AN ASSESSMENT OF CONSUMER PREFERENCE FOR DIRECT-TO-CONSUMER

MARKET OUTLETS IN THE MID-ATLANTIC REGION

By

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ABSTRACT OF THE THESIS

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Changes in the agricultural industry have led to changes in eating behavior, consumption patterns and even attitudes and perceptions of protecting the environment and local businesses. New direct marketing methods allow farmers to overcome obstacles such as farm size, delivery logistics, limited marketing budget and labor constraints to achieve greater customer loyalty and enhanced income. Marketing channels, however, are incomplete, despite growing popularity in the 21st century.

Establishing the direct marketing grounds, this research aims to examine factors affecting users of farmer-to-consumer direct marketing outlets. It also identifies shopping trends while analyzing demographic characteristics of users of direct market outlets under study. Ultimately it helps to predict the likelihood of purchasing through direct markets and paying premiums based on significant consumer demographic and attitudinal factors.

Based on the survey results of 1,134 direct-market-outlet-visiting patrons from the Mid-Atlantic region, estimates of the Logit and Ordered Probit models are used to

regress important perceptions, behavioral characteristic and demographic predictors that increase the likelihood of purchasing fresh produce at a direct market outlet. The findings help to explore patterns specifically on consumer purchasing behaviors that will promote the growth of direct market outlets. Focusing on the appropriate media channels and promoting the farmer-to-consumer shopping concepts, farmers have high potential to maintain and enhance profitability.

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Chapter 1

Introduction

U.S. farmers no longer solely depend on direct-to-consumer sales. In the 1900s, about 40% of Americans lived on farms and most food were produced locally; in year 2000, only about 1% of Americans lived on farms (Pirog, 2009). The conventional consumption pattern has completely changed with the growth of restaurants or grocers and the induced technological advances in food processing and transportation systems. Due to changed consumption environment and different intermediaries sharing profits from farmers, many farmers are unable to stay economically viable. Fortunately with the movement of eating fresh food while promoting local business, the U.S. food system has been re-localized to a more traditional way of consuming.

The motives of consuming locally grown produce may include the perceived freshness and quality that are linked to the importance of healthier food production and food safety practices. According to the 1992 to 2007 USDA Agricultural Marketing Service Census of Agriculture data, the number of farmers participating in direct-to-consumer food marketing grew by 58 percent and the constant dollar value of direct sales increased by 215 percent (Diamond et al., 2009). These data not only indicates the importance of direct marketing but also a change in consumer preferences and a resurgence of a traditional marketing channel.

While past researches have supported the expansion of direct market sales, not many statistics reflect this growing trend. According to the 1997-2007 Agricultural Marketing Service (AMS), the percentage change in direct market sales

grew by 104 percent while the listed total agricultural sales through direct marketing only increased by 47.6 percent (Diamond et al., 2009). Moreover the average growth rate for direct marketing sales in the ten fastest growing states is more than four times greater than the growth of total agriculture sales cross-country (Diamond et al., 2009). The conflicting statistics is widely distorted by the true definition of "local food" and the inadequate sources collected/reported by the Census of Agriculture (Diamond et al., 2009). The power of direct marketing may be undermined by data reports but farmers should not be discouraged by the presented statistics. The changes in consumer preference and new diet behaviors may pave a new income-generating path.

Economical Justifications for Direct-to-Consumer Marketing

It has been observed that direct marketing strategies are more commonly adopted in smaller farms relative to sizable farms. In general, small farms have financial disadvantages that limit their outreach to the wide public. Furthermore, most small farms have limited harvests restricted by their land size. This usually creates the lack of heterogeneous products that are demanded by one-stop shoppers. Capacity-wise, small farms also face a shortage of manpower to operate the farm and often struggle with delivery logistics or the latest information outreach (Martinez, 2010).

With the changes in the food system, both competitive prices and the intricate selling channels have pushed many small-scale farmers to the brink of their earnings. The USDA Economic Research Service (ERS) has analyzed that farmer prices is only a fraction of retail prices (Canning, 2011). In 2006, the USDA Economic

Research Service of farm share and marketing bill has identified that the distribution of the food dollar for farm value was only 19 cents. Most of the food dollar goes into labor, packaging, transportation, energy, advertising, depreciation, rent and other marketing costs; which many low-earning farmers cannot afford (Canning, 2011).

Often, small-scale farmers have limited advertising and information access. In fact, farmers have to at times cut back on marketing investments due to the limited budget. In this respect, farmer-to-consumer direct marketing is one of the more popular strategies to keep financial stress under control (Govindasamy and Nayga, 1997). The direct-to-consumer model promotes the mutual beneficiary where consumers can seek fresher food and farmers can seek higher investment returns from their seasonal harvests (Andreatta and Wickliffe, 2002).

Social Justifications for Direct-to-Consumer Marketing

According to the 2008 Agricultural Resource Management Survey (ARMS), small farms[1] now stand for majority of local food production (Low and Vogel, 2011). These small farms are heavily dependent upon exclusive direct-to-consumer marketing channels such as farmers' market or other organized community farms. According to the 2007 USDA data, small farms accounted for 85 percent of farms that sold directly to consumers as shown in Figure 1.1 (Martinez, 2010). One particular review from a survey collected in the Mid-Atlantic's region clearly shows that direct marketing channels from direct farm operates yield positive economic and social impacts (Brown and Miller, 2008). In the study, they found that not only

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[1] Small Farms are those with less than $50,000 gross annual sales

do consumers get access to fresh fruits and vegetables but farmers and consumers can build a sense of community and created an alternative space and option for social activity.

Figure 1.1 Direct Sales Farms

Small (sales less than $50,000)

Medium (sales of $50,000 to $499,999)

Large (sales of $500,000 or more)
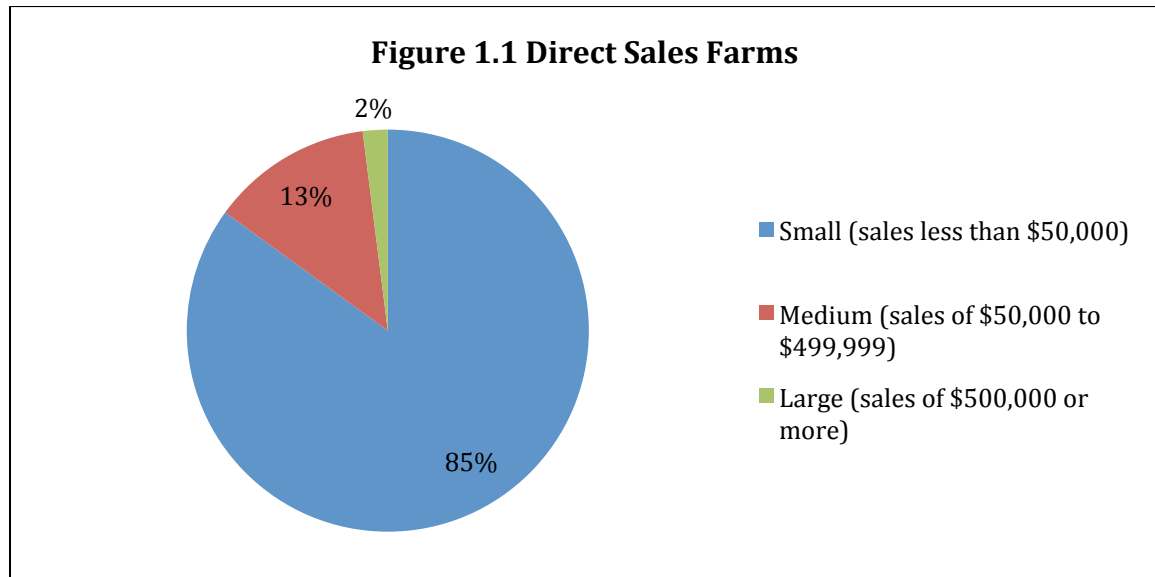
Figure 1.1 Small farms accounted for 85 percent of farms that sold directly to consumers (Martinez, 2010).

Besides economic and social benefits it has been shown that direct sales can trigger other income generating activities such as agritourism, eco-tourism and green tourism (Martinez, 2010). According to the 2007 Census of Agriculture reported that 14 percent of all farms in the United States are engaged in at least one type of entrepreneurial activities. Many consumers engaged with farm-related activities perceive this as a less expensive leisure.

1.1 Recent Trends in Direct-to-Consumer Marketing

Although the consumers' demographic attributes may differ, direct market shoppers do share common motivations. Typically consumers who enjoy culinary, food gardening, fresher food, buying in smaller quantities or eating healthier may

prefer to shop at a direct market outlet over supermarket or grocery stores (Martinez, 2010). One of the studies conducted in New Jersey concluded that quality and freshness are the main reasons why consumers prefer direct market outlets (Govindasamy et al., 1998). Although the impulse of buying local food have often been tied with education or income levels, studies have found an equal chance of buying local food despite these factors (Bond et al., 2009).

The motives of consuming locally produced products are not only pertained to individual health or recreational reasons. One past study showed that consumers who are willing to pay a premium on locally produced products look into the farming methods concerning the environment and how they would be able to support local farmers (Bond et al., 2009). Another study concentrating on local farmers' markets from Maine ranked supporting the farming industry as one of the top two reasons to shop at local direct market (Kezis et al., 1998).

Shopping behaviors are critical factors influencing individuals in selecting direct market outlets. Most consumers divert away from direct market outlets due to market accessibility, seasonal constraints, higher transaction cost, price factors, location inconveniences and aesthetics of the purchased produce. For particular market outlets such as Community Supported Agriculture (CSA), they are most often limited to product choice and comes with inconveniences of pickup place or time (Zepeda and Li, 2006).

It has been perceived that with the better quality, freshness and environmental friendliness, products at direct market outlets have been marked with premium prices. Studies that measured consumers' willingness-to-pay for

locally grown produce are done from many aspects. Most researches are conducted based on close-ended to open-ended survey questions to consumers on a hypothetical scenario aspect. Factors such as gender, income and education level are observed as significant determinants that stimulate the levels of willingness-to-pay. Willingness-to-pay may not be a good indicator to mark potential markets but the essential analyses may help the farmers identify the demographic characteristics and perceptions of shopping individuals.

1.3 Objectives

In 2008, small farms accounted for 81 percent of all local food farms where the group mainly relied on direct-to-consumer marketing channel to generate income (Low and Vogel, 2011). With direct marketing being a potentially effective sales alternative, farmers should target and identify patrons by understanding the real preferences and behaviors of consumers. Studying the survey poll helps farmers map out future trends and marketing methods for potential income increases. In this study, the dissection of direct farmers markets will be categorized into Pick-Your-Own (PYO) activities, Community Farmers' Market (CFM), On-Farm Market (OFM) and Community Supported Agriculture (CSA). This thesis will highlight four main objectives:

1. Examine factors affecting users of farmer-to-consumer direct markets;

2. Identify shopping trends at each of the four studied direct market outlets;

3. Analyze demographic characteristics of consumers for each of the four direct market outlets; and,

4. Determine the demographic and attitudinal factors that are important to predict the likelihood of purchasing and paying premiums through direct markets.

1.4 Organization of Thesis

The mechanism of this research paper starts off with backgrounds of direct farm outlets in demand, growth and trends as composed in Chapter 2. Comprehensive literature reviews on different types of discussed direct market outlets are discussed in Chapter 3. The conceptual framework with theories and models that supports the research discussion can be found in Chapter 4. Methods of conducting this research with details of the data are explained in Chapter 5. Subsequently, the results from descriptive statistics of the data are presented in Chapter 6 whilst the model estimate interpretations, discussions and conclusions are presented in both Chapter 7 and Chapter 8. Finally, Chapter 9 concludes the whole research with limitations, political implications and other future research possibilities.

Chapter 2

Background

2.1 The Farmer-to-Consumer Direct Marketing Concept

There are many programs that support the growth of local farming businesses. These programs are not only growing in size but are also growing in number. Most programs are sponsored by non-profit organizations and aim to build a robust structure in educating the wide public. Federal policies have been

expanded to help local farmers in programs such as the Community Facilities Program, Community Food Project Grants Program, Federal State Marketing Improvement Program, National Farmers' Market Promotion Program, Senior Farmers' Market Nutrition Program, Specialty Crop Block Grant Program and the WIC Farmers' Market Nutrition Program[2] (Martinez, 2010). The names of these programs are generally very self-explanatory and their intention is to strengthen the environment and economic development.

The implementations of direct marketing strategies are not new concepts. The Farmer-to-Consumer Direct Marketing Act in 1976 paved the way to draw the importance of farmers' market access to consumers (Low and Vogel, 2011). The 2008 farm bill also contained a few provisions that supports directly purchased local and regional food systems (Johnson et al., 2012). Common forms of direct marketing operations include pick-your-own (PYO), cut-your-own (CYO), roadside signs or extended versions of recreational activities in a rural farm setting (Bowers, 2001).

Farmers' market is one of the oldest ways to conduct direct marketing sales in the agro-food system (Andreatta and Wickliffe, 2002). Nowadays, other than the long-established method of direct marketing, traditional forms of farmers' market has been further elaborated into community supported agriculture (CSA) farms, agritourism activities that involve pick-your-own (PYO) activities, Internet marketing, or selling through niche markets. Capturing avenues of both economic and social impacts, direct marketing methods is expected to grow. Nonetheless, the

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[2] WIC is the acronym for the Special Supplemental Nutrition Program for Women, Infants and Children

many positive justifications are usually offset by the inconveniences of visiting farmers' markets for the necessary purchases. Based on the social and economic attributes of urban and suburban individuals, this paper helps to diagnose common forms of direct marketing for farmers who intend to attain better earnings and remain viable in the economy.

2.2 Direct Farm Outlets Demand

In the days before grocery stores or food markets were available, consumers used to replenish fresh produce at traditional food market systems. Interestingly, we are seeing a reverse effect today. With the mindset of eating healthy and the realization of sustaining local business and the environment, a growing group of concerned consumers now prefer the traditional shopping method to the conveniences of modern shopping facilities. In fact, one of the explored state programs in New Jersey, *Jersey Fresh*[3], has resulted in an increase in sales of fresh produce by $36.6 million (Govindasamy et al., 2001, 2004).

As the society's demand pattern changes, farmers are again picking up the opportunity of selling value-added products to earn a higher income share through the direct-to-consumer method. The desire to consuming fresh, locally grown fresh produce not only came from individuals but from healthy images that have spread across institutions, schools, colleges and hospitals (Martinez, 2010). Farm-to-school programs are now one of the fastest growing trends that has connect farmers to institutional markets (Martinez, 2010).

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[3] Jersey Fresh was established to promote and market New Jersey agricultural products funded in 1984(Govindasamy et al., 2001)

Behavioral economics may be able to help explain how individuals choose where and what kind of market places to consume fresh fruits and vegetables. Supermarkets may seem to be the most convenient and practical way to shop, but some consumers may choose other alternatives for fresher food, environmental issues, organic/natural products or simply to help small farmers grow (Zepeda and Li, 2006). Despite price-premiums, locally grown foods are perceived in ways to be healthier, eco-friendlier and a means of supporting small-scale agriculture and local rural communities. As a result, the value of the perceived quality and the method of the food growing process have gained its importance to the food-consuming process.

2.3 Direct Farm Markets Growth

Farmers struggling to improve their income are choosing to incorporate much more immediate marketing strategies such as face-to-face interactions with consumers. Direct marketing for farmers are especially highlighted in areas where revenue margins are enhanced and farmlands can be sustained. Several studies have been conducted to examine the characteristics that determine consumer visits to different types of direct marketing facilities. The key to identify consumer's shopping motives has been tied with the socioeconomic and demographic profiles of individuals (Govindasamy and Nayga, 1997). A direct marketing survey study conducted in 1994 captured the mutual benefit scenario of farmers interacting directly with consumers (Govindasamy and Nayga Jr, 1996). Respondents in the survey clearly expressed their interest and desire to visit facilities based on location and quality of fresh produce (Govindasamy and Nayga Jr, 1996).

According to the U.S. Department of Agriculture (USDA), a farmer's market is an organized market where farmers can sell directly to consumers. It can be a community organized by any group, association, organization or extension. Farmer's markets in the United States have a long history and have gained in popularity throughout the years. The concept, which became popular after the placement of the Farmer-to-Consumer Direct Marketing Act of 1976 has been around the country well before the retail agribusiness system (Thilmany and Watson, 2004). According to the USDA Farmers Market directory, there was a 9.6 percent growth rate in year 2012 compared to 2010 of 7,864 operational farmers' markets in the United States as shown in Figure 2.1 (USDA.gov, 2012).
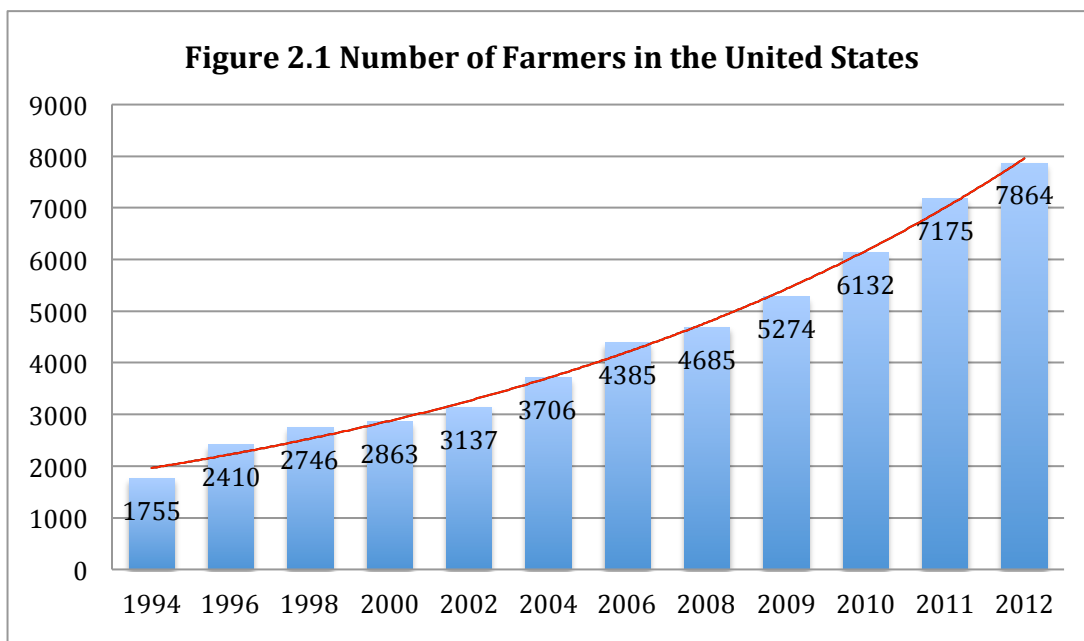
Figure 2.1 National count of farmers in market directory listing (USDA.gov, 2012).

Direct farm marketing practices differ geographically. As shown in Figure 2.2, the West Coast is engaged with bigger farms that are located further away from metropolitan areas. Their local food sales are more tied together with intermediated

marketing for the ease of time and effort (Low and Vogel, 2011). The Northeast areas of the country are comprised of smaller farms and heterogeneous products where a myriad of direct-to-consumer marketing strategies can be applied (Low and Vogel, 2011).

Figure 2.2 Farms with Direct Sales in Year 2007
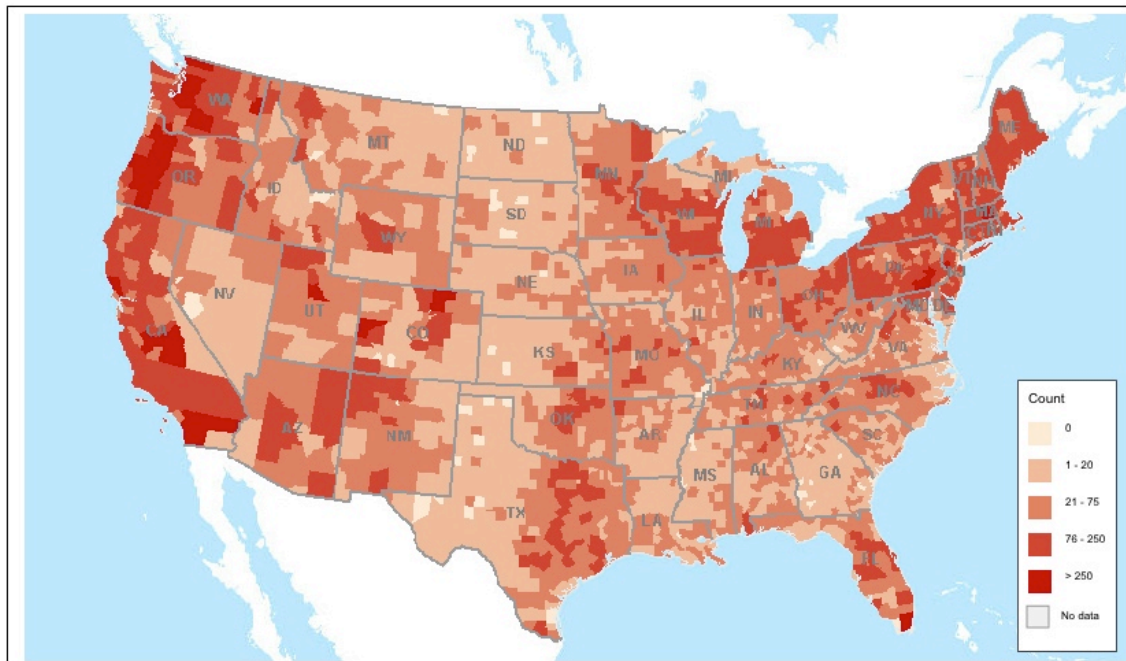
Source: USDA, Economic Research Service, Food Environment Atlas

The demand for fresher produce is one of the highest rated qualities that shoppers look for when visiting direct farm outlets. One study conducted in North Carolina showed that 88 percent of respondents visit farmers' market for fresher produce with the rest indicating levels of wanting local products and less expensive food (Andreatta and Wickliffe, 2002).

