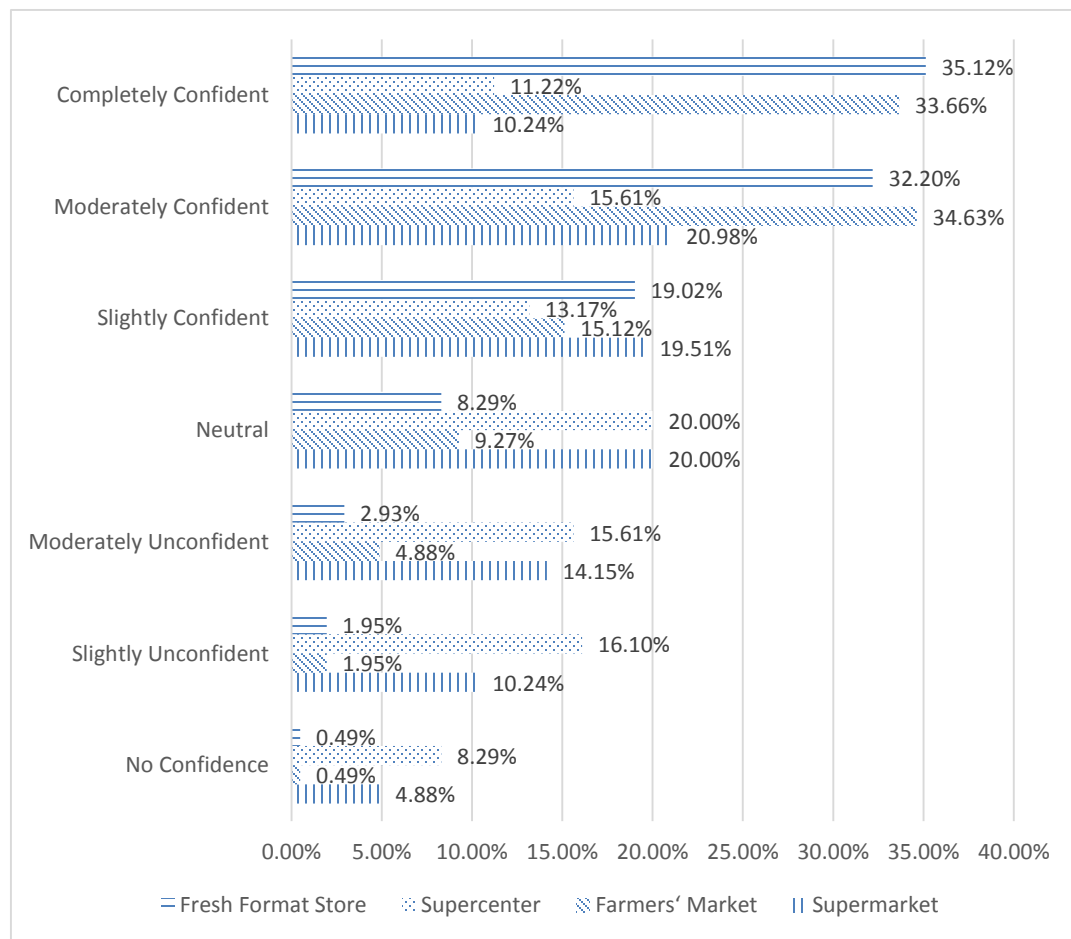


Figure 4.5 Confidence Perception of Organic Grape Tomatoes from Different Outlets

Consumers' confidence perception on how confident consumers were that the grape tomatoes labeled as organic were truly organic were measured in the same way as safety and taste perceptions. The confidence response of consumers are displayed in Figure 4.5. Fresh format stores and farmers markets received more confidence responses across every category. At the same time, they received much less doubtful responses than supercenters and supermarkets. Based on the above, farmers' markets and fresh format stores had a better store image in terms of organic labeling.

Table 4.2 reported the summary statistics of consumers' WTP and their perceptions on the safety, healthy, taste and confidence perceptions on organic grape tomatoes. Fresh format stores received the highest average WTP (\$3.30) from consumers, followed by farmers' markets (\$3.24), supermarkets (\$2.77) and supercenters (\$2.36). It was noticeable that consumers' bid for organic grape tomatoes from fresh format stores and farmers markets were significantly higher than those from supermarkets and supercenters. This might indicate that fresh format stores and farmers' markets have a better brand image than supermarkets and supercenters in terms of organic food. Further perceptual responses supported this finding. Consumers' safety, health, taste and confidence perceptions for organic grape tomatoes from fresh format stores and farmers' markets were significantly higher than those from supermarkets and supercenters. Further analysis on consumers' perceptions will be presented in Chapter 5.

Table 4.2 Consumers' Average Bid and Rating for Perceptual Questions

Venue	WTP	Safety	Healthy	Taste	Confidence
Supermarket	2.7688 (1.05)	5.0634 (1.34)	5.1961 (1.27)	4.8000 (1.25)	4.4293 (1.67)
Farmers' Market	3.2398 (1.16)	5.7317 (1.16)	6.1765 (0.91)	6.3512 (0.98)	5.7512 (1.30)
Supercenter	2.3560 (1.06)	4.4585 (1.61)	4.8137 (1.53)	4.4000 (1.45)	4.0537 (1.82)
Fresh Format Store	3.3051 (1.11)	5.9073 (1.08)	6.1576 (0.95)	6.1024 (0.96)	5.8049 (1.24)

Note: the numbers in parentheses are corresponding standard deviation.

Chapter 5

EMPIRICAL RESULTS

5.1 Introduction

This chapter presents the results from the models in the previous chapter. This chapter also discusses the interpretations of the Tobit model and Ordered Logit model regression results. The chapter is divided into three parts. The first part analyzes the statistical results from the Tobit model, and addresses the effect of demographic characteristics of consumers' willingness to pay for one pint of organic grape tomatoes from four different purchasing venues. The second part focuses on consumers' WTP and their perceptions. The third part emphasizes the perceptions of consumers on organic grape tomatoes regarding safety, health, confidence, and knowledge.

5.2 Tobit model

We required subjects to bid between 0 to 5 dollars for one pint of organic grape tomatoes, hence the bid for one pint of organic grape tomatoes should be within the interval of a lower limit of 0 and an upper limit of 5 dollars. The Tobit model was illustrated as below:

$$\begin{aligned} \text{WTP} = & X_1\text{Male} + X_2\text{Age} + X_3\text{White} + X_4\text{Lessthanhigh} + X_5\text{Highschool} + \\ & X_6\text{Graduate} + X_7\text{Childunder18} + X_8\text{Workonfarm} + X_9\text{Income} + X_{10}\text{Supmkt} + \\ & X_{11}\text{Supcntr} + X_{12}\text{Freshf} + X_{13}\text{Often_supmkt} + X_{14}\text{Often_farmkt} + \\ & X_{15}\text{Often_supcntr} + X_{16}\text{Often_freshf} + X_{17}\text{Often_organic} + \varepsilon \end{aligned} \quad (5.1)$$

A list of explanations of the variables can be found in Table 5.1. The dependent variable was consumers' willingness to pay, which was censored between 0 and 5. The independent variables were a combination of continuous variables and dummy variables. Consumers' age and annual household income were continuous, while gender, ethnicity, education attainment and other characteristics were dummy

variables. Dummy variables were specified in Table 5.1. Consumers' shopping frequency was measured on a scale from 1 to 4, with 1 being never, 2 being sometimes, 3 being often and 4 being always.