2.4 Types of Direct Farm Outlets

The operational strategy behind direct farm outlets varies across region and individual producers. The popularity of direct farm markets have gained its

importance not only as an alternative to consume fresher vegetables and fruits but also motives such as an optional recreational activities, preservation of agricultural lands and community development (Govindasamy and Nayga, 1997). Direct farm market outlet is one of the most effective ways to remind urban consumers the importance of agriculture in this century. It also alleviates competition with sizable shopping outlets by avoiding the intricate distribution system.

The types of direct farm outlets can vary by the sizes of the farmland. Farmers with limited farmland make use of roadside or parking lots to sell their produce. Others with ample land space are able to provide agritourism activities such as on-farm camping, horseback riding, farm tours and field trips, or may host seasonal events such as hunting, planting trees or cut-your-own Christmas trees. These are all types of activities that bring shopping dollars directly to the farm with no intermediaries' interruption.

The other direct selling method is through a movement known as Community Supported Agriculture (CSA). CSA has been expanded and elaborated by locavores[4] who are interested in organic produce and have an awareness in the ecological effect to the environment (Gale, 1997). Consumers who dedicate themselves to CSA will pay in advance at the beginning of a crop season in which they can pick up their produce later or have their fresh produce distributed at a designated location in town. Mutually benefiting farmers and consumers, CSA farms have gained much popularity among health-conscious and environmental-concerned individuals.

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[4] The New Oxford American Dictionary of 2007 defines Locavores as a local resident who tries to eat only food grown or produced within a 100-mile radius

Chapter 3

Literature Review

3.1 Direct Farm Markets

There are a myriad of farm businesses that are considered to engage in the "local" food purchasing activity. Four types of direct farm outlets are explored in this research: Pick-Your-Own (PYO), On-Farm Market (OFM), Community Supported Agriculture (CSA), and Community Farmers' Market (CFM). They are defined as follows:

1. Pick-Your-Own (PYO)- Customers pick/harvest their own produce from a field or orchard;

2. Community Farm Market (CFM)- Marketing outlet at which farmers sell agricultural products to individual customers at a temporary/permanent location;

3. Community Supported Agriculture (CSA)-Marketing arrangement in which members purchase shares of a farmer's expected yield before planting. The harvest will either be picked up or delivered to individual members; and,

4. On-Farm-Market (OFM)- Any single market outlet that sells fresh produce under one roof.

Pick-Your-Own (PYO)

PYO, including cut-your-own (CYO), operations include growing, harvesting and allowing consumers to pick from the field and buy the produce at an amount that they demand for. It gained its popularity in the 1930s and 1940s after World

War II when prices of fruit and vegetables plunged and producers hurdled over labor and material costs (Bruch and Ernst, 2012). Popular crops harvested in PYO sites are those that require high labor but easy farming techniques such as berries, tomatoes, pumpkins and Christmas trees (Bruch and Ernst, 2012). Because PYO involves consumers harvesting fruits and vegetables by themselves, this method of direct marketing strategy not only lowered packaging costs for farmers but also provided consumers with opportunities to interact with families and friends.

PYO is particularly embraced by low-earning farmers because it can save them harvesting time and costs. With consumers coming onto the farm, farmers can save on both equipment and labor. However, since PYO allows free access to outsiders, supervision of the farm must be strictly reinforced to prevent unnecessary damages. The risks of operating a PYO farm are essentially higher as consumers move freely and work their way around the farm. As such, farmers tend to offer only certain types of crops on PYO Farms. The most commonly available commodities for PYO activities are fruit trees or berry crops for a easier and safer logistics (Bruch and Ernst, 2012).

Moreover, without effective advertisement, promotion or community reach methods, it can be difficult to attract consumers (Bruch and Ernst, 2012). According to past survey data, the typical range that consumers are willing to travel to a PYO farm only lies within 40 miles radius(Bruch and Ernst, 2012). The need of good location and population density selection are both hard-to-cross barriers for many farmers.

Past studies also looked into the demographic variables within PYO farms. In one of the studies, the result indicated that college educations are more likely to visit PYO farms than those with only high school educations (Govindasamy and Nayga, 1997). In the same study, they also found that individuals with income higher than $60,000 are more likely to purchase from a PYO site. In another study based on purchasing local produce in Delaware, factors of gender (male), urban consumers and age were all positively related to the preference of local food (Kuches et al., 1999).

Community Farmers' Market (CFM)

Community farmers' markets are non-profit organization establishments where farmers collectively sell their produce alongside those of other farmers. It is one of the oldest methods of helping mid-sized growers with limited marketing cost to distribute fresh produce to consumers with limited marketing costs. As observed in a mid-Atlantic farmers' market survey, the attempt of building such a network triggered positive impacts on both the economic and social level in the community (Brown and Miller, 2008; Oberholtzer, 2003). In 2008, one project in Virginia found a positive state economic impact of 1.075 million dollars based on the shift of dollars spent on farmers market from grocery stores (Hughes et al., 2008).

A lot of surveys that research on behavioral attitudes have shown that product quality and supporting local farmers and business are the two most important reasons to shop at a farmer's market (Kezis et al., 1998). Demographically, an ample amount of study has collectively discovered that individual farmers' market shoppers are typically female, a middle-age adult, and

have an income of around $40,000 or higher (Kezis et al., 1998). Unlike other direct market outlets, Govindasamy et al. 1997, additionally points out that ethnicity is another factor that affects the visitation to farmers' markets; specifically, Caucasians are less likely to visit farmer's markets than people of other race (Govindasamy and Nayga, 1997).

The easiest way to locate an operating on-farm market is by driving around the neighborhood or hearing about it from other people. An interesting finding in one of the past research studies is consumer's loyalty towards farmers' markets. The study showed that loyal patrons generally visit the market at least once a week and spends at least $10 per trip compared to intermittent shoppers (Kezis et al., 1998). The same study also pointed out the sensitivity of pricing on these farms. On average, respondents are willing to pay 17 percent more for produce compared to other conventional shopping sites.

Community-Supported Agriculture (CSA)

The concept of CSA farms was first developed by the Japanese in 1960s and pioneered in the United States in 1985 (Johnson et al., 2012). CSA type of direct marketing involves an arrangement between the farmers and consumers where farmers sell a certain share of their farm produce to the public (Lamb, 1994). The consumer will pay the farmers upfront for any cultivating crop. In exchange the farmers will, upon their best ability, grow the crops accordingly (Lamb, 1994). This is an ultimate risk-sharing and mutual beneficial cooperation. Since the consumers will pay the farmers prior to cultivation it will help the farmers' cash flow. This method of channeling also allows farmers to know what to grow prior to planting,

enabling them to build loyal relationships directly with consumers (Harvest, 2010). The consumers on the other hand will obtain fresh fruits or vegetables in return, and knowing all the sources of their food intake and enjoying their trips to farmlands occasionally (Harvest, 2010).

A typical CSA would offer a mix of around eight to twelve different products a week per shareholder throughout the season (Martinez, 2010). Each share is usually around several hundred dollars and is enough to provide enough fresh produce for a family (Brown and Miller, 2008). It has been measured that CSA benefits the environment, local community, farmers and personal health. A studied focus group in Wisconsin observed only positive attitudes toward local food sharing (Zepeda and Leviten-Reid, 2004). Running under a risk-sharing scheme, one study conducted in West Virginia showed positive net state economic impacts of $1.075 million and an additional 43 job creations (Hughes et al., 2008).

In 2010, there were about 1,400 operating CSAs in the United States (Johnson et al., 2012).Despite the complexity in CSA operations, a CSA farm study in Pennsylvania found that 74 percent of the examined members increased the variety of produce they consumed and 58 percent increased the quantity (Kolodinsky et al., 1999). Positive correlation dealing with CSA farms or becoming a member includes shopping less and changing eating habits to consume fresher and healthier produce (Ostrom, 2007).

Because the CSA movement is widely built upon trust, it is important to point out some of its weaknesses. According to the talk based at the fifth annual Community Supported Agriculture Conference, it emphasized matters such as

meeting consumer needs, consumer commitment, overcoming self-interest of the farmers, land prices and land taxes, sharing risk, eliminating the need for governmental social services and building up community in CSA (Lamb, 1994). At a focused group research, inconvenience and the lack of choice in mix and the amount of produce provided are withdrawal factors to a CSA outlet (Zepeda and Leviten-Reid, 2004).

On-Farm Market (OFM)

An on-farm market is a popular store/sale venue, which involves a sheltered building used to sell fresh produce within the farmlands year around. Roadside farm stand is one type of on-farm market. Some on-farm markets may only operate seasonally depending on harvest period from a truck, trailer or tent. It may also provide outdoor activities as well as traditional PYO activities. Typically, OFM are located close to a PYO farm, where together they attract both parties who enjoy the process of picking fresh produce and those who are more time-short but also demand fresh produce.

From a study conducted in New Jersey, Govindasamy et al. 1997, has shown that shoppers who buy fresh fruits and vegetables and those increasing the volume of fresh produce are more likely to visit roadside stands than others (Govindasamy and Nayga, 1997). The study also classified that patrons who are female, sixty-five years old or younger, have an income under $60,000, and those with some college education are more likely to visit roadside stands. These results are somewhat different from the PYO studies from the same research. The reason is partially due to the other benefits that PYO can provide to shoppers. Today, the format of the on-

farm market operation has expanded to not only sell fresh produce; it also provides

crafts, baked goods, flowers and related items in generating traffic and profit (Gale,

1997).

3.2 Observed Consumer Behavior and Purchasing Patterns

There are several studies that have captured good quality traits of consumers

who visit direct markets. Using the Logit framework, Govindasamy and Nayga 1997,

discovered the relationship between consumption demographics of fresh greens;

produce variety and price expectations to farmers' markets (Govindasamy and

Nayga, 1997). Those patrons who consume more vegetables than they did five years

ago are 16 percent more likely to visit farmers markets (pick-your-own farms,

roadside stands, farmers' markets and direct farm markets). Those who expect

more variety of fresh produce are 13 percent more likely to visit PYO operations.

Compared to those who are above sixty-five years old, patrons who are under

thirty-five are 16 percent more and those between thirty-five and sixty-five are 13

percent more likely to visit roadside stands. Females are genuinely more likely to

visit direct market operations to males. Depending on the location of facility,

roadside stands are more likely to be visited as compared to PYO operations.

Preference for fresher greens typically will be translated to a price premium

for the product. Using a single regression model, Gandee et al. analyzed the influence

of consumer demographic, spatial, and land characteristics upon direct farm-

marketing sales in West Virginia (Gandee et al., 2003). Education and income were

two factors that positively affected the marketing sales. Spatial factors were found

to influence sales: an increase in distance from the metropolitan area increased county direct farm-marketing sales.

A more recent paper used ordered Logit model to analyze the factors that affect farm output sold through direct marketing outlets (Monson et al., 2008). Their unexpected findings were the negative relationship between choosing a direct market selling method based on the earning of farmers income; farmers tend to rely less on high-valued produce as earnings increase.

Chapter 4

Conceptual Framework

The actual behavior of consumers may be much more complex than what one really interests in as to the perceived behaviors. There has been a myriad of approaches that has aimed to measure consumer choices by incorporating on-site attributes to on-site activities. Choices of individuals are to maximize utility by choosing where and what to buy. To use this as the main principle that maximizes both the consumers' and farmers' demands, we need to discover both the private (e.g. convenience, produce selections, travel costs, etc.) and public attributes (e.g. locally sourced products, organic, natural other on-site activities, safety and etc.).

4.1 Consumer Behavior Theories

Consumer behavior and utility maximization theories require that consumers are rational and they will maximize their satisfaction within the price of goods and their ability to pay for the goods (Lancaster, 1966). The consumers' decision is built based on the beliefs of a product, the person's attitude towards it,

behavioral intentions and actual behavior. The theory implies that a shoppers' decision is not one-sided. For example, a person may visit a direct farm outlet to buy fresher greens, but they may also visit because they want to help out local producers or they want to see where their food comes from.

Scholars have found that when individuals are seeking an outdoor recreation, the other available on-site activities are just as important as the location. For example, whether a direct-farm-market-goer decides to only buy fresh produce or to enjoy the on-site activity experience, the place they choose is as important as the other activities can play in the consumption process (Cutter et al., 2007).

Theory of Reasoned Action and Perceived Consumer Effectiveness

Many consumer behavioral studies are drawn on the theory of reasoned action with the extended version of the theory of planned behavior. The theory of reasoned action captures the notion that rational individuals will behave intentionally with the systematical information available to them and act accordingly (Fishbein and Ajzen, 1975). It is the theory where it measures one's behavioral intention based on two explanatory variables: attitude toward the behavior and perception of social pressure. The theory of reasoned action was further modified into the theory of planned behavior because behavioral intention does not always lead to actual behavior (Ajzen, 1991). The theory of planned behavior adds on a new variable to the behavior intention model perceived behavioral control. Perceived behavioral control accounts for real-life determinants for both behavioral intention and behavior such as time, knowledge, experience and

others. Summarizing both, purchase decisions are usually conditionally drawn on the appealing social pressure, one's own value of beliefs and real-life control factors.

The perceived behavioral psychology helps to contribute into the analyses of "perceived consumer effectiveness (PCE)". Effectiveness here can be used to measure an action that causes certain buying behavior based on ones' beliefs (Thilmany et al., 2008). For example, an ecology study on the concerns for the environment found that 33 percent of the variation in the consumers' behavior were explained by the variability in consumers' PCE (Roberts, 1996).

4.2 The Lancaster Model

Lancaster initiated the process of mapping space attributes into a set of activities and then from activities into characteristics in the space of utility (Lancaster, 1966). A few years later, Lancaster re-visited the concept and came up with how consumers derive utility from products directly through the goods' attributes or qualities (Hendler, 1975). He assumed that two different goods (any two different goods) containing different characteristic ratios could be mixed to yield the same characteristics ratios as a third good per unit of consumption. Parallel to this theory, the consumers' decision to buy fresher greens and enjoy recreation at the same time may choose to visit local direct market outlets.

4.3 Willingness-to-Pay (WTP)

With the current multifaceted environment, there are no dominant factors that map out buying behaviors. Consumers' demand toward products can no longer be determined by immediate factors such as price or income. Purchasing trends are additionally observed by consumer preferences and perceptions which can be

influenced by social pressure, sales technique or advertising. For example, consumer's preference to shop indoors like a supermarket or outdoors like a local-grown produce may be illustrated by the random utility models of consumer choice (McFadden, 1973; Rao, 1991). A choice of visiting site can be described by two vectors of (perceived) attributes: indoor shoppers X_J and outdoors shoppers Z_J. Rational consumers will optimize each vector over goods Y and J sources. Similar to past consumer models, we can look at shopping site preferences or the available produce on-site. Consumers may choose upon a direct source like farmers market, denoted d, or an indirect source like supermarkets, denoted nd, when they shop. Subject to other variables such as income, I, and socio-demographic characteristics, S, a consumer will choose a direct source (farmers' market) as long as

$$V(P_d, X_d, Z_d, I, S) \geq V(P_{nd}, X_{nd}, Z_{nd}, I, S)) \qquad (4.1)$$

Where V(.) is the consumer's indirect utility function uniquely evaluated at each source of fresh produce.

In connection to the willingness to pay concept, the WTP for shopping through a direct source like a farmers market can be implied with $V(\bar{P}, \bar{X}, Z_0, I, S) = V(\bar{P}, \bar{X}, Z_1, I\text{-WTP}, S)$. The subscript for Z represents the absence (Z_0) or presence (Z_1) for shopping at a direct outlet. Here the WTP value is actually a function of preferences over both the goods and the outlet source given this specification. People who actually shop at a certain outlet are affected by the perceived effectiveness of factors such as lower transaction costs (or less uncertainty) related to information on the locality and production practices of food marketed at such stores (Thilmany et al., 2008).

Site *indoor* refers to shoppers that prefer grocery stores and site outdoor refers to those who prefer locally produced fresh greens. Suppose we have a fix market size of *M*, composed of indoor and outdoor shoppers. Indoor shoppers are price shoppers with no intention of pursuing healthier options or other farm activity constitutes a fraction q of the market, where $0 \leq q \leq 1$. Outdoors shoppers correspond to the remaining (1-q) of the market.

Consumers of the indoor segment will choose where to shop based on

$$P_i < p_j \rightarrow \text{choose shopping site i, i=1,2, j=3-i} , \qquad (4.2)$$

(known as convenience shoppers). Outdoor shoppers will choose greens based both on price and other preferences where it is referred to δ_k relative to each of the two indoor shopping sites. The choice rule for outdoor shopping consumers is then:

$$P2 \leq P1 + \delta\_k \rightarrow \text{choose indoor shopping site} \qquad (4.3)$$

$$P2 > P1 + \delta\_k \rightarrow \text{choose outdoor shopping site} \qquad (4.4)$$

δ_k can then be referred to as the price premium that is built up by the outdoor shopping site where indoor shoppers are unwilling to pay.

The four different types of direct markets studied in this research can be analyzed in terms of how much consumers are willing to pay in response to different factors such as advertising, the variety of products being sold, socio-economic attributes and more. Looking at the matter as a consumer choice problem, the model can be conceptually constructed with survey-responses to estimate the likelihood of paying for the shopping sites that hold different values as opposed to convenient indoor shopping.

Chapter 5

Methods and Procedures

5.1 Survey Distribution

Reported by the 2007 USDA data, the abundant farmlands in the Mid-Atlantic region were 63,163 in Pennsylvania, 10,327 in New Jersey and 2,546 in Delaware (USDA). Working with large areas of farmlands compliments the applications of this study. Furthermore, all these states enjoys some type of state agricultural marketing program such as *Grown Fresh with Care*[5] in Delaware, *Jersey Fresh* in New Jersey and *PA Preferred*[6] in Pennsylvania ((Delaware Department of Agriculture; Govindasamy et al., 2004; Pennsylvania Department of Agriculture, 2011)). According to the population of selected states from the Mid-Atlantic region, 309 participants were from Delaware, 952 from New Jersey and 1384 from Pennsylvania; out of these 1134 met the screener criteria and completed the questionnaire. The distribution of survey respondents is illustrated in Figure 5.1.

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[5] Launched in 2007, *Grown Fresh with Care*, provides advertising, marketing and promotional services, namely development of advertising campaigns for food and agricultural producers, products and services

[6] Introduced in 2004, *PA Preferred*, is used to market for fresh, unprocessed food products, nursery and other various agricultural items

Figure 5.1 Distribution of Survey Participants
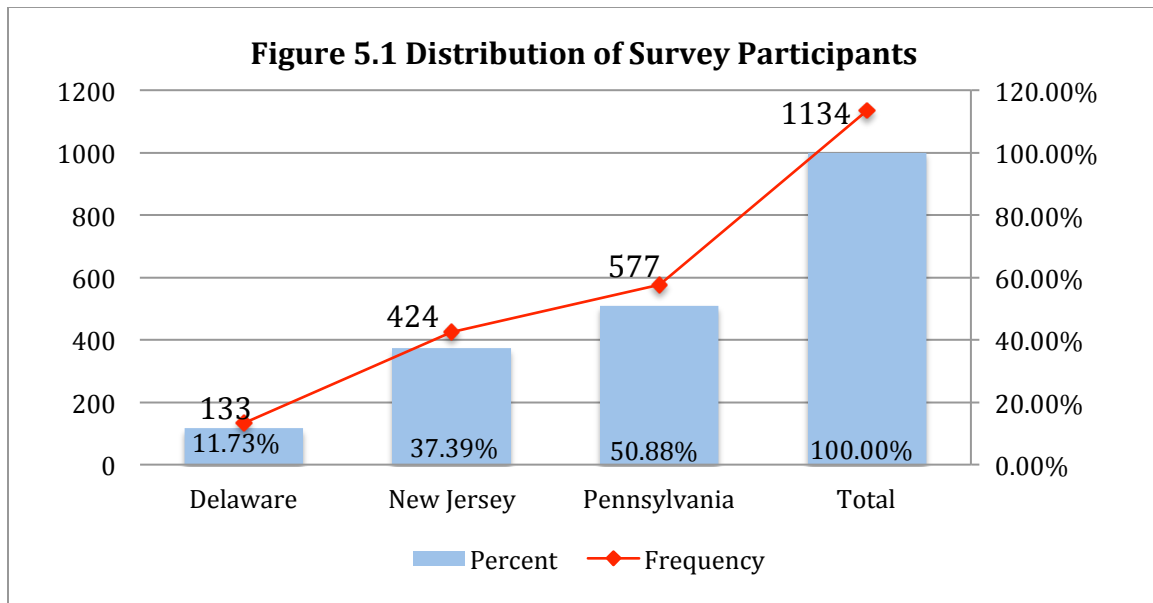
5.2 Survey Components

The complete questionnaire used in this research can be found in Appendix B. All 1134 participants were pre-screened and identity checked from 2594 selected candidates for: age 18 and older, primary food shopper of household and had attended agritourism and direct marketing events or activities in the past. The questionnaire points toward direct-marketing attributes that identifies the type of produce bought, visits per month, dollars spent and all necessary demographic information.

Throughout the survey, the specific terms of farmer's market, community supported agriculture; on-farm market and agritourism are defined to make sure participants have the same knowledge prior to contributing to the research. Most questions in the survey are categorical choices with a few open-ended questions for them to fill in dollar amounts. Demographic questions include socio-economic

attributes of age, gender, 2009 annual gross household income, household size, education level, ethnicity and current employment status.

5.3 Survey Piloting

The 1134 eligible audience from the survey were selected from a group of 2594 participants in Delaware, New Jersey and Pennsylvania via Internet from June 21st to 29th, 2010. Using SurveyMonkey.com (Palo Alto, CA), the on-line tool was pre-tested on 93 consumers to refine and clarify each proposed question prior to the final deployment of the survey. The survey was developed by researchers and was approved by the Office of Research and Sponsored Programs at Rutgers University and the Office of Research Protections at Pennsylvania State University. Candidates were chosen randomly by Survey Sampling International, LLC (Shelton, CT). Panelists were also compensated. The standard compensation for these panelists was the Survey Sampling International, LLC's quarterly $25,000 sweepstakes and an instant win game play.

5.4 Estimation Technique

Two of the estimation techniques of qualitative choice models designed for nonlinear regression models for binary dependent variables have been selected for this paper. The models were developed to identify shopping trends at each of the four studied direct market outlets, demographic characteristics of frequent shoppers and the behavioral patterns of willingness-to-pay. All binary variables were constructed in a way that corresponds to a one being "yes" and zero being "no". Unlike linear probability models, the values of conditional probabilities for Probit and Logit models are always between 0 and 1. Both Probit and Logit models

are used in this study to adopt the nonlinear formulation that yields probability values to be between 0 and 1. Probit and Logit models are similar except for the cumulative distribution function.

A linear probability model is one type of multiple regression model used when the dependent variable is binary. Given that the dependent variable is always either 1 or 0 (based on answering "yes" or "no" on the questionnaire), the OLS estimates the change in the probability of a "yes" or "no" answer associated with a change in the explanatory variable. When the dependent variable is binary, its conditional expectation is the conditional probability that it equals 1, so the expected change in Y arising from a change in X is the change in the probability that Y=1. Working with a cumulative standard normal distribution, the coefficients do not have simple interpretations.

The models that were constructed for the probability of visiting a direct market have been employed with Logit model where the probability is determined by:

$$\Pr(Y = 1 | X_1, X_2, \ldots, X_K) = F(B_0 + B_1 X_1 + B_2 X_2 + \cdots + B_k X_k) = \frac{1}{[1 + e^{-Z_t}]} \qquad (5.1)$$

where:

Pr = the probability that an individual will visit a direct marketing facility or not given the knowledge of demographic characteristics of individuals $B_k X_k$,

F(...) = the value of the cumulative logistic function associated with each possible value of the underlying index ,

e = the base of natural logarithms,

Z_t = the underlying index number or $B_k X_k$; and,

B_0 = the intercept

The Logit model uses maximum likelihood estimate where it aligns with the large-sample properties of consistency and asymptotic normality of the parameter estimates.

An Ordered Probit econometric technique has been employed to analyze the determinants of willingness-to-pay factors. Using an Ordered Probit model remedies the shortcomings of heteroscedasticity that appears in OLS models allowing the estimation to be more efficient (Greene and Hensher, 2009).The willingness to buy at a direct market outlet is used as a categorical variable in the model. The three different levels of willingness-to-pay categories will be defined as $WTP_i = 0$ for willing to pay a low premium, $WTP_i = 1$ for willing to pay a medium premium and $WTP_i = 2$ for willing to pay a high premium. All WTP variables have been transformed into a 0 to 2 discrete scale for computational purposes. The Ordered Probit model will be estimated using equation (5.2) where the willingness to pay a premium for freshly grown greens is based on product attributes, source characteristics and socio-economic attributes.

$$WTP_i^* = \beta' x_i + \varepsilon_i, i = 1, \ldots, n, \tag{5.2}$$

Here the WTP_i^* is observed in discrete through a censoring mechanism;

$$WTP_i = 0 \ if \ \mu_{-1} < WTP_i^* \leq \mu_0 \, ,$$

$$= 1 \ if \ \mu_0 < WTP_i^* \leq \mu_1 \, ,$$

$$= 2 \ if \ \mu_1 < WTP_i^* \leq \mu_2 \, ,$$

$$= \cdots,$$

$$= J \ if \ \mu_{J-1} < WTP_i^* \leq \mu_j. \tag{5.3}$$

Because the coefficients in the Ordered Probit models cannot be interpreted easily, the marginal effects will need to be further calculated for analysis (Greene and Hensher, 2009). The estimation of the marginal effects in the model is based on the implied probabilities,

$$\Pr[WTP_i = j|x_i] = F(\mu_j - \beta'x_i)] - [F(\mu_{j-1} - \beta'x_i)] > 0, j = 0,1,\dots,J. \qquad (5.4)$$

The probabilities for an ordered model with three outcomes will be calculated as,

$$\Pr[WTP_i = 0|x_i] = F(0 - \beta'x_i) - F(-\infty - \beta'x_i) = F(-\beta'x_i) \qquad (5.5)$$

$$\Pr[WTP_i = 1|x_i] = F(-\beta'x_i) - F(\mu_1 - \beta'x_i) \qquad (5.6)$$

$$\Pr[WTP_i = 2|x_i] = F(-\infty - \beta'x_i) - F(\mu_1 - \beta'x_i) = 1 - F(\mu_1 - \beta'x_i) \qquad (5.7)$$

Both the Logit and Ordered Probit models have been estimated using the LIMDEP econometric software. The marginal effects have been interpreted as a change in the probability of a dependent variable given the level per unit change in the independent variable conditional on other covariates.

Chapter 6

Descriptive Data Results

6.1 Observed Shopping Behaviors

The number of farm operations in the mid-Atlantic region is abundant for a complete study. The survey of this research focused on the popularity study of four main direct market outlets: Pick-Your-Own (PYO), Community Farmers' Markets (CFM), Community Supported Agriculture (CSA) farms, and On-Farm Markets (OFM). The distribution of respondents based on each outlet is captured in Table 6.1.

As shown, the numbers highly correlates to the number of the farms combined in each study states.

Table 6.1 Distributions of Respondents by Marketing Outlets per State

Direct Market Outlets	State						Total	
	Delaware		New Jersey		Pennsylvania			
	N	%	N	%	N	%	N	%
Pick-Your-Own	71	53.38	225	53.07	259	44.89	555	48.94
Community Farmers' Market	110	82.71	340	80.19	491	85.10	941	82.98
Community Supported Agriculture (CSA) Farm	9	6.77	49	11.56	51	8.84	109	9.61
On-Farm Market	77	57.89	241	56.84	309	53.55	627	55.29
All	133	-	424	-	577	-	1134	-

Note: N=Frequency, %= Percent. Total percentage will exceed 100 because respondents can select more than one answer.

According to the 2008 ARMS (Agricultural Resource Management Survey), farmers selling local food at farmers' markets traveled an average 30.7 miles, driving to the nearest town of 10,000 residents to their destination, which suggests that small towns may not generate enough consumer demand to support farmers' markets (Low and Vogel, 2011). Due to location conveniences, CFM and OFM markets are usually more practical to visit compared to CSA or PYO sites where larger operational lands are needed. Table 6.1 clearly highlights the popularity of Community Farmers' Market, 80 percent throughout the region over Community Supported Agriculture farm. CSA farms are typically more time consuming and involve more procedures before fresh produce can be obtained. PYO sites and OFM are very harmonious in numbers partly because many facilities contain both outlets at one location. Shoppers who first attend PYO activities may often go to the on-farm market retail area for more supplies. Figure 6.1 shows the number of visits per year to each marketing outlet. Congruent with the survey data, community farmers' market remains the most frequently visited facility.

Figure 6.1 Average Number of Visit per Year to the Four Types of Direct Market Outlets

	Delaware	New Jersey	Pennsylvania	All
PYO	1.74	2.2	1.82	1.97
Community farmers' Market	8.03	6.48	7.37	7.12
On-farm Market	3.84	4.6	3.87	4.14
CSA	0.36	0.9	0.79	0.78
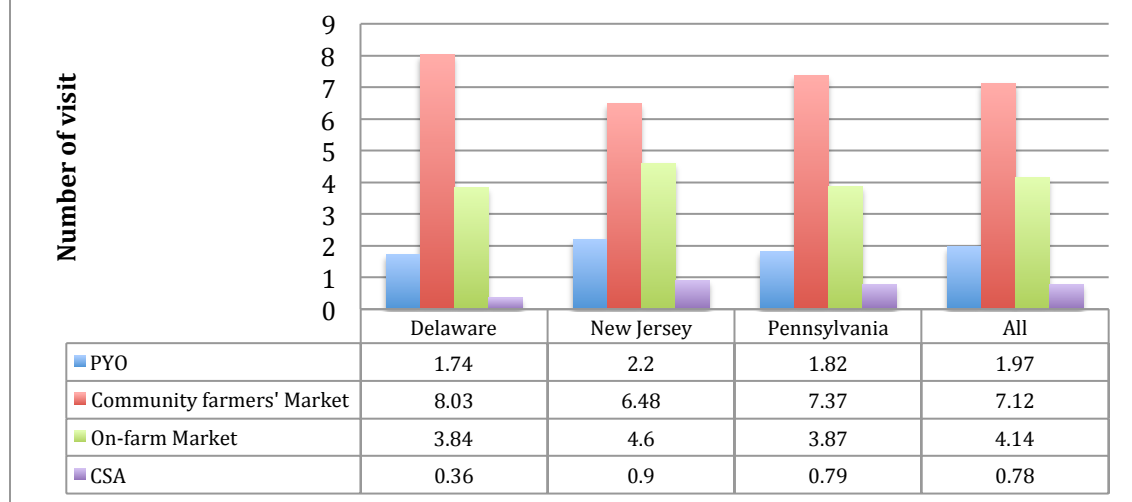
The change of consumptions in purchasing fresh fruits and vegetables is an important determinant for the growth of direct farm outlets. Table 6.2 provides the collected change of fresh produce consumption since 2005. Constructively, the consumptions in both fresh fruits and vegetables had a significant increase: fresh fruits 74 percent and fresh vegetables 68 percent. Very few people have decreased their fresh fruits and vegetables consumption; less than 2 percent. As observed from the survey study, the consumption of fresh greens has had an increasing trend, which points to the opportunity of market growth.

Table 6.2 Changes in Consumption of Fresh Fruits and Vegetables Since 2005

	Consumption	State						All	
		Delaware		New Jersey		Pennsylvania			
		N	%	N	%	N	%	N	%
Fresh Fruits	Increased	98	74.24	294	70.84	426	75.67	818	73.69
	Stayed the same	31	23.48	113	27.23	129	22.91	273	24.59
	Decreased	3	2.27	8	1.93	8	1.42	19	1.71
	Total	132	100	415	100	563	100	1110	100
Fresh Vegetables	Increased	87	65.91	277	66.75	395	70.16	759	68.38
	Stayed the same	41	31.06	129	31.08	159	28.24	329	29.64
	Decreased	4	3.03	9	2.17	9	1.60	22	1.98
	Total	132	100	415	100	563	100	1110	100

Note: N=Frequency, %= Percent.

One of the survey questions looks into whether respondents have expanded the variety of fresh fruits and vegetables they have consumed since 2005. The majority of participant's households have incorporated more varieties of fresh produce in their diet. Table 6.3 further shows that the consumption needs are similar for both fruits and vegetables; 85 percent for fruits and 83 percent for vegetables.

Table 6.3 Changes in Wider Variety Consumption of Fresh Fruits and Vegetables Since 2005

	Wider Variety Consumption	State						All	
		Delaware		New Jersey		Pennsylvania			
		N	%	N	%	N	%	N	%
Fruits	Yes	107	81.06	364	86.46	484	84.17	955	84.66
	No	25	18.94	57	13.54	91	15.83	173	15.34
	Total	132	100	421	100	575	100	1128	100
Vegetables	Yes	104	78.79	348	82.66	479	83.30	931	82.54
	No	28	21.21	73	17.34	96	16.70	197	17.46
	Total	132	100	421	100	575	100	1128	100

Note: N=Frequency, %= Percent.

In terms of where respondents shop for fresh fruits and vegetables, the survey indicated that supermarkets and grocery stores are still the primary sources of shopping outlet. On average about 32 percent of the surveyed candidates bought their fresh produce from supermarkets. The second most utilized source is the community farmers' markets which 18 percent of the respondents depend upon for fruits and vegetables. Other than the popular shopping sites, consumers also buys from on-farm markets (9%), independent grocery stores (8%), PYO farms (7%) and roadside stands (6%). The distribution of outlets in the mid-Atlantic region is shown in Table 6.4[7].

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[7] The question states that the total percentage should equal 100%.

Table 6.4 Percentage Distribution of Fresh Fruits/Vegetables Purchased from Outlets

Outlets	State			TOTAL
---	Delaware	New Jersey	Pennsylvania	
	Average %	Average %	Average %	Average %
Pick-your-own farm	5.61%	7.79%	6.34%	6.79%
Community farmers' market	19.19%	16.65%	19.24%	18.28%
On-farm market	10.40%	8.99%	8.91%	9.12%
Roadside stand	6.62%	5.64%	6.49%	6.19%
Community Supported Agriculture (CSA)	1.25%	2.66%	1.98%	2.14%
Supermarket/grocery store (for example: Shop Rite, Giant Food)	31.52%	37.27%	28.53%	32.10%
Independent grocery store	9.08%	3.98%	11.44%	8.42%
Specialty food store (for example: Whole Foods, Trader Joe's)	1.08%	4.69%	2.36%	3.07%
Discounters (for example: Aldi, Big Lots, Dollar General)	1.35%	1.76%	3.24%	2.47%
Warehouse Club (for example: BJ's, SAM's Club, Costco)	5.09%	4.75%	3.28%	4.03%
Natural food store	0.86%	0.99%	0.71%	0.83%
Convenience store/gas station	0.34%	0.25%	0.25%	0.26%
Internet, catalog, or mail-order service	0.24%	0.26%	0.23%	0.24%
Friend/neighbor's garden	1.86%	0.88%	1.34%	1.23%
Own garden	4.86%	2.77%	4.79%	4.06%
Other source	0.64%	0.68%	0.87%	0.77%
Total	100.00%	100.00%	100.00%	100.00%

Note: N=Frequency, %= Percent.

Table 6.5 entails respondents' plans on visiting a variety of direct market outlets in 2010. This projects on whether there will be any repeat-goers based on their primary experience at an outlet. Looking at the PYO observed statistics, more than half of the respondents have already been or will go, but there is still about 40 percent of the surveyed population that are unsure or will not go. OFM and roadside stands share very similar statistics as PYO when asked about participants' experiences for the outlet. For the CFM outlets, most people are making plans or have already been there with only about 14 percent of no interest or unsure respondents.

The statistics for smaller or less common direct market outlets are also collected such as CSA or others. CSA outlets do not portray a confident potential

customer base. Only about 5 percent of the respondents had been to a CSA site with the majority either declining to visit or unsure of their plans.

Table 6.5 Respondents' Plans to Visit Direct Marketing Outlets in 2010

Plans to visit Direct Market Outlets		State						All	
		Delaware		New Jersey		Pennsylvania			
		N	%	N	%	N	%	N	%
PYO	I have already visited	33	27.27	86	23.43	125	24.56	244	24.47
	Yes, I will visit	43	35.54	142	38.69	160	31.43	345	34.60
	No, I will not visit	25	20.66	51	13.90	110	21.61	186	18.66
	Unsure	20	16.53	88	23.98	114	22.40	222	22.27
	Total	121	100	367	100	509	100	997	100
CFM	I have already visited	66	54.55	172	46.87	241	47.35	479	48.04
	Yes, I will visit	37	30.58	129	35.15	208	40.86	374	37.51
	No, I will not visit	10	8.26	24	6.54	25	4.91	59	5.92
	Unsure	8	6.61	42	11.44	35	6.88	85	8.53
	Total	121	100	367	100	509	100	997	100
OFM	I have already visited	37	30.58	116	31.61	139	27.31	292	29.29
	Yes, I will visit	44	36.36	143	38.96	224	44.01	411	41.22
	No, I will not visit	22	18.18	38	10.35	53	10.41	113	11.33
	Unsure	18	14.88	70	19.07	93	18.27	181	18.15
	Total	121	100	367	100	509	100	997	100
Roadside	I have already visited	15	25.86	45	25.40	51	20.99	111	23.22
	Yes, I will visit	28	48.28	72	40.68	114	46.91	241	44.77
	No, I will not visit	5	8.62	21	11.86	22	9.05	48	10.04
	Unsure	10	17.24	39	22.03	56	23.05	105	21.94
	Total	58	100	177	100	243	100	478	100
CSA	I have already visited	-	-	12	6.78	12	4.94	24	5.02
	Yes, I will visit	9	15.52	22	12.43	35	14.40	66	13.81
	No, I will not visit	31	53.45	80	45.20	110	45.27	221	46.23
	Unsure	18	31.03	63	35.59	86	35.39	167	34.94
	Total	58	100	177	100	243	100	478	100
Other	I have already visited	4	6.90	12	6.78	9	3.70	25	5.23
	Yes, I will visit	1	1.72	11	6.21	15	6.17	27	5.65
	No, I will not visit	32	55.17	67	37.85	108	44.44	207	43.31
	Unsure	21	36.21	87	49.15	111	45.68	219	45.82
	Total	58	100	177	100	243	100	478	100

Respondents doing the survey have various ways of how they are channeled with the direct market outlets. Table 6.6 shows the figures of the distribution percentage of the information sources when patrons were asked how they first learned about a direct outlet. The most effective way to reach new shoppers is via

word-of-mouth (66.67%) followed by entrances' signs (44.97%), newspaper (39.15%) and billboards or roadside signs (34.48%). Perhaps with the specific demographic population shopping at direct markets, none of the internet-based sources were effective in reaching out to new consumers such as websites, emails, blogs or social networking.

Table 6.6 First Time Source of Direct Market Information

Sources of Information	State						TOTAL	
	Delaware		New Jersey		Pennsylvania			
	N	%	N	%	N	%	N	%
Billboard or Roadside sign	57	42.86	138	32.55	196	33.97	391	**34.48**
Sign at the market's entrance	69	51.88	190	44.81	251	43.50	510	**44.97**
Newspaper	58	43.61	168	39.62	218	37.78	444	**39.15**
Magazine	3	2.26	25	5.90	27	4.68	55	4.85
Friends/family/word-of-mouth	96	72.18	265	62.50	395	68.46	756	**66.67**
Television	7	5.26	19	4.48	33	5.72	59	5.20
School activity at the direct market outlet	8	6.02	29	6.84	39	6.76	76	6.70
Radio	10	7.52	17	4.01	47	8.15	74	6.53
Farm advertisement (sent through the mail to the home)	15	11.28	51	12.03	55	9.53	121	10.67
Promotional flyer	13	9.77	52	12.26	53	9.19	118	10.41
Agritourism map with direct markets listed	4	3.01	15	3.54	25	4.33	44	3.88
Tourism guide book	8	6.02	12	2.83	19	3.29	39	3.44
WIC program	3	2.26	11	2.59	35	6.07	49	4.32
Website	13	9.77	44	10.38	39	6.76	96	8.47
Email	8	6.02	29	6.84	18	3.12	55	4.85
Blogs	1	0.75	12	2.83	5	0.87	18	1.59
Social networking sites (for example: Facebook, Twitter)	4	3.01	16	3.77	17	2.95	37	3.26
All	133	100	424	100	577	100	1134	100

Note: N=Frequency, %= Percent.

The average amount of expenditure at a certain direct marketing facility is also investigated per respondant. The average family size is close to about three people per family. Figure 6.2 captures the dollars spent broken into different states. Consumers spend the most at community farmers' markets with an average of

$21.18 per visit and the least is spent on CSA farms, with an average of only $4.84 during each visit.