Table 5.1 Description of Variables

Variable name	Description
WTP	The respondent's bid for one pint of organic grape tomatoes
Male	The gender of the respondent, 1 if he is male ¹
Age	The age of the respondent
White	1 if the respondent is White ¹
Lessthanhigh	1 if the highest level of completed education of the respondent was less than high school ¹
Highschool	1 if the highest level of completed education of the respondent was high school ¹
Graduate	1 if the highest level of completed education of the respondent was graduate or professional degree ¹
Childunder18	1 if the respondent had children under 18 in the household ¹
Workonfarm	1 if the respondent worked on a farm ¹
Income	The annual household income of the respondent's
Supmkt	1 if the organic grape tomatoes were from supermarkets ¹
Supcntr	1 if the organic grape tomatoes were from supercenters ¹
Freshf	1 if the organic grape tomatoes were from fresh format stores ¹

¹ denotes dummy variable, where variable is zero otherwise.

Table 5.1 (Continued)

Variable name	Description
Often_supmkt	The frequency of the respondent shopped fresh produce at supermarkets
Often_farmkt	The frequency of the respondent shopped fresh produce at farmers markets
Often_supcntr	The frequency of the respondent shopped fresh produce at supercenters
Often_freshf	The frequency of the respondent shopped fresh produce at fresh format stores
Often_organic	The frequency of the respondent shopped organic products

The Tobit regression results are in Table 5.2. The coefficients with asterisks indicated that they were significant at a certain level. Gender had a significant impact on consumers' WTP for organic grape tomatoes. The coefficient for male participants demonstrated that a male subject would bid nearly \$0.18 less than that of a female participant when other demographic traits were fixed. When we analyzed the shopping frequency of organic produce and gender in the sample, we found that female participants were a bit more involved with purchasing organic produce than male subjects. Perhaps the lower involvement in purchasing organic produce made men less aware of the value of organic grape tomatoes, thus they underestimated the value of organic grape tomatoes and bided less. This result conflicted with the finding of Urena, Bernarbeau, and Olmeda (2008), who showed that men were likely to bid a higher premium for organics than women. This difference could be explained by the variation of the type of organic food, sample size or other aspects between in the two studies.

Having children in the household significantly increased a research subject's bid for one pint of organic grape tomatoes. This result was in line with Thompson and Kidwell (1998), who suggested that subjects' probability of purchasing organic fresh produce increases when they had children under eighteen years old. It was understandable that with the presence of school age children in the household, the parents paid more attention to the health and safety perspectives of food. They valued organic grape tomatoes more than conventional ones, which would be likely to result in the higher bid on organic fresh produce.

Delaware was added in the regression model because we aimed to determine whether the origin of research subjects had an impact on their bids for organic grape tomatoes. In the model, Delaware was coded as 1 if the participant was from Delaware, 0 if the subject came from Illinois. The result demonstrated that Delawarean consumers bid almost \$0.32 more for one pint of organic grape tomatoes when compared with their Illinoisan counterparts. The lower bid of Illinoisan participants for organic grape tomatoes might partly be due to the fact that Illinois had a larger organic production. In 2011, Illinois had 150 certified organic operations while Delaware only had 7 (USDA, 2012). The huge contrast also lied in the acres of crops, pasture and rangeland in the two states. According to USDA (2012), there were 35,887 total of certified acres of crops, pasture and rangeland in Illinois in contrast to merely 328 acres at Delaware in 2011. Perhaps the larger organic production in Illinois reduced their bid for organic grape tomatoes, while there was a limited production of organic grape tomatoes in Delaware which increased their bid. Or perhaps, Delawarean consumers relied on the organic grape tomatoes imported from other states while Illinois consumers could buy local organic fresh produce in Illinois.

Purchasing venue had a strong impact on consumers' WTP for organic grape tomatoes. Farmers' markets were set as the base group. Tobit model regression results showed that consumers bid around \$0.67 less for one pint of organic grape tomatoes from the supermarket than those from the farmers' market. Moreover, subjects bid nearly \$1 less for one pint of organic grape tomatoes from supercenters than those from farmers markets. In addition, consumers' bid for one pint of organic grape tomatoes from fresh format stores was not significantly less than those from farmers' markets. This indicated that consumers' perceptions towards organic grape tomatoes were different based on venue. Perhaps subjects considered organic grape tomatoes from farmers' markets as having a higher quality than those from supermarkets and supercenters. Or, perhaps the everyday low price strategy employed in supercenters and supermarkets misled consumers in some way such that they thought the organic grape tomatoes were less worthy than those from farmers' markets.

The interaction terms between Delaware and purchasing venues were not significant in this study, which meant that Delaware had no significant relationship with consumers' WTP for organic grape tomatoes from supermarkets, supercenters, and fresh format stores as compared to farmers' markets.

Table 5.2 Tobit Regression Results

Parameter	Estimate	Standard Error	Pr > t
Male	-0.1802*	0.0953	0.0586
Age	-0.0016	0.0029	0.5756
White	-0.0060	0.0997	0.9518
Lessthanhigh	-0.7407	0.5951	0.2132
Highschool	0.0051	0.1151	0.9644
Graduate	0.0897	0.1091	0.4106
Childunder18	0.3728***	0.1115	0.0008
Workonfarm	0.0855	0.1831	0.6403
Income	0.0012	0.0007	0.1119
Delaware	0.3186*	0.1732	0.0659
Supmkt	-0.6742***	0.1609	<.0001
Supcntr	-0.9737***	0.1610	<.0001
Freshf	-0.0808	0.1611	0.6159
Delaware*supmkt	0.2891	0.2361	0.2209
Delaware*supcntr	-0.0286	0.2361	0.9037
Delaware*freshf	0.2764	0.2369	0.2434
Often_supmkt	0.2242***	0.0510	<.0001
Often_farmmkt	0.0958*	0.0521	0.0657
Often_supcntr	0.0447	0.0444	0.3149
Often_freshf	0.0302	0.0538	0.5744
Often_organic	-0.0287	0.0691	0.6780

Note: * denotes statistical significance at the .10 level.

**denotes statistical significance at the .05 level.

*** denotes statistical significance at the .01 level.

5.3 Tobit model results on consumers' perceptions

Previous studies showed that consumers' WTP was affected by an array of factors. Diaz et al. (2010) found that consumers' knowledge of organic foods

expanded their WTP for organic foods. In this study, we aspired to find other possible attributes that could affect consumers' WTP.

In the second phase of the experiment, we required subjects to rate their safety, health and taste perceptions of organic grape tomatoes from the four purchasing venues. In addition, we asked them to compare the safety, healthiness and taste of organic grape tomatoes with conventional grape tomatoes.

When we used consumers' bid for one pint of organic grape tomatoes as the dependent variable and consumers' various perceptions as the independent variables, we obtained the regression results below.

Table 5.3 Consumers' Perception Regression

Variable	Estimate	Standard Error	Pr > t
Safe	0.0423	0.0398	0.2891
Healthy	0.0339	0.0481	0.4816
Taste	0.1283***	0.0391	0.0011
Confidence	0.0817***	0.0303	0.0071
SafeComp	-0.0428	0.0428	0.3175
HealthComp	0.0816	0.0499	0.1023
TasteComp	-0.0098	0.0412	0.8117
KnowFSMA	-0.0254	0.0252	0.3127
KnowOrg	0.0556	0.0347	0.1094
KnowTomSaf	-0.0099	0.0313	0.7521
KnowSalm	-0.0168	0.0268	0.5328
Delaware	0.3984***	0.0778	<.0001

Note: * denotes statistical significance at the .10 level.

**denotes statistical significance at the .05 level.

*** denotes statistical significance at the .01 level.

In Table 5.3, the variables Safe, Health, Taste and Confidence represented participants' safety, health, taste and confidence perceptions of organic grape

tomatoes. They were measured on an equally ascending scale from 1 to 7. Moreover, variables SafeComp, HealthComp, TasteComp illustrated consumers' safety, health, taste and confident perceptions of organic grape tomatoes when compared with conventional grape tomatoes. They were also measured on an equally ascending scale from 1 to 7. The variables KnowFSMA, KnowOrg, KnowTomSaf, and KnowSalm represented consumers' knowledge of Food Safety Modernization Act (FSMA), Organic, Tomato safety and Salmonella, respectively. They were rated in the same way as the above variables.