Figure 6.2 Average Expenditure per Visit and Family Size

	Delaware	New Jersey	Pennsylvania	Average
■ PYO Farm	$14.89	$15.45	$11.79	$13.51
■ CFM Farm	$21.77	$20.38	$21.61	$21.18
■ On-farm Market	$15.95	$19.53	$16.18	$17.38
■ CSA Farm	$2.75	$6.14	$4.44	$4.84
■ Family Size	2.98	2.97	2.81	2.89
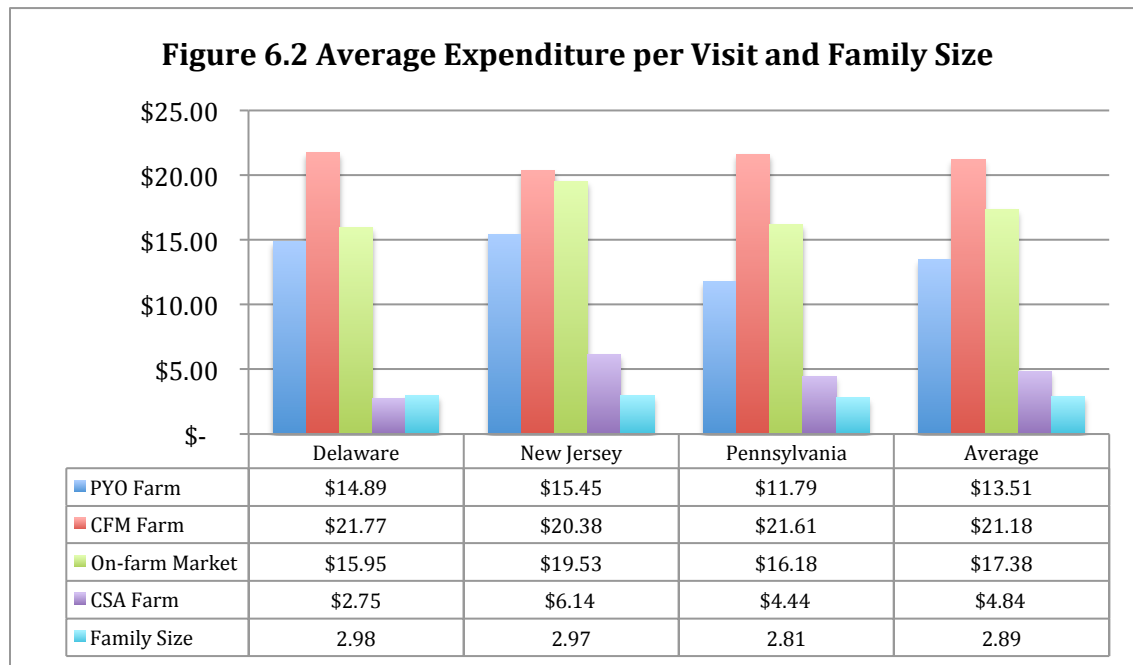
Respondents shop at direct outlet markets for various reasons. Common reasons to shop at direct market outlets are quality, nutrition, preserving farmland and helping local producers. Looking at Table 6.7, we can see that quality is a very important attributes for the fresh greens represented by 88 percent of the surveyed population. On the other hand, the other two attributes (variety and price) were not as clear as quality. Only about half of the total thinks that direct markets carry more variety with better prices.

Table 6.7 Respondents' Opinions Among Direct Market Outlets

Produce Attributes (N= Frequency, %= percent)		State						ALL	
		Delaware		New Jersey		Pennsylvania			
		N	%	N	%	N	%	N	%
Quality	Better	110	88	350	88.16	492	90.94	952	89.56
	Same	15	12	44	11.08	47	8.69	106	9.97
	Worse	-	-	3	0.76	2	0.37	5	0.47
	Total	125	100	397	100	541	100	1063	100

Variety	Better	69	55.20	226	56.93	327	60.44	622	58.51
	Same	44	35.20	131	33	150	27.73	325	30.57
	Worse	12	9.60	40	10.08	64	11.83	116	10.91
	Total	125	100	397	100	541	100	1063	100
Price	Better	80	64	211	53.15	360	66.54	651	61.24
	Same	22	17.60	110	27.71	129	23.84	261	24.55
	Worse	23	18.40	76	19.14	52	9.61	151	14.21
	Total	125	100	397	100	541	100	1063	100

Recalling from the price attribute in Table 6.7, only a little over half of respondents are happier with the prices of goods sold at the direct markets. Figure 6.3 draws out the willingness-to-pay aspect of the survey. On average, there are more consumers who are willing to pay more (63.63%) as opposed to those who wouldn't (36.37%). The extent of how much each respondent who answered yes to this question is detailed in Table 6.8.

Figure 6.3 Willingness-to-pay for Products at Direct Market Outlets
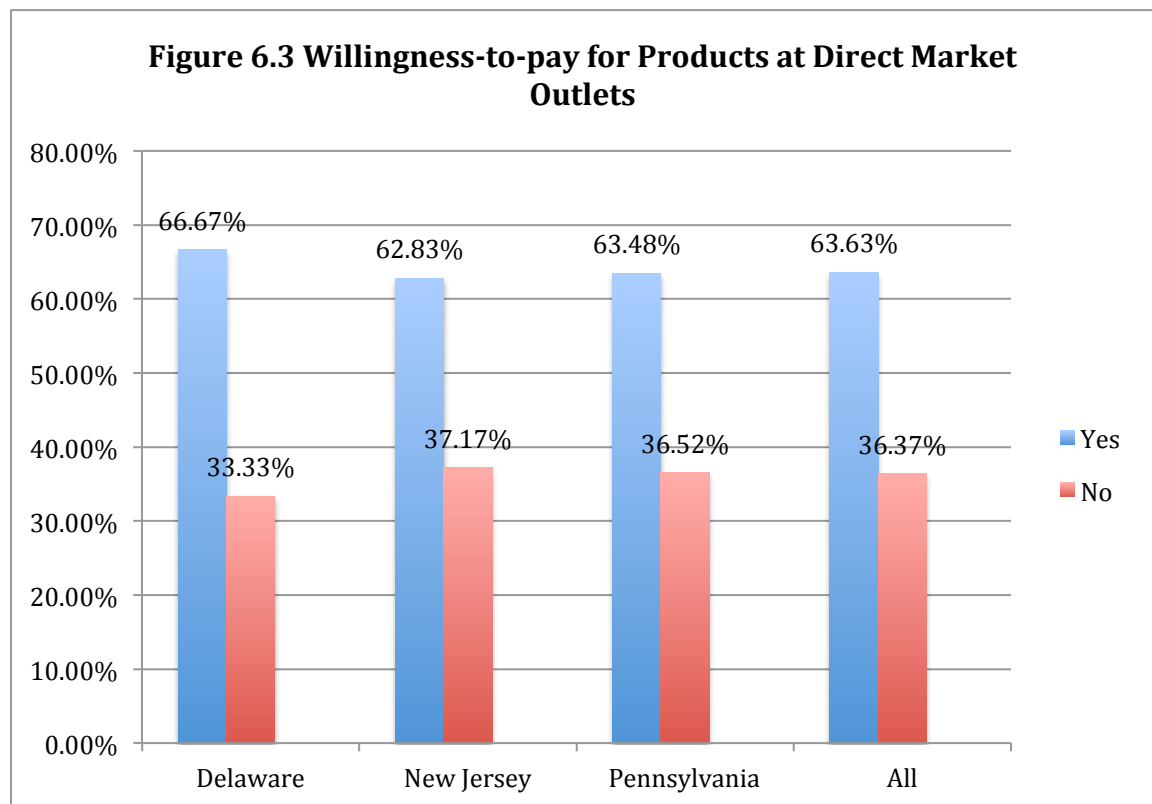
About 41 percent of the candidates are willing to pay about 6 percent to 10 percent more than supermarkets or conventional grocery stores on the fresh greens that they buy at the direct market outlets and about 28 percent are willing to pay 1 to 5 percent more. Around 14 percent of the surveyed consumers are willing to pay 11 to 15 percent more, and 8 percent are willing to pay 16 to 20 percent more. There are very few people who are willing to pay more than 26 percent.

Table 6.8 Percentage Distribution of Willingness-to-pay Based on Different Price Percentage Increase of Fresh Fruits and Vegetables

| Willingness to Pay (%) | State | | | | | | TOTAL | |
| | Delaware | | New Jersey | | Pennsylvania | | | |
	N	%	N	%	N	%	N	%
1 to 5%	22	26.83	75	31.91	88	26.43	185	28.46
6 to 10%	37	45.12	91	38.72	136	40.84	264	**40.62**
11 to 15%	9	10.98	24	10.21	54	16.22	87	13.38
16 to 20%	8	9.76	18	7.66	30	9.01	56	8.62
21 to 25%	4	4.88	10	4.26	11	3.30	25	3.85
26 to 30%	1	1.22	6	2.55	1	0.30	8	1.23
31 to 35%	-	-	3	1.28	2	0.60	5	0.77
36 to 40%	-	-	2	0.85	3	0.90	5	0.77
41 to 45%	-	-	2	0.85	2	0.60	4	0.62
46 to 50%	-	-	1	0.43	5	1.50	6	0.92
51 to 55%	-	-	-	-	1	0.30	1	0.15
66 to 70%	-	-	1	0.43	-	-	1	0.15
81 to 85%	-	-	-	0.43	-	-	1	0.15
86 to 90%	-	-	1	0.43	-	-	1	0.15
96 to 100%	1	1.22	-	-	-	-	1	0.15
All	82	100	235	100	333	100	650	100

Note: N=Frequency, %= Percent.

Table 6.9 shows respondents willingness to buy specific types of fresh produce: locally grown, certified organic, new and genetically modified. Around 96 percent of the mid-Atlantic shoppers in this survey are willing to buy fresh locally grown fruits and vegetables. In general, a little more than half of the respondents in

the three different states are willing to buy certified organic and new (unfamiliar) fruits and vegetables available at the direct market outlets. Looking at genetically modified products, at least half of the respondents have declined their interest to buy them.

Table 6.9 Willingness-to-buy Specific Products from Direct Market Outlets

Willing to Buy		State						TOTAL	
		Delaware		New Jersey		Pennsylvania			
		N	%	N	%	N	%	N	%
Locally Grown	Yes	118	97.52	347	94.29	503	97.67	968	**96.41**
	No	1	0.83	7	1.90	5	0.97	13	1.29
	Unsure	2	1.65	14	3.80	7	1.36	23	2.29
	Total	121	100	368	100	515	100	1004	100
Certified Organic	Yes	82	67.77	262	71.20	324	62.91	668	**66.53**
	No	20	16.53	47	12.77	68	13.20	135	13.45
	Unsure	19	15.70	59	16.03	123	23.88	201	20.02
	Total	121	100	368	100	515	100	1004	100
New/ Unfamiliar	Yes	84	69.42	252	68.48	343	66.60	679	**67.63**
	No	9	7.44	40	10.87	47	9.13	96	9.56
	Unsure	28	23.14	76	20.65	125	24.27	229	22.81
	Total	121	100	368	100	515	100	1004	100
GMO	Yes	13	10.74	79	21.47	74	14.37	166	16.53
	No	62	51.24	179	48.64	248	48.16	489	**48.71**
	Unsure	46	38.02	110	29.89	193	37.48	349	34.76
	Total	121	100	368	100	515	100	1004	100

Note: N=Frequency, %= Percent.

6.2   Demographics Analysis

This section summarizes the characteristics of respondents of the survey population. As shown in Table 6.10, surprisingly, more than 26 percent of respondents have been living at their current location for more than 21 years. Figure 6.4 shows that the majority of the respondents live in suburban areas (69%). About 20 percent of participants live in rural areas and only 11 percent of the participants live in urban areas.

Also listed in Table 6.10, at least a third of the survey population has a family size of two members followed by family sizes of three and four people. Continuing with the table more than half of the respondents have at least one person of age that is under 17 in their household. It can be seen that the number of households and the number of people under age 17 per household drops as the family size increases.

Table 6.10 also lists the ethnicity of survey respondents. More than half of the respondents are Caucasians with less than 12 percent coming from other race. New Jersey by far shows the most diverse ethnicity as compared to the other two States. Among all the respondents, on average 75 percent are female with proportional distribution across the three States as shown in Figure 6.5.

Table 6.10 Demographic Descriptions of Survey Respondents

Characteristics of Respondents (N= Frequency, %= percent)		State						ALL	
		Delaware		New Jersey		Pennsylvania			
		N	%	N	%	N	%	N	%
Number of years at current residence	<1 year	8	6.61	22	6.01	37	7.23	67	6.71
	1- 3 years	20	16.53	53	14.48	78	15.23	151	15.12
	4-5 years	15	12.40	48	13.11	53	10.35	116	11.61
	6-10 years	30	24.79	69	18.85	97	18.95	196	19.62
	11-20 years	26	21.49	78	21.31	105	20.51	209	20.92
	> 21 years	22	18.18	96	26.23	142	27.73	260	26.03
	Total	121	100	366	100	512	100	999	100
Number of respondent's household size	1	16	13.11	49	13.35	73	14.23	138	13.77
	2	38	31.15	114	31.06	187	36.45	339	33.83
	3	27	22.13	79	21.53	109	21.25	215	21.46
	4	22	18.03	76	20.71	83	16.18	181	18.06
	5	16	13.11	30	8.17	43	8.38	89	8.88
	6	1	0.82	13	3.54	11	2.14	25	2.50
	7	1	0.82	5	1.36	5	0.97	11	1.10
	8	-	-	-	-	1	0.19	1	0.10
	9	1	0.82	1	0.27	1	0.19	3	0.30
	Total	122	100	367	100	513	100	1002	100

		N	%	N	%	N	%	N	%
Number of people under age 17 in respondent's household	1	70	57.85	216	58.70	308	60.39	594	59.46
	2	20	16.53	79	21.47	94	18.43	193	19.32
	3	21	17.36	53	14.40	72	14.12	146	14.61
	4	7	5.79	14	3.80	23	4.51	44	4.40
	5	1	0.83	5	1.36	6	1.18	12	1.20
	6	1	0.83	1	0.27	5	0.98	7	0.70
	7								
	8	1	0.83	-	-	1	0.20	1	0.10
	9	-	-	-	-	1	0.20	1	0.10
	Total								
Ethnicity	White/Anglo	101	85.59	307	84.81	461	91.29	869	88.22
	African American Hispanic or Latino	11	9.32	27	7.46	27	5.35	65	6.60
	American Indian or Alaska Native	1	0.85	9	2.49	7	1.39	17	1.73
	Asian American	1	0.85	17	4.70	7	1.39	25	2.54
	Native Hawaiian or Other Pacific Islander	2	1.69	-	-	-	-	2	0.20
	Total	118	100	362	100	505	100	985	100

Note: N=Frequency, %= Percent.

Figure 6.4 Distributions of Respondents by Location

|	Rural	Suburban	Urban
Pennsylvania	26.95%	60.16%	12.89%
New Jersey	10.30%	80.49%	9.21%
Delaware	23.77%	68.03%	8.20%
All	20.44%	68.59%	10.97%

Figure 6.5 Survey Respondent's Gender
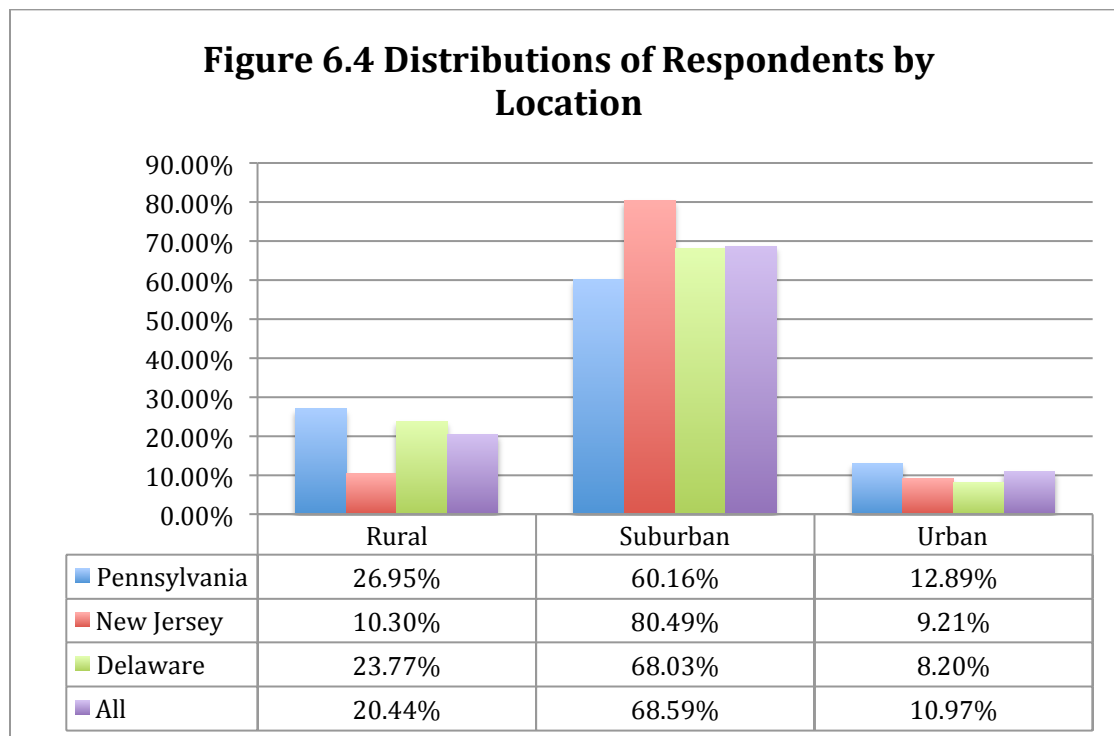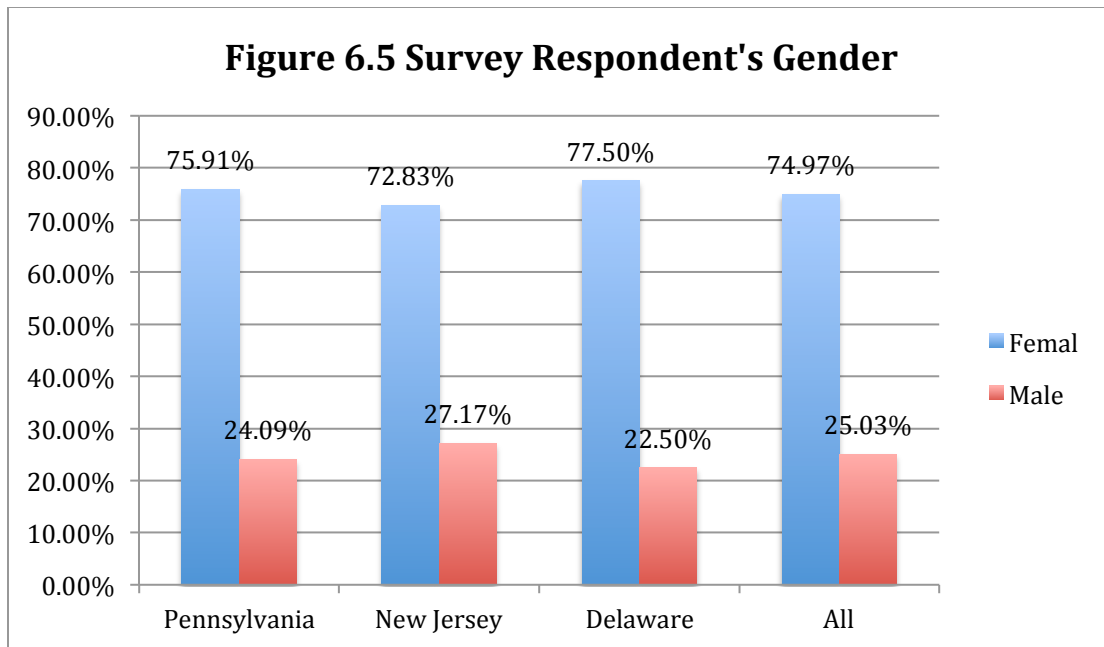
Table 6.11 lists all other important variables of age, education, employment status and income. These demographic variables are crucial determinants of the potential market target. Looking at Table 6.11, most respondents are from the 21-35, 36-50 and 51-65 age brackets. Of the respondents, the majority has at least their high school diploma. On average, most consumers are well acquainted with some level of education. In addition, more than half of the survey population are employed by others meaning that time is crucially considered when stocking up fresh greens. About 17 percent of the studied candidates are homemakers, 14 percent retired and the rest are in other categories. Income wise, most respondents were in the middle to high levels exceeding $20,000 per year. Looking at the statistic numbers, each income bracket was close to even distribution with the exception of those earning less than $20,000 annually in year 2009.

**Table 6.11 Demographic Attributes of Survey Respondents**

Characteristics of Respondents (N= Frequency, %= percent)	State						ALL	
	Delaware		New Jersey		Pennsylvania			
	N	%	N	%	N	%	N	%
Age (years old) 18-20	1	0.82	7	1.92	16	3.14	24	2.41
21-35	41	33.61	116	31.78	135	26.52	292	29.32
36-50	29	23.77	111	30.41	149	29.27	289	29.02
51-65	43	35.25	101	27.67	174	34.18	318	31.93
>65	8	6.56	30	8.22	35	6.88	73	7.33
Total	122	100	365	100	509	100	996	100
Education No formal education	-	-	1	0.27	3	0.59	4	0.40
Elementary	-	-	-	-	3	0.59	3	0.30
High school	32	26.23	85	23.10	164	32.03	281	28.04
2 year college	40	32.79	83	22.55	145	28.32	268	26.75
4 year college	30	24.59	123	33.42	136	26.56	289	28.84
Graduate	20	16.39	76	20.65	61	11.91	157	15.67
Total	122	100	368	100	512	100	1002	100
Employment Retired	22	18.18	41	11.52	71	14.29	134	13.76
Self-employed	9	7.44	24	6.74	41	8.25	74	7.60
Employed by others	56	46.28	185	51.97	260	52.31	501	51.44
Homemaker	21	17.36	67	18.82	74	14.89	162	16.63
Student	8	6.61	21	5.90	34	6.84	63	6.47
Unemployed	4	3.31	11	3.09	10	2.01	25	2.57
Other	1	0.83	7	1.97	7	1.41	15	1.54
Total	121	100	356	100	497	100	974	100
Income < $20,000	6	4.92	23	6.30	56	10.94	85	8.51
$20,000-39,999	33	27.05	53	14.52	104	20.31	190	19.02
$40,000-59,999	19	15.57	69	18.90	130	2539	218	21.82
$60,000-79,999	24	19.67	58	15.89	105	20.51	187	18.72
$80,000-99,999	17	13.93	57	15.62	59	11.52	133	13.31
>$100,000	23	18.85	105	28.77	58	11.33	186	18.62
Total	122	100	365	100	512	100	999	100

Note: N=Frequency, %= Percent.