According to the results in Table 5.3, consumers' taste perceptions positively affected their willingness to pay for organic grape tomatoes. One level of taste rating increase would raise the bid by nearly \$0.13. This was reasonable because organic grape tomatoes are often eaten fresh. Their taste mattered when consumers decided how much they wanted to pay for them. Consumers' confidence on whether the grape tomatoes labeled as organic were truly organic was positively associated their WTP for organic grape tomatoes. This finding suggested that when consumers had confidence in organic grape tomatoes, their bid would not deviate much from the normal price. However, if there were grape tomato contaminations or recall, their WTP would largely decline.

We wanted to find whether state had an impact on consumers' WTP for organic grape tomatoes. Variable Delaware was added in the model as a dummy variable. In Table 5.3, the coefficient Delaware suggested that Delawarean participants bid almost \$0.40 more than Illinoisan participants within a 5 dollar range. Perhaps the larger production of organic produce promoted the organic knowledge and benefits,

which caused Illinoisan consumers to value organic grape tomatoes less and bid less than their counterparts in Delaware.

Since state significantly influenced consumers' WTP for organic grape tomatoes, we hoped to find out how these perceptions affected consumers' WTP in each state. Table 5.4 contained the regression results for Delawarean and Illinoisan subjects. The healthy comparison difference between organic grape tomatoes and conventional ones increased Delawarean consumers' WTP by nearly \$0.13 if consumers increased one level within the 1 to 7 scale. The knowledge of organic food was also an influential explanatory factor for Delawarean subjects. In this case, it meant that organic food marketing on the healthiness of organic food and organic promoting could help consumers increase their WTP and boost organic food sales.

Table 5.4 Delawarean and Illinoisan Consumers' Perception Regression Results

Variable	Delaware			Illinois		
	Estimate	Standard Error	Pr > t	Estimate	Standard Error	Pr > t
Safe	-0.0012	0.0658	0.9860	0.0714	0.0506	0.1590
Healthy	0.1000	0.0778	0.1996	-0.0039	0.0614	0.9497
Taste	0.0850	0.0596	0.1546	0.1606***	0.0525	0.0024
Confidence	0.0713	0.0473	0.1321	0.0929**	0.0400	0.0206
SafeComp	-0.0211	0.0666	0.7518	-0.0613	0.0561	0.2754
HealthComp	0.1272*	0.0749	0.0904	0.0241	0.0679	0.7232
TasteComp	0.0246	0.0617	0.6900	-0.0237	0.0560	0.6724
KnowFSMA	-0.0440	0.0367	0.2309	-0.0219	0.0352	0.5339
KnowOrg	0.1246**	0.0519	0.0168	-0.0059	0.0482	0.9032
KnowTomSaf	-0.0248	0.0455	0.5859	0.0096	0.0449	0.8303
KnowSalm	-0.0191	0.0407	0.6396	-0.0066	0.0363	0.8565

Note: * denotes statistical significance at the .10 level.

**denotes statistical significance at the .05 level.

*** denotes statistical significance at the .01 level.

Illinois was different from Delaware in terms of agricultural production. In Delaware, 63.8% of agricultural outputs were broilers, whereas 53.9% of agricultural outputs of Illinois was corn and 27.5% were soybeans (USDA, 2012). The cropland in Illinois was much larger than that in Delaware, where Delaware had 439,157 acres of cropland, while Illinois had 23,752,778 acres of cropland (USDA, 2012). The organic production in Illinois exceeded that in Delaware. Compared to 58 acres of certified organic vegetable acreage in Delaware, Illinois had 412 acres (USDA, 2012). Though the organic grape tomato production in these two states is not available, the total organic vegetable production could provide some references.

Illinoisan subjects would bid \$0.16 more if the taste of organic grape tomatoes was at a higher level. The significant confidence variable illustrates that consumers' confidence in the organic grape tomatoes positively affect the money they want to spend on the organic grape tomatoes. Knowledge on organic grape tomatoes didn't have any significant influence on Illinoisan consumers' WTP.

5.4 Ordered Logit Model

The Ordered Logit model was selected because the response variables of consumer perceptions were ordinal variables. Research subjects were required to rate their safety, health taste, and confident perceptions for organic grape tomatoes from the four different purchasing outlets on a scale of 1 to 7, which were equally distributed. Using safety perception as an example, the categories from 1 to 7 were "Very unsafe", "Slightly unsafe", "Moderately unsafe", "Neutral", "Slightly safe", "Moderately Safe", and "Very safe". In addition, they were asked to compare the safety, healthiness, and taste of organic grape tomatoes with conventional ones, and specify from 1 to 7, in which 1 represents organic being much less safe and 7

represents organic being much safer than conventional ones (using the safety comparison as an example).

There was one important assumption for the ordered logit model, which was the proportional odds assumption. The proportional assumption was that the logarithms of the odds of the seven categories form an arithmetic sequence. It required the coefficients of the ordered logit model to be equal across different levels of the outcomes of dependent variable. The proportional assumptions were tested in SAS 9.3 (SAS Institute Inc., 2011). Before applying the ordered logit model, we utilized the score test to determine whether the data met the proportional assumptions.

From the previous discussion, we could tell that taste played an important part in deciding consumers' WTP for organic grape tomatoes. The next step was to find out which demographic traits would affect consumers' taste perceptions. Previous studies researched this topic to a certain degree. Liu (2014) found that labeling significantly impacted consumers' taste perceptions on organic apples. However, in this study, we focused on the demographic information influence on taste perceptions of organic grape tomatoes.

Before running this model, we tested whether the proportional odds assumption held. The score test results in Table 5.5 suggested that the null hypothesis of proportional odds for taste perception was rejected, which meant that the proportional odds assumption was not valid in this model.

Williams (2008) noted that the problem of the violation of proportional odds assumption was broadly noticed yet often ignored in practice. Agresti (2010) used religious beliefs data in northeast, Midwest, south, and west regions to indicate that even if the proportional odds assumption was violated, or the proportional odds model

lacked of fit, it still may be useful to conclude the “first-order effects” and relatively powerful to test the null hypothesis of no effect. He also pointed out that the larger observation number and small P-value in proportional odds assumption test may reflect statistical significance instead of practical significance. Furthermore, he addressed that even if cumulative logit model without proportional odds fit better, sometimes a simpler model with proportional odds assumption was utilized because of parsimony. For these reasons, we still used ordered logit model in our analysis. These discussions were also applicable to confidence perception and safety perception.

Table 5.5 Score Test for the Proportional Odds Assumption- Taste Perception

Chi-Square	DF	Pr > ChiSq
657.7520	105	<.0001

In the reported results in Table 5. 6, there was significant gender difference on taste perceptions. Male subjects taste perceptions were worse than those of the female subjects. This was in line with the phenomenon that female participants gave better taste ratings than male ones in this research.

Income was positively related with consumers’ taste perceptions. Consumers’ taste ratings for organic grape tomatoes would increase if their annual household income increases. This suggested that consumers with higher household income cared less about the taste of organic grape tomatoes. Perhaps higher-income subjects focused more on the nutrition facts.

Further, the taste perceptions of organic grape tomatoes from supermarkets, supercenters and fresh format stores were significantly different from each other. The

results indicated that the ranking of the taste results of organic grape tomatoes were farmers' markets, fresh format stores, supermarkets, and supercenters. This was expected as farmers' markets sold organic grape tomatoes directly from farmers to consumers, which reduced the transaction time and could guarantee freshness. Meanwhile, fresh format stores focused on fresh perishable products and made sure they sold fresh produce. The lower ranking of organic grape tomatoes from supermarkets and supercenters could be partly due to the large bulk sale of organic fresh produce, which might partly result in some damage or bad tasting ones that would affect consumers' taste perceptions from these two outlets.

The interaction term between Delaware and supercenter was significant at 5% level. The positive estimate suggested that Delawarean consumers had a better taste perception for organic grape tomatoes from supercenters than Illinoisan consumers.

Lastly, the shopping frequency of consumers significantly affected their taste perceptions on organic grape tomatoes. It was understandable that the more subjects shop at supermarkets, the better taste perceptions they have for organic grape tomatoes. The more consumers shopped at supermarkets, the more possibility they had to encounter the replacement of fresh produce. This significantly increased their taste perceptions. However, it was surprising that consumers' shopping frequency at farmers' markets negatively affect their taste perception of organic grape tomatoes. Possible reason could be that the more often consumers went to farmers' markets, the more likely they purchased fresh produce from different farms, which could bring about a fluctuant and inconsistent taste perception or even worse taste perception.

Table 5.6 Ordered Logit Regression- Taste Perception

Parameter	Estimate	Standard Error	Pr>ChiSq
Male	-0.3961***	0.1499	0.0082
Age	0.0034	0.0045	0.4456
White	0.1318	0.1571	0.4017
Lessthanhigh	-0.1544	0.9250	0.8674
Highschool	-0.0298	0.1815	0.8696
Graduate	-0.1004	0.1726	0.5609
Childunder18	-0.0932	0.1749	0.5942
Workonfarm	0.0084	0.2878	0.9766
Income	0.0025**	0.0012	0.0331
Delaware	-0.3809	0.2923	0.1926
Supmkt	-2.9872***	0.2822	<.0001
Supcntr	-3.6960***	0.2893	<.0001
Freshf	-0.8936***	0.2733	0.0011
Delaware*supmkt	0.5260	0.3812	0.1677
Delaware*supcntr	0.8487**	0.3812	0.0260
Delaware*freshf	0.3967	0.3882	0.3069
Ofsupmkt	0.1788**	0.0804	0.0260
Offarmkt	-0.1583*	0.0820	0.0536
Ofsupcntr	0.2429***	0.0711	0.0006
Offreshf	0.1085	0.0851	0.2024
Oforganic	0.0099	0.1085	0.9272

Note: * denotes statistical significance at the .10 level.

**denotes statistical significance at the .05 level.

*** denotes statistical significance at the .01 level.

In this study, we identified the positive relationship between consumers' confidence perception and their WTP for organic grape tomatoes. Furthermore, we examined the essential factors that affect consumers' confidence in organic fresh produce. The Score test results in Table 5.7 reports that proportional odds assumption

does not hold in this model for confidence perception. However, we still used this model (Discussion on this could be found in P43-P44 in this chapter).

Table 5.7 Score Test for the Proportional Odds Assumption- Confidence Perception

Chi-Square	DF	Pr > ChiSq
187.3898	105	<.0001

Table 5.8 shows the ordered logit regression results for confidence perception. The estimate for the white variable suggested that white subjects had less confidence that organic food labeled as organic was truly organic food than non-white subjects. Previous studies from Loureiro and Hine (2001) and Mabiso et al. (2005) showed that income was positively associated with consumers' WTP for organic food. They were backed here by the finding that consumers' income significantly increased their confidence that the grape tomatoes labeled as organic are truly organic. Income also positively increased consumers' confidence perception. Subjects had higher income tended to consider the organic grape tomatoes labeled as organic were truly organic. This indicated that consumers with high household income were less skeptical on organic grape tomatoes when compared with low income consumers.

Furthermore, supermarkets and supercenters significantly reduced consumers' confidence of organic grape tomatoes. At the same time, supercenters had a stronger impact on reducing consumers' confidence than supermarkets. Supercenters advertise "One stop shopping", however, they did not do well in guaranteeing consumers' confidence in organic foods. The positive relationship between the shopping frequency

at supermarkets and their confidence perceptions was in line with the discussion above.

Table 5.8 Ordered Logit Regression- Confidence Perception

Parameter	Estimate	Standard Error	Pr>ChiSq
Male	-0.0244	0.1453	0.8668
Age	-0.0066	0.0044	0.1329
White	-0.3438**	0.1525	0.0242
Lessthanhigh	-0.2646	0.9047	0.7699
Highschool	0.0322	0.1751	0.8543
Graduate	-0.0038	0.1664	0.9816
Childunder18	0.0573	0.1691	0.7347
Workonfarm	-0.2253	0.2755	0.4135
Income	0.0030***	0.0011	0.0085
Delaware	-0.3564	0.2669	0.1817
Supmkt	-1.4067***	0.2513	<.0001
Supcntr	-1.9834***	0.2547	<.0001
Freshf	-0.0910	0.2513	0.7171
Delaware*supmkt	-0.2853	0.3600	0.4281
Delaware*supcntr	0.0013	0.3596	0.9972
Delaware*freshf	0.3356	0.3656	0.3587
Often_supmkt	0.2623***	0.0779	0.0008
Often_farmkt	0.0615	0.0793	0.4377
Often_supcntr	0.0912	0.0681	0.1802
Often_freshf	0.0661	0.0822	0.4208
Often_organic	0.1111	0.1051	0.2903

Note: * denotes statistical significance at the .10 level.

**denotes statistical significance at the .05 level.

*** denotes statistical significance at the .01 level.

Consumers' safety perception on organic food was an interesting topic. It was necessary to examine which demographic information was closely related to their safety perceptions. The score test results in Table 5.9 suggested the proportional odds

assumption was not valid for the data. However, we still applied this model (Discussion on this could be found in P43-P44 in this chapter).

Table 5.9 Score Test for the Proportional Odds Assumption- Safety Perception

Chi-Square	DF	Pr > ChiSq
182.3078	105	<.0001

The ordered logit regression results are presented in Table 5.10. The positive coefficient for male indicated that male subjects had safer perceptions on organic grape tomatoes than females. This suggested a significant gender difference of taste perception towards organic grape tomatoes. Income had a positive and significant impact on consumers' safety perceptions of organic grape tomatoes. When holding other variables constant, one thousand dollars increase in consumers' household income would increase their logarithm odds by 0.0033 while other variables stayed constant. This result revealed the positive correlation between income and safe perception and indicated that to improve consumers safety perceptions, organic companies should focus on low income consumers.

Delawarean consumers had worse safety perceptions than Illinoisan consumers could be concluded in Table 5.10. This result demonstrated an interesting fact that although Delawarean consumers bid significantly higher than their counterparts at Illinois, they had more doubt on the safety of organic grape tomatoes. From the survey response, 68% of Delawarean subjects considered themselves knowledgeable (this included slightly knowledgeable, moderately knowledgeable and very knowledgeable) on organics and 55% of Illinoisan subjects rated themselves knowledgeable on

organics. This partly excluded the possibility of Delawarean consumers' lack of organic knowledge contributed to their doubt on organic safety. Perhaps the organic certification in Delaware did not play as important role of guaranteeing organic safety as it did in Illinois. Or the organic promoting did not reach as many people in Delaware as in Illinois.

Purchasing venues not only had an impact on consumers' WTP, but also affected their safety perceptions of organic grape tomatoes. In Table 5.10, the negative coefficients for supermarket and supercenter suggested that consumers had a negative safety perception on organic grape tomatoes from supermarkets and supercenters. Their safety perception for organic grape tomatoes from supercenters were worse than those from supermarkets. The significant interaction term of Delaware and Fresh Format Store indicated that Delawarean consumers had better safety perception for organic grape tomatoes from fresh format stores than those from farmers' market. This was expected because fresh format stores set higher standards for themselves than other stores, which could possibly receive better safety perception from their customers. Both the shopping frequency at supermarkets and supercenters positively affected consumers' perceptions of how safe the organic grape tomatoes were. The explanation could be that more frequency at these two venues reduced the chance of coming across rotted grape tomatoes which could significantly reduce their safety perception.