The survey also looks into the willingness-to-pay tied to the public dimension such as supporting local farmers or land/environment preservation. Leading on to that, a little more than half of the respondents have gardens where they grow their own fresh produce intake as shown in Figure 6.6. Another look into those who believe that agriculture business will help maintain the greenery and

open space in their respective states is shown in Figure 6.7. As one can see, most people support local businesses.

Although rationally most people have positive attitudes towards land preservation or supporting local business; actual behaviors may not reflect the same. Looking at the willingness-to-pay observation in Figure 6.8, only about 67 percent of the respondents are willing to pay higher prices in supporting either the local farmers or farmland preservation.

Figure 6.6 Respondents with Garden at Home
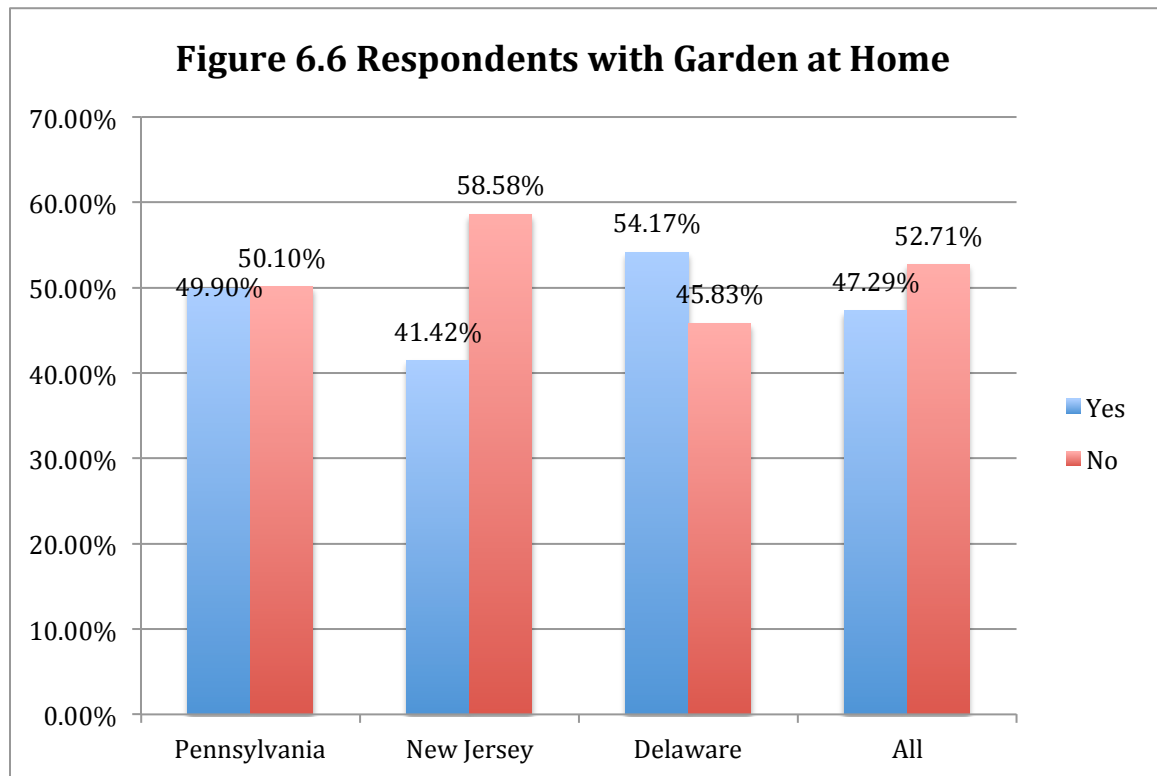
Figure 6.7 Respondents' Attitudse Toward Maintaining Open Space and Greenery Support
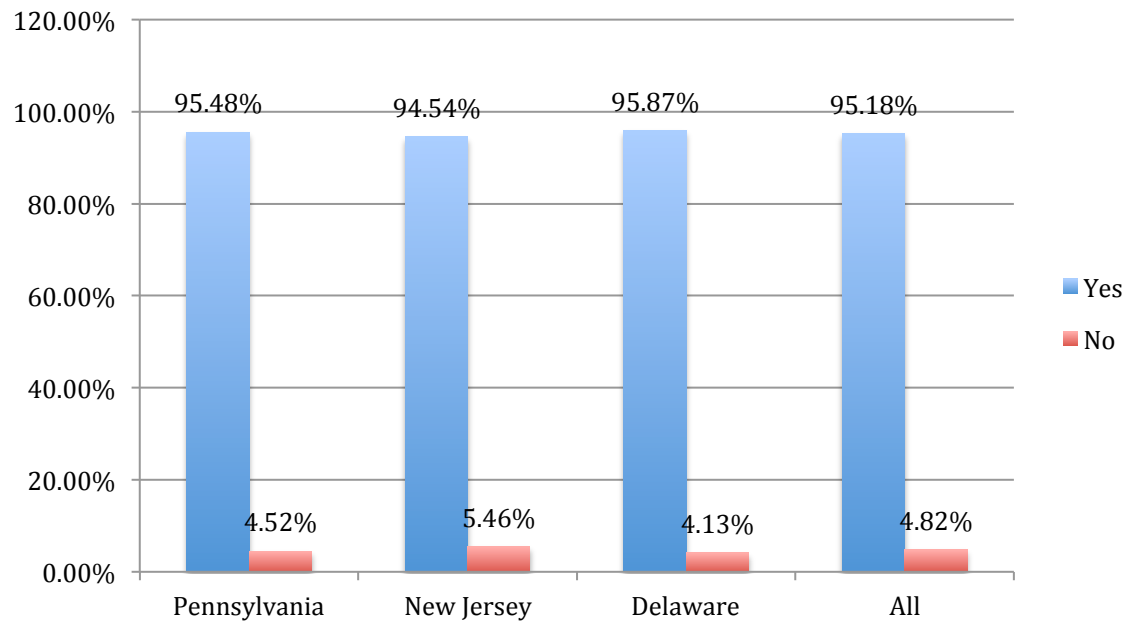
Figure 6.8 Willingness-to-pay for Farmland Preservation and Local Farmer Support
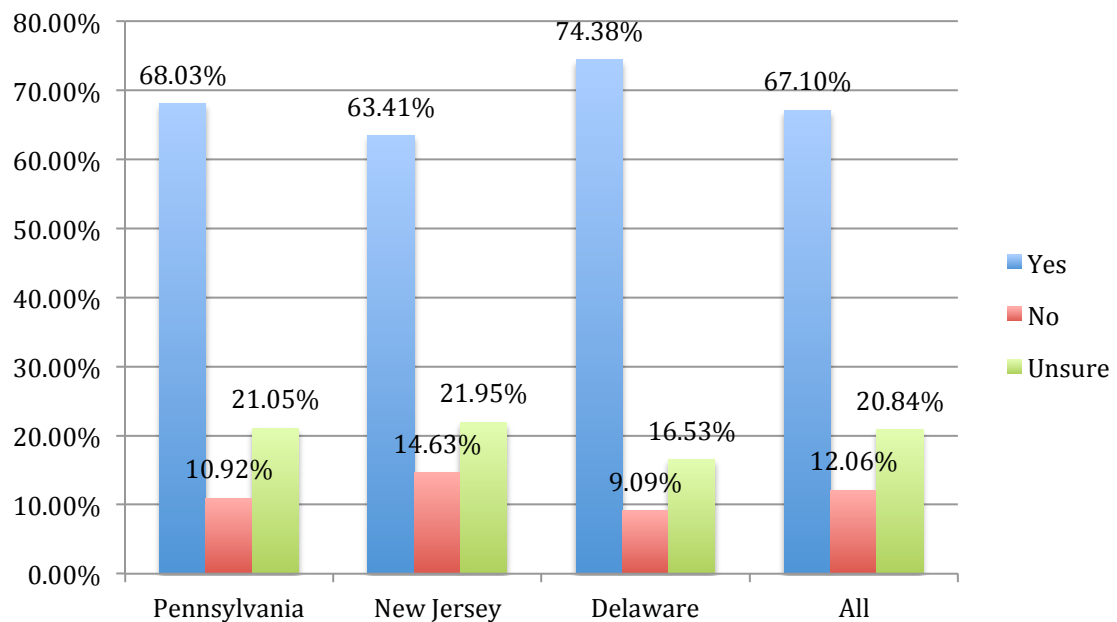
Chapter 7

Methods and Results

7.1   Logit Analyses of Consumer Data

It has been shown in a variety of consumer surveys that consumer-farmer interactions and consumers' desires to support local producers are as important as the quality of the commodity (Low and Vogel, 2011). Four Logit models are constructed based on the cross-sectional Internet survey data collected from consumers residing in Delaware, New Jersey and Pennsylvania. The models are used to help identify and analyze consumer behaviors, socioeconomic status, and preferences in choosing one of the direct markets as a shopping outlet.

The dependent variables in each of the four models are binary variables, which take on the discrete values of zero or one. One refers to the occurrence of the event in choosing a certain direct market and zero otherwise. For example DM_PYO is assigned a value of 1 if a respondent has purchased from a pick-your-own (PYO) farm. The independent (explanatory) variables are both binary and continuous, depending on the type of variable, and the data were collected using the consumer survey. Table 1 summarizes the explanatory variables used in the Logit models.

Parameter estimates are selected to analyze shopping preferences, perception and socio-economic attributes. Shopping preferences include the frequency of visiting different direct market outlets, distance traveled, and importance of produce quality, purchasing behavior and marketing methods of direct outlets. Produce quality corresponds to whether shoppers think that fresh greens sold at direct markets are better (equal to one if the individual agreed to a

better quality, zero if they feel it's the same or worse). Marketing methods are specifically identified as learning market outlets from billboards or road signs, signs at market entrances, and newspaper or other shopper's referral.

Perception includes beliefs and attitudes that correspond to a shopper's willingness to pay and concern for the local environment. Perception analysis includes whether one believes in the importance of open space and greenery in agriculture. The question of whether one is willing to pay higher prices to preserve farmland and local agricultural producers is important for farmers to set prices of fresh produce accordingly. Variables that help in management and increase sales can be factored by socio-economic variables such as living/housing conditions, gender, age, ethnicity, income, education and social status.

Section 7.2 Model Selections

Each of the Logit models was tested respectively. In order to better compare and contrast the four different marketing outlets, the explanatory variables have been added or dropped based on the extent of increasing the regression fit. The final models are selected upon some key criteria in the goodness of fit. Each coefficient of independent variables is only interpreted as significant with under levels of 1, 5 and 10 percent. The McFadden's R^2 statistics are also taken to account; based on a cross-sectional data pool, the captured range are lower compared to a time series data.

The Logit modeling technique used in this research has been appointed to work with binary variables and the estimation technique for large-sample properties are consistent and has asymptotic normality of the parameter estimates (Govindasamy and Nayga 1997). The models applied here are classified as whether

opting for a choice or not (e.g. going to a specific direct market, willing to pay more or not) or having a specific socio-economic attribute (e.g. urban or not, being a homemaker or not). All of the models correctly predict more than 65 percent of the actual outcome. Summary measures of each model are presented together with the maximum likelihood estimated coefficients in Tables 9,11,13 and 15.

Four Logit models corresponding to the four different types of direct markets are developed as:

$$\text{Prob}_i = \beta_0 \quad +\beta_1 \text{ NJ} +\beta_2 \text{ GO}_{i+1} +\beta_3 \text{ GO}_{i+2} +\beta_4 \text{ GO}_{i+3} +\beta_5 \text{ AVG\_DIST} + \beta_6 \text{ }_i\text{\_SP}$$

$$+\beta_7 \text{ PCT}_{i+1} +\beta_8 \text{ PCT}_{i+2} +\beta_9 \text{ PCT}_{i+3} +\beta_{10} \text{ V\_OFM2010}$$

$$+\beta_{11} \text{ MKTING\_B} +\beta_{12} \text{ MKTING\_S} +\beta_{13} \text{ MKTING\_P} + \beta_{14} \text{ MKTING\_M}$$

$$+\beta_{15} \text{ QUAL} +\beta_{16} \text{ ORGANIC} +\beta_{17} \text{ NEW} +\beta_{18} \text{ GMO}$$

$$+\beta_{19} \text{ AG\_HELP} +\beta_{20} \text{ WTP\_HELP}$$

$$+\beta_{21} \text{ URBAN} +\beta_{22} \text{ RESI\_1} +\beta_{23} \text{ RESI\_3} +\beta_{24} \text{ RESI\_5} +\beta_{25} \text{ NUM\_HH}$$

$$+\beta_{26} \text{ HH\_17} +\beta_{27} \text{ GENDER} +\beta_{28} \text{ AGE\_20} +\beta_{29} \text{ AGE\_35} +\beta_{30} \text{ AGE\_50}$$

$$+\beta_{31} \text{ EDU\_4YRC} +\beta_{32} \text{ EMP\_STU} +\beta_{33} \text{ ETH\_WHT} +\beta_{34} \text{ INC\_100}$$

$$+\beta_{35} \text{ INC\_m100} +\beta_{36} \text{ G\_WTP} +\beta_{37} \text{ EMP\_LINC} + \varepsilon_i \qquad (7.1)$$

where

Prob_i	=	1 if respondent purchased fresh fruits and/or vegetables from direct market type $_i$ and 0=otherwise (four models corresponding to $_i$= PYO, CFM, OFM, CSA)
NJ	=	1 if respondent purchased from $_i$ is from NJ; 0=otherwise
GO_i	=	Average times per year go to farm type $_i$
$_i$_SP	=	Average spending per visit at direct markets other than the estimated farm $_i$
AVG_DIST	=	Average miles traveled to direct outlets
QUAL	=	1 if the respondent think quality at direct outlets is better; 0=otherwise
PCT_i	=	Percentage of fresh fruits bought at farm type $_i$

V_OFM2010	=	1 if the respondent has visited OFM in year 2010; 0=otherwise (*this variable is dropped for the OFM model*)
MKTING_B	=	1 if the respondent has first learned direct outlets through billboard or roadside sign; 0=otherwise
MKTING_S	=	1 if the respondent has first learned direct outlets through sign at the market's entrance; 0=otherwise
MKTING_P	=	1 if the respondent has first learned direct outlets through newspaper; 0=otherwise
MKTING_M	=	1 if the respondent has first learned direct outlets through friends/family/word-of-mouth; 0=otherwise
ORGANIC	=	1 if the respondent is willing to buy certified organic at direct markets;0=otherwise
NEW	=	1 if the respondent is willing to buy new fruits and vegetables at direct markets;0=otherwise
GMO	=	1 if the respondent is willing to buy genetically modified produce at direct markets;0=otherwise
URBAN	=	1 if the respondent lives at urban areas; 0=otherwise
RESI_1	=	1 if the respondent lives at the current location for less than an year; 0=otherwise
RESI_3	=	1 if the respondent lives in the current location for one to three years; 0=otherwise
RESI_5	=	1 if the respondent lives in the current location for four to five years; 0=otherwise
AG_HELP	=	1 if the respondent believes in that agriculture will help maintain open space/greenery in their state; 0=otherwise
WTP_HELP	=	1 if the respondent is willing to pay higher prices for products if money is used to preserve farmland and local agricultural producers; 0=otherwise
NUM_HH	=	Number of people in the household
HH_17	=	Number of people in the household younger than age 17
GENDER	=	1 if the respondent is a male; 0=otherwise
AGE_20	=	1 if the respondent is under than 20 years old; 0=otherwise
AGE_35	=	1 if the respondent is 21-35 years old; 0=otherwise
AGE_50	=	1 if the respondent is 36-50 years old; 0=otherwise
EDU_4YRC	=	1 if the respondent has a four-year college education: 0=otherwise
EMP_STU	=	1 if the respondent is currently a student: 0=otherwise
ETH_WHT	=	1 if the respondent's ethnicity is White/Anglo; 0=otherwise
INC_100	=	1 if the respondent has annual income between $80,000-$99,999 before taxes for year 2009; 0=otherwise
INC_m100	=	1 if the respondent has annual income more than $100,000 before taxes for year 2009; 0=otherwise
G_WTP	=	1 if the respondent is a male who is willing-to-pay more for fresh produce sold at direct market outlet
EMP_LINC	=	1 if the respondent is employed by others earning at an income category of less than $20,000 annually

Section 7.3 Data Description

In a past New Jersey study, more than 70 percent of the studied group had visited direct farmers markets (Govindasamy and Nayga, 1997). This study looks at participants who actually purchased at direct markets. From the descriptive statistics shown in Table 7.1, 49 percent of the respondents purchased from PYO operations, 83 percent purchased from CFM, 55 percent purchased from OFM and only 1 percent of respondents purchased from CSA. These statistics clearly show farmer's markets are still the most common type of direct market source that consumers will choose as compared to all other alternate outlets. In general, participants are most likely to visit CFM as opposed to other types of direct markets per year. On average, candidates traveled about 6 miles (one way) to outlets and most consumers learned about a market outlet via signs at market.

Through the survey, 90 percent of the participants ranked quality as a very important factor while purchasing at direct farmers' outlets. More than half of the respondents are willing to buy organic and new fruits/vegetables as opposed to genetically modified foods. 95 percent of the respondents believe direct market outlets will help to maintain the greenery and 67 percent of the surveyed population willing to pay a higher price to preserve farmland and local agricultural producers.

Table 7.1 Descriptive Statistics of the Variables Used in Analyses

Variable		Description	Mean Units/ Percentage	Standard Deviation Units/ Percentage
Dependent Variable	DM_PYO	1 if respondent purchased fresh fruits and/or vegetables from PYO; 0=otherwise	0.49	0.5
	DM_CFM	1 if respondent purchased fresh fruits and/or vegetables from CFM; 0=otherwise	0.83	0.38
	DM_CSA	1 if respondent purchased fresh fruits and/or vegetables from CSA; 0=otherwise	0.01	0.29
	DM_OFM	2 if respondent purchased fresh fruits and/or vegetables from OFM; 0=otherwise	0.55	0.5
NJ		1 if respondent purchased from PYO is from NJ; 0=otherwise	0.37	0.48
GO_PYO		Average times per year go to PYO	1.97	2.79
GO_CFM		Average times per year go to CFM	7.12	6.72
GO_OFM		Average times per year go to OFM	4.14	5.19
GO_CSA		Average times per year go to CSA	0.78	1.78
PYO_SP		Average spending per visit at direct markets other than PYO	38.68	36.09
CFM_SP		Average spending per visit at direct markets other than CFM	31.84	30.53
CSA_SP		Average spending per visit at direct markets other than CSA	46.42	38.83
OFM_SP		Average spending per visit at direct markets other than OFM	34.82	29.54
AVG_DIST		Average miles traveled to direct outlets	5.96	4.69
QUALITY		1 if the respondent think quality at direct outlets is better; 0=otherwise	0.9	0.31
PCT_CFM		Percentage of fresh fruits/vegetables bought at CFM	18.28	19.61
PCT_OFM		Percentage of fresh fruits/vegetables bought at OFM	9.11	11.79
PCT_CSA		Percentage of fresh fruits/vegetables bought at CSA	2.14	6.37
PCT_PYO		Percentage of fresh fruits/vegetables bought at PYO	6.78	10.37
V_OFM2010		1 if the respondent has visited OFM in year 2010; 0=otherwise	0.29	0.46
MKTING_B		1 if the respondent has first learned direct outlets through billboard or roadside sign; 0=otherwise	0.39	0.49
MKTING_S		1 if the respondent has first learned direct outlets through sign at the market's entrance; 0=otherwise	0.51	0.5
MKTING_P		1 if the respondent has first learned direct outlets through newspaper; 0=otherwise	0.44	0.5
MKTING_M		1 if the respondent has first learned direct outlets through friends/family/word-of-mouth; 0=otherwise	0.75	0.43
ORGANIC		1 if the respondent is willing to buy certified organic at direct markets;0=otherwise	0.67	0.47

NEW	1 if the respondent is willing to buy new fruits and vegetables at direct markets;0=otherwise	0.68	0.47
GMO	1 if the respondent is willing to buy genetically modified produce at direct markets;0=otherwise	0.17	0.37
URBAN	1 if the respondent lives at urban areas; 0=otherwise	0.11	0.31
RESI_1	1 if the respondent lives at the current location for less than an year; 0=otherwise	0.07	0.25
RESI_3	1 if the respondent lives in the current location for one to three years; 0=otherwise	0.15	0.36
RESI_5	1 if the respondent lives in the current location for four to five years; 0=otherwise	0.12	0.32
AG_HELP	1 if the respondent is believes that agriculture will help maintain open space/greenery in their state; 0=otherwise	0.95	0.21
WTP_HELP	1 if the respondent is willing to pay higher prices for products if the money is used to preserve farmland and local agricultural producers; 0=otherwise	0.67	0.47
NUM_HH	Number of people in the household	2.89	1.39
HH_17	Number of people in the household younger than age 17	1.72	1.09
GENDER	1 if the respondent is a male; 0=otherwise	0.25	0.43
AGE_20	1 if the respondent is under than 20 years old; 0=otherwise	0.02	0.15
AGE_35	1 if the respondent is 21-35 years old; 0=otherwise	0.29	0.46
AGE_50	1 if the respondent is 36-50 years old; 0=otherwise	0.29	0.45
EDU_4YRC	1 if the respondent has a four-year college education: 0=otherwise	0.29	0.45
EMP_STU	1 if the respondent is currently a student: 0=otherwise	0.07	0.25
ETH_WHT	1 if the respondent is White/Anglo; 0=otherwise	0.88	0.32
INC_20	1 if the respondent has annual income of less than $20,000 before taxes for year 2009; 0=otherwise	.09	0.28
INC_40	1 if the respondent has annual income between $20,000-$39,999 before taxes for year 2009; 0=otherwise	0.19	0.39
INC_100	1 if the respondent has annual income between $80,000-$99,999 before taxes for year 2009; 0=otherwise	0.13	0.34
INC_m100	1 if the respondent has annual income more than $100,000 before taxes for year 2009; 0=otherwise	0.19	0.39
G_WTP	Male respondent who are willing to pay more for products purchased at a direct market outlet	0.16	0.37
EMP_LINC	Respondent who are employed by others and earns an annual income of less than $20,000 in 2009	.02	0.14

7.4 Analyses of Direct Farm Outlet Models

Model 1- Logit Analysis Findings for PYO farms

Presented in Table 7.2 is the maximum likelihood estimates for the PYO Logit model. The dependent variable in this model projects shoppers who have visited and purchased from a PYO farm. There are eight variables at a 10 percent significance level that can be drawn with some conclusions. The PYO visitation Logit model yields 70 percent correct predictions as shown in Table 7.3. The overall model is significant with a goodness-of-fit of 0.15.