Table 5.10 Ordered Logit Regression- Safety Perception

Parameter	Estimate	Standard Error	Pr>ChiSq
Male	0.3754**	0.1470	0.0106
Age	-0.0021	0.0044	0.6291
White	-0.1320	0.1527	0.3873
Lessthanhigh	-0.2950	0.9074	0.7451
Highschool	0.0744	0.1762	0.6729
Graduate	-0.1275	0.1673	0.4458
Childunder18	-0.0017	0.1697	0.9922
Workonfarm	0.0642	0.2783	0.8175
Income	0.0033***	0.0011	0.0040
Delaware	-0.6454**	0.2668	0.0156
Supmkt	-1.1640***	0.2508	<.0001
Supcntr	-1.8764***	0.2546	<.0001
Freshf	0.0236	0.2522	0.9255
Delaware*supmkt	0.5041	0.3610	0.1626
Delaware*supcntr	0.4116	0.3604	0.2534
Delaware*freshf	0.5197	0.3663	0.1560
Often_supmkt	0.2978***	0.0784	0.0001
Often_farmkt	-0.0137	0.0796	0.8636
Often_supcntr	0.1242*	0.0685	0.0697
Often_freshf	0.0960	0.0825	0.2447
Often_organic	-0.0286	0.1054	0.7860

Note: * denotes statistical significance at the .10 level.

**denotes statistical significance at the .05 level.

*** denotes statistical significance at the .01 level.

Chapter 6

CONCLUSIONS AND IMPLICATIONS

6.1 Introduction

This chapter summarizes the regression results in the prior chapter. This chapter has three parts. First, the research process is reiterated here. Second, the conclusions and implications from the regression results are presented. Last, the limitations of this research and future research suggestions are provided.

6.2 Data and methods

This research surveyed 205 consumers in supermarkets, local parks, university campuses, and natural food stores in the summer of 2014 in Delaware and Illinois. The research subjects were selected to represent the US consumers. The Becker-DeGroot-Marshack auction method was applied in the process of elicit consumers' true WTP for one pint of organic grape tomatoes. The Tobit model was applied to analyze consumers' WTP for organic grape tomatoes and to test whether purchasing venues played a role on consumers' WTP. The ordered logit model was utilized to examine consumers' attitudes and perceptions of a series of topics on organic grape tomatoes.

6.3 Consumers' Willingness to Pay for Organic Grape Tomatoes

From the survey data calculation, the purchasing venue that received the highest bid for one pint of organic grape tomatoes was the fresh format store, followed by the farmers market, the supermarket and the supercenter. The Tobit model results suggested that consumers were willing to pay significantly less for one pint of organic grape tomatoes from supermarkets and supercenters than those from farmers' markets. The results in this study also suggested that consumers were willing to pay more for

organic grape tomatoes from supermarkets than those from supercenters. This was in line with Huang and Lin (2007), who demonstrated that consumers constantly paid a higher price for fresh tomatoes from traditional supermarkets or specialty food stores than fresh tomatoes at supercenters. However, regression results did not suggest significant difference between bid for organic grape tomatoes from fresh format stores and farmers' markets. Consumers viewed organic grape tomatoes from different purchasing venues differently. The results here supported earlier research from Onken et al. (2011) stating that farmers' markets received higher WTP and better consumer attitudes.

The relationship between demographic information and WTP was also examined. Gender difference in WTP was identified here. Males who were willing to pay less for organic grape tomatoes here was in contrast to the finding of Urena et al. (2008). However, it supported Onyango et al. (2007). The gender difference could vary across different sample and products.

Previous studies have shown mixed findings about the role a child played on deciding the household's purchasing decisions about organic food. Thompson and Kidwell (1998) stated that household with children under eighteen increased their probability to buy organic produce. Further, Hsieh and Stiegert (2011) summarized that consumers with preschool children were more inclined to choose organic milk as opposed to conventional milk, while consumers with school-age children liked conventional milk more than organic milk. In contrast, Loureiro and Hine (2001) concluded that children in the household reduced consumers' WTP for organic and Colorado-Grown potatoes. Additionally, Batte et al. (2007) found that children had no influence on the household's possibility of willingness to pay a price premium for

multi-ingredient organic foods. The results in this study supported the positive influence of children under 18 on consumers' WTP.

Unsurprisingly, the state where consumers came from had an impact on their WTP for organic grape tomatoes. It was to our expectation that consumers in Delaware would bid more than consumers in Illinois. Illinois is an agricultural state which provides much more organic fresh produce for its residents than Delaware does. The results of the relationship of consumers' shopping frequency and their WTP were different across each purchasing outlet. The shopping frequency consumers had at supermarkets and farmers markets significantly increased consumers' WTP for organic grape tomatoes. On the contrary, there was no significant correlation between consumers shopping frequency at supercenters and fresh format stores and their WTP for organic grape tomatoes.

6.4 Consumers' Perceptions on Organic Grape Tomatoes

This study also examined consumers' perceptions on organic grape tomatoes. The subjects in this study offered the highest rating to the healthiness of the organic grape tomatoes while giving the lowest rating to the taste perception difference between the organic and conventional grape tomatoes. Previous studies showed that consumers considered organic food as healthy, safe, tasty, environmental-friendly, and of high quality, (Magnusson et al., 2001; Harper and Makatouni, 2002; Radman, 2005; Padel and Foster, 2005; Roitner-Schobesberger et al., 2008; Pearson et al., 2010). The subjects in this study, on average, perceived organic grape tomatoes as healthy, tasty, and safe products, which backed the previous literature above.

The regression results suggested that consumers' taste perceptions, confidence on labeled organic grape tomatoes, and their state-of-origin were important

determinants for their WTP for organic grape tomatoes. All of the perceptions were positively and significantly related to their bids on organic grape tomatoes. This was in line with Tarkiainen and Sundqvist's (2005) finding that there was a positive and significant relationship between consumers' attitudes on buying organics and their intentions to buy them.

There were certain differences between Delawarean participants and Illinoisan participants. The health perceptions when compared with conventional ones and the knowledge of organic foods significantly increased Delawarean subjects' bids on organic grape tomatoes while they had no effect on Illinoisan subjects' bids. In addition, Illinoisan consumers' taste and confidence perceptions played a role in deciding their decision on purchasing organic grape tomatoes, however, Delawarean consumers' taste and confidence perceptions were insignificant. This finding suggested that different marketing strategies should be applied to consumers in different regions. Although in the whole sample, taste and confidence perception were significant, there were other factors that could affect Delawarean consumers' WTP.

6.5 Consumers' Perceptions and Demographic Characteristics

This research also measured how consumers' background, such as their age, ethnicity, education attainment, and purchasing pattern could affect their perceptions on organic food, especially those perceptions that significantly influenced their organic food purchasing behavior. Empirical results in this study suggested that consumers' taste perceptions, confidence perceptions had positive correlations with their WTP for organic grape tomatoes.

Results suggested that males had worse taste perceptions than females. Consumers with higher income tended to consider organic grape tomatoes as tasty.

Consumers' taste perceptions on organic grape tomatoes differed across purchasing outlets. Farmers markets received the highest taste ranking, followed by fresh format stores, supermarkets and supercenters. Consumers' shopping frequency at supercenters and supermarkets increased their taste perceptions on organic grape tomatoes. Surprisingly, their shopping frequency at farmers markets reduced their taste perceptions on organic grape tomatoes.

In terms of confidence perceptions, we found that non-white subjects had higher confidence rating than white subjects. Income also significantly increased consumers' confidence perception. To our surprise, Delawarean consumers had less confidence in organic grape tomatoes than Illinoisan consumers. Consumers trusted organic grape tomatoes from farmers' markets the most, followed by supermarkets and then supercenters. In addition, consumers' shopping frequency at supermarkets had a positive relation with their confidence perceptions on organic grape tomatoes, while their shopping frequency at other purchasing venues had no impact on their confidence perceptions.

Although safety perceptions did not significantly impact consumers' WTP in this study, they still were important parts among consumers' attitudes. The ordered logit results suggested that male subjects had higher safety perceptions than females. Farm work experience and income were also found to be positively related to safety perception. This indicated that to boost consumers' safety perceptions, the emphasis should be on females, low income consumers or consumers without farm work experience. A significant regional difference on safety perception was also examined here. Delawarean consumers had a higher WTP for organic grape tomatoes while casting more doubts on the safety of them. Possible reasoning could be that organic

certification in Delaware did not operate as well as in Illinois. Purchasing venues have had significant influence on consumers' safety perceptions. Results suggested that supermarkets and supercenters impaired consumers' safety perception towards organic grape tomatoes. This indicated the importance of actions by supermarkets and supercenters to improve their brand image and safety of their organic produce. The positive relationship between shopping frequency and their safety perceptions also supported this.

6.6 Limitations and Suggestions

Though this research thoroughly studies the impact of purchasing venues on consumers' WTP for organic grape tomatoes and their perceptions, it had some limitations that could be improved in future research.

First, this research only studied consumers in two states, one state in the East Coast area and the other in the midwest. Future research could extend to more states, especially the states located in the West and the South. This could comprehensively represent all US consumers.

Second, this research selected four types of purchasing venues: supermarkets, supercenters, farmers' markets, and fresh format stores. However, they did not include small grocery stores and wholesale clubs. Consumers' perceived value for organic grape tomatoes might vary across these two types of stores. Further research could extend to these two types of stores and draw a bigger picture of consumers' perceptions and perceived value on organic grape tomatoes.

Third, organic grape tomatoes are fresh and perishable. The impact of purchasing outlets could be different on other types of perishable food, such as meat, poultry and dairy products. In addition, purchasing venue might also have an influence

on non-perishable, processed and multi-ingredient organic food. There are large unexplored areas in this field. Further research is necessary to depict the clearer picture of how purchasing venues affect consumers' WTP and attitudes on organic food.

REFERENCES

- Aarset, B., S. Beckmann, E. Bigne, M. Beveridge, T. Bjorndal, J. Bunting, P. McDonagh, C. Mariojouis, J. Muir, A. Prothero, L. Reisch, A. Smith, R. Tveteras, and J. Young "The European Consumers' Understanding and Perceptions of the "Organic" Food Regime- The Case of Aquaculture." *British Food Journal* 106 (2004):93-105.
- Agresti, A. "Modeling Ordinal Categorical Data." Presented for Harvard University Statistics Department. October 23, 2010.
- Andreatta, S. and W. Wickliffe "Managing Farmer and Consumer Expectations: A Study of a North Carolina Farmers Market." *Human Organization* 61 (2002): 167-76.
- Batte, M. T., J. Beaverson, N. H. Hooker, and T. Haab "Consumer (o)for Multi-Ingredient, Processed Organic Food Products." Selected paper Prepared for presentation at the American Agricultural Economics Association Annual Meeting, Denver, Colorado, July 1-4, 2004.
- Becker, G. M., M. H. DeGroot and J. Marshack "Measuring Utility by a Single-Response Sequential Method." *Behavioral Science* 9 (1964): 226-32.
- Beggs, S., S. Cardell and J. Hausman "Assessing the Potential Demand for Electric Cars." *Journal of Econometrics* 16 (1981): 1-19.
- Bernard, J. C., D. J. Bernard "Comparing Parts with the Whole: Willingness to Pay for Pesticide-Free, Non-GM, and Organic Potatoes and Sweet Corn." *Journal of Agricultural and Resource Economics* 35 (2010):457-75.
- Bhatnagar, A., and B.T. Ratchford "A Model of Retail Format Competition for Non-Durable Goods." *International Journal of Research in Marketing* 21 (2004): 39-59.
- Bond, C. A., D. Thilmany, and J. K. Bond "Understanding Consumer Interest in Product and Process-Based Attributes for Fresh Produce." *Agribusiness* 24 (2008):231-52.
- Bond, J. K., D. Thilmany, and C. Bond "What Influences Consumer Choice of Fresh Produce Location?" *Journal of Agricultural and Applied Economics* 41 (2009): 61-74.
- Bond, J. K., D. Thilmany, and C. A. Bond "Direct Marketing of Fresh Produce: Understanding Consumer Purchasing Decisions." *Choices* 21 (2006):229-35.

- Brooks, K. and J. L. Lusk “Stated and Revealed Preference Organic and Cloned Milk: Combining Choice Experiment and Scanner Data.” *American Journal of Agricultural Economics* 92 (2010):1229-41.
- Cicia, G., T.D. Giudice, and I. Ramunno “Environmental and Health Components in Consumer Perception of Organic Products: Estimation of Willingness to Pay.” *Journal of Food Products Marketing* 15 (2009):324-36.
- Cicia, G., T.D. Giudice, and R. Scarpa “Consumers’ Perception of Quality in Organic Food- A Random Utility Model under Preference Heterogeneity and Choice Correlation from Rank-Orderings.” *British Food Journal* 104 (2002):200-13.
- Corrigan, J. R., and M. C., Rousu “Testing Whether Field Auction Experiments Are Demand Revealing in Practice.” *Journal of Agricultural and Resource Economics* 33 (2008):290-301.
- Cranfield, J.A.L, and E. Magnusson “Canadian Consumer’s Willingness-To-Pay for Pesticide Free Food Products: An Ordered Probit Analysis.” *International Food and Agribusiness Management Review* 6 (2003):13-30.
- Diaz, F.J.M., F.M.C. Pleite, J.M.M. Paz, J. and P.G. Garcia “Consumer Knowledge, Consumption, and Willingness to Pay for Organic Tomatoes.” *British Food Journal* 114 (2010):318-31.
- Dunn, R. A., J. R. Sharkey, J. Lotade-Manje, Y. Bouhlal, R. M. Nayga Jr. “Socio-economic Status, Racial Composition and the Affordability of Fresh Fruits and Vegetables in Neighborhoods of a Large Rural Region in Texas.” *Nutrition Journal* 10 (2011):6.
- FMI (2014). U.S. Grocery Shopping Trends 2014 Overview. Retrieved from <http://www.fmi.org/docs/default-source/research/presentation.pdf?sfvrsn=0>
- Gallons, J., U.C. Toensmeyer, J.R. Bacon, and C.L. German “An Analysis of Consumer Characteristics Concerning Direct Marketing of Fresh Produce in Delaware: A Case Study.” *Journal of Food Distribution Research* (1997): 98-106.
- Glaser, L. K. and G. D. Thompson “Demand for Organic and Conventional Beverage Milk.” Paper Presented at the Western Agricultural Economics Association Annual Meeting, Vancouver, British Columbia June 29-July 1, 2000.