The significant behavioral attribute variables that indicate a higher likelihood to visit PYO farms includes shopper who has visited CSA, the location of direct outlets and percentage of fresh produce bought at farmer's market. From the model, the frequency of CSA visits has a positive effect to PYO farm visits. On average, each visit to a CSA market has a 4 percent higher chance of visiting PYO farms. Usually CSA and PYO share some similar traits, as both are located at a less convenient travel distance as opposed to OFM or CFM markets. Due to the fact that most PYOs are usually not centralized in urban areas, shoppers are 3 percent more likely to go to a PYO farm for each additional mile traveled.

The PYO Logit model estimate also provides valuable insights for shopping behaviors and demographic targets. Regarding purchasing behaviors, from the actual outcome, an increase of visits to CFM and OFM outlets will decrease the likelihood of shoppers visiting PYO farms. Friends or family influences are not effective ways to bring in consumers as opposed to other media channels or social interactions. As indicated by the model, age, ethnicity and income level are

important traits of PYO attendees. Providing recreational purposes, shoppers of ages 21-35 are more likely to visit PYO farms compared to other age groups. Caucasians are more drawn to PYO farms. High income is an important factor that supports going to PYO farms.

Although the percentage of fruits and vegetables bought at CFM gives a negative statistical significance, it is only economically significant with less than 1 percent change. Therefore, it can be inferred that those who bought a greater percentage of fresh produce at a CFM market have nearly no impact of their next choice of buying fresh produce at a PYO site.

The location of PYO outlets is most likely to be situated at distant suburbs; marketing efforts are usually harder to deliver. Compared to all sources of learning about a PYO farm, marketing through billboards or road signs are more effective. If a shopper has learned about a PYO site through a billboard or road sign, they are 8 percent more likely to go and visit one. This is logical since fresh-produce-seekers who have sighted an advertising sign in their car might as well make most the most out of the ride.

Surprisingly many perceptional variables such as quality, variety or willingness-to-pay factors are not significant enough to draw any conclusions. Many of the product attributes or public visions of supporting PYO are not apparent partly because only a small fraction of shoppers had purchased through a PYO outlet as opposed to shopped at a CFM or OFM outlet. However there are several demographic variables that are useful to capture characteristics of shopping individuals.

According to most reports that looked into demographics have come to the one conclusion that middle-aged adults were more likely to visit a direct farm outlet. This trend is also observed in this model. Consumers in the age category of 21 to 35 are 13 percent more likely to visit a PYO farm than those who are younger. This may be due to the fact that individuals of this group have some income and are also at an age where recreational activities are an important part of social life.

The model also shows that people in the income category of earning at least $100,000 are more likely to visit PYO than other people who make less. This is not a different finding to many other studies. In another Logit analysis of direct marketing outlet, it is concluded that individuals with incomes of $60,000 and higher are more likely to visit a PYO site (Govindasamy and Nayga, 1997).

Ethnicity is also an important attribute to look at in this model. As examined, Caucasians are 21% more likely to visit a PYO farm. This factor while commonly included in similar research has not been seen significant in many cases. Cultural background reasons may explain beyond individual behavior to environment beliefs and behavior (Johnson et al., 2004).

Table 7.2 Parameter Estimates and Marginal Effects for Purchasing at PYO

S.No	Variable	Coefficient	Standard Error	T-ratio	Probability	Marginal Change
	Constant	-2.7517	0.6318	-4.3560	0.0000	
1	NJ	0.1068	0.1840	0.5800	0.5619	
2	GO_CFM	-0.0120	0.0155	-0.7760	0.4380	
3	GO_OFM	-0.0033	0.0234	-0.1410	0.8878	
4	GO_CSA	0.1693**	0.0698	2.4260	0.0153	0.04
5	PYO_SP	-0.0033	0.0029	-1.1330	0.2574	
6	AVG_DIST	0.1363***	0.0217	6.2880	0.0000	0.03
7	QUAL	0.4140	0.2837	1.4590	0.1446	
8	PCT_CFM	-0.0223***	0.0058	-3.8720	0.0001	-0.005
9	PCT_OFM	-0.0093	0.0088	-1.0490	0.2940	

10	PCT_CSA	-0.0103	0.0208	-0.4940	0.6213	
11	V_OFM2010	0.2675	0.2286	1.1700	0.2420	
12	MKTING_B	0.3326*	0.1777	1.8720	0.0612	0.08
13	MKTING_S	0.2330	0.1740	1.3390	0.1805	
14	MKTING_P	0.1459	0.1749	0.8340	0.4043	
15	MKTING_M	-0.0995	0.2012	-0.4940	0.6212	
16	ORGANIC	0.0305	0.1916	0.1590	0.8735	
17	NEW	0.0218	0.1926	0.1130	0.9099	
18	GMO	0.1639	0.2384	0.6870	0.4918	
19	URBAN	0.0320	0.3031	0.1060	0.9159	
20	RESI_1	0.2293	0.3519	0.6510	0.5148	
21	RESI_3	0.1418	0.2591	0.5470	0.5844	
22	RESI_5	-0.1928	0.2754	-0.7000	0.4839	
23	AG_HELP	0.0128	0.3830	0.0330	0.9734	
24	WTP_HELP	0.2570	0.1913	1.3430	0.1792	
25	NUM_HH	0.0092	0.1028	0.0900	0.9283	
26	HH_17	0.1529	0.1312	1.1650	0.2439	
27	GENDER	0.2272	0.3230	0.7030	0.4819	
28	AGE_20	0.2291	0.6422	0.3570	0.7212	
29	AGE_35	0.5145**	0.2589	1.9870	0.0469	0.13
30	AGE_50	0.4004*	0.2336	1.7140	0.0865	0.10
31	EDU_4YRC	0.0604	0.1909	0.3170	0.7516	
32	EMP_STU	0.3886	0.4110	0.9450	0.3445	
33	ETH_WHT	0.8588**	0.2959	2.9020	0.0037	0.21
34	INC_100*	0.4851*	0.2609	1.8590	0.0630	0.12
35	INC_m100	0.1779	0.2321	0.7660	0.4434	
36	GWTP	-0.0557	0.3747	-0.1490	0.8818	
37	EMP_LIN	-0.6704	0.6204	-1.0810	0.2799	

McFadden R²: 0.15
Chi squared: 149.9097
Degrees of freedom: 37
Overall Model Significance: 0.0000
*** Significant at 1%; **Significant at 5%; * Significant at 10%*

Table 7.3 Prediction Success of the Logit Model for PYO

Actual	Predicted		Correct
Value	0	1	Total
0	**246(34.4%)**	109(15.2%)	355 (49.6%)
1	111 (15.5%)	**250 (34.9%)**	361 (50.4%)
Total	357(49.9%)	359 (50.1%)	716 (100.00%)
Number of correct predictions: 496			
Percentage of correct predictions: 70%			

Model 2- Logit Analysis Findings for CFM farms

The CFM Logit model projects the maximum likelihood characteristics of shopping consumers. As shown in Table 7.4, the model correctly predicts 86 percent of actual outcome with 631 correct predictions out of 734 observations. This significant model yields seven significant variables with a McFadden's R-square of 13 percent. Most of the significant factors in this model are aligned with behavioral and perceptional variables.

Due to the nature of CFM farms, the numbers of inferences that we can confidently conclude are less apparent. Looking at how the outlet visitations affect each other, individuals who go to OFM outlets have a less than1 percent chance of going to CFM farms. Compared to OFM outlets, CFM operate with a completely different mechanism. CFM farms are usually more internally organized, with a lesser produce selection than the latter form of operation.

On the other hand, individuals who visit CSA have a 2 percent increase of likelihood to visit a CFM farm. Typically consumers who choose CSA and CFM carry similar characteristics such as supporting local agriculture, supporting local business and produce source and quality. It is noted that consumer who goes to CFM outlets do not mind traveling further. Respondents who travel one more mile will be 1 percent more likely to purchase at a CFM outlet. Although not tangibly observed in this research, this can be reflected upon the better quality, price or variety in the fresh greens carried by the local direct markets.

Indicated from the model, the more that consumer buy from OFM or PYO, the less they would buy from CFM. Both OFM and PYO have a different operation

structures and are usually tied with other recreational purposes. If the reason for buying fresh produce is not related to health motives but instead tied with purposes such as recreation and tourism then it is less likely that one will go to CFM farms. However, from the model output, people who have already visited an OFM farm in 2010 showed a 6 percent increase in likelihood to visiting a CFM farm.

CFM farms enjoy most of its publicity through newspaper. Although no demographic variables are significant enough to conclude on the characteristics of people who visit CFM outlets, each presence of an advertisement in a newspaper has a 5 percent likelihood of drawing consumers in. This may highly infer that individuals who actually read a physical newspaper has a higher chance of visiting a CFM outlet compared to those who only receives information on the World Wide Web.

Table 7.4 Parameter Estimates and Marginal Effects for Purchasing at CFM

S. No	Variable	Coefficient	Standard Error	T-ratio	Probability	Marginal Change
	Constant	1.8361	0.8587	2.1380	0.0325	
1	NJ	-0.2197	0.2415	-0.9100	0.3630	
2	GO_PYO	-0.0086	0.0488	-0.1750	0.8607	
3	GO_OFM	-0.0603**	0.0274	-2.2030	0.0276	-0.01
4	GO_CSA	0.1723*	0.1071	1.6100	0.1075	0.02
5	SP_CFM	-0.0046	0.0046	-1.0040	0.3155	
6	AVG_DIST	0.0603**	0.0306	1.9700	0.0489	0.01
7	QUAL	-0.1830	0.3980	-0.4600	0.6457	
8	PCT_OFM*	-0.0189*	0.0100	-1.8880	0.0591	-0.001
9	PCT_PYO	-0.0569***	0.0121	-4.6920	0.0000	-0.01
10	PCT_CSA	-0.0002	0.0258	-0.0060	0.9953	
11	V_OFM2010	0.5902*	0.3140	1.8800	0.0601	0.06
12	MKTING_B	-0.2347	0.2311	-1.0160	0.3098	
13	MKTING_S	0.3252	0.2319	1.4030	0.1607	
14	MKTING_P	0.4725**	0.2379	1.9870	0.0470	0.05
15	MKTING_M	0.3722	0.2510	1.4830	0.1381	
16	ORGANIC	0.0135	0.2492	0.0540	0.9569	

17	NEW	0.3063	0.2542	1.2050	0.2283	
18	GMO	-0.3061	0.3141	-0.9750	0.3298	
19	URBAN	0.4394	0.4252	1.0330	0.3015	
20	RESI_1	-0.6413	0.4508	-1.4230	0.1548	
21	RESI_3	-0.3031	0.3385	-0.8950	0.3706	
22	RESI_5	-0.2574	0.3649	-0.7050	0.4806	
23	AG_HELP	-0.4273	0.5614	-0.7610	0.4466	
24	HOME_GRO	0.0761	0.2360	0.3220	0.7472	
25	WTP_HELP	0.1796	0.2502	0.7180	0.4729	
26	NUM_HH	-0.1575	0.1349	-1.1680	0.2429	
27	HH_18	0.2749	0.1768	1.5550	0.1200	
28	GENDER	0.2107	0.4389	0.4800	0.6311	
29	AGE_20	0.4706	0.9560	0.4920	0.6226	
30	AGE_35	0.4490	0.2992	1.5010	0.1334	
31	EDU_4YRC	-0.3504	0.2559	-1.3690	0.1710	
32	EMP_STU	0.6022	0.6517	0.9240	0.3554	
33	ETH_WHT	0.1381	0.3869	0.3570	0.7211	
34	INC_20	-0.2960	0.5340	-0.5540	0.5794	
35	INC_40	-0.2620	0.3143	-0.8340	0.4045	
36	GWTP	0.2873	0.5240	0.5480	0.5835	
37	EMP_LIN	0.3145	0.9467	0.3320	0.7397	

McFadden R^2: 0.13
Chi squared: 78.64
Degrees of freedom: 37
Overall Model Significance: 0.0000
*** Significant at 1%; **Significant at 5%; * Significant at 10%*

Table 7.5 Prediction Success of the Logit Model for Community Farmers' Market (CFM)

Actual Value	Predicted		Correct Total
	0	**1**	
0	**12(1.6%)**	99(13.5%)	111(15.1%)
1	4(0.5%)	**619(84.3%)**	623 (84.9%)
Total	16 (2.2%)	718 (97.8%)	734(100.00%)

Number of correct predictions: 631
Percentage of correct predictions: 86%

Model 3- Logit Analysis Findings for CSA farms

CSA market outlets have a more complex operating structure than the other discussed types of direct market outlets. Because the required element of a

consumer-farmer relationship, it would be interesting to look into the characteristics of shopping individuals. Table 7.6 lists the empirical results from the maximum likelihood applied on a Logit regression model. The overall model is significant with a 0.17 McFadden's R-square. The correct percent of prediction is 91 percent for this particular model.

It has been found that the growth of CSAs is largely cross-country. In 2010, the number of CSA operation sites has exceeded 2500 as opposed to only two CSA operations in 1986 (Martinez, 2010). One significant behavioral variable in the CSA Logit model has supported the visitation of going to a CSA Farm. The statistics shows a 3 percent increase in probability of a shopper going to CSA outlets if they have been to an OFM in 2010.

There are three perceptional variables that have been observed in this model that are significant to discuss. Two are congruent characteristics as to why people may choose to purchase from a CSA outlet, one is not as expected. First of all, consumers who enjoy eating healthier usually prefer organically grown products. Although there are many definitions of organic certified, regardless of the exact production method, it is commonly valued as a healthy eating habit. The statistics of this variable shows that consumers who are willing to buy organically certified products have a 2 percent chance of visiting a CSA farm.

As supporting direct market outlets are typically tied with helping local businesses or farmers, we expect to see some positive relationship from the model. Observing individuals' willingness-to-pay motives, candidates who have responded

to the statement of willing to pay a higher price to help preserve farmland and local producers have a 3 percent chance of being more likely to visit a CFM farm.

In alignment with all the health perception variables of why consumers would cooperate with a CSA farm, one should find a reverse effect of consuming genetically modified foods. Confusingly, the result of the model shows that people who are willing to buy genetically modified foods have a 3 percent chance of visiting a CSA outlet; however, the result may be misconstrued due to consumers' true understanding of genetically modified food and/or the definition of the term on the survey. The term was defined as "Any possible alteration of genetic material, in agriculture products to make them capable of producing new products or performing new functions or increasing production." In a way the definition of the term phrased on the survey only refers to genetically modified food and neglects other controversial matters of consuming genetically modified food that they are not aware of. The biasness of the definition may have affected the unexpected result empirically.

The data also shows that consumers who have lived at their current residence for 4 to 5 years have a 4 percent higher chance of visiting a CSA market outlet. Since we know that CSA outlets require a long-term commitment with farmers, people without a permanent residency will probably find it harder to cooperate with farmers.

Furthermore, the numbers of young households have a positive relation with the chance of supporting CSA outlets. Families who are concerned about the nutrition intake of young household members may consider a CSA operation as they

are guaranteed to fresh food supply without worrying about the production source. To our finding, each additional household member that is added to the family will result in a higher chance for visiting a CSA site as opposed to other sources of direct market outlets.

Table 7.6 Parameter Estimates and Marginal Effects for Purchasing at CSA

S. No	Variable	Coefficient	Standard Error	T-ratio	Probability	Marginal Change
	Constant	-4.9198	1.0606	-4.6390	0.0000	
1	NJ	0.2954	0.2914	1.0140	0.3107	
2	GO_PYO	0.0722	0.0523	1.3810	0.1672	
3	GO_CFM	0.0096	0.0247	0.3900	0.6967	
4	GO_OFM	-0.0547	0.0447	-1.2250	0.2204	
5	CSAP_SP	0.0024	0.0038	0.6250	0.5318	
6	AVG_DIST	0.0334	0.0313	1.0700	0.2845	
7	QUAL	-0.2754	0.4771	-0.5770	0.5637	
8	PCT_OFM	-0.0095	0.0171	-0.5570	0.5773	
9	PCT_PYO	0.0189	0.0130	1.4570	0.1450	
10	PCT_CFM	-0.0089	0.0099	-0.9010	0.3674	
11	V_OFM2010	0.8773***	0.3297	2.6610	0.0078	0.03
12	MKTING_B	0.0258	0.2966	0.0870	0.9308	
13	MKTING_S	-0.3476	0.2896	-1.2000	0.2301	
14	MKTING_P	0.1257	0.2904	0.4330	0.6653	
15	MKTING_M	0.0998	0.3414	0.2920	0.7700	
16	ORGANIC	0.7315**	0.3788	1.9310	0.0535	0.02
17	NEW	-0.0191	0.3486	-0.0550	0.9563	
18	GMO***	0.8311***	0.3311	2.5100	0.0121	0.03
19	URBAN	-0.2604	0.4611	-0.5650	0.5722	
20	RESI_1	0.7944	0.5229	1.5190	0.1287	
21	RESI_3	0.5252	0.4080	1.2870	0.1980	
22	RESI_5	0.9622***	0.3908	2.4620	0.0138	0.04
23	AG_HELP	-0.0514	0.6262	-0.0820	0.9346	
24	HOME_GRO	0.0873	0.2852	0.3060	0.7594	
25	WTP_HELP	0.7312**	0.3675	1.9890	0.0466	0.02
26	NUM_HH	-0.0970	0.1733	-0.5600	0.5757	
27	HH_17	0.3618*	0.1984	1.8240	0.0682	0.01
28	GENDER	0.5121	0.5161	0.9920	0.3211	
29	AGE_20	0.0999	0.9406	0.1060	0.9155	

30	AGE_35	-0.1058	0.3283	-0.3220	0.7473	
31	EDU_4YRC	-0.0821	0.3061	-0.2680	0.7886	
32	EMP_STU	0.3861	0.6569	0.5880	0.5567	
33	ETH_WHT	0.1807	0.4421	0.4090	0.6827	
34	INC_20	-0.6724	0.9340	-0.7200	0.4716	
35	INC_40	0.3612	0.3905	0.9250	0.3550	
36	GWTP	-0.2310	0.5870	-0.3940	0.6939	
37	EMP_LIN	-28.2249	.122847D+07	0.0000	1.0000	
McFadden R²: 0.17						
Chi squared: 80.41						
Degrees of freedom: 37						
Overall Model Significance: 0.0000						
*** Significant at 1%; **Significant at 5%; * Significant at 10%*						

McFadden R^2: 0.17

Table 7.7 Prediction Success of the Logit Model for CSA

Actual Value	Predicted		Correct Total
	0	**1**	
0	**658(90.0%)**	3(0.4%)	661(90.4%)
1	62 (8.5%)	**8(1.1%)**	70 (9.6%)
Total	720(98.5%)	11 (1.5%)	731(100.00%)
Number of correct predictions: 666			
Percentage of correct predictions: 91%			

Model 4- Logit Analysis Findings for OFM farms

On-farm Markets along with the other forms of direct market outlets can be easily established with the lowest barriers: no specific land requirements and no required customer-farmer relationship. The average distance traveled is proportionate with the probability of visiting an OFM outlet. On average, consumers are not hesitant to travel longer for OFM outlets like most others. The most that is required is shelter and good produce. Using the Logit specification for OFM outlets, it explained about 20 percent of the overall goodness-of-fit in the model as shown in Table 7.8. The correct prediction percentage has reached 70 percent with 11 significant variables under the same degrees of freedom as the other models.