- Govindasamy, R., and J. Italia "Predicting Willingness-to-Pay a Premium for Organically Grown Fresh Produce." *Journal of Food Distribution Research* (1999):44-53.
- Govindasamy, R., J. Italia and A. Adelaja "Farmers' Markets: Consumer Trends, Preference, and Characteristics." *Journal of Extension* 40(2002).
- Govindasamy, R., and R. M. Nayga, Jr. "Determinants of Farmer-to-Consumer Direct Market Visits by Type of Facility: A Logit Analysis." *Agricultural and Resource Economics Review* (1997):31-38.
- Harper, G. C., and A. Makatouni "Consumer Perception of Organic Food Production and Farm Animal Welfare." *British Food Journal* 104 (2002):287-99.
- Hausman, J. A., and P. A. Ruud "Specifying and Testing Econometric Model for Rank-Ordered Data." *Journal of Econometrics* 34 (1987):83-104.
- Henneberry, S.R., H.N. Agustini "An Analysis of Oklahoma Direct Marketing Outlets: Case Study of Produce Farmers' Markets." Selected Paper Prepared for Presentation at the Southern Agricultural Economics Association Annual Tulsa, Oklahoma, 2004.
- Hsieh, M.F., and K.W. Stiegert "The Consumption Choice of Organics: Store Formats, Prices, and Quality Perception- A Case of Dairy Products in the United States." *Organic Food and Agriculture-New Trend and Developments in the Social Sciences* (2012):3-18.
- Hsieh, M. and K.W. Stiegert "The Consumption Choice of Organics: Store Formats, Prices, and Quality Perception – A Case of Dairy Products in the United States, *Organic Food and Agriculture – New Trends and Developments in the Social Sciences*. In Tech, 2012.
- Hsieh, M., and K.W. Stiegert "Store Format Choice Organic Food Consumption." *American Journal of Agricultural Economics* 94 (2011):307-13.
- Huang, C.L "Consumer Preference and Attitudes towards Organically Grown Produce." *European Review of Agricultural Economics* 23 (1995):331-42.
- Huang, C.L., and B. Lin "A Hedonic Analysis of Fresh Tomato Prices among Regional Markets." *Review of Agricultural Economics* 29 (2007):783-800.
- Hwang, M. and S. Park "The Impact of Wal-Mart Supercenter Conversion on Consumer Shopping Behaviors (September 23, 2013) Available at SSRN: <http://ssrn.com/abstract=2174712>

- Irwin, J.R., G.H. McClelland, M. McKee, W. D. Schulze, and N.E. Norden “Payoff Dominance vs. Cognitive Transparency in Decision Making.” *Economic Inquiry* 36 (1998):272-85.
- Jilcott, S. B., T. Keyserling, T. Crawford, J. T., MaGuirt, and A. S. Ammerman “Examining Association among Obesity and Per Capita Farmers’ Markets, Grocery Stores/Supermarkets, and Supercenters in US Counties.” *Journal of the American Dietetic Association* 111 (2011):567-72.
- Jin, Y. H., D. Zilberman, and A. Heiman “Choosing Brands: Fresh Produce Versus Other Products.” *American Journal of Agricultural Economics* 90 (2008): 463-75.
- Kaiser, H. M., C. W. Scherer, and D. M. Barbano “Consumer Perception and Attitudes towards Bovine Somatotropin.” *Northeastern Journal of Agricultural and Resource Economics* (1992):10-20.
- Kezis, A., T. Gwebu, S. Peavey and H. Cheng “A Study of Consumers at a Small Farmers’ Market in Maine: Results from a 1995 Survey.” *Journal of Food Distribution Research* (1998):91-99.
- Kyureghian, G., R.M. Nayga, and S. Bhattacharya “The Effect of Food Store Access and Income on Household Purchases of Fruits and Vegetables: A Mixed Effects Analysis.” *Applied Economics Perspective and Policy* 35 (2013):69-88
- Liu, Y. (2014). “How Labeling Changes Consumers’ Taste Perceptions: A Field Experiment on Organic and Local Apples.” (Masters’ Thesis, University of Delaware, Newark, USA). Retrieved from <http://udspace.udel.edu/handle/19716/16308>
- Loureiro, M.L., and W.J. Umberger. “Estimating Consumer Willingness to Pay for Country-of-Origin Labeling.” *Journal of Agricultural and Resource Economics* 28(2003):287-301.
- Loureiro, M.L., and S. Hine “Discovering Niche Markets: A Comparison of Consumer Willingness to Pay for A Local (Colorado-Grown), Organic, and GMO-free product.” Selected Paper, American Agricultural Economics Association Meetings, Chicago, IL. 2001
- Lusk, J. L., and D. Hudson “Willingness-to-Pay Estimate and Their Relevance to Agribusiness Decision Making.” *Review of Agricultural Economics* 26(2006): 152-69.

- Lusk, J. L., Feldkamp, T., and T.C. Schroeder "Experimental Auction Procedure: Impact on Valuation of Quality Differentiated Goods." *American Journal of Agricultural Economics* 86 (2004): 389-405.
- Lusk, J. L., and T.C. Schroeder "Are Choice Experiment Incentive Compatible? A Test with Quality Differentiated Beef Steaks." *American Journal of Agricultural Economics* 86 (2004): 467-82
- Mabiso, A., J. Sterns, L. House, and A. Wysocki "Estimating Consumers' Willingness-To-pay for Country-Of-Origin Labels in Fresh Apples and Tomatoes: A Double-Hurdle Probit Analysis of American Data Using Factor Scores." Selected paper presented at the American Agricultural Economics Association Annual Meeting, Providence, RI. 2005.
- McCullagh, P. "Regression Models for Ordinal Data." *Journal of the Royal Statistical Society B* 42(1980):109-42.
- Maddala, G. S. "A Perspective on the Use of Limited-Dependent and Qualitative Variables Models in Accounting Research." *The Accounting Review* 66(1991):788-807.
- Magistris, T., and A. Gracia "The Decision to Buy Organic Food Products in Southern Italy." *British Food Journal* 110 (2008): 929-47.
- Magnusson, M.K., A. Arvola, U.K. Hursti "Attitudes towards Organic Foods among Swedish Consumers." *British Food Journal* 103 (2001):209-26.
- Magnusson, M.K., A. Arvola, U.K. Hursti, L. Aberg, and P. Sjoden "Choice of Organic Foods is related to Perceived Consequences for Human Health and to Environmentally Friendly Behavior." *Appetite* 40 (2003): 109-17.
- Maguire, K.B., N. Owens and N.B. Simon "The Price Premium for Organic Babyfood: A Hedonic Analysis." *Journal of Agricultural and Resource Economics* 29(2004): 132-49.
- Onianwa, O., M. Mojica, and G. Wheelock "Consumer Characteristics and Views Regarding Farmers Markets: An Examination of On-Site Survey Data of Alabama Consumers." *Journal of Food Distribution Research* 37 (2006): 119-25.
- Onken, K.A., J.C. Bernard, and J. D. Pesek "Comparing Willingness to Pay for Organic, Natural, Locally Grown, and State Marketing Program Promoted Foods in the Mid-Atlantic Region." *Agricultural and Resource Economics Review* 40 (2011): 33-47.

- Onyango, B.M., W.K. Hallman, and A.C. Bellows "Purchasing Organic Food in US Food Systems- A study of Attitudes and Practice." *British Food Journal* 109 (2007): 399-411.
- OTA (2014). American Appetite for Organic Products Breaks through \$35 Billion Mark. Retrieved from <https://www.ota.com/news/press-releases/17165>
- OTA (2015). State of the Industry. Retrieved from http://ota.com/sites/default/files/indexed_files/StateOfOrganicIndustry_0.pdf
- Padel, S., C. Foster "Exploring the Gap Between Attitudes and Behavior- Understanding Why Consumers Buy or Do Not Buy Organic Food." *British Food Journal* 107(2005): 606-25.
- Pearson, D., J. Henryks, and H. Jones "Organic Food: What We Know (and Do Not Know) about Consumers." *Renewable Agriculture and Food Systems* 26 (2010):171-77.
- Powell, L.M., S. Slater, D. Mirtcheva, Y. Bao, and F.J. Chaloupka "Food Store Availability and Neighborhood Characteristics in the United States." *Preventive Medicine* 44 (2007): 189-95.
- Radman, R. "Consumer Consumption and Perception of Organic Products in Croatia." *British Food Journal* 107 (2005):263-73.
- Roitner-Schobesberger, B., I. Darnhofer, S. Somsook, and C. R. Vogl "Consumer Perceptions of Organic Foods in Bangkok, Thailand." *Food Policy* 33 (2008):112-21.
- Saba, A. and F. Messina "Attitudes towards Organic Food and Risk/Benefit Perception Associated with Pesticides." *Food Quality and Preference*. 14 (2003):637-45.
- Senauer, B., and J. Seltzer "The Changing Face of Food Retailing." *Choices* 25 (2010).
- Shogren, J.F., J.A. Fox, D.J. Hayes, and J. Roosen "Observed Choices for Food Safety in Retail, Survey, and Auction markets." *American Journal of Agricultural Economics* 81(1999): 1192-99.

- Singh, V.P., Hansen, Karstern T. and Blattberg, Robert C., Impact of Wal-Mart Supercenter Entry on Consumer Purchase Behavior: An Empirical Investigation (March 15, 2004). Available at SSRN: <http://ssrn.com/abstract=544286> or <http://dx.doi.org/10.2139/ssrn.544286>.
- Smith, T.A., C.L. Huang, and B. H. Lin "Estimating Organic Premium in the US Fluid Milk Market." *Renewable Agriculture and Food Systems*: 24 (2009):197-204.
- Suarez-Balcazar, Y., L. I., Martinez, G. Cox, and A. Jayraj "African Americans' Views on Access to Healthy Foods: What a Farmers' Market Provides." *Journal of Extension* 44(2006).
- Tarkiainen, A., and S. Sundqvist "Subjective Norms, Attitudes and Intentions of Finnish Consumers in Buying Organic Food." *British Food Journal* 107 (2005): 808-22.
- Thilmany, D., C. A. Bond, and J. K. Bond "Going Local: Exploring Consumer Behavior and Motivations for Direct Food Purchases." *American Journal of Agricultural Economics* 90 (2008):1303-09.
- Thompson, G. D "Consumer Demand for Organic Foods: What We Know and What We Need to Know." *American Journal of Agricultural Economics* 80 (1998):1113-18.
- Thompson, G.D., and J. Kidwell "Explaining the Choice of Organic Produce: Cosmetic Defects, Prices, and Consumer Preferences." *American Journal of Agricultural Economics* 80 (1998): 277-87.
- Tobin, J. "Estimation of Relationships for Limited Dependent Variables." *Econometrica* 26 (1958):24-36.
- Torjusen, H., G. Lieblein, M. Wandel "Food System Orientation and Quality Perception among Consumers and Producers of Organic Food in Hedmark County, Norway." *Food Quality and Preference* 12 (2001):207-16.
- Tregear, A., J.B., Dent, M.J. McGregor "The Demand for Organically-Grown Produce." *British Food Journal* 96 (1994):21-25.
- Trobe, H. L. "Farmers' Markets: Consuming Local Rural Produce." *International Journal of Consumer Studies* 25 (2001):181-92.
- Urena, F., R. Bernabeu, and M. Olmeda "Women, Men and Organic Food: Differences in Their Attitudes and Willingness to pay. A Spanish Case Study." *International Journal of Consumer Studies* 32 (2008):18-26.

- USDA (2004). Organic Produce, Price Premiums, and Eco-labeling in U.S. Farmers' Markets. Retrieved from http://www.ers.usda.gov/media/269468/vgs30101_1_.pdf
- USDA (2012). State Fact Sheets: Delaware. Retrieved from <http://www.ers.usda.gov/data-products/state-fact-sheets/state-data.aspx>
- USDA (2012). State Fact Sheets: Illinois. Retrieved from <http://www.ers.usda.gov/data-products/state-fact-sheets/state-data.aspx>
- USDA (2013). Organic Production. Retrieved from <http://www.ers.usda.gov/data-products/organic-production.aspx>
- USDA (2014). Farmers Markets and Local Food Marketing. Retrieved from <http://www.ams.usda.gov/AMSV1.0/ams.fetchTemplateData.do?template=TemplateS&leftNav=WholesaleandFarmersMarkets&page=WFMFarmersMarketGrowth&description=Farmers+Market+Growth>
- USDA (2014). Organic Market Overview. Retrieved from <http://www.ers.usda.gov/topics/natural-resources-environment/organic-agriculture/organic-market-overview.aspx>
- Uusitalo, Outi "Consumer Perceptions of Grocery Retail Formats and Brands." *International Journal of Retail & Distribution Management* 29 (2001): 214-25.
- Volpe, R., A. Okrent, and E. Leibtag "The Effect of Supercenter-Format Stores on the Healthfulness of Consumers' Grocery Purchases." *American Journal of Agricultural Economics* (2013):1-22.
- Volpe, R. J., and N. Lavoie "The Effect of Wal-Mart Supercenters on Grocery Prices in New England." Selected Paper American Agricultural Economics Association Annual Meeting Providence, Rhode Island July 24-27, 2005.
- Wang, Q., C. Halbrendt, J. Kolodinsky and F. Schmidt "Willingness to Pay for rBST-Free Milk: A Two-Limit Model Analysis." *Applied Economics Letters* 4 (1997):619-21.
- Webber, C. B., J. Sobal, and J. S. Dollahite "Shopping for Fruits and Vegetables. Food and Retail Qualities of Importance to Low-Income Households at the Grocery Store." *Appetite* 54 (2010):297-303.

- Willard Bishop (2014). The Future of Food Retailing. Retrieved from http://www.iddba.org/pdfs/wis/Willard%20Bishop%202014%20Future%20of%20Food%20Retailing_Newsletter.pdf
- Williams R. "Ordinal Regression Models: Problems, Solutions, and Problems with the Solutions." German State User Group Meeting, June 27, 2008.
- Wolf, M. M. "A Target Consumer Profile and Positioning for Promotion of the Direct Marketing of Fresh Produce: A Case Study." *Journal of Food Distribution Research* 10 (1997):11-17
- Wolf, M. M., A. Spittler and J. Ahern "A Profile of Farmers' Market Consumers and the Perceived Advantages of Produce Sold at Farmers' Markets." *Journal of Food Distribution Research* 36 (2005):192-201
- Yue, C. and C. Tong "Organic or Local? Investigating Consumer Preference for Fresh Produce Using a Choice Experiment with Real Economics Incentives." *Hortscience* 44 (2009): 366-71.
- Yue, C., H.H. Jensen, D.S. Mueller, G.R. Nonnecke, D. Bonnet, M.L. Gleason "Estimating Consumers' Valuation of Organic and Cosmetically Damaged Apples." *Hortscience* 42 (2007):1366-71.
- Zepeda, L. and C. Leviten-Reid "Consumers' View on Local Food." *Journal of Food Distribution Research* 35 (2004):1-6.

Appendix A

INSTITUTIONAL REVIEW BOARD APPROVAL LETTER



RESEARCH OFFICE

210 Halliburton Hall
University of Delaware
Newark, Delaware 19716-1551
Ph: 302/831-2136
Fax: 302/831-2828

DATE: August 6, 2014

TO: Michelle Paukett
FROM: University of Delaware IRB

STUDY TITLE: [641370-1] Consumer Preferences and WTP for Organic Grape Tomatoes in Relation to Safety Concerns and Outlet of Purchase

SUBMISSION TYPE: New Project

ACTION: DETERMINATION OF EXEMPT STATUS
DECISION DATE: August 5, 2014

REVIEW CATEGORY: Exemption category # (6)

Thank you for your submission of New Project materials for this research study. The University of Delaware IRB has determined this project is EXEMPT FROM IRB REVIEW according to federal regulations.

We will put a copy of this correspondence on file in our office. Please remember to notify us if you make any substantial changes to the project.

If you have any questions, please contact Nicole Farnese-McFarlane at (302) 831-1119 or nicolefm@udel.edu. Please include your study title and reference number in all correspondence with this office.