Interestingly, people who buy from CFM outlets are less willing to visit OFM outlets. We have already measured this relationship from the CFM model. Because

the operating structure is different, people who want to be guaranteed with a number of sellers with a wider produce variety may not enjoy shopping at an OFM outlets. As observed in this model, for each additional percentage of fresh produce bought at a CFM outlet reduces the likelihood for an individual to visit an OFM market. People who like OFM operating structure will have a higher tendency to visit it again. This is supported by the variable of those who had visited an OFM farm in 2010 are 34 percent more likely to buy from an OFM outlet again.

We have seen earlier in the CFM model that newspaper is the most effective way of media channeling with consumers as opposed to all other forms of campaigning methods. For an OFM operation, farmers are encouraged to market via different channeling methods such as signs, newspapers or spread via word-of-mouth. As testified from the model, all these methods have equal chances of being about 10 percent more likely to grab shoppers' attention. Congruent with a study done earlier in Delaware asking how candidates first learn about the outlet source, word-of-mouth has been the main source of learning OFM outlets (Gallons et al., 1997).

Visiting an OFM outlet usually requires transportation and is more time consuming. Unless for leisure purposes, busy urban individuals are less likely to travel a certain amount of distance just to buy fresh produce. This is observed in the Logit specification model in this research. Consumers who live in large cities or towns are 26 percent less likely to visit an OFM outlet.

Unlike the effect of CSA outlets, people who have lived longer at one residence location are 16 percent less likely to visit an OFM farm. The reason for this

observation may be highly dependent upon the quality, the variety and the consistency of the supplied fresh produce. As OFM farms are typically more mobile than other forms of outlet, it also means that they are less structured for a long-term loyalty relationship. Furthermore, unlike the demographic variables observed in other prediction models, middle-aged adults are less attracted to OFM outlets. On average, consumers in the 21-35-age category are 11 percent less likely to visit an OFM as opposed to other age categories.

There are two income related significant demographic variables observed with the collected data. Participants in the lower income range level, earning less than $20,000 annually, are 28 percent more likely to purchase from an OFM outlet. Compared with a previous study, they have also observed that lower income categories have a higher probability of visiting OFM outlets than those of higher income category group (Govindasamy and Nayga, 1997). However, an interaction variable between employment and income category has been tested to observe the relationship between employment and income. It was observed that those who were employed by others but in a lower income category group were 47 percent less likely to visit an OFM outlet.

Table 7.8 Parameter Estimates and Marginal Effects for Purchasing at OFM

S. No	Variable	Coefficient	Standard Error	T-ratio	Probability	Marginal Change
	Constant	-1.5705	0.6483	-2.4220	0.0154	
1	NJ	0.2212	0.1915	1.1550	0.2480	
2	GO_PYO	-0.0190	0.0453	-0.4190	0.6755	
3	GO_CFM	0.0258	0.0163	1.5830	0.1134	
4	GO_CSA	0.0169	0.0689	0.2460	0.8061	
5	OFM_SP	0.0013	0.0038	0.3350	0.7377	
6	AVG_DIST	0.0434**	0.0217	2.0010	0.0454	0.01
7	QUAL	0.3918	0.2871	1.3650	0.1724	

8	PCT_PYO	0.0048	0.0103	0.4630	0.6437	
9	PCT_CFM	-0.0291***	0.0061	-4.8060	0.0000	-0.01
10	PCT_CSA	-0.0273	0.0233	-1.1740	0.2404	
11	V_OFM2010	1.5553***	0.2285	6.8060	0.0000	0.34
12	MKTING_B	0.1824	0.1816	1.0040	0.3153	
13	MKTING_S	0.4289**	0.1794	2.3910	0.0168	0.11
14	MKTING_P	0.3835**	0.1814	2.1140	0.0345	0.10
15	MKTING_M	0.3833*	0.2063	1.8580	0.0632	0.10
16	ORGANIC	-0.0082	0.1965	-0.0420	0.9667	
17	NEW	0.0472	0.1986	0.2380	0.8121	
18	GMO	0.2937	0.2506	1.1720	0.2412	
19	URBAN	-1.0595***	0.3110	-3.4070	0.0007	-0.26
20	RESI_1	-0.3275	0.3733	-0.8770	0.3803	
21	RESI_3	-0.1581	0.2606	-0.6070	0.5441	
22	RESI_5	-0.6431**	0.2814	-2.2860	0.0223	-0.16
23	AG_HELP	0.4599	0.4002	1.1490	0.2504	
24	HOME_GRO	0.0292	0.1835	0.1590	0.8737	
25	WTP_HELP	0.1824	0.1954	0.9340	0.3505	
26	NUM_HH	-0.1574	0.1067	-1.4760	0.1400	
27	HH_17	0.0532	0.1324	0.4020	0.6878	
28	GENDER	-0.3166	0.3385	-0.9350	0.3496	
29	AGE_20	-0.5339	0.6450	-0.8280	0.4078	
30	AGE_35	-0.4561**	0.2280	-2.0000	0.0455	-0.11
31	EDU_4YRC	-0.0904	0.1989	-0.4550	0.6494	
32	EMP_STU	-0.5432	0.4414	-1.2310	0.2184	
33	ETH_WHT	0.4804	0.3121	1.5390	0.1237	
34	INC_20	1.3686***	0.4487	3.0500	0.0023	0.28
35	INC_40	0.1562	0.2557	0.6110	0.5412	
36	GWTP	0.1811	0.3942	0.4590	0.6460	
37	EMP_LIN	-2.4595***	0.7919	-3.1060	0.0019	-0.47

McFadden R^2: 0.20
Chi squared: 194.69
Degrees of freedom: 37
Overall Model Significance: 0.0000
*** Significant at 1%; **Significant at 5%; * Significant at 10%

Table 7.9 Prediction Success of the Logit Model On-farm Market (OFM)

Actual Value	Predicted		Correct Total
	0	**1**	
0	**199(27.5%)**	123(17.0%)	322(44.5%)
1	95 (13.1%)	**306 (42.3%)**	401 (55.5%)
Total	294(40.7%)	429 (59.3%)	723(100.00%)

Number of correct predictions: 505
Percentage of correct predictions: 70%

Section 7.5 Ordered Probit Analyses of Willingness-to-pay (WTP)

The levels of willingness to pay for fresh produce are integral for farmers operating a direct market platform. The Ordered Probit model implemented is selected over OLS (Ordinary Least Squares) as the nature of the dependent variables are categorical and will provide a greater generality of the purchase likelihoods (Jekanowski et al., 2000). The WTP model here can be interpreted as a latent variable that observes the cause of what influences decisions. Three categories of the WTP are estimated using the model: willing to pay a low premium (1-5%), willing to pay a medium premium (6-10%) and willing to pay a high premium (11-100%) for the fresh greens sold at direct farmer markets. The probability of the categories is estimated under a normal curve calculated as (Greene and Hensher, 2010):

Prob [y=1]= $\Phi(-\beta'x)$,   (7.2)

Prob [y=2]=$\Phi(\mu - \beta'x) - \Phi(\beta'x)$ (7.3)

Prob [y=3]=$1 - \Phi(\mu - \beta'x)$ (7.4)

where μ is the threshold parameter, Φ is the cumulative normal and x is the vector of independent variables. The threshold parameters adjust to make probabilities match sample proportions and do not discrete a normal or logistic distribution (Greene and Hensher, 2010). WTP here is driven by the extent to which utilities change with regards to the individual consumption choice. If the consumers' WTP falls within a certain range, the numeric value that is assigned to it reflects the category of individuals' willingness-to-pay. The Ordered Probit model is developed as:

$$WTP_i = \beta_0 \quad +\beta_1 \text{ HOME\_GRO} +\beta_2 \text{ WTP\_HELP} +\beta_3 \text{ AG\_HELP} +\beta_4 \text{QUAL}$$

$$+\beta_5 \text{ PRICE} +\beta_6 \text{ G\_Q} +\beta_7 \text{ G\_P} +\beta_8 \text{ ORGANIC} +\beta_9 \text{ GMO}$$

$$+\beta_{10} \text{ MKTING\_M} + \beta_{11} \text{ MKTING\_B} +\beta_{12} \text{ MKTING\_S} +\beta_{13} \text{ MKTING\_P}$$

$$+\beta_{14} \text{ OFM\_SP} +\beta_{15} \text{ VAL\_ADD}$$

$$+\beta_{16} \text{ RESI\_1} +\beta_{17} \text{ RESI\_3} +\beta_{18} \text{ AVG\_DIST} +\beta_{19} \text{ DIST\_NJ} + \beta_{20} \text{ Gender}$$

$$+\beta_{21} \text{ AGE\_M65} +\beta_{22} \text{ ETH\_WHT} +\beta_{23} \text{ INC\_80} + \beta_{24} \text{ INC\_100}$$

$$+\beta_{25} \text{ INC\_M100} +\beta_{26} \text{ EDU\_2YRC} +\beta_{27} \text{ EDU\_4YRC} +\beta_{28} \text{ EMP\_SE}$$

$$+\beta_{29} \text{ EMP\_RE} + \varepsilon_i \qquad\qquad (7.5)$$

where Table 7.10 summarizes the descriptive statistics of explanatory variables.

Table 7.10 Descriptive Statistics of the Variables Used in Analysis

Variable	Description	Mean Units/ Percentage	Standard Deviation Units/ Percentage
WTPi *(Dependent Variable)*	WTPi=1 if the respondent is willing to pay a low premium; WTPi=2 if the respondent is willing to pay a medium premium; WTPi=3 if the respondent is willing to pay a high premium	1.02	0.77
RESI_1	1 if the respondent lives at the current location for less than an year; 0=otherwise	0.01	0.23
RESI_3	1 if the respondent lives at the current location for one to three years; 0=otherwise	0.14	0.35
HOME_GR	1 if the respondent have a garden at home where they grow fruits and vegetables for own consumption; 0= otherwise	0.50	0.50
WTP_HELP	1 if the respondent is willing to pay higher prices for products if the money is used to preserve farmland and local agricultural producers; 0= otherwise	0.86	0.34
AG_HELP	1 if the respondent believes in that agriculture will help maintain open space/greenery in their state; 0=otherwise	0.96	0.18
ORGANIC	1 if the respondent is willing to buy certified organic fresh fruits and vegetables from direct market outlets; 0= otherwise	0.69	0.46
GMO	1 if the respondent is willing to buy genetically modified fresh fruits and vegetables from direct market outlets; 0= otherwise	0.18	0.38
QUAL	1 if the respondent think quality of fresh produce sold at direct outlets is better; 0=otherwise	0.94	0.23
PRICE	1 if the respondent think price of fresh produce sold at direct outlets is better; 0=otherwise	0.58	0.49

G_Q	1 if the respondent is a male who thinks the quality of fresh produce sold at direct market outlet is better; 0=otherwise	0.23	0.42
G_P	1 if the respondent is a male who thinks the price of fresh produce sold at direct market outlet is better; 0=otherwise	0.13	0.33
MKTING_B	1 if the respondent has first learned direct outlets through billboard or roadside sign; 0=otherwise	0.38	0.49
MKTING_S	1 if the respondent has first learned direct outlets through sign at the market's entrance; 0=otherwise	0.52	0.50
MKTING_P	1 if the respondent has first learned direct outlets through newspaper; 0=otherwise	0.46	0.50
MKTING_M	1 if the respondent has first learned direct outlets through friends/family/word-of-mouth; 0=otherwise	0.75	0.44
OFM_SP	Average spending per visit at direct markets other than OFM	18.66	20.47
VAL_ADD	1 if the respondent thinks it is not important to purchase value-added products (for example: jams, honey, baked goods) when deciding to visit an agritourism location; 0= otherwise	0.61	0.49
GENDER	1 if the respondent is a male; 0=otherwise	0.26	0.44
AGE_M65	1 if the respondent is over 65 years old; 0=otherwise	0.01	0.29
ETH_WHT	1 if the respondent's ethnicity is White/Anglo; 0=otherwise	0.88	0.32
INC_80	1 if the respondent has annual income between $60,000-$79,999 before taxes for year 2009; 0=otherwise	0.19	0.39
INC_100	1 if the respondent has annual income between $80,000-$99,999 before taxes for year 2009; 0=otherwise	0.14	0.35
INC_M100	1 if the respondent has annual income more than $100,000 before taxes for year 2009; 0=otherwise	0.20	0.40
AVG_DIS	Average miles traveled to direct outlets	6.73	4.61
DIST_NJ	Average miles of New Jersey residences traveled to direct outlets	2.37	4.30
EDU-2YRC	1 if the respondent has a two-year college or technical degree education: 0=otherwise	0.26	0.44
EDU_4YRC	1 if the respondent has a four-year college education: 0=otherwise	0.30	0.46
EMP_RE	1 if the respondent is currently retired: 0=otherwise	0.16	0.37
EMP_SE	1 if the respondent is currently self-employed: 0=otherwise	0.01	0.28

Table 7.11 and Table 7.12 provide the results of an Ordered Probit model with estimate coefficients and marginal effects of the selected explanatory variables. The overall model is significant with the McFadden's R-square of 0.04. The correct percentage count is 44%, which is estimated over a third of the prediction.

The marginal effect observed for consumers' willingness to pay more in order to help preserve farmland or local business is highly significant. As shown in Figure 7.1a, the marginal effect of *WTP_HELP* at willing to pay a high premium for direct market outlet produce (WTP_3) is 0.1023, which means that the respondent who is willing to pay more to preserve farmland will be 10 percent more likely to be willing to pay a high premium for produce compared to those who are not willing to pay more to preserve farmland. However, the marginal effect of *WTP_HELP* at willing to pay a low premium for direct market outlet produce (WTP_1) is -0.1081, which means that the respondent who is willing to pay more to preserve farmland will be 11 percent less likely to be willing to pay a low premium compared to those who are not willing to pay more to preserve farmland. This statistical result is consistent with the theoretical belief that the higher the awareness of farmland protection, the higher the premium a concerned consumer is willing to pay.

Another environmental awareness related variable, which believes that agriculture will help maintain open space/greenery, is also significant according to the data results. The marginal effect of *AG_HELP* at willing to pay a low premium for direct market outlet produce (WTP_1) is 0.0003. Although low in magnitude, the respondent that believes agriculture will help maintain open space/greenery and will be more likely to pay a low premium compared to those who do not believe so. On the other hand, the marginal effect of *AG_HELP* at willing to pay a high premium for direct market outlet produce (WTP_3) is -0.0003, which means that the respondent who is willing to pay more based on their belief in open space/greenery is less likely to be willing to pay a high premium compared to those who are not

willing to pay more on their belief in open space/greenery. As one can observe from Figure 7.1e, greenery awareness is an important concept at a low premium markup.

The price of fresh produce is an important factor determining consumers' willingness to pay at direct market outlets. The *PRICE* variable from the survey maps out individual shoppers' attitudes on the prices of fresh produce in direct market outlets such as Figure 7.1c. The marginal effect of *PRICE* at willing to pay a low premium for direct market outlet produce (WTP_1) is 0.0578; on average, the respondent who is willing to pay more because they think the produce prices are better at direct market outlets will be 6% more likely to be willing to pay a low premium compared to those who are not willing to pay more because they do not think prices are better. However, the marginal effect of *PRICE* at willing to pay a high premium for direct market outlet produce (WTP_3) is -0.0630, which means that individual shoppers are 6 percent less likely to pay a high premium compared to those who are not willing to pay more because they do not think prices are better. From the above observation, the direct market outlet operators have to be tactical at marking the prices of goods if they want to increase their earnings.

An interaction term of gender and price was included in this analysis. Male shoppers who also think that the price of fresh produce is better at direct market outlets are willing to pay a higher premium on average compared to female shoppers who do not think price is better at direct market outlets as shown in Figure 7.1d. The marginal effect of *G_P* at willing to pay a high premium for direct market outlet produce (WTP_3) is 0.0646, which means that male respondents who are willing to pay more because the price of fresh produce is better at direct market

outlets will be 6% more likely to pay a high premium compared to females who are not willing to pay more because they do not think prices are better at direct market outlets.

Moving onto demographic variables, the marginal effect for ethnicity is also significant. In Figure 7.1b, Caucasians are more likely to be willing to pay a high premium compared to those of other ethnicities. They are however less likely to be willing to pay a low premium compared to those of other ethnicities. The discovery of this variable is interesting, as it has not played much significance in past similar studies.

The marginal effect of *ECU_2YRC* at willing to pay a low premium for direct market outlet produce is 0.1005, which means that a two-year college respondent is 10 percent more likely to be willing to pay a low premium compared to those of other educational levels. They are also less likely to be willing to pay a medium or high premium compared to those of other educational levels. This could imply that the magnitude of willing to pay more at direct market outlets is education related, but will be influenced by other consumer behavior and utility maximization theories.

On average, New Jersey residents are less likely to be willing to pay a higher premium on fresh produce for each additional mile they have to travel. Looking at the marginal effect of *DIST_NJ* at willing to pay a low premium for direct market outlet (WTP$_1$) will be about 1 percent more likely to be willing to pay a low premium. New Jersey residents will be about 1 percent less likely to be willing to pay a high premium based on each additional mile they have to travel. However, we discovered an inverse relationship for the mid-Atlantic fresh greens shoppers as a

whole. On average, as the travel distance increases, the likelihood of them paying a

higher premium increases based on each additional mile they have to travel.

Table 7.11 Ordered Probit Parameter Estimates of Willingness-to-pay at Direct Market Outlets

S. No	Variable	Coefficient	Standard Error	Marginal Change		
				Willing to pay a low premium 1-5%	Willing to pay a medium premium 6-10%	Willing to pay a high premium 11-100%
1	Constant	0.4951	0.2518			
2	RESI_1	0.0710	0.1041	-0.0228	-0.0026	0.0254
3	RESI_3	-0.0707	0.1041	0.0235	0.0011	-0.0246
4	HOME_GR	0.0003	0.0005	-0.0001	0.0000	0.0001
5	WTP_HELP	0.3101***	0.1106	-0.1081	0.0058	0.1023
6	GENDER	0.3472	0.3908	-0.1073	-0.0192	0.1265
7	AGE_M65	-0.0007	0.0005	0.0002	0.0000	-0.0002
8	ETH_WHT	0.0009**	0.0004	-0.0003	0.0000	0.0003
9	ORGANIC	0.0005	0.0005	-0.0002	0.0000	0.0002
10	GMO	-0.0002	0.0005	0.0001	0.0000	-0.0001
11	QUAL	0.0198	0.2497	-0.0065	-0.0004	0.0070
12	PRICE	-0.1779*	0.1020	0.0578	0.0051	-0.0630
13	G_Q	-0.5249	0.3994	0.1841	-0.0144	-0.1697
14	G_P	0.1779*	0.1021	-0.0557	-0.0088	0.0646
15	MKTING_M	-0.1071	0.0860	0.0345	0.0037	-0.0382
16	MKTING_B	0.1420	0.0896	-0.0459	-0.0045	0.0504
17	OFM_SP	0.0004	0.0003	-0.0001	0.0000	0.0001
18	VAL_ADD	0.0003	0.0004	-0.0001	0.0000	0.0001
19	INC_80	-0.1228	0.0872	0.0412	0.0012	-0.0424
20	INC_100	0.1007	0.0928	-0.0323	-0.0038	0.0360
21	INC_M10	0.0205	0.0862	-0.0067	-0.0006	0.0072
22	AG_HELP	-0.0008*	0.0005	0.0003	0.0000	-0.0003
23	AVG_DIS	0.0210**	0.0104	-0.0069	-0.0005	0.0074
24	DIST_NJ	-0.0212**	0.0105	0.0070	0.0005	-0.0075
25	MKTING_S	-0.1189	0.0849	0.0388	0.0032	-0.0420
26	MKTING_P	0.0838	0.0812	-0.0274	-0.0022	0.0296
27	EDU_4YRC	-0.0145	0.0801	0.0048	0.0003	-0.0051
28	EMP_SE	0.1257	0.0991	-0.0398	-0.0056	0.0454
29	EMP_RE	-0.1255	0.0990	0.0422	0.0010	-0.0432
30	EDU_2YRC	-0.2945***	0.0848	0.1005	-0.0010	-0.0995
McFadden R²: 0.04 Chi squared: 59.03						

Degrees of freedom: 29
Overall Model Significance: 0.00
*** Significant at 1%; **Significant at 5%; * Significant at 10%*

Table 7.12 Ordered Probit Model Prediction Success of the Willingness-to-pay

Actual Value	Predicted			Correct Total
	0	**1**	**2**	
0	**10**	98	6	114
1	9	**147**	25	181
2	5	95	**31**	131
Total	**24**	**340**	**62**	**426**
Number of correct predictions: 188				
Percentage of correct predictions: 44%				

Figure 7.1 Impact of Marginal Effects on Willingness to Pay at Direct Market Outlets

Figure 7.1a: WTP_Help versus Willingness-to-pay at Direct Market Outlets

Figure 7.1b: ETH_WHT versus Willingness-to-pay at Direct Market Outlets

Figure 7.1c: Price versus Willingness-to-pay at Direct Market Outlets

Figure 7.1d: G_P versus Willingness-to-pay at Direct Market Outlets

Figure 7.1e: AG_Help versus Willingness-to-pay at Direct Market Outlets

Figure 7.1f: AVG_DIS versus Willingness-to-pay at Direct Market Outlets

Figure 7.1g: DIST_NJ versus Willingness-to-pay at Direct Market Outlets

Figure 7.1h: EDU_2YRC versus Willingness-to-pay at Direct Market Outlets

Chapter 8

Discussions and Conclusions

Many prior researches have delved into the production and consumption of local foods but few have looked closely into nonmarket reasons (i.e. maintaining green/space in the state, tourism, preserving farmland and local activities, a sense of environmental responsibility). The farming industry is dynamic and farmers have to quickly adapt to new food practices, understanding consumer preferences and get in line with the overall community perception. Although statistics have shown small numbers in the growth of local foods, directly selling from farmers to consumers is definitely a potential way to increase a viable revenue stream.

Although sales can be created in various ways, farmers with limited resources should be targeting potential consumers in the most economic and practical way. One of the main reasons why CFM enjoys better visitation among the other direct farm facilities is the variety of produce it can deliver. This vividly points out that busy individuals would like to buy fresh foods in a one-stop-shopping fashion. Thus, for small farms that are limited to the outreach of expanding additional entrepreneurial activities, investing in a wider variety of fresh produce may be important to succeed in the business.

There are several findings that can be drawn from the four different Logit models for each type of the discussed direct market outlets. For example, proximity is probably not a disadvantage causing low visitations. Farmers should not be discouraged if their location is not as favorable as urban shopping outlets. Other than the CSA market system where deliveries are often made available, all of the

other three models project that people are willing to travel. Although this may be tied with the available recreational motive, as long as the food products are fresh, this is not a barrier that deters visitation from consumers.

Since most small farmers (frequent users of direct market outlets) have limited marketing or campaigning budgets, it has been discovered in this project that using traditional media usage is sufficient. Direct farm outlets do not have to worry about spending big bucks for fancy media promotions. From this research we observed that a fraction of people have learned about CFM outlets through newspapers. PYO outlets have drawn consumers to their operating site most commonly through bulletin board or road signs. Many individuals have first learned about OFM outlets through signs at entrances, newspapers or simply word-of-mouth.

Having the first time experience in a direct-market outlet is beneficial to this form of business. From this specific study, consumers who have been to an OFM outlet are more likely to go to either a CSA or CFM than those who have not been to any. Individuals who have been to a CSA outlet are also more likely to further purchase from a CFM outlet. The key insight of this finding is that direct market outlets can use their similar characteristics (selling fresh produce) to influence and help each other in promoting the locally grown industry.

Policy Implications

Although local and naturally grown food shopping boosts both healthy and recreational benefits, its popularity still remains relevantly low compared to food shopping at grocery stores or supermarkets. Reciting this research, the more

educated consumers are with environmental awareness, the more they are willing to pay a premium for freshly produced greens. To help boost the general knowledge of operating direct markets, it is best to have the society or the government's advocacy in promoting the concept (Martinez, 2010). It is imperative to have the message clear and transparently made for the public for a better understanding of what is now available.

Having the message delivered to the public is only one step closer to success. Further research needs to be investigated in areas relating to the location, size, produce variety and marketing for the producers' side. More data on the types of food, prices of the food, and intentions for different types of direct market outlets will be critical to support the growth of local farmers. Only through unveiling actual consumer behaviors can farmers keep up with the recent consumer demands to operate an income-generating direct market outlet.

The location of the direct market outlet should also be strategically planned based on consumer's preferences and shopping trends. Those operating outlets that want to increase sales and build a strong buyer-seller relationship should be careful with marking up the prices of freshly produced vegetables or fruits.

Chapter 9

Limitations and Future Research

Overall the demographics are weak predictors of the research bounded by the low popularity of shopping at a direct market outlet. Even with the growing trend, direct market outlets still only account for a small portion of sales in the U.S.

agriculture. Due to the limited accessibility, seasonal constraints, and awareness of farmers' market accessibility, the customer base for a behavioral research may be more inclined towards one characteristic than another.

To further look into the change in consumers' behavior towards consuming local food, we can possibly elaborate this cross sectional data into a panel data collection. Working with panel data not only helps us examine the change in consumer purchasing behavior but also allows us to see effects of public programs. State and local policies are vital instruments that help the growth of direct market outlets. Because this was a one-time Internet survey, it would be interesting to see how regulations and government intervention can help the growth of direct market outlets.

In addition to the willingness-to-pay extension research, product attributes such as organic, local food, genetically modified foods or new fruits and vegetables can be further investigated. Future research can dig deeper into cost factors or the types of foods that consumers want for each of these interested products attributes. Through the dynamic demand trends of the everyday shopper, it would be worthwhile to investigate how individual attributes could play a role in generating more income for farmers.

Lastly, there seems to be a direct analogy between consuming local foods with health and nutrition. Because local foods may be provided more fresh and are less processed, it is presumably healthier to consume compared with other stored or processed foods. However, there were no studies available yet that investigate the relationship between locality and health outcomes. Moreover, even though this

study looked at the distance traveled for local foods, it was not tied to or linked with

nutritional factors.

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Appendix A
Definition of Variables

	Variable	Description
Dependent Variables	DM_CFM	1 if respondent purchased fresh fruits and/or vegetables from CFM; 0=otherwise
	DM_CSA	1 if respondent purchased fresh fruits and/or vegetables from CSA; 0=otherwise
	DM_OFM	2 if respondent purchased fresh fruits and/or vegetables from OFM; 0=otherwise
	DM_PYO	1 if respondent purchased fresh fruits and/or vegetables from PYO; 0=otherwise
	WTP_i	$WTP_i=1$ if the respondent is willing to pay a low premium; $WTP_i=2$ if the respondent is willing to pay a medium premium; $WTP_i=3$ if the respondent is willing to pay a high premium
Behavioral Variable	GO_CFM	Average times per year go to CFM
	GO_CSA	Average times per year go to CSA
	GO_OFM	Average times per year go to OFM
	GO_PYO	Average times per year go to PYO
	V_OFM2010	1 if the respondent has visited OFM in year 2010; 0=otherwise
	CFM_SP	Average spending per visit at direct markets other than CFM
	CSA_SP	Average spending per visit at direct markets other than CSA
	OFM_SP	Average spending per visit at direct markets other than OFM
	PYO_SP	Average spending per visit at direct markets other than PYO
	PCT_CFM	Percentage of fresh fruits/vegetables bought at CFM
	PCT_CSA	Percentage of fresh fruits/vegetables bought at CSA
	PCT_OFM	Percentage of fresh fruits/vegetables bought at OFM
	PCT_PYO	Percentage of fresh fruits/vegetables bought at PYO
	AVG_DIS	Average miles traveled to direct outlets
	DIST_NJ	Average miles of New Jersey residences traveled to direct outlets
	MKTING_B	1 if the respondent has first learned direct outlets through billboard or roadside sign; 0=otherwise
	MKTING_M	1 if the respondent has first learned direct outlets through friends/family/word-of-mouth; 0=otherwise
	MKTING_P	1 if the respondent has first learned direct outlets through newspaper; 0=otherwise
	MKTING_S	1 if the respondent has first learned direct outlets through sign at the market's entrance; 0=otherwise
Perceptional Variables	PRICE	1 if the respondent think price of fresh produce sold at direct outlets is better; 0=otherwise
	QUAL	1 if the respondent think quality of fresh produce sold at direct outlets is better; 0=otherwise
	G_P	1 if the respondent is a male who thinks the price of fresh produce sold at direct market outlet is better; 0=otherwise
	G_Q	1 if the respondent is a male who thinks the quality of fresh produce sold at direct market outlet is better; 0=otherwise
	G_WTP	Male respondent who are willing to pay more for products purchased at a direct market outlet

	ORGANIC	1 if the respondent is willing to buy certified organic fresh fruits and vegetables from direct market outlets; 0= otherwise
	GMO	1 if the respondent is willing to buy genetically modified fresh fruits and vegetables from direct market outlets; 0= otherwise
	NEW	1 if the respondent is willing to buy new fruits and vegetables at direct markets;0=otherwise
	WTP_HELP	1 if the respondent is willing to pay higher prices for products if the money is used to preserve farmland and local agricultural producers; 0=otherwise
	AG_HELP	1 if the respondent is believes that agriculture will help maintain open space/greenery in their state; 0=otherwise
	HOME_GR	1 if the respondent have a garden at home where they grow fruits and vegetables for own consumption; 0= otherwise
	VAL_ADD	1 if the respondent thinks it is not important to purchase value-added products (for example: jams, honey, baked goods) when deciding to visit an agritourism location; 0= otherwise
Demographic Variables	NJ	1 if respondent purchased from PYO is from NJ; 0=otherwise
	GENDER	1 if the respondent is a male; 0=otherwise
	AGE_20	1 if the respondent is under than 20 years old; 0=otherwise
	AGE_35	1 if the respondent is 21-35 years old; 0=otherwise
	AGE_50	1 if the respondent is 36-50 years old; 0=otherwise
	AGE_M65	1 if the respondent is over 65 years old; 0=otherwise
	EDU_4YRC	1 if the respondent has a four-year college education: 0=otherwise
	EDU-2YRC	1 if the respondent has a two-year college or technical degree education: 0=otherwise
	EMP_LINC	Respondent who are employed by others and earns an annual income of less than $20,000 in 2009
	EMP_RE	1 if the respondent is currently retired: 0=otherwise
	EMP_SE	1 if the respondent is currently self-employed: 0=otherwise
	EMP_STU	1 if the respondent is currently a student: 0=otherwise
	ETH_WHT	1 if the respondent is white/anglo; 0=otherwise
	RESI_1	1 if the respondent lives at the current location for less than an year; 0=otherwise
	RESI_3	1 if the respondent lives in the current location for one to three years; 0=otherwise
	RESI_5	1 if the respondent lives in the current location for four to five years; 0=otherwise
	NUM_HH	Number of people in the household
	HH_17	Number of people in the household younger than age 17
	URBAN	1 if the respondent lives at urban areas; 0=otherwise
	INC_20	1 if the respondent has annual income of less than $20,000 before taxes for year 2009; 0=otherwise
	INC_40	1 if the respondent has annual income between $20,000-$39,999 before taxes for year 2009; 0=otherwise
	INC_80	1 if the respondent has annual income between $60,000-$79,999 before taxes for year 2009; 0=otherwise
	INC_100	1 if the respondent has annual income between $80,000-$99,999 before taxes for year 2009; 0=otherwise
	INC_M100	1 if the respondent has annual income more than $100,000 before taxes for year 2009; 0=otherwise

Appendix B

Farmer's Direct Marketing Survey Questionnaire

Please help Rutgers - The State University of New Jersey and The Pennsylvania State University by participating in this survey and answering questions pertaining to agritourism and direct marketing events and activities in which you have participated.

Your responses are greatly appreciated.

1. Please read the following definitions.

Farmers' Market: Farmers' markets are common facilities or areas where several farmers gather on a regular basis to sell various fresh fruit, vegetables, meat, and other farm products directly to consumers.

Community Support Agriculture: Consists of a community of individuals who pledge support to a farm operation where the growers and consumers share the risks and benefits of food production. CSAs usually consist of a system of weekly delivery or pick-up of vegetables and fruit in a vegetable box scheme, sometimes including dairy products and meat.

On-Farm Market: A market or retail outlet location on the farm.

Have you ever purchased fresh fruits and/or vegetables at any of these locations?

○ Yes

○ No

1. You responded that you <u>did purchase</u> fresh fruits and/or vegetables from pick-your-own farms, community farmers' market, on-farm markets, or a CSA.

Please indicate the direct markets from which you purchased the fruits and/or vegetables (Please select all that apply).

☐ Pick-your-own farm

☐ Community Farmers' Market

☐ Community Supported Agriculture (CSA) farm

☐ On-Farm Market

1. In which of the states listed below do you currently reside?

◯ Delaware

◯ New Jersey

◯ Pennsylvania

◯ Other

1. In general, in the past five years (since 2005), has the consumption of fresh fruits and/or vegetables in your household:

	Increased	Stayed the same	Decreased
Fresh fruits	◯	◯	◯
Fresh vegetables	◯	◯	◯

2. In the past five years (since 2005), has your household been consuming a wider variety of:

	Yes	No
Fresh fruits	◯	◯
Fresh vegetables	◯	◯

1. During an average month, <u>how much do you spend on fresh fruits and vegetables</u> for yourself and/or other members of your household?

When entering the amount please do not type in a dollar sign ($) but just the amount in whole numbers. For example, please type in a 4 if you spend "$4.00."

Average amount spent per month (in whole numbers): [   ]

2. During an average month, <u>how much do you spend on value-added produced products</u> such as bakery items, jams, honey, etc?

Average amount spent per month (in whole numbers): [   ]

For you information we have again included the definitions of some direct marketing outlets.

Farmers' Market: Farmers' markets are common facilities or areas where several farmers gather on a regular basis to sell various fresh fruit, vegetables, meat, and other farm products directly to consumers.

Community Support Agriculture: Consists of a community of individuals who pledge support to a farm operation where the growers and consumers share the risks and benefits of food production. CSAs usually consist of a system of weekly delivery or pick-up of vegetables and fruit in a vegetable box scheme, sometimes including dairy products and meat.

On-Farm Market: A market or retail outlet location on the farm.

1. On average, <u>how many times per year</u> do you go to the following direct market outlets?

Pick-your-own farm (Average visits per year):

Community farmers' market (Average visits per year):

On-farm Market (Average visits per year):

Community Supported Agriculture (CSA) farm (Average visits per year):

2. How much <u>do you spend (in whole numbers)</u> during an average visit at each direct market outlet?

When entering the amount please do not type in a dollar sign ($) but just the amount in whole numbers. For example, please type in a 4 if you spend "$4.00."

Pick-your-own farm (Average dollars spent):

Community farmers' market (Average dollars spent):

On-farm market (Average dollars spent):

Community Supported Agriculture (CSA) farm (Average dollars spent):

3. On average, <u>how many miles do you travel (one way)</u> to each direct market outlet?

Pick-your-own farm (Average miles traveled):

Community farmers' market (Average miles traveled):

On-farm market (Average miles traveled):

Community Supported Agriculture (CSA) farm (Average miles traveled):

1. Thinking about the direct markets you visit (for example, farmers' market, on-farm market, CSA, pick-your-own farm), do you believe that the quality, variety, and price of fruits and vegetables <u>sold at the direct markets</u> is better, same, or worse than fruits and vegetables <u>sold at typical American grocer stores</u> that you visit?

	Better	Same	Worse
Quality	○	○	○
Variety	○	○	○
Price	○	○	○

1. During an average year, <u>what percentage of fresh fruits and vegetables</u> that you and other members of your household consume <u>are purchased and/or obtained from the following outlets</u>? The total percentage should equal 100%.

1. Pick-your-own farm (%) [   ]

2. Community farmers' market (%) [   ]

3. On-farm market (%) [   ]

4. Roadside stand (%) [   ]

5. Community Supported Agriculture (CSA) (%) [   ]

6. Supermarket/grocery store (for example; Shop Rite, IGA, Giant Food, independent grocery store) (%) [   ]

7. Specialty food store (for example: Whole Foods, Trader Joe's) (%) [   ]

8. Discounters (for example: Aldi, Big Lots, Dollar General) (%) [   ]

9. Warehouse Club (for example: BJ's, SAM's Club, Costco) (%) [   ]

10. Natural food store (%) [   ]

11. Convenience store/gas station (%) [   ]

12. Internet, catalog, or mail-order service (%) [   ]

13. Friend/neighbor's garden (%) [   ]

14. Own garden (%) [   ]

15. Other source (%) [   ]

2. If you selected "other source," please specify the source:

[   ]

1. Are you planning to visit any of the following direct market outlets in 2010?

	I have already visited in 2010	Yes, I will visit	No, I will not visit	Unsure if I will visit
Pick-your-own farm	◯	◯	◯	◯
Community farmers' market	◯	◯	◯	◯
On-farm market	◯	◯	◯	◯
Roadside stand	◯	◯	◯	◯
Community Supported Agricutlure (CSA)	◯	◯	◯	◯
Other	◯	◯	◯	◯

2. If you selected "other," please specify:

[   ]

3. How do you first learn about direct marketing outlets (for example, farmers' market, on-farm market, CSA, pick-your-own farm) you visit (Please select all that apply)?

- ☐ Billboard or Roadside sign
- ☐ Sign at the market's entrance
- ☐ Newspaper
- ☐ Magazine
- ☐ Friends/family/word-of-mouth
- ☐ Television
- ☐ School activity at the direct market outlet
- ☐ Radio
- ☐ Farm advertisement (sent through the mail to the home)
- ☐ Promotional flyer
- ☐ Agritourism map with direct markets listed
- ☐ Tourism guide book
- ☐ WIC program
- ☐ Website
- ☐ Email
- ☐ Blogs
- ☐ Social networking sites (for example, Facebook, twitter, MySpace)

Other (please specify)

[   ]

1. You responded 'Yes,' that you would be willing to pay more for products purchased from direct market outlets (for example, farmers' market, on-farm market, CSA, pick-your-own farm), compared to products you would purchase from a supermarket or conventional grocery store.

Please select from the options below the percent increase you would be willing to pay.

- ◯ 1 to 5%
- ◯ 6 to 10%
- ◯ 11 to 15%
- ◯ 16 to 20%
- ◯ 21 to 25%
- ◯ 26 to 30%
- ◯ 31 to 35%
- ◯ 36 to 40%
- ◯ 41 to 45%
- ◯ 46 to 50%
- ◯ 51 to 55%
- ◯ 56 to 60%
- ◯ 61 to 65%
- ◯ 66 to 70%
- ◯ 71 to 75%
- ◯ 76 to 80%
- ◯ 81 to 85%
- ◯ 86 to 90%
- ◯ 91 to 95%
- ◯ 96 to 100%

1. If made available to you, would you be <u>willing to buy</u> fresh fruits and vegetables from direct market outlets (for example, farmers' market, on-farm market, CSA, pick-your-own farm) that are:

	Yes	No	Unsure
Locally grown	◯	◯	◯
Certified organic	◯	◯	◯
New fruits and vegetables, or those you are unfamiliar with	◯	◯	◯
Genetically modified	◯	◯	◯

<u>Genetically Modified definition:</u> Any possible alteration of genetic material, in agriculture products to make them capable of producing new products or performing new functions or increasing production.

1. Please indicate if you had ever heard of any of the following terms <u>before participating in this survey</u>.

	Yes	No
Agritourism	◯	◯
Ecotourism	◯	◯
Green tourism	◯	◯

1. How important are the following reasons to you <u>when deciding to visit an agritourism location</u> for an activity or event (for example, hay rides, wine tasting, agricultural fairs/festivals)?

	Not at all important	Low importance	Slightly important	Neutral	Moderately important	Very important	Extremely important
To purchase fresh fruits and vegetables	○	○	○	○	○	○	○
To purchase value-added products (for example: jams, honey, baked goods)	○	○	○	○	○	○	○
To support local farmers	○	○	○	○	○	○	○
To enjoy the rural scenery/nature	○	○	○	○	○	○	○
To spend time with family and friends	○	○	○	○	○	○	○
To learn or be taught how food is produced/grown	○	○	○	○	○	○	○
To see where and/or how food is produced/grown	○	○	○	○	○	○	○
Conveniently located near my home or work	○	○	○	○	○	○	○
Want the experience of a farm visit	○	○	○	○	○	○	○

Other (please specify)

[   ]

1. From the list below, please select the option that best describes the community where you live.

○ Urban (large city or town)

○ Suburban (smaller city or town within commuting distance to a large city or town)

○ Rural (farming or country community)

2. For how many years have you been living at your current place of residence?

○ Less than 1 year

○ 1 to 3 years

○ 4 to 5 years

○ 6 to 10 years

○ 11 to 20 years

○ More than 21 years

3. Do you believe that agriculture will help maintain open space/greenery in your state?

○ Yes

○ No

4. Do you have a garden at your home where you grow fruits and vegetables for your household to consume?

◯ Yes

◯ No

5. Please respond to this statement: I am willing to pay a higher price for products and to attend events or activities if the money is used to help preserve farmland and local agricultural producers.

◯ Yes

◯ No

◯ Don't know/unsure

1. How many people, including yourself, live in your household?

◯ 1

◯ 2

◯ 3

◯ 4

◯ 5

◯ 6

◯ 7

◯ 8

◯ 9

◯ 10 or more

2. How many people living in your household are age 17 and younger?

○ 0

○ 1

○ 2

○ 3

○ 4

○ 5

○ 6

○ 7

○ 8

○ 9

○ 10 or more

3. Please indicate your gender

○ Male

○ Female

4. Please indicate your age category.

○ Under 20 years of age

○ 21 to 35 years of age

○ 36 to 50 years of age

○ 51 to 65 years of age

○ Over 65 years of age

5. Please indicate the highest level of education you have completed.

○ No formal education

○ Elementary school

○ High school graduate

○ Two year college or technical degree

○ Four year college degree

○ Graduate degree

1. Which of the following best describes your current employment status?

◯ Retired

◯ Self-employed

◯ Employed by others

◯ Homemaker

◯ Student

Other (please specify)

[   ]

2. Please indicate which of the following choices best describes your ethnicity.

◯ White/Anglo

◯ African American

◯ Hispanic or Latino

◯ American Indian or Alaska Native

◯ Asian American

◯ Native Hawaiian or other Pacific Islander

Other (please specify)

[   ]

3. Please indicate your household's annual-income category, before taxes, for 2009.

◯ $ Less than 20,000

◯ $ 20,000 - 39,999

◯ $ 40,000 – 59,999

◯ $ 60,000 - 79,999

◯ $ 80,000 – 99,999

◯ $ 100,000 or more

We are sorry, but based on your responses you do not qualify for this survey. Please click the "next" button.

Thank you for your participation. Please click "done."